ENHANCING COMPLIANCE OF CONSTRUCTION PROJECTS TO CONSTRUCTION INDUSTRY REGULATIONS IN KENYA: A CASE OF NAIROBI CITY COUNTY

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Enhancing Compliance of Construction Projects to Construction Industry Regulations in Kenya: A Case of Nairobi City County

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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DEDICATION

This work is dedicated to my family and friends, whose steadfast support provided the essential foundation for navigating this demanding academic endeavour. Their understanding and patience regarding my prolonged absences from daily routines were truly invaluable. I extend particular gratitude to my dear wife, Faith Kibet, and our children, Hadassah, Hansel, and Helena, for their unwavering encouragement throughout this journey. This dedication also extends to my parents, William (who now rests in eternal peace) and Esther, whose enduring belief in my capabilities and consistent motivation were instrumental to my progress. Finally, this work is dedicated to the reader, who is the ultimate recipient and interpreter of its content.

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As the author, I assume full responsibility for any errors or omissions within this work.

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ACRONYMS AND ABBREVIATIONS

ANOVA	Analysis of Variance
BCA	Building Control Authority
BCD	Building Control Department
BOWEC	Building Operations and Works of Engineering Construction (Safety) Regulations
BLRRHC	Building Law & Regulation Review and Harmonisation Committee
BPR	Business Process Re-Engineering
BRE	Building Research Establishment
CFA	Confirmatory Factor Analysis
CG	County Government
CIDB	Construction Industry Development Board
CONQUAS	Construction Quality Assessment System
COQ	Cost of Quality
CORENET	Construction and Real Estate Network
DOSH	Department of Occupational Safety and Health
DT	Deterrence Theory
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
FIDIC	International Federation of Consulting Engineers
FMAM	Fire Marshals Association of Minnesota
IHBC	Institute of Historic Building Conservation
IBS	Industrialised Building Systems

ILO	International Labour Organisation
KCAA	Kenya Civil Aviation Authority
KEBS	Kenya Bureau of Standards
KNBS	Kenya National Bureau of Statistics
KPMG	Klynveld Peat Marwick Goerdeler
MCT	Measures of Central Tendency
MDACs	Ministries, Departments, Agencies, and all Counties
MGI	McKinsey Global Institute
MOOCs	Massive Open Online Courses
MOW	Ministry of Works
MRA	Multiple Regression Analysis
MSACC	Multi-sectoral Agency Consultative Committee
NACOSTI	National Commission for Science and Technology
NBI	National Building Inspectorate
NCA	National Construction Authority
NCC	Nairobi City County
NCLR	National Council for Law Reporting
NCRC	National Crime Research Centre
NEMA	National Environment Management Authority
OECD	Organisation for Economic Cooperation and Development
OPRS	Online Project Registration System
PEP	Project Execution Plan
PITR	Public Interest Theory of Regulation
PLUPA	Physical and Land Use Planning Act
PMBOK	Project Management Body of Knowledge

PMI	Project Management Institute
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality of Construction
RCIS	Regulatory and Construction Information System
RDM	Robust Decision Making
SCT	Social Cognitive Theory
SEM	Structural Equation Modelling
SIT	Singapore Improvement Trust
SOPs	Standard Operating Procedures
SPSS	Statistical Product and Service Solutions developed by IBM
TQM	Total Quality Management
TRC	Theory of Regulatory Compliance
UK	United Kingdom
US	United States of America
USAID	United States Agency for International Development
VIF	Variance Inflation Factor
WIBA	Work Injuries Benefits Act
WRA	Water Resources Authority

LIST OF CODES ADOPTED FOR THE STUDY VARIABLES

RS	Registration status of a construction project
PS	Conditions or activities occurring on a construction project site
CW	Status of the workforce engaged in a construction project site
SLF	Suitability of the project legal framework
PRA	Proactiveness of the regulatory agencies
ERP	Efficiency in regulatory processes
CTE	Conduciveness of the construction task environment
CPC	Characteristics of the project client
CPL	Competency of project leaders
GCL	Goodness of construction labour
SEE	Stability of prevailing economic environment
AEF	Adherence to ethical factors

ABSTRACT

This study critically examined regulatory compliance within Kenya's construction sector, driven by escalating concerns regarding project implementation and the persistent high incidence of building failures. The primary objective was to develop a framework to enhance regulatory compliance, thereby improving quality and safety on construction sites and ultimately reducing building collapses. The study utilised a multi-theoretical lens to evaluate behavioural and institutional compliance drivers. The outcome variable, level of regulatory compliance, was conceptualised through three variables: registration status of a construction project (RS), conditions at the construction project site (PS), and the status of the workforce at the construction site (CW). Nine determinants of regulatory compliance were identified from existing literature as: suitability of the project legal framework (SLF), proactiveness of regulatory agencies (PRA), efficiency in regulatory processes (ERP), conduciveness of the construction task environment (CTE), characteristics of the project client (CPC), competency of project leaders (CPL), goodness of construction labour (GCL), stability of the prevailing economic environment (SEE), and adherence to ethical factors (AEF). The study employed a quantitative research strategy and a cross-sectional research design to investigate compliance drivers. The target population comprised all construction projects in Nairobi City County enumerated in the National Construction Authority (NCA) 2023 database. Primary data was gathered through questionnaires administered to a randomly selected sample of construction site supervisors representing 261 projects, while objective secondary data was sourced from the NCAs OPRS. Data analysis involved descriptive statistics, confirmatory factor analysis (CFA), correlation analysis, and multiple regression analysis (MRA). The study revealed a significant lack of compliance at the project registration stage, with only 26.22% of projects being registered. Furthermore, a medium compliance rate of 64.75% was observed for registered projects during implementation, falling short of the industry's vision of at least 90% compliance. It was established that SLF, PRA, CTE, CPC, CPL, and GCL collectively accounted for 67.8% of the variability in regulatory compliance. Several significant barriers to regulatory compliance were identified, including bureaucratic hurdles, corruption, and financial constraints. In response, the study recommends a regulatory framework that advocates for a strategic shift from a deterrence-based approach to a mixed, responsive, and service-oriented framework. This new approach emphasises regulators assisting in compliance and leveraging technology to promote adherence. Moreover, the study proposes the conferment of regulatory responsibilities upon the project client, granting legal recognition to Project Execution Plans (PEPs), and institutionalising the role of regulatory compliance champions within project structures. This research, therefore, significantly contributes to the understanding of regulatory compliance in the Kenyan construction industry and offers practical measures for its enhancement, ultimately fostering safer construction practices.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Problem

The construction industry is among the biggest and oldest sectors globally that have experienced increasing project delivery challenges from ancient times. Beyond fundamental concerns like food, disease, and clothing, historical records underscore the perennial struggle for adequate shelter as one of the oldest threats to human existence. Various religious texts and ancient writings, such as the Code of Hammurabi from ancient Egypt (a collection of 284 laws attributed to King Hammurabi), illustrate humanity's ongoing efforts to innovate and establish minimum standards for structures to ensure health, safety, and well-being amidst challenges (IHBC, 2022). Heijden (2019) observes that the significant advancement of regulation as a practice, profession, and discipline, specifically in addressing construction challenges, gained momentum approximately 4,000 years ago and has since been subject to continuous refinement.

Despite its ancient origins, the construction industry continues to lag behind other global sectors in key performance indicators. Over the past two decades, labour-productivity growth in construction averaged a mere 1% annually, starkly contrasting the 2.8% for the global economy and 3.6% for manufacturing (MGI, 2017). This disparity, according to this source, is partly attributable to construction's status as one of the least digitalised sectors worldwide, showing reluctance to adopt new ideas, which has resulted in stagnant output per personnel. For instance, since 1945, the retail, manufacturing, and agriculture sectors in the United States have seen growth exceeding 1500% by leveraging Artificial Intelligence (AI) and other transformative technologies, while construction has shown minimal advancement. Other reports attribute this underperformance to factors such as extensive regulation, industry fragmentation, and corruption, which collectively distort the market and create opacity. Some of the proposed strategies for boosting construction productivity by

50%–60% include commissioning regulatory reforms, enhancing on-site management, and integrating more technology into construction processes.

The construction industry's continued overreliance on human labour contributes significantly to its high rate of occupational fatalities. The International Labour Organisation (ILO) estimates that in developed nations, the building segment employs 6%–10% of the workforce but accounts for 25%–40% of occupational fatalities, a figure likely higher in developing countries (Lingard, 2013). Consequently, robust safety regulation is paramount in all contemporary undertakings, especially in the construction sector, which remains human-centric.

Lessons garnered from practical experiences and scientific modelling have informed the development of quality management processes, including Codes, Standards, and Standard Operating Procedures (SOPs). These frameworks aim to mitigate the recurrence of preventable adverse effects. Further, regulatory agencies have been established globally to ensure compliance. Gunningham (2015) highlights that while the intent of these agencies is compliance, the critical question remains: how should an exceptional regulator effectively mediate industry dealings to ensure compliance and enable enforcement? In response, governments worldwide have increasingly adopted measures to evaluate the effects of new regulations prior to implementation; however, there has been little consideration of performance review post-adoption (Coglianese, 2012).

Construction inherently carries numerous risks, and reported incidents heighten public concern regarding general safety in the built environment, underscoring governments' obligation to ensure safety (Heijden, 2009; NCA, 2020). This concern is amplified by the integral role structures, particularly buildings, play in contemporary livelihoods. Therefore, regulation is expected to guarantee safety while simultaneously facilitating positive socio-economic development (Coglianese, 2012). Gunningham (2015) postulates that an exemplary regulator should facilitate, catalyse, and direct the involvement of second and third parties to refine regulatory outcomes. Twum-Darko and Mazibuko (2015) corroborate this, asserting that regulators must periodically assess stakeholders' understanding of their roles. In Kenya, however, this ideal is often unmet, as various regulators with related mandates hardly share crucial information, creating a diluted, disjointed, and compromised regulatory environment demonstrably linked to dire outcomes such as building failures.

Globally, built environment regulators are gradually transforming regulatory practices by embracing partnerships and alternative systems centred on new multi-sectoral approaches that necessitate proper coordination and collaboration (World Bank Group, 2013). For instance, at the turn of the new millennium, the Netherlands experienced significant challenges in enforcing public building regulations, resulting in substantial property damage and fatalities (Heijden, 2009). A notable incident on July 11, 2006, involved the evacuation of a newly occupied mixed-use building in Amsterdam due to structural safety concerns. Government inquiries revealed that the responsible authority - the Municipal Building Control Department (BCD)- lacked the capacity to enforce building regulations. Consequently, BCD's procedures were reviewed, leading to the institutionalisation of certified private sector inspectorates as complementary to BCD's, ostensibly establishing a hybrid governance model.

In Kenya, the construction industry has sustained growth, driven by increased investor confidence and amplified government spending on large-scale infrastructure projects. In 2020, the sector grew by 11.8%, an increase from 5.6% in 2019, a trend corroborated by rising cement consumption (KNBS, 2021). While these indicators suggest industry expansion, they fail to account for the economic losses associated with structural collapses and failures that tarnish an otherwise robust sector. Data from various sources indicate that between 1990 and 2020, at least 119 incidents of failed and collapsed building structures were documented in Kenya, resulting in over 226 fatalities (Lagat et al., 2024; NCA, 2020). In 2021 alone, the National Construction Authority (NCA) recorded 17 cases of structural failure and collapses, with the issue extending to public buildings that should benefit from the government's comprehensive regulatory framework, signifying a worsening problem. Investigations into these cases consistently revealed non-compliance with regulatory requirements, highlighting an urgent need to enhance compliance by identifying potential hazards before disasters occur. Further, a 2019 World Bank report indicates that 70% of Kenya's cities consist of unregulated settlements, which are highly susceptible to hazards (World Bank, 2019). This study, therefore, comprehensively investigated the construction regulatory environment and identified overarching regulatory and compliance loopholes affecting the application of policies, laws, and regulations, culminating in a proposed redesign of regulatory compliance processes.

1.2 Statement of the Problem

The regulatory framework governing the Kenyan construction industry is established to ensure standardised quality, public safety, and structural integrity across the built environment. However, a critical conflict exists between these legal requirements and their practical implementation, particularly within Nairobi City County. This gap is evidenced by over 100 building collapses in the last two decades, resulting in more than 200 fatalities and extensive property destruction, alongside the prevalence of unauthorised projects and falsified documentation, the majority being drawn from Nairobi. Figure 1.1 provides an illustrative example of such a collapse, where lives were lost, and property of indeterminate value was destroyed.

Figure 1.1: Rescue Operation after a Building Collapse in Nairobi on 6th December 2019

Source: Structural Engineer (2019)

It is speculated that current enforcement mechanisms are insufficient to address the systemic drivers of non-compliance, suggesting that without a structured, context-specific intervention, the cycle of catastrophic failures will persist. Therefore, the purpose of this study is to develop a comprehensive framework for enhancing regulatory compliance. The rationale for this research lies in the urgent need to promote site safety and mitigate the human and economic costs of building failures, thereby safeguarding the public interest and ensuring the long-term sustainability of the construction sector.

Despite the enactment of the National Construction Authority (NCA) Act (2011) and the operationalisation of a dedicated regulatory mandate a decade ago, building failures persist, suggesting that critical drivers of non-compliance remain unaddressed. This stagnation indicates that the systems supporting the implementation of existing laws are fundamentally insufficient. Investigations into building failures and collapses have consistently revealed widespread regulatory defiance, while academic discourses have characterised the Kenyan construction sector as being hindered by complex, uncoordinated, and overlapping institutional mandates (Commissions of Inquiry, 1996; NBI, 2015; NCA, 2020; Omollo, 2020; World Bank, 2019). Figure 1.2 provides a summary of the current challenges plaguing the construction industry.

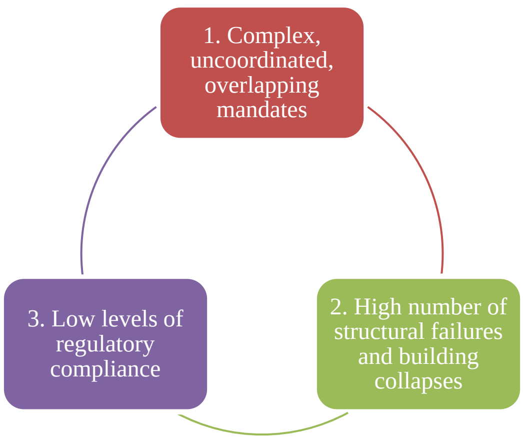

Figure 1.2: Current Challenges in Building Regulation in Kenya

Source: Author (2026)

Such deep-seated deficiencies necessitate a move beyond symptomatic fixes toward the identification of the underlying explanatory variables that define the "implementation gap." Consequently, there is an urgent need to develop a robust, long-term framework that is both cohesive and enforceable. Such an intervention is essential to harmonise fragmented regulatory mandates and drive the industry toward consistent, high-level compliance outcomes.

1.3 Aim and Objectives of the Study

This research aimed to develop a framework for enhancing the compliance of construction projects with construction industry regulations in Kenya, with the purpose of fostering quality and safety on the site and eliminating building failures.

The specific objectives of the study were:

1) To establish the levels of regulatory compliance in construction projects within Nairobi City County County;
2) To establish factors that affect the level of regulatory compliance in construction projects within Nairobi City County;
3) To establish the relationship between regulatory compliance in construction projects within Nairobi City County and its influencing factors; and
4) To formulate a framework for enhancing the regulatory compliance of construction projects in Kenya.

1.4 Research Questions

1) What is the current level of regulatory compliance in construction projects within Nairobi City County?
    i) What constitutes construction regulation and regulatory compliance?
    ii) How do construction projects currently perform in terms of levels of regulatory compliance?
    iii) Is construction regulation necessary?
2) What factors influence the level of regulatory compliance in construction projects within Nairobi City County?
    i) What factors motivate regulatory compliance in construction projects?
    ii) What factors discourage regulatory compliance in a construction project?

   iii) Who are the actors, and what are their roles in the space of construction regulatory compliance?

3) What is the nature of the relationship between regulatory compliance in construction projects within Nairobi City County and its identified influencing factors?
   i) What are the determinants of construction regulatory compliance?
   ii) What are the determinants of construction regulatory non-compliance?
   iii) How do the different determinants of regulatory compliance interact towards the overall level of a project's regulatory compliance?
4) What framework can be formulated to effectively enhance regulatory compliance in construction projects within Kenya?
   i) What should be done to improve the regulatory compliance of construction projects in Kenya?
   ii) What measures should be put in place to encourage regulatory compliance of construction projects in Kenya?
   iii) What measures should be put in place to discourage regulatory noncompliance of construction projects in Kenya?
   iv) How should regulatory compliance of construction projects be monitored and sustained?

1.5 Significance of the Study

The Kenyan construction industry faces persistent challenges in project implementation, particularly concerning adherence to regulations and regulatory compliance. Despite the operationalisation of the National Construction Authority (NCA) Act (2011)—which empowers the NCA to regulate and coordinate industry development—and the enactment of numerous other policies and laws, regulatory challenges persist. These issues are evident in the unabated failures and collapses of buildings, leading to significant loss of life and property, wastage of finite resources, and a lack of order within the built environment.

A critical contributing factor to these challenges is the current regulatory system's heavy reliance on developers' goodwill for inviting supervision and the varying aggressiveness of planning and regulatory regimes. While existing research has explored the intricate relationships among project proprietors, capital providers, design experts, contractors, construction workers, and regulators—primarily focusing on project accomplishments in terms of time, cost, and quality—there remains a scarcity of studies examining the direct impact of these relationships on regulatory compliance at the construction project site level. This omission is significant because the project site serves as the primary interface where industry stakeholders and other economic sectors interact, creating an environment susceptible to collusion that can undermine regulatory compliance, particularly within a disjointed regulatory landscape.

To address the multifaceted philosophical and practical issues arising from complex construction project regulatory compliance interactions, this study draws upon five theoretical paradigms from diverse fields. Key questions explored include: Can an imposed code genuinely elicit compliance? Are the existing construction regulations and regulatory frameworks equitable? Is it more effective to prioritise enforcement, deterrence, or risk mitigation in the building process? Does a culture of compliance exist, and can such a culture be cultivated within the industry?

The utility of this study is threefold. First, it contributes to the ongoing discourse on building failures and collapses, aiming to foster enhanced quality and safety at construction sites. This includes expanding upon previous foundational research, such as the NCA's (2020) study on building failures and collapses in Kenya and the National Crimes Research Centre's (2021) study on crimes related to housing permit forgeries. Second, this research offers timely and practical solutions for enhancing regulatory compliance in Kenyan construction projects. This is achieved through the formulation of a framework that regulators can leverage to promote quality and safe construction, encompassing a redesign of construction regulatory procedures to maximise regulatory adherence and, by extension, improve overall project performance. Third, the insights gleaned from this study can inform the development of educational content and curricula for the training of construction industry professionals and stakeholders. Consequently, the study's findings are anticipated to not only assist industry regulators in making informed decisions for continuous sector improvement but also serve as an informational resource for industry players regarding the comprehension and application of construction laws and regulations.

1.6 Justification of the Study

The historical evolution of construction regulation, spanning from antiquity, demonstrates its adaptability to varying technological, cultural, and geographical contexts. However, in the contemporary geopolitical landscape, the limitations of existing construction regulations persist, manifesting as pervasive issues such as building failures and collapses, particularly within an increasingly urbanised global environment. These incidents have resulted in significant loss of life, extensive property damage, environmental degradation, and a surge in economically and psychologically burdensome litigation. Numerous prior studies, including those by the Commissions of Inquiry (1996), NBI (2015), NCA (2020), Omollo (2019) and Twum-Darko and Mazibuko (2015), have addressed these serious concerns, yet many have concluded with calls for further research, highlighting the inconclusive nature of current understanding.

The urgency of this matter is further underscored by global development agendas. The United Nations Sustainable Development Goals (SDGs) specifically advocate for creating inclusive, safe, resilient, and sustainable cities and human settlements through innovation and interconnectedness (United Nations, 2024). This aspiration is particularly pertinent for Africa, including Kenya, where urban populations are projected to reach 60% by 2063 (African Union Commission, 2015). Achieving these demographic shifts necessitates the establishment of effective institutional capacities for long-term transformation, which can be fostered through the harmonisation of policy, legal, and regulatory frameworks (EAC Secretariat, 2016). For Kenya, this imperative is amplified by the construction sector's pivotal role in the nation's strategy to transition into a newly industrialising middle-income economy (Government of Kenya, 2007).

In alignment with these developmental blueprints, there has been a concerted effort in Kenya to continuously refine the construction regulatory environment. This aims to mitigate the repercussions of low regulatory compliance, which have hindered the industry's optimal contribution to national, regional, and global development agendas. The measures proposed in this study are thus expected to inform governmental bodies on effective strategies for mitigating building failures and their associated impacts. Such advancements can significantly bolster public confidence in government initiatives, particularly as the nation strives to realise its economic aspirations. Beyond reducing the economic and social burdens linked to building failures and collapses, this research is anticipated to foster responsible resource consumption and production—a critical aspect often undermined when structures are demolished, condemned, or collapse—thereby promoting environmental stewardship.

Furthermore, this study provides technology-based practical recommendations for enhancing inter-governmental collaborations between national and devolved administrative units. The overarching goal is to synergise and improve regulatory efforts by acknowledging the dynamic and tactical repositioning of stakeholders across all levels. This approach will cultivate good governance by addressing challenges associated with poor coordination and "silo-working," which often impede the timely sharing of vital information. Ultimately, this study aims to refine the understanding of construction regulation and regulatory compliance in Kenya, proposing a comprehensive framework designed to enhance regulatory adherence and ensure the industry's optimal contribution to national and regional transformation. This will be achieved through proposals aimed at, among others, enhancing the suitability of the legal framework, specifically by ensuring that laws are clear, comprehensive, all-encompassing, and adaptable.

1.7 Scope and Delimitations of the Study

1.7.1 Geographical Scope

The study's geographical scope was delimited to construction projects within Nairobi City County (NCC) in the Republic of Kenya for several compelling reasons. Firstly, as the capital city, Nairobi possesses well-established construction governance structures that facilitate the maintenance of comprehensive databases concerning construction regulatory compliance at both national and county levels. Secondly, the NCC functions as an independent regional zone for the National Construction

Authority (NCA) and other regulatory bodies, providing a suitable governance framework for in-depth evaluation. Thirdly, Nairobi consistently reports the highest numbers of both registered and unregistered projects, coupled with a disproportionately high incidence of building failures and collapses per square kilometre annually, making it an ideal candidate for this investigation. Fourthly, the selection of this locale was influenced by the accessibility of information and the researcher's professional background within the region, which enhances the feasibility and depth of the inquiry.

1.7.2 Theoretical Scope

The complex nature of regulatory compliance necessitated a structured, hierarchical theoretical approach, as no single framework could fully encompass the multifaceted constructs of the Kenyan construction industry. This study is primarily anchored in Public Interest Theory of Regulation (PITR) and the Theory of Regulatory Compliance (TRC), which provide the overarching lens for understanding how industry regulations are designed to safeguard the common good. Within this primary layer, the research utilises Deterrence Theory (DT) and Capture Theory (CT) as critical lenses to evaluate the "implementation gap." These theories analyse the tension between the threat of sanctions and the potential for regulatory bodies to be influenced by the very private interests they are mandated to oversee.

To further refine the analysis of individual and organisational behaviour, the study integrates Social Cognitive Theory (SCT). This adds a behavioural dimension to the hierarchy, accounting for how observational learning, reciprocation, and modelling influence compliance decisions on-site. By triangulating these perspectives, the study moves beyond a linear view of regulation to account for the environmental, political, and socio-economic variables that act as regulatory "predictors." While this hierarchical triangulation offers a significant comparative advantage in defining a robust framework, it is intentionally delimited to these constructs to maintain analytical focus, acknowledging the inherent challenge of integrating these often-diametric theoretical tensions into a cohesive model for improved compliance.

1.7.3 Methodological Scope

In terms of methodology, the study is delimited to a quantitative research strategy utilising a cross-sectional research design. This approach facilitated the systematic collection of structured data through questionnaires and the review of archival materials. To ensure statistical validity, the study employs random sampling facilitated by R programming software. The analytical scope is confined to descriptive statistics, bivariate analysis (correlations), and multivariate approaches, specifically Confirmatory Factor Analysis (CFA) and Multiple Regression Analysis (MRA). While content and thematic analysis are utilised to interpret qualitative nuances within the open-ended responses, the study does not provide a longitudinal perspective or a purely ethnographic account of construction site culture, focusing instead on defining measurable trends, patterns, and relationships within the established timeframe.

1.7.4 Institutional Delimitations

It is pertinent to note that the assessment of regulatory compliance in this study is delimited to the perspectives and legislative frameworks of five specific agencies: the Nairobi City County Government (NCC), the National Construction Authority (NCA), the National Environment Management Authority (NEMA), the Directorate of Occupational Safety and Health Services (DOSHS), and the Water Resources Authority (WRA). Consequently, the study primarily presents the viewpoints of these selected regulatory bodies and their corresponding mandates. It does not encompass in detail the entire spectrum of construction regulatory influences—such as the regulation of construction professionals—thereby maintaining a manageable and focused investigation into the primary pillars of Kenyan construction oversight, while not ignoring the rest.

1.7.5 Functional and Procedural Delimitations

To maintain a focused inquiry into the determinants of regulatory compliance within the Kenyan construction industry, this study establishes specific functional and procedural boundaries. While recognising that projects often face unforeseen disruptions and "storms," the research excludes the technical modelling of financial contingencies, the development of specific recovery plans, and the actuarial assessment of risk. These elements are treated strictly as environmental factors influencing a site’s regulatory status rather than core subjects of analysis.

Furthermore, although the study acknowledges the broader regulatory environment, it explicitly omits the evaluation of specific legal protocols, the technicalities of arbitration or litigation, and the management of individual contractual disputes between clients and contractors. Consequently, the technical management of time-cost-quality trade-offs and specific project risk-planning methodologies fall outside the scope of this inquiry. By centring the research on established compliance determinants and the formulation of an enhanced regulatory framework, these exclusions ensure the study remains anchored in a positivist paradigm, focusing on the objective reality of regulatory interactions without diverging into the fields of construction law or general project management.

1.8 Assumptions of the Study

The assumptions outlined in this section delineate the presumptions about the subject area, methodologies, and theoretical frameworks. These presumptions were accepted as valid in the absence of complete empirical corroboration, yet they fundamentally influenced the design and execution of the research process.

1.8.1 Assumptions on the Subject Area

For this study, several warranted assumptions were made regarding the subject area. First, the research was ontologically grounded in objectivism, operating under the premise that reality is singular, observable, objective, and governed by identifiable laws. It was assumed that respondents possessed an awareness of regulatory compliance issues affecting their lives and livelihoods, and that these experiences fostered unbiased, memorable, and measurable attitudes. Based on the fundamental assumption that all phenomena operate within a predictable system or order, whether theoretically derived or based on logical common sense, the study presumed that enhancing regulatory compliance could effectively reduce the incidence of building failures and collapses. Secondly, the study assumes that the findings, determinants, and barriers identified within construction projects in Nairobi City County are representative of and can be generalised to the construction industry countrywide in Kenya. This is based on the fact that the primary regulatory body, the National Construction Authority (NCA), maintains a uniform national mandate, utilises a single Online Project Registration System (OPRS), and applies the same 7-item compliance checklist across all 14 regional offices in Kenya. Furthermore, as the capital city and the hub of construction governance, Nairobi serves as an ideal governance framework for identifying systemic challenges that are likely prevalent in other urbanising counties.

1.8.2 Assumptions on Methods

Epistemologically, this study was rooted in positivism, an approach that assumes knowledge is objective, quantifiable, inherently existing, and discoverable through scientific inquiry. Consequently, it was presumed that conducting a survey, deemed the most suitable research approach, would lead to the discovery and explanation of genuine knowledge regarding regulatory compliance. Additionally, the study proceeded with the assumption that the collected data originated independently from each respondent and that all participants' observations were mutually independent, honest, and reliable.

1.8.3 Assumptions in Theory

This study addressed a broad spectrum of issues, necessitating the examination of constructs from five interrelated theories: The Theory of Regulatory Compliance (TRC), the Public Interest Theory of Regulation (PITR), the Social Cognitive Theory (SCT), Capture Theory (CT), and Deterrence Theory (DT). Consequently, certain assumptions inherent in each of these theories were implicitly adopted as assumptions for this study, particularly in the formulation of conclusions and recommendations.

The TRC, for instance, postulates an inverse relationship between the intensity of regulatory effort and the level of compliance when the desired optimum amount of regulation defined by critical factors is exceeded. It suggests an optimal balance of rules and regulations for effective mitigation. Therefore, this study assumes that regulatory agencies should focus their efforts on the most critical aspects of regulatory risk, thereby avoiding overregulation. Under the PITR, it is assumed that laws serve the public good and that governmental intervention is essential in cases of market failure to protect the public interest and enhance systemic effectiveness and efficiency. Accordingly, such interventions are presumed to lead to a reduction in building failures and collapses.

The SCT, on the other hand, suggests that behaviour is shaped by personal and environmental factors, alongside cognitive processes, enabling learning through observation, imitation, and modelling. From this, the study assumes that compliance issues are reciprocal and that stakeholders can be retrained towards regulatory adherence. Similarly, CT operates on the premise that all entities—regulators, regulated entities, and the general public—are inherently self-interested. Regulatory proposals should therefore manage these diverse interests to prevent self-serving outcomes. Finally, the DT highlights the significance of the certainty, celerity, and severity of sanctions. Through this theory, it is assumed that punishing violators also discourages others from committing similar offences. The deterrence perspective, therefore, assumes uniformity in the rational decision-making mechanisms across individuals.

1.9 Definition of Key Terms

Compliance: Denotes the act or process of alignment of an activity to the relevant laws, acts, rules, codes, regulations and/or guidelines. It entails actively identifying and understanding the applicable regulations, creating internal controls and processes to meet those requirements, and consistently monitoring and reviewing operations to ensure ongoing adherence (Fiene, 2023).

Construction: Refers to a building project that is under development on site, a renovation or demolition, wholly or partly above or below ground level, and is temporary.

Regulatee(s): For this study, regulatee(s) refers to any individual(s) or organisation(s) whose activities are subject to the oversight and rules established by a regulatory agency.

Regulations: Individual rules or collections of rules or standards approved by government and supported by certain threats, normally negative ones like penalties, and which derive from institutional sources such as parliaments, ministries or agencies, or even the electorates through different forms of plebiscites, specifically aimed at preventing misconduct and business behaviour that can be detrimental to society (Coglianese, 2012; Coglianese & Kagan, 2007).

Regulatory compliance refers to the process by which individuals, organisations, or entities adhere to and fulfil the requirements set forth by relevant laws, regulations, and industry standards (Fiene, 2023). It involves ensuring that policies, procedures, and practices align with the specific legal and regulatory frameworks applicable to a particular industry or jurisdiction and are aimed at safeguarding the interests of consumers of a good or service and the general public.

Sweet spot: Refers to the optimal regulatory balance or regulatory equilibrium under the TRC, where stakeholders and regulators reach a stable state of compliance (Braithwaite, 2017).

1.10 Organisation of the Study

This study is structured into six chapters, each progressively building upon the last to present a comprehensive examination of the subject matter.

Chapter One provides a general introductory appraisal of the research. It covers the background to the problem, the statement of the problem, the aim and objectives of the study, and the research questions guiding the study. Additionally, it explicates the significance and justification of the study, delineates its scope, outlines its foundational assumptions, defines key terms, and presents the overall organisation of the study.

Chapter Two details the comprehensive literature review undertaken for this study. It begins by outlining a historical perspective of regulation and compliance, followed by a detailed examination of the concepts of regulation and compliance. The chapter then reviews global best practices in regulatory frameworks, alongside an analysis of building regulations and compliance practices specifically within Kenya. It further delves into the measurements and determinants of regulatory compliance as presented in existing literature, and explores various models proposed for enhancing regulatory compliance. Additionally, this chapter encompasses the regulatory reforms, theoretical review, identifies the research gap, establishes the theoretical framework and conceptual framework, states the research hypothesis, and provides the conceptual and operational definitions of variables pertinent to the study.

Chapter Three details the methodology employed in conducting the study. It outlines the philosophical underpinnings, the chosen research strategy, and the specific research design. Furthermore, it defines the unit of analysis, the study area, the target population and sample size, and the sampling techniques utilised. The chapter also describes the data collection methods, data analysis procedures, data presentation approaches, considerations for reliability and validity, the ethical contemplations governing the study, and the pilot study.

Chapter Four presents the study's findings and discussions. It methodically analyses the observations and data gathered through the research instruments, transforming them into tangible outcomes directly aligned with the study's objectives. This chapter addresses critical aspects such as the response rate, handling of missing values and outliers, reliability assessment, tests for statistical assumptions, Confirmatory Factor Analysis (CFA), and the demographic characteristics of the respondents. In line with the study's objectives, the chapter also presents findings concerning the levels of regulatory compliance and the assessment of the determinants of regulatory compliance, including barriers to construction regulatory compliance. It also examines the relationships between regulatory compliance and its determinants through hypothesis testing, correlation analysis and Multiple Regression Analysis (MRA). In so doing, the study's outcomes are discussed in light of findings from other existing literature. Finally, the chapter presents a summary of empirical findings and establishes an empirical basis for regulatory enhancement.

Chapter Five introduces the proposed framework for enhancing the compliance of construction sites with construction industry regulations in Kenya. It elaborates on the rationale behind the framework, identifies key actors involved, outlines necessary actions, and describes the networks that should be established to ensure its effectiveness and efficiency in regulatory endeavours. The chapter proposes a phased roadmap for the implementation of the framework, outlines its guiding principles, its benefits and potential challenges.

Chapter Six outlines the study's conclusions and recommendations, providing a summary reflection on the entire research journey. It presents conclusions aligned with each objective, derives specific recommendations, and offers a practical reflection on the effectiveness of the Kenyan building and regulation environment. Furthermore, this chapter presents a recapitulation of the study and the researcher's self-reflection. The research's practical contributions to both knowledge and practice, an acknowledgement of its limitations, and an identification of areas for further research are also undertaken.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides a comprehensive review of the literature pertaining to regulation and regulatory compliance within the construction industry. It begins with a historical overview of regulation and compliance, followed by an examination of the concept of regulation. The discussion then shifts to an explication of compliance, specifically addressing its relationship to quality assurance, enforcement strategies, and the influence of client attributes. The chapter thereafter presents an overview of best practices in regulation and details the legal and institutional framework for construction regulation in Kenya. Subsequently, it explores measurements and determinants of regulatory compliance and discusses various models for enhancing regulatory compliance. This leads to a review of regulatory reforms and related theories that collectively provide the multifaceted perspective necessary for evaluating the complex legal, political, and behavioural drivers of building regulatory compliance. The chapter concludes with the identification of the research gap, the development of a theoretical and conceptual framework, a statement of research hypotheses, and the conceptual and operational definition of the study's variables.

2.2 History of Regulation and Regulatory Compliance

2.2.1 Overview

The origins of regulation and regulatory compliance are deeply rooted in history, with evidence tracing back to antiquity. These early forms varied significantly based on technological, cultural, and geographical contexts. Modern legal systems worldwide derive from ancient societies (Tulane University Law School, 2017). For instance, traditional or tribal societies globally implemented measures for restorative justice, such as "blood money," predating similar provisions in major religions (Heijden, 2019).

A notable historical example is King Hammurabi's Code, a collection of 284 laws from circa 1772 BC. This code established rules governing a builder's duties and responsibilities to clients and prescribed penalties for various transgressions (Heijden, 2009; Heijden, 2019; Tulane University Law School, 2017). Edict 229 of the Code of Hammurabi, for example, stipulated that a builder whose unsound construction led to the death of the homeowner would face execution. This Code, which dates from circa 1772 BC, provided that *"If a builder build a house for a man and do not make its construction firm, and the house which he has built collapse and cause the death of the owner of the house, that builder shall be put to death"* (IHBC, 2022). King Hammurabi was renowned for his equitable laws and governance, fostering respect rather than fear, and ensuring accountability irrespective of social status or income (Tulane University Law School, 2017).

This application of laws and codes to create harmony in societies compares well across most of the early civilizations such as ancient Greece with the ancient Greek legal system, ancient Rome with the Roman law considered the foundation of civil law in many modern countries, and even ancient China known for the Confucian codes of conduct, which focused on people's responsibility to be virtuous without having the law dictate their actions.

Accounts from religious books like the Holy Bible also indicate the existence of similar provisions. According to the New International Version (2011, Deuteronomy 22:8), the Holy Bible records that *"When you build a new house, make a parapet around your roof so that you may not bring the guilt of bloodshed on your house if someone falls from the roof".* These are perhaps some of the oldest references that show that building regulations have existed for a long time and that, from the onset, they were enacted to provide basic benchmarks for health, safety, and general well-being, as shown in Figure 2.1. All these supports the accounts of Heijden (2019), who demonstrates that regulation as a practice, profession, and discipline existed and has advanced significantly in the past 4,000 years, from dull, rigid, and extremely legalistic provisions to the current, more innovative regulatory interventions.

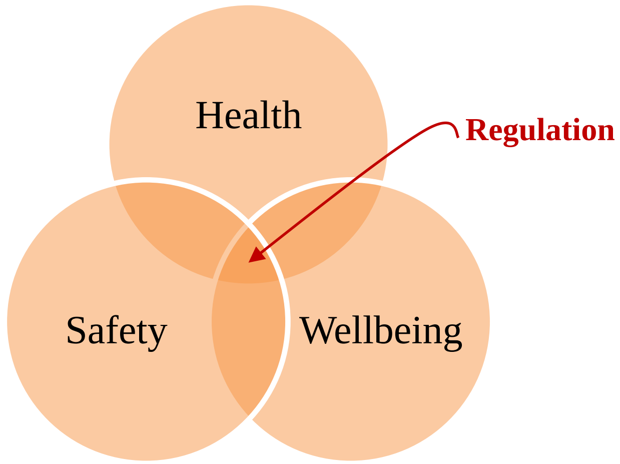

Figure 2.1: Factors Outlining the Need for Building Regulations

Source: Author (2026)

2.2.2 Regulation and Compliance in African Traditional Contexts

Indigenous African communities possessed sophisticated systems for regulating their built environments long before the advent of Western influence. While Western architectural and urban planning concepts have largely dominated academic discourse, obscuring the rich history of African vernacular architecture, a closer examination reveals remarkable parallels in spatial organisation and responsiveness to human needs (Rukwaro & Maina, 2006). Each pre-colonial African tribal culture developed distinct architectural morphologies, iconographies, and construction methodologies, deeply rooted in its unique socio-cultural narratives. These systems, though often undocumented in written form, served as *de facto* regulatory frameworks ensuring the health, safety, and well-being of inhabitants. According to Oliver (2006), building was not merely a technical task but a cultural process regulated by inherited wisdom, social hierarchies, and spiritual beliefs. It was a communal undertaking where the "native science of building" was governed by unwritten codes and a shared "vernacular know-how". As such, building activities were regulated by the authority of tradition, where decisions regarding form, materials, and siting were based on precedent and social acceptance (Asquith & Vellinga, 2006).

In Kenya, the Maasai settlements exemplify this dynamic planning approach that fostered communal life through intricate social networks. Their spatial hierarchies, based on principles of centrality, dualism, and mythical concepts, maintained cosmic unity, influencing the arrangement of homesteads, watering points, pathways, and ritualistic and recreational spaces (Rukwaro & Maina, 2006). Their traditional building practices featured clear divisions of labour based on gender, age, and professional status; for instance, women build the framework *(enkang)* of the house (Oliver, 2006). The evolution of traditional Kikuyu dwelling environments, as analysed by Kamenju (2013), on the other hand, demonstrates how community life revolved around villages interconnected by pathways and courtyards. Despite transformative forces like Christianity, civilisation, and commerce, these courtyards have retained their significance as focal points of homesteads.

Similarly, traditional Luo homesteads exhibited a spatial philosophy rich in cultural information. The design, location, and size of huts and other structures conveyed details about the inhabitants' gender, age, occupation, and profession (Neal & Jackson, 2019). Furthermore, the meticulous practice of using only new materials for constructing a new homestead symbolised a fresh beginning, and the division of responsibilities (building by men, with each unit lasting two generations) pointed to an inherent, albeit unwritten, regulatory structure. Internal hut layouts also designated specific areas for various activities, such as sleeping, eating, cooking, sitting and talking, storing food, holding pots, and keeping chickens and newly-born livestock, showcasing a highly organised use of space.

Regionally, intricate architectural traditions are observed among the Dogons of Mali, the Lamba of Zambia, and the Zulus of South Africa. The 15th-century Dogon cliff dwellings of Bandiagara, a UNESCO World Heritage site, for instance, exemplify well-adapted architecture that provided protection, utilised local materials, and optimised land use for agriculture (Field Study of the World, 2019). Their granaries, designed for optimal grain drying, further highlight their advanced understanding of environmental control. Among the Lambas, the village headman determined the plan of the permanent settlement *(intanda),* which precisely reflected the structure and relationships of the constituent clans, with the roles of men and women carefully delineated (Oliver, 2006). In Asante (Ghana), any significant building activity or research required formal consultation with the chief, elders, and the Queen Mother through a formal spokesman *(okyeame).* Zulu architecture, characterised by natural materials, also reflected a clear segregation of responsibilities.

Historically, therefore, construction within African traditions was a communal undertaking centred on the intergenerational transfer of knowledge, which sustained the cultural integrity of the built environment (Asquith & Vellinga, 2006). This "tradition as process" functioned through a rigorous apprenticeship model managed by professional guilds, where apprentices traded labour and discipline for technical, ritual, and political expertise. The culmination of this journey was a community-validated professional identity, overseen by a gerontocratic structure of elders who served as the custodians of architectural heritage. This rich heritage, however, is often marginalised by contemporary biases that frame African vernacular architecture as primitive or substandard (Sojkowski, 2015). Such reductive views ignore the complex, unwritten regulatory frameworks and deliberate craftsmanship that defined these indigenous building systems.

2.2.3 Western Perspectives on Building Regulation

In Western countries, governments have exercised control over economic activities for a long time, but the scope of regulation expanded significantly during the 20th century. This surge was driven by rapid shifts in technology, economics, and politics, necessitating protection against monopolies and the growing hazards of industrialisation (Coglianese & Kagan, 2007; KPMG, 2019). Some scholars trace the genesis of modern regulation to the 19th-century Industrial Revolution, citing societal changes, increased migration, and scientific discoveries linking unhygienic conditions to public health concerns (Heijden, 2013). Stanley (2024) concurs, highlighting "inspections" as a pivotal Victorian innovation through which governments addressed social and economic challenges brought on by industrialism.

The United States, as an example, saw substantial development in building regulations following the mid-19th-century Industrial Revolution. While the earliest building codes were established in 1625 primarily focused on fire safety through material specifications for roof coverings, with broader adoption in larger U.S. cities beginning in the early 1800s. This followed recommendations from George Washington in the late 1770s, who advocated for height and area limitations on wood-frame structures (Fire Marshals Association of Minnesota [FMAM], 2023). North Carolina introduced the first formal building code in 1788, followed by Baltimore in 1859. New Orleans led the way in 1865 by becoming the first city to mandate inspections of public places (FMAM, 2023). Since then, the regulatory framework has evolved towards more form-based codes.

In the United Kingdom, significant building legislation emerged in London after the Great Fire of 1666, which devastated the densely timber-built city. The Rebuilding of London Act 1666 mandated external walls of brick or stone to control density and enhance fire resistance (Institute of Historic Building Conservation [IHBC], 2022). This act remained in effect with variations until the 1770s, when the London Building Acts of 1772 and 1774 introduced specific requirements for wall and foundation thickness, correlated with building rates. These acts also established a statutory role for surveyors to inspect new constructions and administer an oath for their duties (IHBC, 2022).

By the 1840s, epidemic diseases, attributed to overcrowding, dampness, and poor ventilation, superseded fire as the primary concern. Regulatory adjustments were made to ensure adequate light, drainage, and ventilation in building design and construction. The Local Government Act 1858 empowered local authorities to create bylaws and manage drainage systems. However, the Public Health Act (1875) and the Model Byelaws issued by the Local Government Board in 1877 marked the most significant legislative advancements, providing comprehensive minimum requirements for fire protection, structural stability, height restrictions, drainage, damp prevention, and ventilation (IHBC, 2022).

The first comprehensive "real" building regulations in the UK were published in 1963, following Scotland's Building (Scotland) Act 1959, with England and Wales subsequently adopting similar measures. This led to the Building Act (1984), which introduced "functional performance standards," legally defining adequacy, reasonableness, or appropriateness. This act also incorporated aspects of supervision, inspection, approval, and competition into building control, with "approved building inspectors" implementing a self-funding system. Inspectorates were expected to stimulate good management, emphasising their operational methods (Stanley, 2024). Subsequent changes have moved towards privatisation, exemplified by the Building Research Establishment (BRE) in 1997.

This historical overview demonstrates the progressive development of regulatory frameworks in response to evolving societal needs, technological advancements, and public health concerns in both the United States and the United Kingdom.

2.2.4 Eastern Perspectives on Building Regulation

The development of building regulatory control in many Asian nations is deeply rooted in both indigenous traditions and foreign historical influences. For instance, Singapore, a former British colony (1819-1959), exhibits significant legal characteristics inherited from its coloniser (Low, 2011).

A structured framework for building regulation in Singapore emerged in the 1930s with the establishment of the Singapore Improvement Trust (SIT). This committee was tasked with the inspection and approval of public and private building plans to address the prevalent issue of unauthorised construction (National Archives of Singapore, 2024). Following Singapore's attainment of self-governance in 1959, the trajectory of building control underwent significant changes. The responsibilities initially held by SIT, and subsequently transferred to the Building Surveyor's Department within the Singapore Municipality after the enactment of the Control of Building Ordinance in 1948, were then assigned to the Building Control Division (BCD) in 1972. The BCD's mandate was expanded to encompass the issuance of certificates of fitness and enforcement actions against unauthorised buildings.

In 1999, the Building and Construction Authority (BCA) assumed these roles, with an expanded mandate to foster a technologically advanced construction industry to support Singapore's economic objectives and ensure building safety. This transition marked a shift from predominantly paper-based processes to an electronic platform

(Low, 2011). The Singaporean experience, therefore, highlights a continuous evolution driven by the need to ensure building safety, adapting to new governance structures and technological advancements to enhance resource sharing, coordination, and transparency, exemplified by platforms such as the Construction and Real Estate Network (CORENET).

In China, the earliest surviving technical manual on buildings is the Yingzao Fashi (State Building Standards), a Twelfth-Century Chinese Building Manual compiled by Li Jie, a Superintendent of State Buildings (Guo, 1998). This comprehensive document provided detailed illustrations, units of measurement, design standards, and construction principles, encapsulating long-established technological traditions. However, tracing the complete evolution of ancient Chinese building codes and regulations, as evidenced by extant historical structures and the family-guild system, remains challenging due to the unique processes within each administrative unit (province).

Hong Kong, a special administrative region of China and a former British colony (1841–1997), initially focused its building control policies on public health concerns and addressing dangerous structures to safeguard public safety (ZOU, 2013). Following World War II, Hong Kong's building control systems progressively transitioned from prescriptive to performance-based requirements for planning, design, and construction. This period also saw the development of a register of contractors to ensure control and discipline within the building industry. While China is often perceived to have had an early advantage in construction regulation due to its historical context, its current developmental trajectory has outpaced its existing legal framework. Consequently, China's construction regulation system is undergoing rapid reforms to streamline lengthy approval processes associated with a planned economic system, moving towards a market economy where state-owned enterprises have gained greater operational autonomy (Hongliang et al., 2001).

Generally, building regulatory and compliance practices in many Eastern countries, including China, India, and Taiwan, draws heavily from both local traditional practices and foreign historical influences. Nevertheless, the underlying motivations for these practices often mirror those in Western countries, with public health, order, and safety being paramount. This underscores the fundamental principle that building regulation and compliance should prioritise human needs and adapt to the dynamic trends of human habitation.

2.2.5 General Shift to the Contemporary Regulation

Socio-legal research indicates a four-stage evolutionary shift in regulatory regimes. This progression encompasses a transition from traditional, often non-binding restorative approaches to uniform, retaliatory frameworks enforced by a sovereign entity or its representatives. Subsequently, a deterrence-oriented regime emerged, emphasising rule compliance over violation. The final stage involves correction-oriented regulatory regimes characterised by punitive measures, such as imprisonment, as a means of governing conduct (Heijden, 2009; Heijden, 2019; OECD, 2018; Sullivan, Dickinson, & Henderson, 2020). Consequently, contemporary dynamic regulatory frameworks are often hybrid in nature, having transitioned from prescriptive mandates towards performance-based models, including self-regulation and co-regulation, with an increased focus on risk as an object of regulatory governance (Heijden, 2019; Hutter & Lloyd-Bostock, 2017).

To complement self-regulation and co-regulation, Heijden (2013) introduces the smart regulation philosophy, which suggests that actors directly involved in the regulatory process are optimally positioned to enforce regulations. The advantages attributed to these "progressive" approaches include high acceptance of internally developed rules and the ready availability of relevant technical expertise and knowledge from within the regulated entity, often at reduced costs. However, critics contend that these approaches are susceptible to capture, lack demonstrable assurance of serving public interests, and suffer from a deficit of democratic legitimacy in their enforcement mechanisms.

In response to increasingly complex challenges, regulatory focus is now shifting from behaviour correction to behaviour formation (Heijden, 2019). For example, while performance-based building regulations enhance adaptability, they can simultaneously compromise regulatory certainty, potentially creating ambiguity for both enforcers and *regulatees* (Heijden, 2013). Accordingly, Radaelli (2018), and Eliantonio and Spendzharova (2017) propose that instead of reactive "quick fixes," regulators should adopt evidence-based and anticipatory approaches, such as meta-regulation reforms like a "whole-of-government approach to regulation." Heijden (2013) advocates for trade-offs, suggesting that facilitative enforcement styles more positively influence a regulatee's willingness to comply than formalistic styles, asserting that regulators can achieve greater success through subtle persuasion, irrespective of the available punitive measures.

In summary, the narrative of building regulation and control is characterised by reactive measures in response to crises and an ongoing tension between public protection and private profit motives. Human nature, by its inclination to push creative boundaries in construction, can lead to choices that compromise building safety, thereby necessitating regulation. Historical evidence, dating back to the Code of Hammurabi, demonstrates that human conduct in trade ranges from reputation-based adherence to opportunism, with the majority falling between these extremes. The Institute of Historic Building Conservation (2022) highlights a persistent issue of under-resourcing in implementing institutions, even amidst legislative improvements. Ideally, the most vulnerable segments of society, being most susceptible to the consequences of poor and uncontrolled building practices, stand to benefit most from a robust system of regulatory control. Researchers are progressively reorienting their focus to regulatory procedures to comprehend the mechanisms by which regulations operate and their impact on businesses and societies.

2.2.6 Contestation between Western and African Perspectives on Regulation

While indigenous settlement patterns offer insights into unwritten traditional "regulations" governing the organisation, nature, and use of dwellings, a significant effort is required to translate these historical patterns into contemporary regulatory frameworks. This endeavour is complicated by the cosmopolitan nature of modern urban environments and the cultural variations influenced by temporal activities and seasonal changes, revealing a notable disparity, for instance, between African (which is the context of this study) and Western conceptual approaches (which have influenced this context).

This divergence prompts several fundamental questions: Does the challenge in consistently adhering to building regulations in Africa, and specifically Kenya, stem from these traditional influences? Is *"Africanisation"* fostering resistance to externally derived regulations, or is *"internationalisation and/or globalisation"* prioritising global perspectives at the expense of local insights? Are established "Western" best practices sufficiently adaptable to the nuances of the African way of life? Figure 2.2 illustrates the features of the African-Western contestations.

Western	**Period**	**Pre-industrial Revolution (Before 1750s)**	**Post-industrial revolution (Post 1750s)**
	Influences	• Crises (fires) • Control of densities	• Crises (fires, epidemics) • New way of life • New materials and technologies • Written laws and policies • Planning: Zoning, height restrictions
	Features	-Response to crisis -Shaped by the past and the future -Government involvement	-Systems planning involving specification of materials and insistence on functional performance -Efficiency -Public health: drainage, sewer, lighting, air quality -Rights: managing interests -Approvals/inspections/supervision -Shaped by the past and the future -Government involvement

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African				
	Features	-Traditional planning -Harmony -Unwritten law -Shaped by the past -Voluntarism -Gerontocracy	-Duress -Segregation -New order	-Written laws and policies -Specification of materials -Approval/inspections/supervision -Africanization -Government involvement
	Influences	• Cultural norms • Values • Way of life • Environment	• Colonial chiefs • Christianity • Trade • Advent of new materials and technologies	• Advent of new materials and Technologies • Written laws and policies • Planning: zoning, height restrictions • Densities/crisis
	Period	**Pre-Colonial (pre-1890s)**	**Colonial (1890s - 1960s)**	**Post-colonial (post-1960s to date)**

Figure 2.2: Comparative History of Regulation between Western and African Perspectives

Source: Compilation from FMAM (2023), IHBC (2022), *Kamenju (2013), Stanley (2024), Rukwaro and Maina (2006), Oliver (2006), and Asquith and Vellinga (2006).*

McKenzie (1973), in a broad comparison of Western and African conceptual frameworks, highlights a central point of divergence concerning the nature of "becoming" and its relationship to the past, present, and future. He observes that, within African thought, space, much like time, is not considered real until it has been experienced. This perspective suggests that actual time comprises only the past and the present. While appearing to align with Kamenju's (2013) arguments, McKenzie further notes that Western religious philosophies significantly influenced traditional African thought by introducing and emphasising a "future" dimension, which was previously less articulated.

This fundamental difference in spatial understanding, being intrinsically linked to culture, inevitably led to a tenuous connection between traditional African architecture and its contemporary forms. Van Rensburg and Da Costa (2008) observe that African cities are currently striving to identify suitable solutions to reclaim their identities and forge authentic African urban expressions. They propose that this can only be achieved through careful consideration of scale, identity, and the acknowledgement of diverse stakeholders. Table 2.1 provides a summary of these contrasting African and Western concepts.

Table 2.1: The Dialectic between African and Western Philosophies

	African Philosophy	***Western Philosophy***
Interdependence	Together	Alone
Integration	Whole	Pieces
Continuum	Past	Future
Magnanimity	Harmony	Control
Stewardship	Share	Accumulate
Validation	Gerontocracy	Licensure

Source: Adapted from Van Rensburg and Da Costa (2008), Oliver (2006), and Asquith and Vellinga (2006)

African philosophy prioritises harmony, experiential space-time, and voluntary adherence to unwritten norms. In contrast, Western thought emphasises formalised, crisis-driven regulations and strict enforcement within a linear temporal framework. This fundamental disparity creates friction in matters such as regulatory compliance. African concepts of space and time, being holistic and experience-based, influence conduct and a present-focused outlook, clashing with Western linear approaches to universal regulations. Consequently, legal obedience varies, with traditional communal norms often preferred over formalistic Western enforcement, raising questions of contestations of cultural relevance and legitimacy. The Eastern Unity approach integrates advanced technology with clear state leadership to internalise regulation within existing cultural frameworks. Rather than relying on punishment, this model leverages technology to facilitate compliance, ensuring that rigorous safety standards align with communal and participatory values. For a rapidly urbanising environment like Kenya, this provides a philosophical foundation for a community-based, service-oriented, technologically integrated regulatory system.

2.3 The Concept of Regulation

2.3.1 Overview

Regulations are essentially rules or standards formally approved by a government, backed by potential negative consequences like penalties, and originating from institutions such as parliaments, ministries, agencies, or even direct plebiscites (Coglianese, 2012; Coglianese & Kagan, 2007). Their primary purpose is to prevent misconduct and business behaviours that could harm society. These measures are fundamentally cautionary, designed to avert detrimental occurrences.

As Parker and Nielsen (2017) note, regulations are implemented to achieve specific policy objectives, but their effectiveness hinges on how well individual citizens and businesses adhere to them. This underscores the crucial role of drafters in ensuring regulations are responsive to the complex socioeconomic and political environments in which they operate (Parker & Nielsen, 2017). This perspective is echoed by Heijden (2019), who emphasises that a political system is always necessary to authorise and enforce regulatory compliance.

Several arguments have been fronted by proponents in support of regulation, first that it is essential for economic efficiency and consumer choice, secondly that it is required to address market failures, thirdly, that it is necessary to achieve social solidarity and security, fourthly, to unburden the justice system so that not every breach needs to be processed by the justice system, and fifthly for the good of the people so that they don’t make bad choices out of misinformation, (Eliantonio & Spendzharova, 2017; Heijden, 2019; Hutter & Lloyd-Bostock, 2017). Ultimately, a regulation is deemed successful when it effectively resolves, mitigates, or ameliorates the problem that prompted its governmental implementation (Coglianese, 2012).

To meaningfully and reliably quantify regulatory improvements, it is essential to identify indicators that can gauge results and research strategies to support inferences about how much a given regulation has driven changes in desired outcomes (Coglianese, 2012). While metrics such as the number of inspections, enforcement actions, or size of imposed penalties can indicate how well regulations or policies are managed against administrative goals, they don't necessarily reflect actual changes in behaviour or outcomes.

Coglianese (2012), the World Bank Group (2013), and Heijden (2019) advocate for governments to cultivate supportive institutional environments for organised research on regulatory outcomes. This proactive approach aims to generate more robust and higher-quality regulatory evaluations, providing a clearer picture of their true impact.

2.3.2 Regulation of Building Works

Effectively applying building regulations is a complex, knowledge-intensive task. As Gelder (1997) and Lovegrove (2019) highlight, these regulations can be difficult to understand, extensive, spread across various documents, and often disconnected from real-world construction practices, as illustrated in Figure 2.3. Different activities may require consulting disparate sections of the regulations, while activities requiring the same sections might interpret provisions differently based on specific goals. Lovegrove (2019) stresses the need for a more streamlined approach, advocating for a single Building Act with clear objectives, a unified collection of building regulations, a consistent building code, and a dedicated 'ministry of construction.' This consolidation aims to enhance clarity and usability for all stakeholders in the building industry.

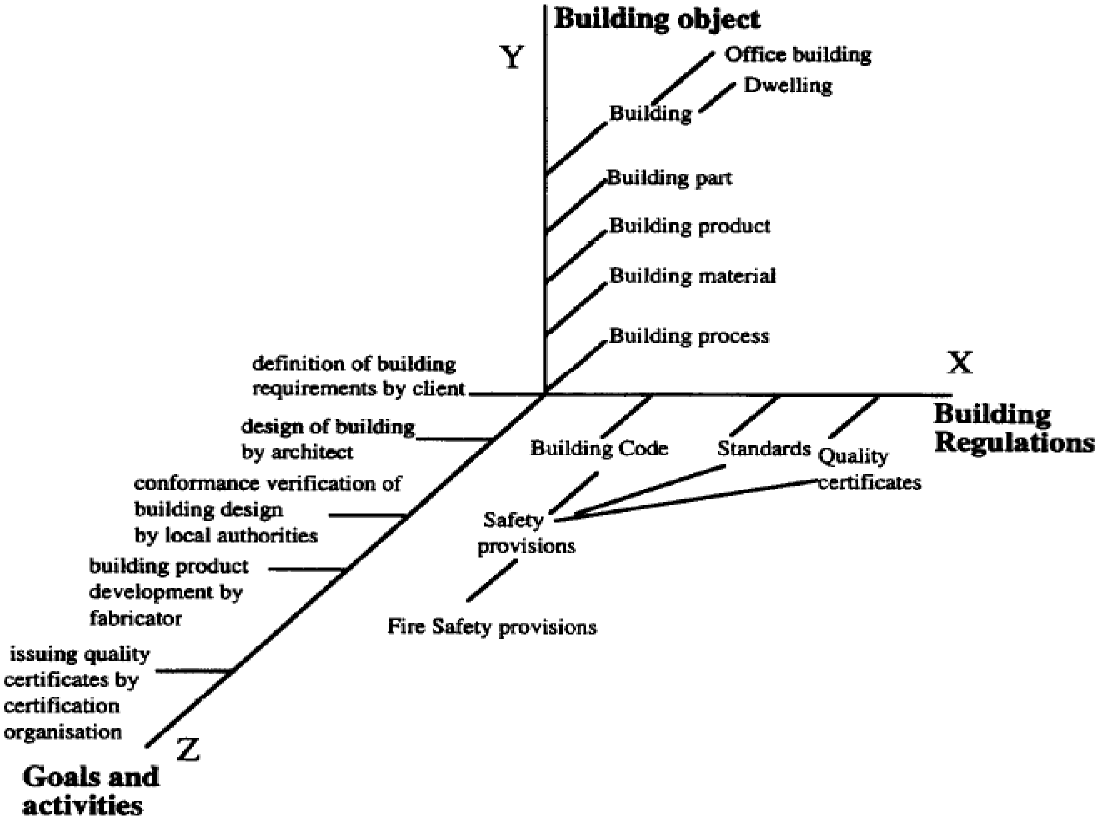

Figure 2.3: Conceptual Modelling of Building Regulation Knowledge

Source: Gelder (1997)

The efficacy of a regulation, even if initially successful, must be continuously evaluated over time due to the complex interplay among various stakeholders (Coglianese, 2012). It's crucial to acknowledge that improvements in outcomes may not solely be attributable to regulation, as underlying economic shifts or technological advancements can also contribute (Coglianese & Kagan, 2007; Heijden, 2019). Therefore, every industry needs a responsive regulatory framework. Within this framework, government regulatory agencies must establish measures that ensure developers safeguard the interests, interactions, and transactions of diverse stakeholders. This is achieved by creating predictability through clear expectations (i.e., rules) and defining the consequences (i.e., rewards and penalties) for meeting or failing to meet those expectations (Heijden, 2019).

2.3.3 Regulation in Construction and Construction Quality Management

a) Definition and Meaning of Quality

Quality is a crucial element within the project triangle, with its definition varying based on the application context. It can represent customer satisfaction or adherence to contractual and regulatory requirements. In construction, quality specifically refers to a structure's conformance to requirements, while a "quality building" signifies the realisation of the owner's wishes within the defined scope, budget, and timeline (Mashwamaa et al., 2017). Here, "requirements" encompass the specifications and stipulations in contract documents, which, unfortunately, aren't always thoroughly reviewed. Further, this definition prioritises the "owner's wishes" over the "public interest" creating a critical shortcoming because a building that satisfies a client's aesthetic wishes but fails a structural safety code cannot be defined as "quality" in a regulatory sense.

Due to this subjective nature, quality has been defined variously by scholars. For example, Joseph Juran describes quality as a fitness for purpose, Philip Crosby expresses it as conformance to requirements, while W. Edwards Deming defines it as worker effectiveness (Adewale et al., 2019). Basu (2014) simply extends the definition by Philip Crosby, defining it as consistent conformance to customer expectations, while Stevens (1996) defines it as meeting the requirements of all customers. The primary demerit of definitions by Deming (worker effectiveness) or Basu (customer expectations) is their inherent subjectivity. In construction, "quality" is often manufactured as a one-off project on a client's site, meaning expectations can shift, making these definitions too fluid for a strict regulatory framework.

More detailed definitions have also emerged from corporate entities. For instance, ISO 9000:2000 defines quality as "the totality of characteristics of an entity that bear on its ability to satisfy stated and implied need" (Hoyle, 2001). The Building Research Establishment (BRE) describes it as "the totality of the attributes of a building that enable it to satisfy needs (external attributes, performance attributes, and aesthetics and amenity)" (Ashworth, 2010). The International Federation of Consulting Engineers (FIDIC) also provides a comprehensive definition: "Quality, which meets or exceeds the requirements of the Employer as specified in the contract documents, whilst complying with law, codes, standards and regulatory policy, which apply to the contract" (CIDB, 2011; FIDIC, 2011). Table 2.2 provides a summary of these foundational definitions of quality that can be incorporated into regulatory frameworks.

Table 2.2: Definitions of Quality

Source	***Definition***
Juran cited by (Adewale et al., 2019)	fitness for purpose
Crosby cited by (Adewale et al., 2019)	conformance to requirements
Deming cited by (Adewale et al., 2019)	worker effectiveness
ISO 9000 cited by Hoyle (2001)	totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs
BRE cited by Ashworth (2010)	totality of the attributes of a building that enable it to satisfy needs
Basu (2014)	consistent conformance to customer expectations
Stevens (1996)	meeting the requirements of all customers
FIDIC (2011)	that which meets or exceeds the requirements of the employer, as specified in the contract documents, whilst complying with law, codes, standards, and regulatory policy, which apply to the contract

Source: Author compilation (2026)

Quality control aims to guarantee the achievement of excellence and strict conformance to client specifications, ensuring satisfaction both at project handover and throughout the asset's subsequent use, all while optimising costs (Ashworth, 2010). Consequently, quality must be meticulously planned, actively managed, and subjected to continuous monitoring (Wawak et al., 2020). Effective quality management necessitates the seamless integration of operational and managerial processes throughout the construction lifecycle (Chin-Keng & Hamzah, 2011).

While the literature offers diverse definitions of quality, a critical shortcoming is the tendency to treat quality as a negotiable outcome of customer satisfaction rather than a non-negotiable administrative mandate. This research asserts that FIDIC’s definition is the most robust for the Kenyan context, as it is one of the few that explicitly requires compliance with 'law, codes, standards and regulatory policy' alongside employer requirements. By moving away from purely production-oriented views (like Juran or Deming), this study positions quality as an outcome of assisted compliance, where the 'totality of characteristics' must first satisfy the public safety mandates established by law before addressing the client's subjective desires.

b) Quality in the Building Process

Building quality is determined by the project implementation processes, organisational processes, and the final result, collectively defining overall construction quality (Wawak et al., 2020). Unlike other industries, the relationship between these quality aspects in construction is unique, significantly influencing the nature of the product. Several factors make quality in construction distinct. First, the definition of quality itself can be subjective. Secondly, buildings are typically constructed on the client's site as one-off projects, lacking prototype models for organisation, construction, or pricing, and thirdly, there's no single, universally applicable standard or specification for the final product (Mahmood & Mohammed, 2008). Because of these, it's essential to develop quantifiable, predictive quality performance indicators and user-friendly, easily updatable implementation guides. These tools should clearly outline what, how, and when to measure quality, and how to use the results (Stevens, 1996). Achieving the right mix of site-specific quality requirements is critical, placing regulation at the core of construction quality.

According to Elbashir (2018), true building quality is only realisable through a commitment to quality at every stage, including sanctioning, planning, designing, construction, maintenance, and inspection. As depicted in Figure 2.4, Basu (2014) presents a three-dimensional model summarising building project quality feature as the design aspects (defined by specifications), conformance to process (defined by the adherence to laws, standards, and regulations), and organisational issues (influenced by culture). Failure to achieve a critical balance among these three dimensions can lead to "project quality leaks," ultimately resulting in substandard buildings that do not conform to regulations.

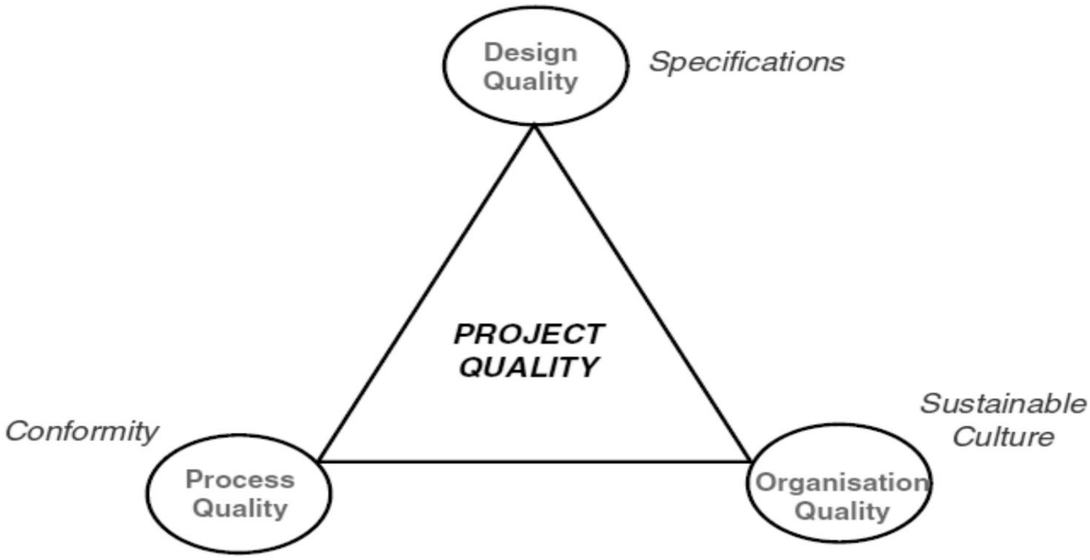

Figure 2.4: Three Dimensions of Project Quality

Source: Basu (2014)

Quality planning, as defined by Elbashir (2018), is the process of identifying specific quality prerequisites and standards for projects and their outputs. It also involves documenting how these outputs demonstrate compliance with quality provisions, culminating in a Quality Management Plan (QMP). To ensure a building achieves the required quality level, Elbashir (2018) emphasizes that the following project documents must be readily available and meticulously maintained on-site, in an updated and properly organized format: contract documents (includes agreements, approved drawings, technical specifications, overall project schedules); quality assurance/quality control (QA/QC) plan; health, safety and environmental (HSE) plan; method statements; request for inspections (RFI) & request for material inspections (RMI); tests records; marked up drawings; concrete pouring forms; factory acceptance tests (FAT) reports; inspection test plans (ITP); site instructions; calibration certificate(s); approved material vendor list; vendor drawings; project organization chart; log-sheet for all the documents etc.

The Project Management Body of Knowledge (PMBOK) identifies several tools and techniques useful for quality control and observing the impact of regulation (PMI, 2021). These include: inspection protocols, control charts, Pareto diagrams, statistical sampling, flowcharting, scatter diagrams, cause & effect diagrams, histograms, and check sheets. Furthermore, the Construction Industry Development Board (CIDB, 2011) recommends setting regulatory quality goals in construction, implementing benchmarking, and encouraging contractors to pursue quality certifications like ISO 9000 to promote high-quality building. In addition, to assess the quality of a building, Howarth and Greenwood (2018) identify five key regulatory indicators to observe: function, durability, economy, aesthetics, and depreciation.

c) Motivators to Quality Implementation of Building Works

Delivering a quality structure involves several key objectives: ensuring adherence to regulations, achieving client satisfaction, maintaining a strong reputation, and securing profitability by avoiding reworks (Emuze & Mhlwa, 2015). Contrary to some perceptions, factors like wages have been largely dismissed in earlier studies as primary drivers of quality. For example, Emuze and Mhlwa (2015), in their research on "Managing Quality on Construction Sites in South Africa," found a minimal correlation between workers' quality of work and their wages. This aligns with Elbashir's (2018) findings, which attribute 85% of quality issues to managerial problems and only 15% to employees.

Therefore, the success of building regulations and overall quality in construction have been found to largely depend on four main areas: (i) the skills and experience of the engineer or architect; (ii) the promoter's (client's) commitment and financial capacity; (iii) the organizational and operational capabilities of the constructor, including subcontractors and supervisors, and (iv) the designer's supervisory capabilities in ensuring adherence to required standards (Ashworth, 2010).

d) Barriers to Quality Implementation in Building Works

Achieving quality in building construction is often hindered by hidden regulatory influences that impede informed decision-making (Wawak et al., 2020). Several challenges have been identified, including a failure to change the culture, philosophy, or environment where quality efforts are being implemented (Mahmood & Mohammed, 2008). Emuze and Mhlwa (2015) note inadequate staff training on quality protocols, on-site disharmony (particularly during inspections), insufficient documentation, a shortage of experienced supervisory personnel, and an excessive focus on quality assurance over direct quality control.

Other common obstacles involve bureaucracy, high costs, time consumption, interpretation complexities, excessive paperwork, the temporary nature of the labour force, workers' perceived indifference to quality issues, difficulties in measuring outcomes, subcontracting complexities, and ineffective communication (Chin-Keng & Hamzah, 2011). Resistance to information gathering, documentation, and implementation (Howarth & Greenwood, 2018), along with corruption, political interference, institutional barriers, procurement-related hurdles, weak capacities, the use of inexperienced contractors, undercutting practices, and weak monitoring systems, also pose significant challenges (CIDB, 2011). Others include resistance to information gathering, documentation, and implementation (Howarth & Greenwood, 2018); corruption, political interference, and institutional barriers, procurement-related barriers, weak capacities, use of emerging contractors instead of experienced ones, undercutting, and weak monitoring systems (CIDB, 2011).

Ashworth (2010) simplifies these quality regulatory obstacles into seven "M" factors: markets, men, money, management, materials, methods, and machines. Among these, "men" (human factors) are identified as the most dominant, a position supported by Basu (2014), who stresses the critical importance of people-related matters in determining both the construction process and the final product. The Construction Industry Development Board (CIDB, 2011) further categorises these barriers into construction-related, design-related, and procurement-related issues. Failure to effectively address these impediments frequently results in wastage and defects, hallmarks of irregular, low-quality construction (Wawak et al., 2020).

e) The Cost of Quality in Building

Quality in construction is fundamentally linked to both cost and time. Errors during a project can lead to significant financial burdens for all involved parties. Studies indicate that between 6% and 15% of construction costs are often wasted on reworking defective components (Mashwamaa et al., 2017; Waje & Patil, 2012). Furthermore, 20% to 40% of all site defects occur during the construction phase, with 54% attributed to human factors like worker skill levels and supervision, and another 12% to material and system failures. Given these figures, a robust regulatory system is essential for effectively preventing, detecting, and resolving defects early on, ensuring quality assurance. Without this, the cost of poor quality (COPQ) remains hidden (all expenses incurred due to substandard products and services, including the cost of regulatory non-compliance), only to emerge more severely during the project's latent and patent defects phases (Mashwamaa et al., 2017).

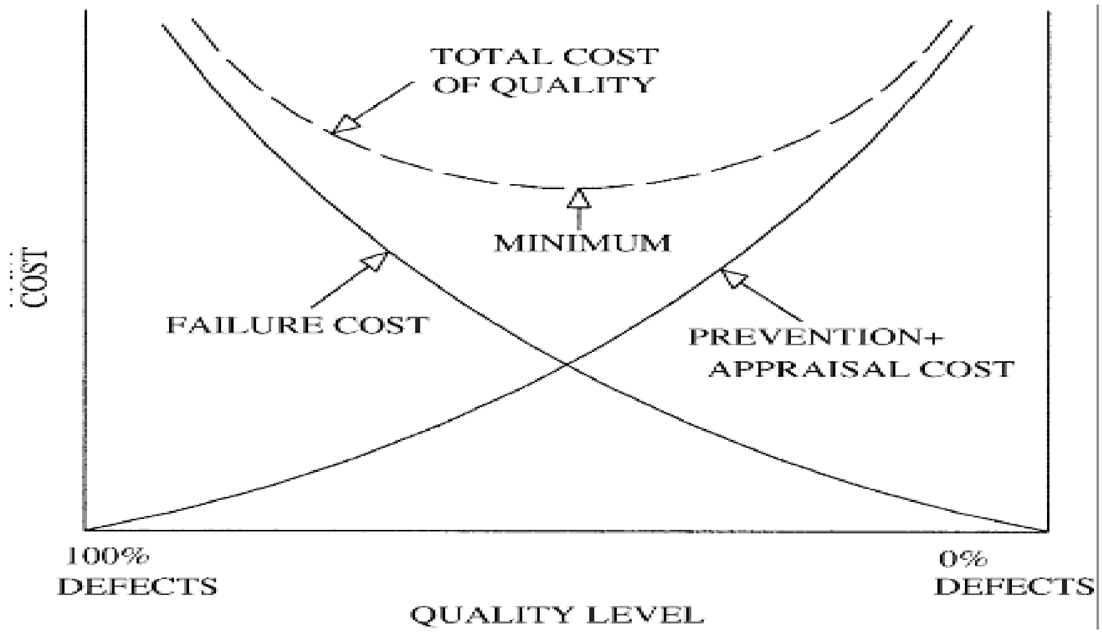

Figure 2.5: The Basic Model of Optimum Quality Cost

Source: Waje and Patil (2012)

Various economic and mathematical models have been developed to establish the optimal cost of quality. While some researchers have questioned this approach, the traditional model proposed by Brown and Kane (1984), as illustrated in Figure 2.5, has gained widespread acceptance (Kazaza et al., 2004; Waje & Patil, 2012). The main challenge in these models is identifying the "optimum point," which can vary based on project specifics, overall quality costs (including regulation), and profit objectives. Ultimately, the optimal point for total quality cost is generally considered to be where there's less than 100% quality conformance, acknowledging a practical balance between perfection and economic viability.

A significant portion of project problems stems from the inflexible application of regulations within the "triple constraints" of time, quality, and cost. This is often compounded by project managers' failure to utilise crucial "soft skills" like leadership, collaboration, and communication.

f) Quality Management Systems

i) ISO 9000

ISO standards emphasise several core principles: customer focus, strong leadership, engagement of personnel, process-oriented approaches, a systems-based approach to management, continuous improvement, and fact-based decision-making (Hoyle, 2001). Adherence to these principles promotes consistency and reliability in terms of quality, compatibility, and compliance across various operations. Quality has emerged as a crucial element in competitive strategy, recognised by numerous organisations as vital for developing products and services that consistently meet regulatory requirements and ensure ongoing success (Waje & Patil, 2012).

However, while ISO 9000 offers a valuable framework for good practice in designing and implementing quality assurance systems, it does not directly address construction quality standards specifically. Its inherent bias lies predominantly towards manufacturing processes, emphasising quality systems rather than concrete quality standards applicable to the unique characteristics of construction (Ashworth, 2010).

ii) Total Quality Management (TQM)

Total Quality Management (TQM) is a comprehensive management philosophy that permeates every aspect of an organisation, positioning quality as a strategic imperative (Chin-Keng & Hamzah, 2011). Originating from the ideas of Dr W. Edwards Deming, TQM centres on individual attitudes and collective efforts for continuous quality improvement. It aims to meet the needs of both internal and external customers by realigning the organisation's mission, culture, working practices, and fostering an ongoing pursuit of quality enhancement (Ashworth, 2010).

Mahmood and Mohammed (2008) identify thirteen crucial elements of a quality culture that contribute to the successful implementation of TQM and, by extension, regulatory compliance as leadership and top management commitment, focus on the customer, continuous improvement, education and training, teamwork, worker participation, empowerment, supplier partnership, rewards and recognition, communication, motivation, organization structure, and strategic and quality policy.

Unlike ISO 9000, which aims to meet a predefined quality standard, TQM strives for continuous quality advancement through an iterative process of research, assessment, and feedback. Its implementation follows a top-down approach (Ashworth, 2010), necessitating a fundamental cultural change within the organisation. This change is defined by clear values and beliefs designed to bolster positive regulatory behaviour and compliance (Mahmood & Mohammed, 2008).

2.3.4 Regulation in Construction Health and Safety

a) Construction Health and Safety Data

The International Labour Organisation (ILO) reports a staggering global toll from occupational accidents and illnesses, estimating 2.3 million deaths annually, equating to 6,000 fatalities each day (ILO, 2023). The construction industry contributes a disproportionately high percentage to this figure, which also includes approximately 340 million work-related accidents and 160 million cases of occupational sicknesses worldwide every year.

These tragic outcomes, stemming from failures to adhere to regulations and resulting in defective buildings and processes, lead to cumulative global economic losses projected to be in the billions of US dollars annually. In response to this critical situation, an assembly of experts approved a revised ILO code of practice on safety and health in construction in February 2022. This updated code, an improvement upon previous versions from 1992, 1987, and earlier, is designed to be integrated into regulatory frameworks. It offers comprehensive practical guidance for governments, employers, workers, and their representatives on how to effectively eliminate, reduce, or control construction-related hazards and risks throughout a building's entire life cycle (ILO, 2022).

While the construction industry is highly diverse, the importance of construction health and safety cannot be overstated and must be rigorously protected through regulation. The safety of building structures should encompass all considerations during the construction, maintenance, and tenancy phases. Furthermore, this focus must extend to addressing conduct or exposures that may occur specifically during the construction phase, particularly concerning the safety of construction workers.

b) Influencers of Health and Safety in Construction

While the core attributes of any building project—time, cost, and quality—form a triple constraint, the issues of time and cost often fade from memory once a project is complete. However, quality remains a lasting concern. This challenge is magnified by the complex and diverse nature of the construction environment, particularly the numerous stakeholders involved in the construction value chain. As Albtoush et al. (2022) emphasise, aspects of quality and safety must align with regulations, codes, and standards. Non-adherence can lead to substandard quality, unsafe structures, and disputes. Similarly, Waje and Patil (2012) connect quality and safety to technical issues and the active participation of the client, designers, and effective construction management processes.

Therefore, comprehensive plans for ensuring quality and safety should be established at the project's inception, during the conceptualisation phase. These plans should assign key responsibilities to competent authorities, clients, workers, engineers, architects, contractors, suppliers, and manufacturers. Adequate involvement, regulatory monitoring, and continuous feedback throughout the entire project process are crucial. This approach aligns with fundamental project management principles, including stewardship, tailoring, teamwork, quality, stakeholder engagement, managing complexities, upholding values, risk assessment, systems thinking, adaptability, resiliency, leadership, and change management (PMI, 2021). These factors are pivotal to a project's internal and external environments, ultimately culminating in overall regulatory compliance, health, and safety.

2.4 The Concept of Compliance

2.4.1 Overview

Compliance is a multifaceted concept with varying theoretical and practical definitions. Amodu (2008) offers two broad interpretations: it can refer to the extent to which regulated entities adhere to regulations and their motivations for doing so, or it can describe the enforcement mechanisms employed by agencies to achieve regulatory responsiveness. Parker and Nielsen (2017) provide a more nuanced definition, viewing compliance as the behavioural and attitudinal reactions of individuals and organisations towards regulations, considering institutional characteristics, capacities, and resource allocation for decision implementation. This frames compliance as a regulatory obligation. Liu et al. (2022) link these attitudes in builders to project pressures, regulatory demands, and firm reputational concerns. Thus, compliance can be categorised as either objectivist or interpretivist, depending on the approach, the actors involved, and various short-term or long-term factors.

Parker and Nielsen (2017) classify attitudinal responses to compliance or non-compliance as either spontaneous or enforced. Spontaneous compliance encompasses factors that would motivate individuals even without direct government intervention, such as education, support, grievance handling, monitoring, inspection, and enforcement. This includes the regulated group's inherent ability to comply. Enforced compliance, conversely, pertains to the various government actions that influence compliance and non-compliance, and how these actions are perceived by those obligated. These actions include compliance education and support designed to deter non-compliance, such as preventing record falsification. Such strategies can be punitive or more accommodating, involving persuasion, education, and information provision. In practice, regulatory agencies often employ a blend of these two approaches (Amodu, 2008; Heijden, 2019). Generally, regulatory control is exerted through monitoring, surveillance, and enforcement (Sutinen & Kuperan, 1999).

Business commitment to regulatory compliance is also shaped by external social pressures, such as the presence of citizen watchdog organisations that can draw media or regulatory attention to an organisation's infringements (Coglianese & Kagan, 2007). Additionally, an internal sense of moral obligation stemming from socialisation processes plays a role (Sutinen & Kuperan, 1999). Conversely, the pursuit of economic efficiency, emphasising cost containment and maintaining positive earnings, tends to exert downward pressure on expenditures for both basic compliance and "beyond compliance" actions (Coglianese & Kagan, 2007; Heijden, 2019).

2.4.2 Compliance and Quality Assurance in Construction

Quality Assurance (QA) is defined by Howarth and Greenwood (2018) as the "collective term for the formal activities and managerial processes that are planned and undertaken in an attempt to ensure that products and services are delivered at the required quality level." These activities are categorised into: (i) operational indicators (those directly related to specific construction activities), and (ii) diagnostic indicators (those providing specific information for assessment). Ashworth (2010) similarly defines QA as an organisation's establishment of standards and the subsequent verification of their practical implementation. Thus, effective QA in the building process necessitates clear communication, meticulous detailing of every stage, and the identification of measurable attributes to guide quality determination.

Wawak et al. (2020) delineate a building construction project into five stages: (i) project initiation, (ii) project planning, (iii) project execution, (iv) project monitoring and control, and (v) project closure. The quality of a project primarily emerges from the first four phases, with the final phase serving as a platform to observe the achieved quality of work. Howarth and Greenwood (2018) further expand on this by identifying five key actors with major QA responsibilities: the client, the designer, the manufacturer, the contractor, and the user. This implies that the pursuit of quality and compliance commences with the client and extends through the design and construction periods to the building's utilisation and management.

At the design stage, quality compliance is determined by the design team (engineer or architect) based on their skill, experience, and the promoter's (client's) willingness and/or financial capacity. During construction, quality compliance is influenced by the management and operational capabilities of the constructor (and subcontractors), and the supervisory capabilities of the designers and project managers, all guided by prevailing standards (Ashworth, 2010). Matching the project team's capabilities to project requirements is therefore critical for QA, as their contributions are interdependent, especially concerning the final product (CIDB, 2011). Consequently, compliance with quality aspects in a building is a shared responsibility among all stakeholders (CIDB, 2011; Elbashir, 2018; Howarth & Greenwood, 2018).

Ashworth (2010) and Stevens (1996) outline several crucial stages in construction projects and important factors subject to quality control compliance. These include design and specification, material (ordering, handling, storage, usage), and completion aspects related to protection and testing. Other attributes of quality building compliance features include dimensions, appearance, strength, stability, materials, performance, and finishes. Given this complexity, there is no single universal standard or specification applicable to every building, leading to inherent difficulties in ensuring comprehensive quality assurance (Mahmood & Mohammed, 2008). Howarth and Greenwood (2018) emphasise that quality compliance in a building must be informed by adherence to regulatory standards. As such, QA must be rigorously applied throughout the entire building process, from conceptual stages (feasibility and briefing) through construction, to completion and project operationalisation. Table 2.3 illustrates the building stages and some attendant attributes, aspects, and determinants of quality compliance.

Table 2.3: Sample Quality Assurance Aspects in Construction

Stage	Attribute	Aspect	Determinants
i) Initiation and planning	Site/context Scope	Planning Topographical surveys Budget	Client Design team Regulator
ii) Execution, monitoring and control	Design and specification	Choice of material Design detailing Client's budget	Client Contractor Regulator
	Materials Ordering	Specification requirements Samples	Prevailing standards or regulations
	Materials handling	Delivery Offloading Checking Distribution Testing	Supervisory team experience Construction worker competence
	Materials storage	Compound facilities Stockpiling Protection Security	
	Material usage	Skill and care Workmanship standards Supervision Testing	
iii) Closure	Completion	Protection Testing	Client Prevailing regulations

Source: Author compilation (2026)

Audits and inspections are standard practices used to ensure adherence to quality assurance (QA) procedures (Ashworth, 2010). Research indicates that roughly 50% of building defects originate during the design stage, 30% from on-site activities, and 20% from the manufacturing of materials and components (Adewale et al., 2019). This highlights the design stage as the most critical phase requiring rigorous QA before construction begins to achieve desired compliance levels.

To enhance building QA practices, several strategies are crucial. These include continuous improvement of registration and licensing systems, along with robust pre-qualification processes and an emphasis on prior performance assessment (CIDB, 2011), and regular review of cases and the institutionalisation of quality management tools and techniques, supported by a steadfast commitment from construction companies and consultants to quality compliance (Chin-Keng & Hamzah, 2011). Nyakala et al. (2018) emphasise that continuous QA should drive improvements in product quality, processes, services, concurrent engineering, management, and design team formation. Therefore, QA efforts should encompass thorough analysis of documentary evidence, visual examinations, and rigorous scientific testing.

2.4.3 Compliance and Enforcement Strategies

For any regulator, compliance and enforcement are paramount. Laws that aren't efficiently applied rarely achieve their intended social and economic objectives (Gunningham, 2015). Heijden (2013) defines enforcement as the implementation of building regulations and control. He identifies the key determinants of compliance and enforcement as: The quality of the law itself, the enforcement strategies employed, the enforcement styles adopted, and the type of enforcement actors involved. To ensure regulations are workable and enforceable, Heijden (2013) highlights the adequacy, feasibility, legal certainty (ensuring minimal misunderstanding about the regulations' meaning and enforcement), and adaptability of laws (capacity to be adjusted to both current and future) as significant factors that ought to be considered.

Gunningham (2015) outlines seven different (but mutually compatible) regulatory enforcement and compliance measures with varying advantages and disadvantages. These measures include advice and persuasion, deterrence, responsive regulation, risk-based regulation, smart regulation, meta-regulation, and criteria strategy. Heijden (2013) refers to these as enforcement strategies. He extends this to describe the tactical choices made by enforcement agencies regarding resource allocation, target setting, and outcome monitoring, as well as the specific actions taken, such as imposed sanctions and compliance-related incentives. Heijden (2013) further reclassifies these enforcement strategies as deterrence-based, compliance-based, risk-based, or mixed, as detailed in Table 2.4.

Table 2.4: Enforcement Strategies

Strategy	Description
Deterrence-based strategy	-assumes that the higher the chance of getting caught breaking the law, the less willing people are to break it, and conversely, the higher the sanctions if the law is broken, the less willing people are to break it -aims at deterring non-compliance before the law is broken or at sanctioning non-compliance after the law has been broken -the consequences of non-compliance have to be feared -critics of this strategy state that it is ineffective, expensive, and prone to regulatory capture
Compliance-based strategy	-aims at the spontaneous obedience to regulation -weakens those features that bring about non-compliance. -spontaneous obedience is considered to proceed from feelings of moral disapproval about breaking the law -instead of using negative incentives, e.g., fines and penalties, it believes compliance can also be reached through positive incentives, e.g., deploying grants or subsidies -regulatees have a choice between the costs of non-compliance and the benefits of compliance
Risk-based strategy	-aims at setting standards, collecting information, influencing and changing behaviour, while aiming enforcement resources at those subjects that create the greatest risk -accepts that risks do exist and that some risks are inevitable, but tries to reduce them to a minimum -the downside of this is that it is impossible to determine a risk objectively
Mixed strategy	-states that rejecting punitive regulation is naïve; however, total commitment to it might lead to unnecessary employment of means -proposes a responsive regulatory model that begins with less punitive and less restrictive strategies, and preferably a mix -believes that the trick to successful regulation lies in establishing synergy between punishment and persuasion -the relationship between controller and subject, and the controller's ability to choose between different sanctions, is regarded as the strength of this model.

Source: Adapted from Heijden (2013) and Braithwaite (2017)

Coglianese and Kagan (2007) identify two primary models of regulatory enforcement typically undertaken by specialised government agencies. The first model treats regulatory enforcement primarily as a legal procedure. Here, regulations are viewed as authoritative legal norms, and their violation should lead to punishment. This model assumes regulatory programs aim more to prevent harm than to punish it, thus seeking to prohibit all detrimental outcomes (Heijden, 2019). The second model considers enforcement more as a social procedure, designed to encourage cooperative problem-solving between government and businesses, demanding corrective responses to breaches (Coglianese & Kagan, 2007; Heijden, 2019). From this perspective, effective regulatory enforcement involves discussions between regulators and officials at each regulated facility. It requires a nuanced blend of rules and persuasion, threats and education, firmness and compromise, and even offering rewards. Regulatory officials in this scenario should be granted considerable discretion in implementing general regulatory standards.

Enforcement by local government agencies often leads to insufficient, over-regulated, slow, and expensive procedures (Heijden, 2009). This is supported by Sutinen and Kuperan (1999), who note that enforcement can account for a quarter to over half of all public expenditures among regulatory institutions. Coglianese and Kagan (2007) further point out that many regulatory violations, unlike traditional crimes, don't cause immediate, tangible injury, leading to them being frequently overlooked.

They propose a dynamic enforcement approach where regulators can choose to withhold punitive action and accept "substantial compliance" instead of demanding strict adherence to all legal rules. This is based on the idea that cooperation is more cost-effective and beneficial than punishment, provided the threat of punishment remains a credible backdrop to the invitation for cooperation. To ensure this threat is credible, regulators must have access to legal sanctions that are less severe, quicker, and cheaper than criminal prosecution, making them more likely to be utilised.

Coglianese and Kagan (2007) suggest that regulators can effectively threaten to counter a regulated entity's non-cooperation by progressively escalating actions up a "pyramid of sanctions." This starts with a legal reference or cautionary letter (the most common action at the base of the pyramid). If non-cooperation persists, actions escalate to intensified surveillance, then to administratively imposed fines, before moving to more significant court-imposed civil penalties. As a last resort (or in the most severe cases), criminal penalties or delicensure may be pursued.

This capability to use a full range of responses allows regulatory enforcement to advance promptly and effectively at the lower levels of the pyramid before escalation, representing a progressive shift from restorative justice to deterrence and ultimately incapacitation (Braithwaite, 2017; Coglianese & Kagan, 2007). According to Sutinen and Kuperan (1999), it is crucial to control flagrant violators. Failure to do so could signal that regulatory procedures are unfair or ineffective, thereby eroding the gains achieved from compliance by others. Figure 2.6 shows the full range of regulatory responses that can be used to effectively advance compliance.

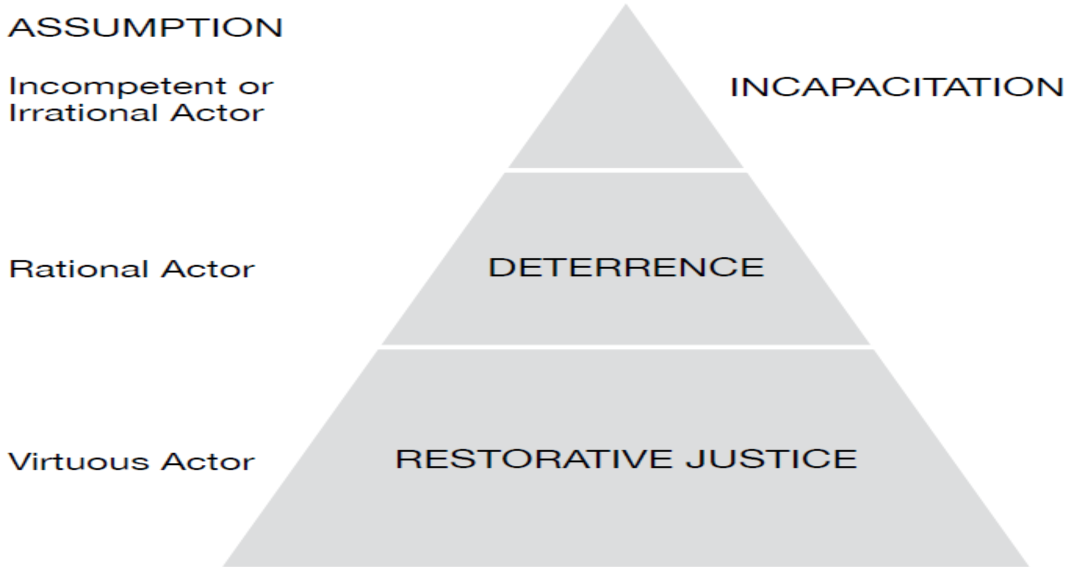

Figure 2.6: The Integration of Restorative, Deterrent, and Incapacitative Justice

Source: Braithwaite (2017)

Enforcement style, as defined by Heijden (2013), characterises an inspector's behaviour toward a regulated entity, while an enforcement actor refers to the agents and agencies responsible for carrying out actual enforcement tasks. Liu et al. (2022) and Gunningham (2015) note that the regulatees are ordinarily inspired to comply by: (i) fear of discovery and punishment by government enforcement agents; (ii) fear of embarrassment or shame in the eyes of family members or social peers (social license); and (iii) an internalized sense of responsibility to conform to norms and beliefs about doing the right thing. These observations align with Sutinen and Kuperan (1999), who outline additional factors determining compliance to include potential illegal gain, severity and certainty of sanctions, individuals' moral development and their standards of personal morality, individuals' perceptions of how just and moral the rules being enforced are, and social environmental influences, as shown in Figure 2.7.

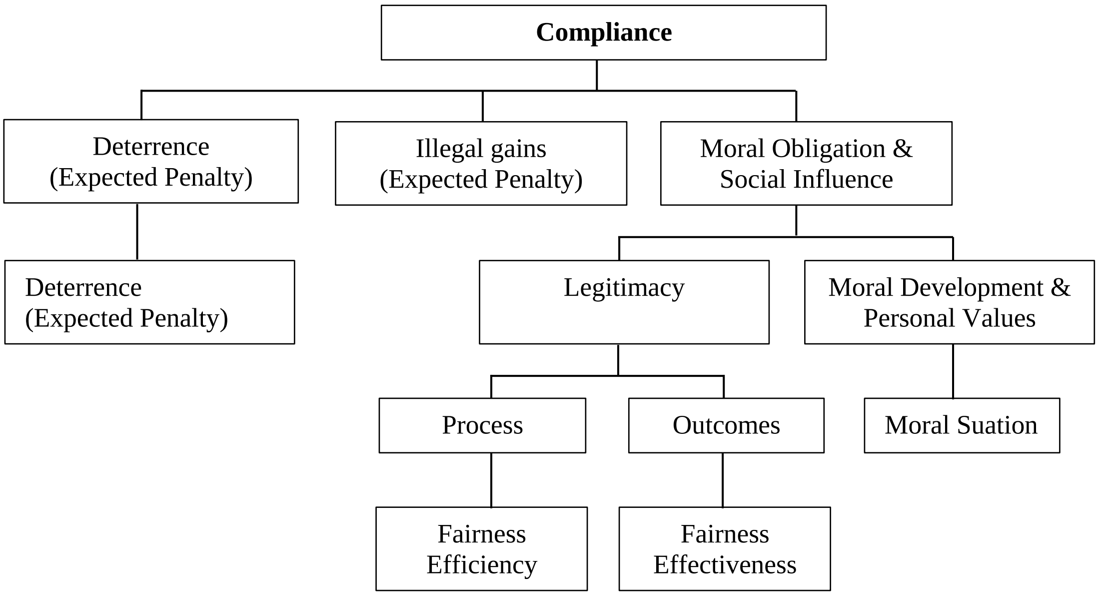

Figure 2.7: Factors That Can Determine the Level of Compliance

Source: Sutinen & Kuperan (1999)

The choice of enforcement style is often shaped by several key factors. These include the legal characteristics of the regulated entity, the prevailing political environment, the ideologies of the government in power, the consequences of severe incidents attributed to regulatory negligence, or even the aftermath of a media exposé, all of which can significantly influence how regulations are enforced (Coglianese & Kagan, 2007). Fiene (2023) broadly categorises compliance deterrence measures to include license revocation or suspension, regulatory audits and inspections, corrective actions and remediation costs, and criminal charges and penalties.

2.4.4 Effect of Client Attributes on Compliance

In construction, the client or proprietor is the project's originator and eventual owner, making their input critical to success. This differs significantly from retail, where the vendor controls interactions (Turner, 2021). The final construction product's character is largely shaped by the client's knowledge, skills, communication abilities, commitment, and leadership, especially in early project stages (AlBarami et al., 2020). High team bonding and active client involvement can foster motivation, knowledge sharing, and integration among team members, leading to a better understanding of client needs and more creative, effective solutions (Fu et al., 2023).

Clients are categorised in various ways—public or private, individual or corporate, primary or secondary, experienced or inexperienced, one-off or regular, profit-oriented or non-profit, singular or pluralistic—each category influencing project management based on project, individual, or organisational factors. Given that every project involves risk, informed decision-making is crucial at every stage.

Turner (2021) identifies four essential interaction points between client and contractor: pre-project, tendering, project delivery, and post-project. During the pre-project phase, effective client guidance in defining needs and objectives can significantly reduce change orders during project delivery and increase satisfaction. For instance, Mahat and Adnan (2018) found that 83% of change orders during construction originated from clients, with 17% from consultancy teams, largely due to differing information levels. While client involvement can have mixed effects, it is predominantly positive when clients better understand the project and provide quality-enhancing feedback (Fu et al., 2023).

Fu et al. (2023) draw a parallel to legal practice, where client participation is integral to the overall outcome. However, clients are often disadvantaged by the construction industry's complexity, limiting their participation without proper guidance. Construction companies, aiming for client satisfaction and future loyalty, may involve clients at every step, potentially compromising their neutrality on crucial matters like construction quality and regulatory compliance.

To boost client participation efficiency, AlBarami et al. (2020) recommend creating integrated project teams that include the client, fostering team contributions and idea exchange. This necessitates equipping clients adequately for effective participation and guiding their attitudes to improve construction sector performance (AlBarami et al. 2020; Fu et al., 2023). Suggested methods for skill advancement include attending conferences, training courses, or obtaining specialised certifications in construction projects.

Thomson (2011) observes an emerging trend where client’s express satisfaction even when projects don't meet initial formalised time, cost, and performance goals, but successfully address emergent requirements not understood during the initial briefing. This positive shift is often attributed to improved client characteristics, particularly a heightened awareness of project goals.

2.5 Global Best Practices on Construction Regulation

2.5.1 Overview

Governments worldwide are increasingly developing laws, standards, and best practice guidelines to ensure predictable quality in construction. These frameworks are implemented by agencies specifically responsible for overseeing construction. For example, the World Bank Group (2013) published "Good Practices for Construction Regulation and Enforcement Reform," which provides detailed guidelines for construction permitting and building control systems. This publication emphasises the importance of established processes, the agencies involved, performance measures, and recommended periodic reviews (every 5 to 10 years). In this publication, key performance indicators for regulatory compliance and public safety include: deaths and injuries related to construction, number of structural collapses or defects in new structures compared to the total new building stock, cost of repairing construction defects, unannounced periodic audits of new constructions by inspectors, data on building defect settlements from civil lawsuits against designers, contractors, and building officials, estimates of illegal building activity derived from random surveys, number of building permits and occupancy permits issued, timelines for permit application processing, and associated permitting costs.

Similarly, USAID (n.d.) advocates for regulatory practices that are transparent, efficient, effective, and equitable. They recommend a "whole-of-government" approach with internal coordination to achieve a coherent regulatory system. Beyond capacity building, USAID highlights the need for simplified, step-by-step guidelines for regulatory implementation. Humanitarian organisations such as the Global Shelter Cluster (2021), underscore the importance of customisation in developing detailed guidelines for construction in humanitarian settings. This is crucial because standard building codes may conflict with humanitarian imperatives, internal pressures, traditions, and donor expectations in such contexts.

In line with these principles, the World Bank Group (2013) has examined various emerging best practices in building control across different jurisdictions such as Austria (focuses on regulating the builder rather than the building), Colombia (focuses on privately run permitting process), France (employs an insurance-driven building regulatory system), Norway (assigns code compliance responsibilities to professionals), Singapore (enhances efficiency through electronic permitting systems), the UK (authorizes approved private-sector inspectors and inspection agencies to conduct inspections), and Australia (gives builders a private-inspector option). Figure 2.8 summarises the primary elements of the emerging regulatory control chains in Austria, Colombia, and New Zealand.

	1 Review of Plans	2 Issuance of Permits	3 Site Inspections	4 Code Compliance Certificate
Austria	Certified Private Engineer	Municipality	Certified Private Engineer	(Notification)
Colombia	Certified Private Engineer	Certified Private Engineer	Municipality	Municipality
New Zealand	Accredited Agency (Public or Private Entity)	Accredited Agency (Public or Private Entity)	Accredited Agency (Public or Private Entity)	Accredited Agency (Public or Private Entity)

Figure 2.8: Emerging Regulatory Control Chain

Source: The World Bank Group (2013)

The 2014 Government Regulatory Practice Initiative (G-REG) in Aotearoa, New Zealand, a network of central and local government regulatory agencies, represents another illustrative example of ongoing regulatory reform (Heijden, 2019). These initiatives generally target the planning, permitting, inspection, and compliance certification processes. Numerous studies emphasise that the fundamental guarantees of building safety stem from adherence to building materials standards, adequacy of structural designs, and conformity to building codes and regulations. Achieving global quality assurance in construction necessitates addressing a complex array of challenges, including cultural, economic, financial, political, social, and technological factors.

Lovegrove (2019) identifies twelve core principles for best practice in building regulation for 2020 and beyond as the need for: (i) a unified building act, (ii) clearly defined objectives for the building act, (iii) a single set of building regulations, (iv) a singular building code, (v) a dedicated ministry for construction, (vi) a board responsible for practitioner licensing, (vii) building officials tasked with overseeing building approvals, (viii) a mandatory final joint inspection, (ix) a robust builder registration and licensing regime, (x) a user-funded auditing regime, (xi) a specialized division within tribunals and courts for hearing building disputes, and (xii) a stringent liability regime that protects consumers and appropriately allocates liability among multiple parties based on their contribution to poor construction outcomes.

The World Bank Group (2013) advocates for continuous reforms to legal and institutional frameworks to effectively address current and emerging regulatory challenges. Their emphasis is on ensuring that processes, agents, and performance measures are transparent, efficient, effective, and equitable. Consequently, the World Bank Group (2013), USAID (n.d.), and Lovegrove (2019) have all reviewed and proposed the adoption of several emerging best practices in building control.

Additional recommendations for enhancing construction quality and compliance include: developing a sound and agreeable enforcement policy framework to improve the organizational and technical aspects of building standards and regulatory compliance (Agapiou & Yakubu, 2019); implementing strict measures against public sector corruption, intensifying quality testing of materials, and enhancing procurement procedures (Kakitahi et al., 2015); promoting the Industrialized Building System (IBS) or prefabrication processes, fostering collaboration among stakeholders, securing top management commitment, and embracing continuous improvement and leadership as alternatives for quality enhancement (Alaloul et al., 2023); and emphasis on quality in the contractor selection procedure as per the FIDIC (International Federation of Consulting Engineers) procedures (CIDB, 2011).

2.5.2 Singapore

In the early 1990s, the Singaporean government, in collaboration with professionals from various sectors, developed a master plan to leverage information technology (IT) for boosting productivity and improving citizens' quality of life, including within the real estate sector. This initiative led to the creation of the Construction and Real Estate Network (CORENET), an online platform designed to enhance the quality and efficiency of construction approvals by enabling online applications and verifications (World Bank Group, 2013). Prior to these reforms, obtaining construction approvals in Singapore was a cumbersome process, requiring multiple applications to different agencies. This often resulted in delays, unnecessary interactions, and increased costs associated with printing, transportation, and office storage (Government of Singapore, 2016).

The Building Control Department (BCD), now known as the Building and Construction Authority (BCA), was tasked with leading the digitalisation of approval processes. Their comprehensive approach included: establishing various digital back-office systems, categorising and granting project approvals based on anticipated risk levels, integrating, simplifying, and standardising approval requirements and processes, providing training for qualified professionals, and raising public awareness through regular seminars and workshops to foster ownership and commitment.

To encourage adoption, early users of e-submission services received incentives, subsidies, and dedicated support. CORENET was supported by a massive educational campaign involving digital "how-to" modules and virtual workshops that ensured a high level of stakeholder ownership. Mandatory use was only implemented three years after the initial launch (World Bank Group, 2013). This provides a global precedent for your e-learning proposals. The adoption of the CORENET e-Information System and the use of common technical standards have significantly improved efficiency and quality within Singapore's construction industry. This success led to subsequent upgrades, from CORENET to CORENET 2.0, and most recently to CORENET X.

These advancements have resulted in a remarkable reduction in turnaround times for construction industry business processes (Government of Singapore, 2016), as illustrated in Figure 2.9.

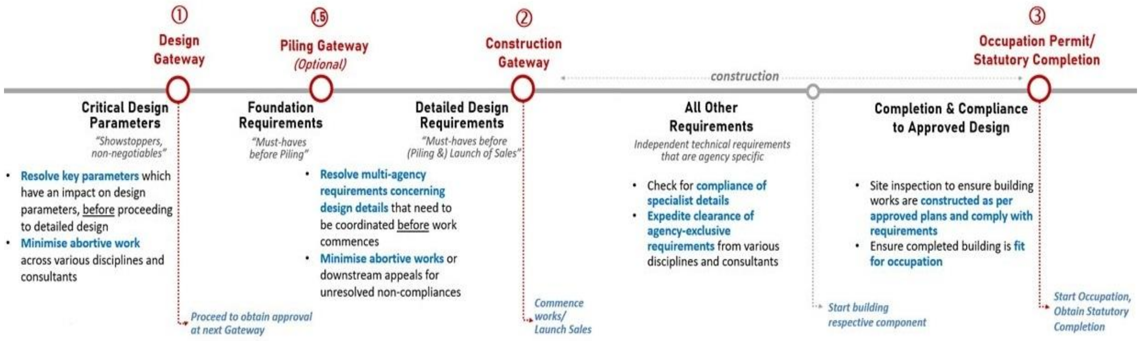

Figure 2.9: Redesigned Approval Processes

Source: BCA (2023)

Singapore's Building Control Authority (BCA) developed the Construction Quality Assessment System (CONQUAS) to encourage high-quality building practices among contractors. Several other countries, including Malaysia, China, Thailand, Hong Kong, India, and Vietnam, have since adopted this system. CONQUAS employs a sampling methodology to assess adherence to quality standards. The outcome is a CONQUAS score, expressed out of 100, which indicates the project's overall quality. A bonus or penalty of 0.2% of the effective contract sum is applied for each point scored above or below a predetermined threshold (CIDB, 2011).

To ensure accountability, contractors who accumulate more than five CONQUAS default points across their latest five contracts face an automatic downgrade of one grade for up to 12 months. Furthermore, if a contractor accumulates 10 or more default points within their latest five contracts, debarment is recommended (BCA, 2023). The assessment typically covers structural, architectural, and mechanical/electrical works. Utilising the CONQUAS system provides several benefits for contractors, including benchmarking workmanship quality, increasing client confidence, gaining a competitive advantage, strengthening market position, and enhancing corporate image (CIDB, 2011).

2.5.3 Victoria, Australia

Australia implemented a competitive building control system in 1994, initiated by the Building Act of 1993. This legislation established the Building Commission (BC), tasked with overseeing building control. These reforms aimed to enhance efficiency and effectiveness within the industry while simultaneously addressing information asymmetry, a market condition where sellers possess more information than consumers or buyers (World Bank Group, 2013).

The regulatory framework was crucial for ensuring and guaranteeing a desired level of building safety, health, and amenities for both building occupants and government agencies. The Building Commission's functions encompass a wide range of responsibilities, including enforcing compliance with the Building Act and its associated regulations, actively participating in the development of national building standards, monitoring industry developments, overseeing the building-permit levy-collection system, providing information and training to the building industry, facilitating dispute resolution, and advising the responsible minister (World Bank Group, 2013).

Under this system, building permits can be issued by both private building surveyors (inspectors) and municipal councils (NSW Government, 2023). To safeguard the public when engaging private building practitioners, the 1994 reforms to Australia's building legislation mandated compulsory registration and insurance for builders and other categories of building practitioners. This created a competitive building-permit system, as illustrated in Figure 2.10. Under this revised framework, building owners became responsible for applying for building permits and for notifying the building surveyor of any design modifications (World Bank Group, 2013). To enhance consumer protection, the developer's bond against defects was increased from 2% to 3% of the total building cost (NSW Government, 2023).

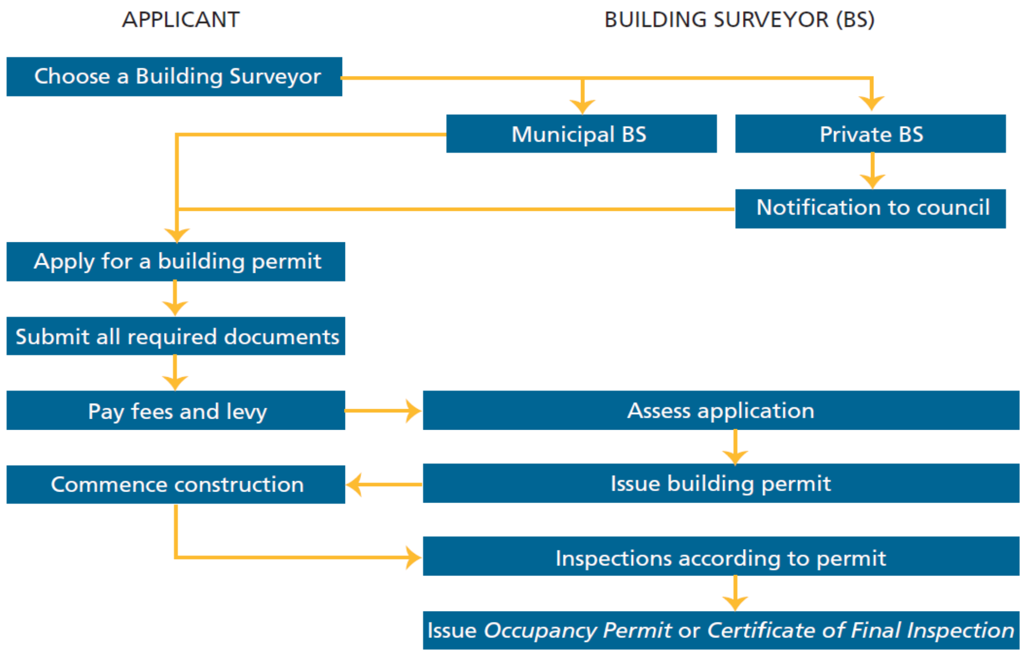

Figure 2.10: Pathways for Building-Permit Approval and Inspections

Source: The World Bank Group (2013)

The 1994 reforms to Australia's building legislation mandated compulsory registration and insurance for builders and other categories of building practitioners. Under this revised framework, building owners became responsible for applying for building permits and for notifying the building surveyor of any design modifications (World Bank Group, 2013). To enhance consumer protection, the developer's bond against defects was increased from 2% to 3% of the total building cost (NSW Government, 2023).

Designers are responsible for producing functional working drawings and specifications that adhere to applicable laws and may apply for building permits. General contractors bear the overall responsibility for construction, which includes procuring materials, scheduling, ensuring quality workmanship, and managing subcontractors and suppliers. They also serve as the primary contact with the building surveyor and oversee site inspections to ensure conformity with the building permit. Subcontractors, in turn, are responsible for their specific portion of the work (World Bank Group, 2013).

Further changes to building legislation in November 2023 altered the nature of site inspections for residential and freestanding buildings. These inspections transitioned from a "lodgement" requirement to an "anytime, anywhere" activity, empowering inspectors to issue rectification orders, stop work orders, or impose penalties (NSW Government, 2023). The Act also introduced a chain of responsibilities and new duties for manufacturers, suppliers, importers, designers, and tradespeople involved in the building product supply chain, thereby enhancing accountability.

Despite these reforms, the system has faced criticism regarding its efficacy in safeguarding public safety, ensuring competence, and enforcing compliance with the Building Act. Critics argue that the system's heavy reliance on the competence, performance, and honesty of private-sector practitioners may compromise the achievement of public safety and other public objectives (World Bank Group, 2013). There is a perception that this reliance has led to an abdication of duties by public surveyors, consequently having a detrimental effect on the quality of inspections (Baiche, Walliman, & Ogden, 2006).

2.5.4 United Kingdom

The United Kingdom embarked on modernising its building regulatory system in 1984. This process began with transforming the Building Code into a more flexible, innovation-friendly, performance- or objective-based code, followed by a similar transformation of the building control regime itself (World Bank Group, 2013). Under this new system, home builders gained the flexibility to choose between private approved inspectors or inspectors from the local authority, often engaged by the National House Building Council (NHBC), for building inspections. By 2012, approximately 60 private approved inspectors, including several large corporate inspection firms, were actively operating, undertaking an estimated 30% of building control work (World Bank Group, 2013).

UK legislation mandates local authorities to act as backstop providers of building control for all types of construction within their municipal boundaries. The focus is primarily on building control rather than strictly controlling building practitioners. Additionally, approved contractors have the option of self-certification for small, low-risk projects. However, a more stringent regulatory regime applies to higher-risk buildings (those at least 18 meters in height or with a minimum of seven stories), as shown in Figure 2.11.

A crucial requirement is the submission of a Construction Control Plan (CCP) as part of the building control approval application. This ensures that before construction commences, all duty holders (client, contractor, designers) have clear strategies in place to guarantee continuous compliance with all applicable building regulations (Crown, 2023). In cases of design changes, a clear change control plan is required to maintain accurate records, ensure appropriate regulatory oversight of these changes, and mandate the reporting of safety occurrences (Crown, 2023).

When a builder opts to use an approved inspector, both the builder and the inspector must file an initial notice with the local building control authority. This notice, accompanied by building plans and all project information, formally communicates this decision and indicates that the builder will not be seeking building control services from the local authority. Consequently, the local building authority's role includes filing the approved inspector's documents, ensuring adherence to required procedures, and providing alternative, backstop inspections if an approved inspector is not used or becomes unavailable (World Bank Group, 2013).

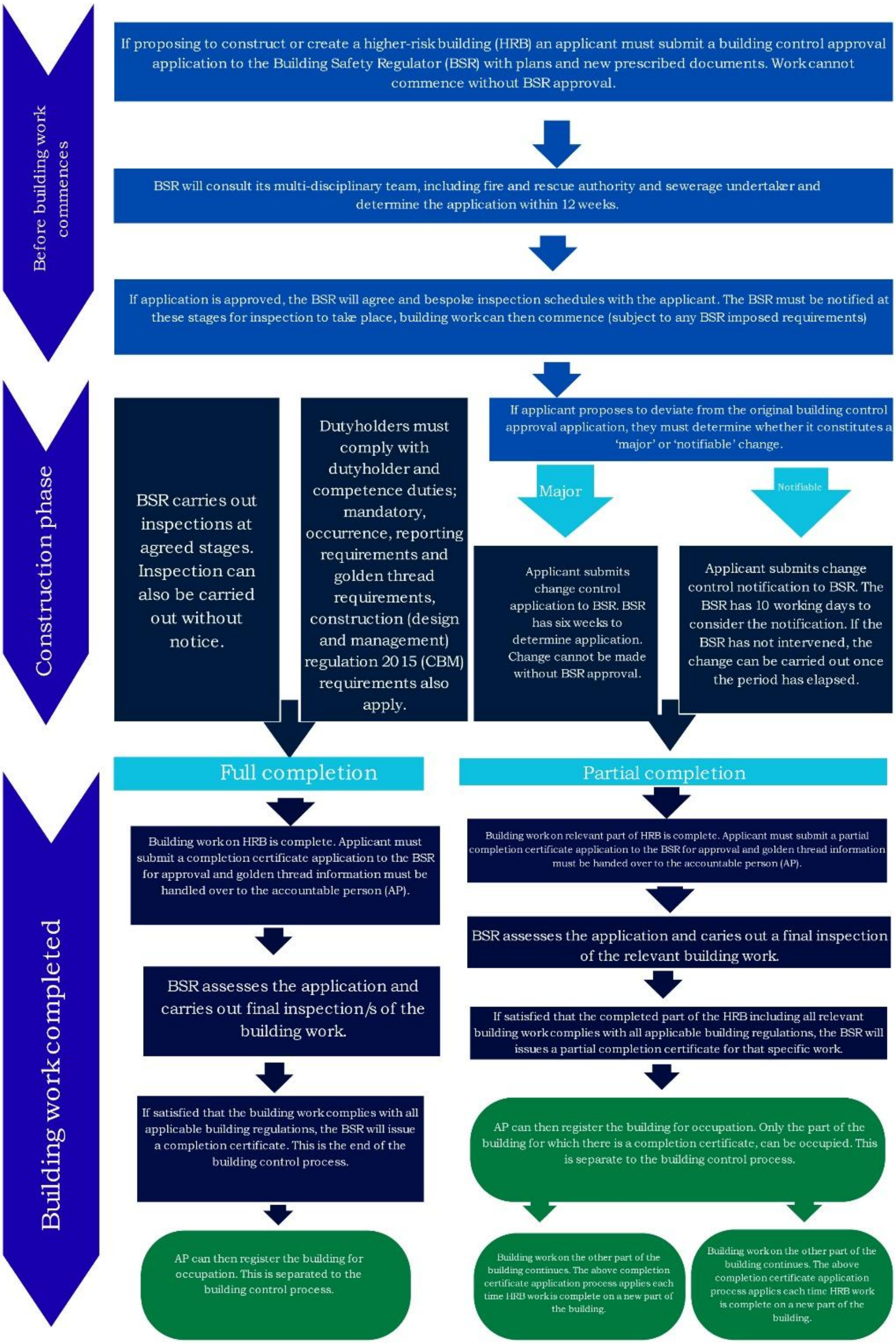

Figure 2.11: Building Control Process for Creating Higher-Risk Buildings

Source: Crown (2023)

The approved inspector and the builder collaborate to develop a schedule of inspections at the project's outset, with the number of inspections varying based on the project's nature. It's important to note that the plan's certificate (approval) issued by the approved inspector at the beginning cannot be challenged, nor can the completion certificate, which signifies that the approved inspector has reviewed the building and is satisfied that the construction complies with the Building Code. This system also incorporates a centralised registration process.

To qualify as an approved inspector, individuals must demonstrate competence through a combination of experience, credentials, and successfully passing an interview conducted by the Construction Industry Council (CIC) (World Bank Group, 2013). The government has entrusted the CIC with administering the registration system for approved inspectors, encompassing both qualification and disciplinary aspects. Approved inspectors are also mandated to carry the required level of errors and omissions insurance with a 10-year runoff period, designed to cover any personal injury and economic loss resulting from their negligence.

Generally, in the UK, the primary responsibility for ensuring building code compliance lies with the builder. A notable success attributed to the introduction of approved inspectors has been the transformation of the public sector's approach to building control. This shift moved from a bureaucratic mindset focused on identifying reasons to reject plans to a more service-oriented philosophy (World Bank Group, 2013). However, a significant drawback identified with approved inspectors is their propensity to select the most profitable projects, leaving less lucrative endeavours unaddressed (World Bank Group, 2013). To enhance accountability, the application for a Completion Certificate now mandates individual compliance declarations from the client, the principal designer, and the principal contractor (Crown, 2023). Additionally, a system has been implemented to facilitate retrospective applications for previously unauthorised building work.

2.5.5 Other Measures for Improving Construction Regulation

Business Process Reengineering (BPR) is a widely recognised methodology for initiating significant organisational changes, particularly in response to economic, political, and social pressures such as those stemming from building failures (Twum-Darko & Mazibuko, 2015). Experts like Windapo and Rotimi (2012) and Laubscher (2011) contend that catastrophic events and adverse impacts can arise from the failure to implement efficient and effective procedures, especially within construction regulation, or when regulatory actions prove unsuccessful. Laubscher (2011) therefore advocates for a shift in focus towards restructuring regulatory procedures. The aim is to ensure consistency in interpreting and applying legislation, thereby guaranteeing buildings that are safe and healthy for human habitation and that meet necessary environmental safeguards.

Drawing on these insights, Twum-Darko and Mazibuko (2015) evaluated the primary business procedures of South Africa's National Building Regulations. Their objective was to assess the efficacy of these regulations in ensuring structural safety and, by extension, protecting end-users, building owners, and occupants. They proposed a three-step critical approach: understanding and interpreting the issues, re-evaluation, and developing improvements where weaknesses and inadequacies are identified. They also emphasised that BPR initiatives should be supported by sufficient measures and robust monitoring frameworks. Despite its potential, BPR has faced considerable criticism due to its inherent limitations. The two main criticisms are that it can lead to a significant number of job redundancies or layoffs, and that it operates under the assumption that faulty processes are the sole cause of poor performance, overlooking other contributing factors.

Shewaram (1996) observes that successful case studies often transcended the confines of BPR by adopting more holistic approaches. She argues that merely redesigning business processes may prioritise efficiency at the expense of innovation and flexibility, making it unsuitable for driving massive organisational change. Cao et al. (2001) further note that an exclusive focus on process, structure, culture, or power distribution has contributed to high failure rates. As an illustration, Shewaram (1996) references a 1994 survey that indicated a 70% BPR failure rate in entities where it was implemented.

2.6 Building Regulations and Compliance in Kenya

2.6.1 Kenya's Evolving Construction Regulatory Landscape

Kenya has one of Africa's most comprehensive regulatory frameworks for the construction industry, encompassing both national and county government levels. It is also notable for being one of the few in Africa to have adopted Regulatory Impact Assessment (RIA) for all policies, a practice highlighted by USAID (n.d.). This robust regulatory environment has driven significant transformations within the industry since the colonial era.

The initial regulatory measures were introduced by the colonial administration in 1926 through a set of building by-laws applicable to the then Nairobi Town Council. These were subsequently superseded by the Nairobi City Council By-laws (Building) in 1948, which were later codified as the Local Government (Adoptive By-Laws) (Building) 1968, commonly known as the Building Code. This code largely replicated the then British Building guidelines, drawing upon the independence constitution, among other foundational documents.

The promulgation of the Constitution of Kenya (2010) marked a pivotal moment. It repealed the Local Government Act (CAP 265), which had underpinned the 1968 Building Code, thereby rendering the code ineffective due to the absence of an enforcing authority. This constitutional shift necessitated a comprehensive review and amendment of other acts designed to regulate the construction industry, ensuring their alignment with the new constitutional order. For instance, the Fourth Schedule of the Constitution of Kenya (2010) (Part 1) designates "National Public Works" (item 19) and "capacity building and technical assistance to counties" (item 32) as responsibilities of the National Government.

Consequently, numerous Ministries, Departments, Agencies, and all Counties (MDACs) have been vested with implementation, coordination, or oversight roles in construction matters. These include, but are not limited to the National Construction Authority (NCA), currently under the State Department for Public Works (under which the new National Building Code 2024 is anchored), the 47 County Governments, the National Building Inspectorate (NBI), the Directorate of Occupational Safety & Health Services (DOSHS), Kenya Bureau of Standards (KEBS), National Environment Management Authority (NEMA), the National Land Commission (NLC), and the Water Resources Authority (WRA). Other specialised zone regulators, such as the Kenya Civil Aviation Authority (KCAA), Kenya Airports Authority (KAA), Kenya Ports Authority (KPA), Kenya Wildlife Service (KWS), and Kenya Railways Corporation (KRC) also exist.

While construction project quality assurance activities across these diverse entities should ideally be seamlessly integrated for comprehensive oversight, significant fragmentation persists in practice. Table 2.5 shows the site-specific roles of some of the different MDACs involved in the construction industry regulatory endeavour.

Table 2.5: Quality Assurance Legal and Institutional Framework

Agency	Legal Basis	Operationalization	Site-specific construction role
County Governments	The Constitution of Kenya (2010) (4th schedule)	-The Constitution of Kenya (2010) -County Governments Act, No. 17 of 2012 -National Government Coordination Act, No. 1 of 2013 - Physical and Land Use Planning Act (PLUPA) (2019) and attendant regulations -Urban Areas and Cities Act (2011) -Zoning Ordinance -National Land Use Policy (2017)	-Handles the planning and development functions, land survey and mapping, and housing to be done by the Counties. -County Government enforcement officers carry out regular inspections of the construction processes on site (excavation, foundations, plumbing, underground works, structural framing and stairs, finalisation, and certification before occupancy). -Issues amalgamation certificates, construction permits, inspection certificates, and Occupation Certificates. -Can issue closure notices in case of non-compliance. -Provide for the classification, governance, and management of urban areas and cities -Rights of participation by residents

Agency	Legal Basis	Operationalization	Site-specific construction role
National Environment Management Authority (NEMA)	Environmental Management and Coordination Act (EMCA), No. 8 of 1999	-Waste Management Regulations (2006) -Wetlands regulations - EIA Regulations (2017) -Noise regulations -Other*	-Environmental protection -Issues EIA's/ ESIA's/ EA's Licences -Implements the conditions of the permit
Water Resources Authority (WRA)	Water Act No. 43 of 2016	-Water authority rules and regulations	-Issues special zone permits (riparian zones)
National Construction Authority (NCA)	NCA Act No. 41 of 2011	-NCA Regulations (2014) -National Building Regulations (2024), also called the National Building Code 2024	-Registers contractors and construction site supervisors. -Accredit skilled construction workers. -Issues Certificate of Compliance, taking into consideration approvals by County governments, NEMA, WRA, etc. -Carry out quality assurance inspections and issue closure notices where necessary
Directorate of Occupational Safety & Health Services (DOSHS)	Occupational Safety and Health Act, (2007)	-Building Operations and Works of Engineering Construction (Safety) Regulation (BOWEC)	-Registration and renewal of workplaces -Workplace Inspection -Examination and testing of plants -Accident investigation and WIBA Processing - Issuing improvement/ prohibitory notices
National Building Inspectorate (NBI)	Executive Order No. 1 of 2018	-	-Audit buildings for conformity with land registration, planning, zoning, building standards, and structural soundness.
Kenya Bureau of Standards (KEBS)	Standards Act. Cap. 496	-Standards Tribunal (Practice and Procedure Rules (2013) -Various standards	-Standardisation of construction materials and equipment
Kenya Civil Aviation Authority (KCAA)	The Civil Aviation Act No. 21 of 2013	-The Civil Aviation (Rules of the Air) Regulations (2018)	-Issues special zone permits (areas around airports)
Kenya Airports Authority (KAA)	Kenya Airports Authority Act (Cap 395) of 1991	-Civil Aviation (Aerodrome Design and Operations) Regulations 2024	-Regulates the planning, design, and construction of runways, taxiways, aprons, and terminal buildings -KAA and KCAA regulate the height of any building or structure within a 15km radius of an airport or airstrip

Agency	Legal Basis	Operationalization	Site-specific construction role
Kenya Ports Authority (KPA)	Kenya Ports Authority Act (Cap 391) of 1978	-	-Controls any private or public construction within port limits or the shoreline
Kenya Wildlife Service (KWS)	Wildlife Conservation and Management Act (WCMA), 2013	-Wildlife Conservation and Management (Activities in Protected Areas) Regulations, 2015	-Regulate developments in protected areas -Provides technical clearance for EIAs for lodges or infrastructure built within protected ecosystems
Kenya Railways Corporation (KRC)	Kenya Railways Corporation Act (Cap 397) of 1978	-	-Controls and regulates construction within railway reserves (way leaves)
National Land Commission (NLC)	The Constitution of Kenya, 2010	-National Land Commission Act No. 5 of 2013 -Lands Act, No. 6 of 2012 -Land Registration Act, No. 3 of 2012	-Revises, consolidates, and rationalises the registration of titles and leases -Issuance of land ownership documents (titles)

Source: Author compilation (2026)

As previously discussed, the primary objective of these legal and institutional frameworks was to foster the development of safe and structurally sound buildings. However, as illustrated in Figure 2.12, the contemporary regulatory landscape is characterised by jurisdictional overlaps and fragmented mandates, often leading to administrative ambiguity and significant enforcement challenges. The succeeding sections discuss the roles of the six primary building regulators in detail: the County Governments, the National Environment Management Authority (NEMA), the Water Resources Authority (WRA), the National Construction Authority (NCA), the Directorate of Occupational Health and Safety Services (DOSH), and the National Building Inspectorate (NBI).

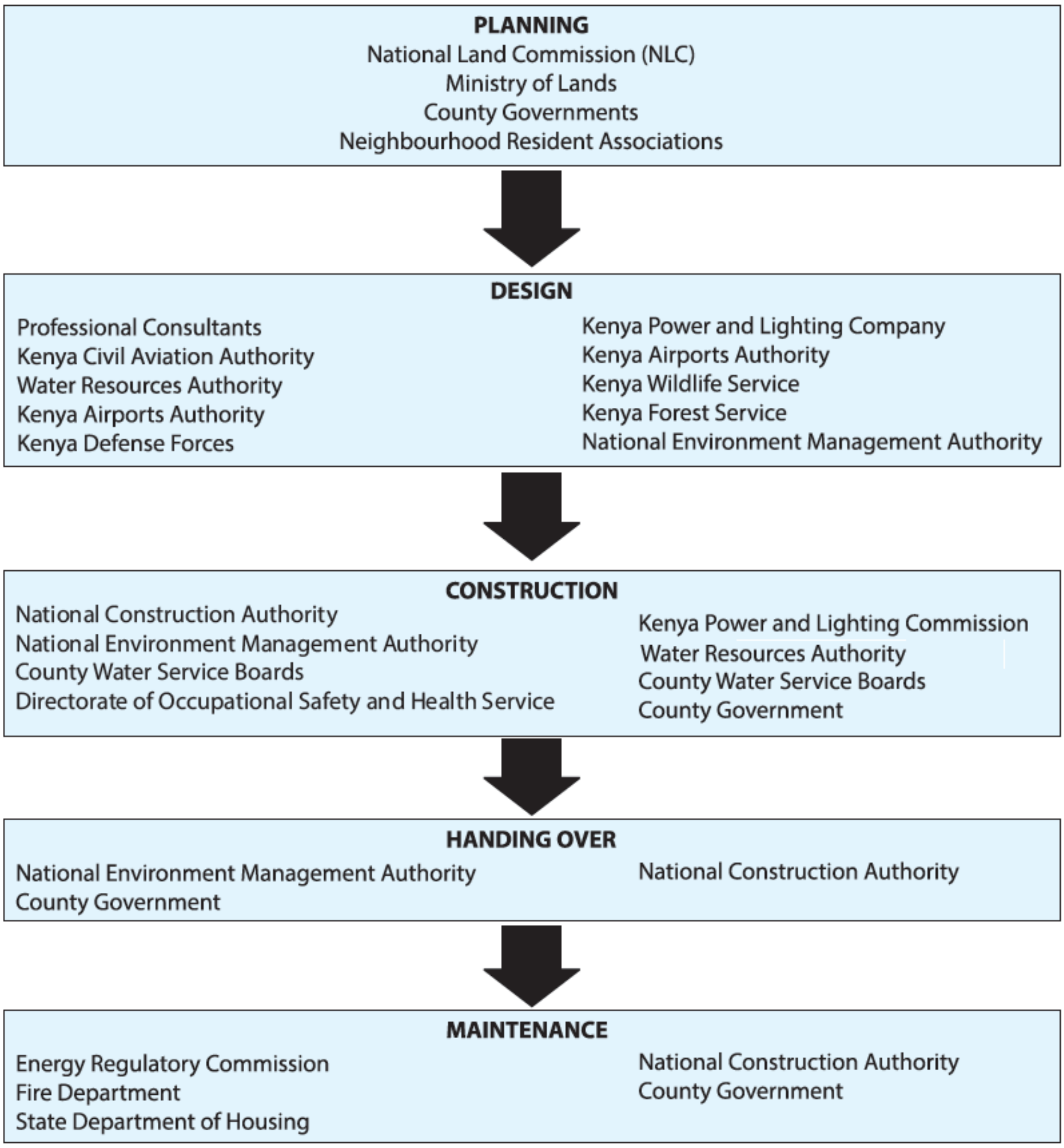

Figure 2.12: Institutions Involved at Different Stages of Construction

Source: NCA (2020)

a) County Government – Nairobi City County

In Kenya, Counties are established by the Constitution of Kenya (2010) as the primary units of devolved government. These county governments bear significant responsibility for all matters related to the built environment. Their authority is derived from a comprehensive set of legal instruments, including the Constitution of Kenya (2010), the Public Health Act Cap 242, the Physical and Land Use Planning Act

(PLUPA) (2019), the Land Registration Act (2012), County Governments Act (2012), Urban Areas and Cities Act (2011), Environmental Management and Co-ordination Act (1999), and the National Building Regulations (2024) among others.

County Governments are tasked with developing physical planning guidelines, issuing construction approvals and permits, and ultimately providing Certificates of Occupation. They are also legally mandated to inspect all stages of a building project, from foundation excavation to reinforcement, concrete works, walling, plumbing, and drainage. However, the National Construction Authority (NCA) reported in 2020 that these inspections are often infrequent due to capacity challenges within the county governments (NCA, 2020).

Building permit issued by the County Government is a requirement for all construction projects, regardless of their size or nature in line with the Constitution of Kenya (2010), County Governments Act, No. 17 of 2012, National Government Coordination Act, No. 1 of 2013, Physical and Land Use Planning Act (PLUPA) (2019) and attendant regulations, Urban Areas and Cities Act (2011), National Land Use Policy (2017), County Zoning ordinances, and the National Building Regulations (2024) among others. Compliance with these regulations is essential for ensuring order, safety, and environmental preservation in all construction projects. The issuance of a building permit signifies official authorisation that the proposed building adheres to established design, construction standards, and regulations.

Nairobi City County utilises a hybrid permitting system (combining online and physical processes) for the approval of architectural and structural drawings. Before submitting these drawings for permitting, applicants must first obtain a Survey Plan and a Beacon Certificate (Survey Form C/3) from a qualified Surveyor. These documents are crucial for supporting ownership proofs, such as a Land Title or Share Certificate, and a rates clearance certificate. Should the proposed development conflict with existing zoning requirements, a change of user application, processed and approved with the assistance of a planner in accordance with PLUPA (2019), must be completed prior to any development proposal submission for permitting.

To obtain architectural plan approval, one is required to: (i) register on the Nairobi City County self-service portal, (ii) submit architectural plans and all other supporting documents through the platform, (iii) pay the required permit fees - county permitting costs vary based on the zone, total built area and type of project e.g. residential, public, offices, shops, warehouses, industry, regularization, occupation certificate, etc. The other related charges are the site construction board fee (Annual License fee of KSh. 15,000), and the site construction board fee (Annual License Application fee of KSh. 5,000), (iv) obtain architectural plans approval notification online (once approved), (v) submit a hard copy of architectural plans for signing and stamping, (vi) obtain authenticated architectural plans and construction permit. The passing of the plan approval operates based on provisions of the National Building Code (2024), the Public Health (Cap 242), the Physical Planning Act (2019), Sections 36, 41, and 52; and any other rules made thereunder. Development proposals must also be commenced within twelve months of the date of the approval and completed within two years of such date. Failure to meet these deadlines or to seek an extension will render the approval null and void.

The construction permit is issued with a set of conditions that can vary based on the specific project, in accordance with Section 8 of the Third Schedule of the PLUPA (2019). Some of the common conditions include: (i) maintaining a certificate of workmanship (ii) Ensuring that all debris and excavated materials are dumped on sites approved by the county, (iii) ensuring that an occupation permit is obtained before occupation, (iv) ensuring that the plot does not constitute any disputed private or public utility allocations, (v) installing a project signboard as per M.O.W. standards, approved by City County of Nairobi indicating names, addresses and telephone numbers of developers, contractors, project consultants, (vi) ensuring that no trees shall be cut down and/or uprooted without permission from Director of Environment City Council of Nairobi, (vii) ensuring that works are executed by a contractor registered with National Construction Authority (NCA), (vii) indemnifying the County (including their agents or assignees) approving the plan from any claims that might arise during and after construction, (viii) ensuring provision of facilities for physically challenged persons, (ix) ensuring approval is renewed on expiry for uncompleted works (x) maintaining way leave for sewer, water, power, drainage, riparian way leave,

(xi) providing solar for hot water as per ERC Act, and (xii) submission of satisfactory details including foundations, Beams, columns & Trusses.

Upon completion and approval of architectural plan submissions, the process progresses to structural plan approval. This similarly involves (i) submission of structural plans (and all necessary details and calculations), (ii) obtaining of structural plans approval notification, (iii) submission of a hard copy of structural plans for signing and stamping, and (iv) obtaining of the authenticated structural plans. With both architectural and structural drawings approved by the county, the developer must then comply with other legal requirements, such as securing an Environmental Impact Assessment (EIA) Licence from the National Environment Management Authority (NEMA) and a Certificate of Compliance from NCA.

To ensure adherence to permit conditions, the county government is legally required to conduct both organised and impromptu site visits. Historically, the City Council of Nairobi (now Nairobi City County) utilised a postcard system to monitor developments (Copy attached as Appendix I). This physical document, issued upon development proposal approval, was intended to facilitate staged inspections by building inspectors. It captured crucial details like the date and time of receipt, plot number, section, land registration number, road, and plan registration number. Developers were mandated to provide 30 hours' notice before a required inspection, with failure to do so potentially resulting in a fine, imprisonment, or both. Inspections were limited to mornings and targeted specific works: foundation excavation, foundation concrete, oversite consolidation and concrete, damp proof course, reinforcement, shuttering removal, surface soil drains, and completion. The card was also meant to be signed and dated after each inspection.

While structural concerns exist regarding the content of this postcard, there is currently no evidence of its active use. Developers are no longer issued these cards, and there are no records of fines or imprisonments resulting from their disregard. Generally, non-compliance with permit conditions can lead to severe consequences, including site closure, permit withdrawal, penalties, prosecutions, demolition, or a combination of these actions.

b) National Environment Management Authority (NEMA)

The National Environment Management Authority (NEMA), established under the Environmental Management and Coordination Act No. 8 of 1999 (EMCA), serves as the principal government body responsible for implementing all environmental policies in Kenya. NEMA fulfils its mandate by publishing various regulations addressing diverse environmental concerns, such as the Environmental Impact Assessments (EIA) regulations, wetlands regulations, waste management regulations, air quality regulations, and noise regulations, among others.

NEMA exercises comprehensive oversight over all environmental matters. This includes inventorying Kenya's natural resources, monitoring their utilisation, and promoting conservation. One of their key functions is to ensure the integration of environmental considerations into all development projects. Specifically, Environmental Impact Assessments (EIAs) and Environmental and Social Impact Assessments (ESIAs) are mandatory for all projects exceeding KSh. 5,000,000 in value. NEMA issues a conditional license only after confirming that the minimum requirements have been met and validated. Furthermore, existing commercial developments are required to undertake annual Environmental Audits (EAs) and submit the necessary reports.

Through these studies, conducted by licensed experts or firms, comprehensive measures are developed to mitigate negative impacts (risks, hazards, and vulnerabilities) and maximize positive effects across all project stages: planning, design, construction, operation, monitoring, evaluation, and decommissioning. Building projects are specifically categorised under the Second Schedule of EMCA (1999) as activities requiring an EIA/ESIA. These assessments must be conducted systematically from the project's inception to ensure that environmental considerations are integrated into decision-making processes.

An EIA expert is responsible for preparing and submitting a Summary Project Report (SPR) to NEMA for approval. This report details the likely environmental impacts of the project and proposes mitigation measures. An SPR typically outlines the nature of the project supported by approved designs drawn to scale and signed by a qualified person like an architect or engineer, the location of the project including proof of land ownership, elaboration of any environmentally sensitive area to be affected, description on conformity to land use plan or zonation plan, identification of potential environmental and social impacts of the project at all the project cycle phases (Planning, Construction, operation and decommissioning) and the necessary mitigation measures. This process culminates in the development of an Environmental Management Plan (EMP) for the entire project lifecycle. Comprehensive public consultation is often required, with evidence presented through duly signed minutes of consultation meetings with project-affected persons and key stakeholders, attendance lists, and completed questionnaires.

The simplified steps for obtaining the licence are as follows: (i) the proponent (project client/representative) engages a registered expert for the service – one should have an account in the NEMA licensing portal, (ii) the expert prepares and submits EIA/ESIA study report certified by the proponent online, (iii) the expert submits hard copies of the study report to the nearest NEMA office,(iv) a notice for gazettement is obtained from NEMA, (v) a proforma invoice is generated for payment for gazettement, (vi) a gazette notice is obtained, (vii) evidence of advertisement is submitted to NEMA, (viii) a conditional EIA/ESIA licence is obtained, and (ix) an Environmental Management Plan (EMP) of ESIA/EIA is implemented in the project. The project proponent is responsible for all EIA process costs, including the agreed-upon fee for the expert's services and the fee payable to NEMA. NEMA's fee is set at 0.1% of the total project cost, with a minimum payment of KSh. 10,000 and no upper cap.

The EIA/ESIA license typically includes comprehensive, project-specific conditions classified into several categories, normally as: (i) general conditions (covers issues such as licence validity period – normally two (2) years renewable, description of the project, how to handle changes and change orders, and communication), (ii) construction conditions (covers among other, issues associated with approval and implementation of works in partnership with other relevant agencies), (iii) operational conditions (covers among other issues associated with water management, waste management, and general environmental protection), (iv) notification conditions (covers among other changes associated with the licence, handling hazardous malfunctions, and intend to decommission), and (v) decommissioning conditions. To ensure compliance with these permit conditions, NEMA officials are mandated to conduct regular inspections of all facilities. Failure to comply can result in the issuance of improvement notices, restoration or closure orders, license withdrawal, penalties, prosecutions, or a combination of these measures.

NEMA's guidelines recommend three types of monitoring activities: (i) Baseline Monitoring -conducted before construction, (ii) Impact Monitoring – conducted to help detect any environmental changes during construction in line with the baseline data, and (iii) Compliance Monitoring -conducted periodically to check on compliance with recommended environmental safeguards. Monitoring and inspection activities are also guided by project EMPs in EIA and EA reports, licensing conditions, public complaints, developer requests, and established office workplans. Section 117/137 of EMCA (1999) mandates that every member of the public must grant inspectors access to their premises and provide requested information. Sample EIA inspection report forms and EMP monitoring tools are available in Appendix II (a) and (b).

c) Water Resources Authority (WRA)

The Water Resources Authority (WRA), established under the Water Act, 2016, functions as an agent of the National Government. Its primary responsibility is to regulate the management and use of water resources across Kenya. Section 12 of the Water Act grants WRA the authority to formulate and enforce standards, procedures, and regulations governing water resource management, utilisation, and flood mitigation. To fulfil this mandate, WRA has developed key regulations, including the Water Resources Regulations (2021) and the Water Harvesting and Storage Regulations (2021).

The National Construction Authority (NCA) Act (2011) broadly defines "construction works" to include various water-related infrastructure, such as drainage systems, irrigation works, river control structures, bridges, dams, reservoirs, pipelines, sewers, and site clearance, among others. Consequently, the National Construction Authority (NCA) registers contractors undertaking these types of works and consults with WRA regarding any development proposed near water bodies. If, during a Due Diligence

(DD) inspection by NCA Compliance Officers (prior to issuing a Compliance Certificate) or through notification from a developer or stakeholder, it is determined that a building project site is located within or close to a riparian reserve or floodplain, WRA is promptly informed to provide professional and legal guidance.

By invoking the provisions of the Sixth Schedule of the Water Resources Management Rules (2007), WRA imposes strict requirements for riparian areas to ensure that: (i) no permanent buildings are developed on the riparian, (ii) no disposal of any form of waste occurs on the riparian land, (iii) no excavation of soil or development of quarries is done on the riparian, and (iv) no activity which in the opinion of WRA or any other relevant stakeholder may degrade the water resources is allowed. Approvals from WRA are typically communicated through an official letter addressed to the project proponent.

WRA conducts quality inspection activities based on stipulated conditions and enforces them by issuing orders under Regulation 130 of the Water Resources Regulations, 2021. This empowers WRA to issue an order to any person to desist from any activity, demand the implementation of corrective measures, such as demolition, suspension/stop orders, or orders specific actions to be undertaken to improve compliance. In the context of building projects, any variation of approved works without obtaining re-approval constitutes a breach of permit conditions. Such violations can lead to arrests and prosecution, carried out in liaison with the Police and the Office of the Director of Public Prosecutions.

There is, however, an evident discrepancy in the definition of riparian by NEMA and WRA. NEMA, through the EMCA (1999), defines it as the distance between six (6) and 30 metres on either side of a river bank, depending on the highest ever recorded flood level (horizontal distance), while WRA defines it through regulations as six (6) metres to 30 metres from the top edge of a river (height). These create confusion that the sectors need to address.

d) The National Construction Authority (NCA)

According to the NCA Act (2011), the National Construction Authority (NCA) has the overall mandate to regulate, streamline, and build capacity in the construction industry of Kenya (NCLR, 2023). The NCA Regulations (2014), which operationalise this Act, outline four core functions of the Authority as: (i) registration of all contractors operating within Kenya, (ii) registration of all construction projects undertaken in Kenya, (iii) certification and accreditation of skilled construction workers and construction site supervisors operating in Kenya, and (iv) collection of construction levy.

According to the provisions of Section 17 of the NCA Regulations (2014), it is the responsibility of the developer to register a project. This is facilitated through the NCA's Online Project Registration System (OPRS). Developers, however, must fulfil several prerequisites before registration, including: (i) obtaining a construction approval permit from the relevant county planning department, and (ii) securing an Environmental Impact Assessment (EIA) or Environmental and Social Impact Assessment (ESIA) license from the National Environment Management Authority (NEMA) for projects exceeding KSh. 5,000,000 in value.

To submit a development application on OPRS, a developer must satisfy the following requirements. First, the developer must create an OPRS account and nominate a contractor. The nominated entities must be registered with the NCA and must possess a valid practicing license at the time of application and processing. Secondly, a developer is required to nominate project consultants, including engineers, architects, and quantity surveyors. These consultants must be duly registered with their respective professional regulatory bodies, such as the Engineers Board of Kenya (EBK) and the Board of Registration of Architects and Quantity Surveyors (BORAQS), and hold valid practicing licenses. The application cannot proceed until nominated consultants confirm their participation online and accept adherence to the established code of conduct.

In the application binder, the developer is required to submit the following, among others: (i) drawings: architectural and structural drawings approved by the relevant county government authority, (ii) county building permit: physical planning forms (county approval permits/ letters/PPA2), (iii) Other statutory and regulatory approvals such as NEMA, EPRA, WRA and KCAA licenses (where applicable), (iv) bill of quantities summary page duly signed and stamped by a registered quantity surveyor, (v) copy of developer’s Kenya Revenue Authority (KRA) Personal Identification Number (PIN), (vi) Signed contract/tender form or signed agreement by developer with the contractor, and (vii) supervision commitment letters by consultants and/or agreements/contract by developer with consultants.

Upon fulfilling all requirements, the NCA contacts the developer to schedule a visual inspection of the construction site. This Due Diligence inspection aims to verify the adequacy of the submitted information, map out the site using Global Positioning System (GPS), and subsequently issue a conditional Certificate of Compliance. Should a developer wish to change the project consultants, contractors, or project details after receiving a Certificate of Compliance, they are required to log into the OPRS and select "Submit Updated Application." All necessary documents must be re-uploaded for review and approval, currently free of charge, provided the changes are deemed satisfactory.

While Section 5 (2) (g) of the NCA Act (2011) mandates the Authority to "promote and ensure quality assurance in the construction industry," no formal document currently stipulates the exact methodology for achieving this. Nevertheless, the NCA has developed a seven-item checklist to define its quality assurance activities. These are: (i) the engagement of NCA registered contractor on site, (ii) erection of site board showing all approvals and the professionals engaged in the project, (iii) having safety signs on site, (iv) adorning Personal Protective Equipment (PPE) while on site, (v) ensuring sufficient hoarding and fencing on sites, (vi) having a valid NCA Compliance Certificate, and (vii) engaging NCA accredited construction workers and site supervisors in construction activities as shown in suspension notice Appendix III.

Failure to meet any item on this checklist results in a suspension notice issued by a compliance officer, detailing the non-compliant items and requiring remedial actions within a specified period, typically fourteen days. Non-compliance after this period leads to site closure and potential prosecution of the developer. In extreme cases, particularly for unregistered projects or those failing to meet minimum quality and safety standards, the NCA collaborates with other agencies through the Multi-sectoral Agency Consultative Committee (MSACC) to review the building and recommend actions, which may include demolition and prosecution.

The National Construction Authority (NCA) Act of 2011 envisioned the NCA as the central coordinating body for the construction industry, with a primary focus on quality assurance and an overarching coordination and oversight role, as depicted in Figure 2.13.

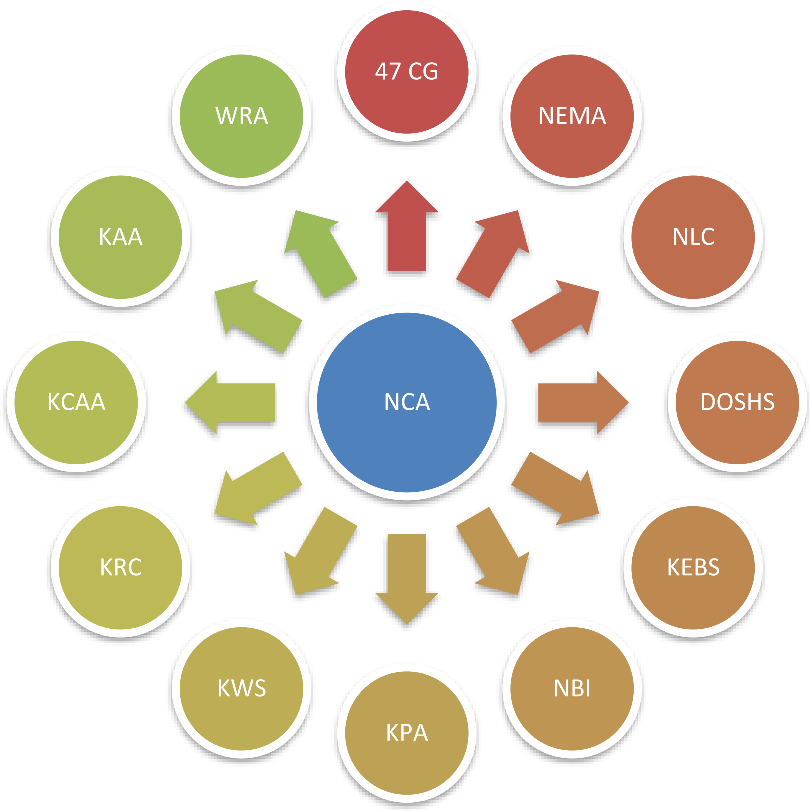

Figure 2.13: Postulated Role of NCA in Construction Industry Coordination

Source: Author (2026)

This framework has, however, faced considerable criticism. Currently, the NCA is perceived by some as overstepping its mandate by engaging in activities that fall within the purview of other regulatory bodies, particularly concerning its quality assurance functions, as shown in Table 2.6. Additionally, a significant limitation identified is the NCA's lack of prosecutorial powers, which hinders its ability to fully achieve its objectives.

Table 2.6: Analysis of QA Checklist by NCA

Inspection item	Legal citation
(i) engagement of the NCA registered contractor on site	NCA Act Sec 16, 18 & 19 NCA Regulations Sec 3 – 16
(ii) erection of a site board showing all approvals and the professionals engaged in the project	National Building Code 2024 BOOM
(iii) having safety signs on site	*DOSHS
(iv) adorning Personal Protective Equipment (PPE) while on site	*DOSHS
(v) ensuring sufficient hoarding and fencing on sites	*DOSHS
(vi) having a valid NCA Compliance Certificate	NCA Regulations 17 (6) NCA Act 5(2)(i)
(vii) engaging NCA-accredited construction workers and site supervisors	NCA Regulations 18 – 24 NCA Act 5(2)(l)

**Currently implemented by NCA using the legal provisions of other institutions*

Source: Author compilation (2026)

Despite these challenges, there's a growing recognition among both government and industry stakeholders regarding the severe human and socio-economic consequences of regulatory failures in the construction sector. This awareness has spurred a concerted effort to strengthen existing institutional frameworks. For instance, the NCA Act No. 41 of 2011 was amended in 2020 through the Business Laws (Amendment) Act (2020). This amendment aimed to formally incorporate the Building Code, now referred to as the National Building Code 2024. The implementation of this Building Code involves a shared responsibility, with the NCA supervising the building control function, while county governments oversee the development control function. This collaborative approach seeks to address previous criticisms and enhance the overall effectiveness of construction industry regulation.

e) Directorate of Occupational Safety and Health Services (DOSHS)

The Directorate of Occupational Safety and Health Services (DOSHS), established under the Occupational Safety and Health Act (OSHA) (2007), is a department within the Ministry of Labour and Social Protection. Its primary mandate is to ensure compliance with the provisions of OSHA (2007) and administer the Work Injury Benefits Act (WIBA) (GoK, 2007).

DOSHS employs a multidisciplinary team of safety advisors, including engineers, chemists, biologists, doctors, and environmentalists, to ensure workplaces are free from hazards and comply with established safety standards. Their core functions involve conducting routine inspections, examinations, and investigations to ensure workplaces adhere to the Act's provisions and associated regulations, registration of workplaces, registration of plants, registration of approved persons and institutions, workplace inspection & audits, examination & testing of plants, accident investigation & WIBA processing. Inspection officers are guided by the provisions in the Building Operations and Works of Engineering Construction (BOWEC) Rules derived from the Factories Act CAP 514 (now repealed), and the documented Standard Operating Procedures (SOPs) for conducting compliance with safety and health laws.

DOSHS plays a crucial role in ensuring the quality assurance of buildings throughout their entire lifecycle. Ideally, DOSHS should review architectural drawings before construction to ensure that the planned building and its facilities meet minimum safety requirements. Further, during construction, occupational safety and health officers should conduct routine follow-ups at various stages of construction to ensure compliance. DOSHS advisors should assess safety aspects such as the provision of fire exits (including on-site layouts), the condition of plant and equipment in use that should meet the minimum safety requirements, and materials in use, among other factors, to ensure workers are not inadvertently exposed. DOSHS also ensures workers are not exposed to unsanitary conditions. Where there is a change of design, the architectural plans are supposed to be resubmitted to the area DOSHS office for concurrence to avoid later ramifications. After construction and during actual use of the spaces, DOSHS is again required to periodically review the work environment to ensure it meets the required safety standards.

According to OSHA, any workplace employing more than 20 persons must be registered. Given the diverse safety considerations at construction sites, each project site is evaluated independently, meaning there are no standardised site inspection criteria or checklists. When deficiencies requiring correction are identified during routine inspections, DOSHS has the legal authority to issue either an improvement notice or a prohibitory notice. An improvement notice mandates the recipient to implement specified improvements, as advised by inspectors, within a 14-day timeframe. This may include actions such as staff safety training. A prohibitory notice immediately halts work until certain stipulated conditions are fulfilled.

DOSHS issues various documents to facilitate compliance. One key document is the notification and application for registration of building operations or works of engineering construction. This requires anyone undertaking building operations lasting over six weeks to notify the area Occupational Health and Safety Officer within seven days of commencing operations, providing specific particulars. This process includes: Payment of an OSH levy of KSh. 5,000, completion of a self-assessment form (DOSH 23), and Appointment of a Safety Supervisor (DOSH 30). Appendix IV (a), (b), and (c) show the different documents often issued by DOSHS.

Currently, up-to-date statistics regarding the application of these requirements within the construction industry are unavailable. Furthermore, these specific DOSHS requirements are notably absent from the seven-item checklist utilised by the National Construction Authority (NCA) during its compliance checks.

f) The National Building Inspectorate (NBI)

In 2015, a series of building collapses, and notably the Huruma tragedy that claimed over 50 lives, prompted a presidential directive on January 19, 2015, via letter Ref. OP/CAB 26/1/3A. This directive instructed the Principal Secretary, Ministry of Land, Housing and Urban Development, to undertake several critical actions. These included a comprehensive audit of all buildings to identify those not meeting construction standards, inspecting buildings for validation and regularisation of safe unauthorised structures, issuing Certificates of Occupation, and proposing mitigation strategies, including the immediate demolition of substandard buildings. The directive also called for a vetting committee to determine building habitability, collaboration with police and stakeholders to address impostors, and facilitating the issuance of title deeds. Consequently, the National Building Inspectorate (NBI) was established to execute these directives.

Executive Order No. 1 of 2018 further solidified the NBI's mandate. It tasked the NBI with identifying unsafe structures, auditing and testing them for structural integrity, and determining appropriate actions, including demolition of uninhabitable buildings, to ensure necessary approvals for minimum safety standards are met. It also tasked the NBI with integrating and coordinating legal, regulatory, policy, and institutional frameworks to foster a multi-sectoral agency approach capable of enforcing standards and ensuring a functional built environment.

The NBI's creation aimed to foster a safe and healthy built environment for citizens and to support the government's development blueprints, such as the Big Four Agenda, specifically the affordable housing goal, now customised to align with the current administration's Bottom-up Economic Transformation Agenda (BETA) for inclusive growth. The NBI fulfils this mandate by conducting inspections and audits of buildings, collecting and compiling data, and preparing audit reports. To avoid conflicts with other government entities with similar mandates, the NBI primarily focuses on the audit and testing of existing (completed) buildings to ensure their compliance with design standards and specifications.

Despite an extensive legal and institutional framework for quality assurance in the building and construction industry, involving numerous institutions and legislative acts, these measures have inadvertently compounded rather than resolved industry challenges. This issue largely stems from a perceived lack of coordination among these entities. This view is consistently highlighted in observations from various bodies, including the Commission of Inquiry (1996), the Ministry of Housing (2015), the Building Law & Regulation Review and Harmonisation Committee (2009), and the

NCA (2020), among others. Furthermore, a common challenge across most agencies is their lack of prosecutorial powers, necessitating constant reliance on the National Police Service (NPS) for enforcement.

2.6.2 Compliance Processes for Building Works in Kenya

Kenya faces a significant challenge in its built environment, characterised by widespread non-compliance with construction standards. The World Bank (2019) estimates that approximately 70% of Kenya's cities consist of unregulated settlements, rendering them highly susceptible to hazards. This assessment is corroborated by a physical audit conducted by the National Building Inspectorate (NBI), which examined 14,895 buildings. The audit revealed that only 14.73% (2,194 buildings) were deemed safe, while a staggering 72.45% (10,791 buildings) were found to be unsafe, and 4.85% (723 buildings) were structurally very dangerous (NCA, 2020). These findings align with Omollo's (2020) research, which also identified low compliance as a statistically significant issue within Kenya's building sector. Such non-compliance ultimately leads to substantial costs, particularly in the event of building collapses. This situation stands in stark contrast to the National Construction Authority's (NCA) strategic objective of achieving 90% compliance with building standards by 2025 (NCA, 2021).

Despite the Kenyan government's efforts over the years to establish appropriate legislation, policies, and strategies aimed at enhancing the resilience and safety of the built environment (World Bank, 2019), significant shortcomings persist. Nyangweso (2007) critically observes that Kenya's building regulatory system, while promising in intent, often proves deceptive in practice. For instance, underlying the reported vibrancy and growth of the sector are outdated policies, such as a more than half-century-old Building Code whose review was perpetually delayed. The city of Nairobi, where this study is situated, also operated without an updated master plan for several decades. Furthermore, workforce deficiencies are prominent, with Kenya reportedly having a low ratio of professionals to its population, and over 50% of development control-related activities are allegedly conducted by unqualified individuals. These systemic weaknesses, among others, are believed to have fostered a culture of non-compliance within the sector (NCA, 2020; Nyangweso, 2007; World Bank, 2019).

The Fourth Schedule of the Constitution of Kenya 2010 assigns the national government a central role in policy formulation and oversight, while counties are tasked with policy implementation. However, this general framework is insufficient to effectively guide the sector, as evidenced by a persistent lack of coordination among the various agencies involved. Through the lenses of institutions referenced in the preceding section, NCA (2020) has outlined seven important approval processes for building construction quality assurance to include: (i) architectural plan submission and approval, (ii) structural plan submission and approval, (iii) EIA/ESIA licensing, (iv) registration by NCA, (v) construction, (vi) inspection, and (vii) obtaining Certificate of Occupation. There is an urgent need to harmonise the diverse laws and regulations governing these processes to foster synergy among implementing institutions.

The current compliance management process for building developments commences at the local level. A committee established by the County Government's Development Control division reviews proposed developments, either approving, disapproving, or recommending changes. This process begins with the submission of architectural designs, prepared and approved by a registered architect in good standing with a current practising license. Subsequently, structural designs are submitted under the authority of a registered structural engineer, also in good standing. All parties involved in the project must obtain approval of these construction plans at the county level, as permitting and inspection processes are vital for achieving the structural integrity, functionality, aesthetic appeal, and economic viability of the building.

Upon county-level approval, the developer must engage an environmental expert to prepare an Environmental Impact Assessment (EIA) or Environmental and Social Impact Assessment (ESIA), depending on the development's size and value. Once the relevant conditions are met, this assessment is then licensed by NEMA. These approved documents are subsequently submitted to the NCA for registration and validation before a Certificate of Compliance is issued.

The NCA undertakes several checks to ensure the integrity of submitted information. Firstly, all listed consultants (architects and engineers) are notified and required to confirm their awareness of and participation in the projects. Other licenses, including the County building permit, NEMA's EIA/ESIA, and Water Resources Authority (WRA) permits, are also validated. Following this, the developer must nominate a contractor with a current registration license to undertake the construction works. An NCA team then conducts a due diligence site visit to validate the project location and site characteristics before issuing a compliance license for work execution. Should the site require clearance from other agencies, such as WRA, Kenya Wildlife Service (KWS), or Kenya Airports Authority (KAA), necessary communication is initiated, and the Certificate of Compliance is delayed until concurrence is obtained from the affected agency. Once the compliance certificate is issued, the developer can commence and proceed with works, ensuring adherence to the conditions of all relevant permits.

Throughout the construction phase, various agencies conduct occasional site visits (both organised and ad hoc) to ensure the project progresses under sufficient supervision and oversight as required, culminating in the County Government issuing a Certificate of Occupation upon project completion. These processes, actors, and actions are summarised in Table 2.7 and Figure 2.14. These seemingly straightforward processes are, in reality, fraught with considerable complexities. A primary contributor to the failures in regulatory enforcement is the inconsistency of requirements, which vary significantly across different counties and project types. This lack of a uniform national standard complicates effective implementation and compliance.

Table 2.7: Responsibility Matrix

Category	Actors	Process tools	Place	Person	Inputs	Outputs
A. Regulators	NCA County Govts. WRA NEMA DOSHS	Institutional systems/ processes/ laws/ regulations	Office/ construction site	Legal	Laws, standards	Safe buildings Harmony Order
B. Regulatee’s	Construction Worker Site foreman Consultant	Contractual agreements/ laws	Office/ construction site	Legal/ natural	Service (labour, materials, expertise)	Building structure
C. Unregulated	Client	Construction brief	Office/ Site	Legal/ natural	Finances Aspirations	Vision

Source: Author (2026)

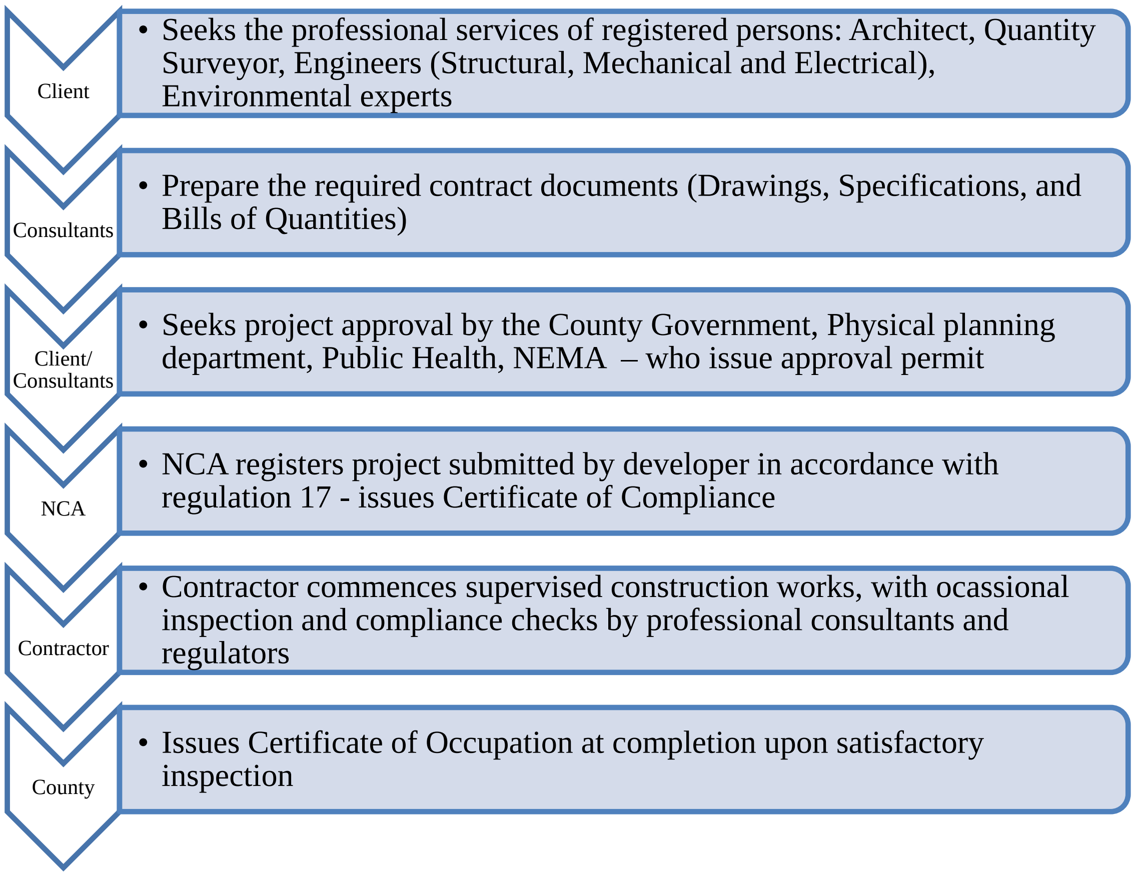

Figure 2.14: Building and Regulatory Processes in Kenya

Source: Author compilation (2026)

2.7 Measurement of Regulatory Compliance

Regulatory compliance signifies the degree to which mandatory regulatory provisions are adhered to. Effective measurement of this adherence involves both internal and external indicators, which should align with the measurable aspects of a regulator's functions and provide performance evaluation metrics. The OECD (2014) suggests that internal performance assessments should typically focus on systems, processes, and procedures, in evaluating the regulator's general operations crucial for effectiveness. Conversely, external appraisals should concentrate on whether strategic objectives, such as safeguarding public health or refining reliability, are being met.

Various scholars highlight critical indicators for regulatory compliance to include: (i) reputational and perception effects of regulator/regulation including customer satisfaction or display of behaviour and opinions that persons and organisations make towards the regulation and/or the regulator (Heijden, 2009; Parker & Nielsen, 2017); (ii) penalties imposed for default (Coglianese, 2012; Heijden, 2009); (iii) visibility of violations to complainants (Parker & Nielsen, 2017); (iv) frequency of interaction with regulated entities (Parker & Nielsen, 2017); (v) adherence to quality statement (s) (Parker & Nielsen, 2017); (vi) defects identified and construction cost wasted on reworking defective components (Mashwamaa et al., 2017; World Bank Group, 2013; Waje & Patil, 2012); (vii) reduction or elimination of the problem(s) that provoked the government to implement the regulation (Coglianese, 2012); (viii) the number of inspections done and enforcement actions taken (Coglianese, 2012); (ix) adaptability and/or flexibility of the regulator towards the regulation (Coglianese & Kagan, 2007; Heijden, 2019); (x) the degree to which the regulated public abide by the regulations (Amodu, 2008); (xi) the method of enforcement applied by the agency to protect regulatory responsiveness (Amodu, 2008); (xii) complaints and complaints handling (Parker & Nielsen, 2017); (xiii) reports on impromptu audits of structures by inspectors (OECD, 2014; World Bank Group, 2013); and (xiv) number of building officials including numbers of successful prosecutions (OECD, 2014; World Bank Group, 2013). Others include material-related attributes in markets and construction sites on aspects such as (xv) quality aspects (Ashworth, 2010; Chin-Keng & Hamzah, 2011; Mashwamaa et al., 2017); (xvi) materials standards (Ashworth, 2010; Basu, 2014; Elbashir, 2018; Stevens, 1996); (xvii) material testing culture (Ashworth, 2010; Elbashir, 2018; Stevens, 1996); and (xviii) information disclosures on products or processes (Coglianese & Kagan, 2007).

The World Bank Group (2013) further notes the following as important metrics: (xv) frequency of regulatory reviews (every 5 to 10 years); (xvi) number of construction-related deaths and injuries; (xvii) number of structural collapses or other flaws in new structures compared to the number of the new building stock; (xviii) information on structural defect; (xix) settlements in civil litigation against involved consultants, contractors; (xx) estimates of number illegal construction arrived at through random surveys; (xxi) number of construction permits delivered; (xxii) number of occupancy permits delivered; (xxiii) permit application timelines; and (xxiv) associated permitting costs.

According to NCA (2021) the Strategic Plan of Kenya's National Construction Authority under the Key Result Area 3 on safety in all construction works, the Authority seeks to: (i) ensure compliance with construction industry standards; (ii) enforce the building code; (iii) enforce the code of conduct; and (iv) develop and promote construction standards and best practice guide. Consequently, the Authority has projected several performance indicators in its 5-year Strategic Plan to include: (i) improved budgetary allocation; (ii) 90 % adherence to quality construction check-lists; (ii) 10% improvement in compliance to the building code; (iii) increasing the number of quality assurance checks; (iv) 15% increase in awareness of the building code; (v) 15% increase in awareness of the code of conduct; and (vi) increased number of sensitization initiatives especially with regard to the standardization framework. A summary of these indicators is captured in Table 2.8.

Table 2.8: Summary of the Indicators of Regulatory Compliance

Author	***Measure or Indicator (s)***
(OECD, 2014)	Internal: systems, processes, and procedures External: appraisals on public health and refining reliability
(Heijden, 2009; Parker & Nielsen, 2017)	Reputation, perception, customer satisfaction
(Coglianese, 2012; Heijden, 2009)	Penalties imposed for default
(Parker & Nielsen, 2017) (Mashwamaa et al., 2017; Waje & Patil, 2012; World Bank Group, 2013)	Visibility of violations; frequency of interaction between the regulated and the regulators; adherence to quality statement (s) Defects identified; construction cost wasted on reworking defective components
(Coglianese, 2012)	Reduction or elimination of the problem(s) that provoked the government to implement the regulation; the number of inspections done, and the enforcement actions taken
(Coglianese & Kagan, 2007; Heijden, 2019)	Adaptability and/or flexibility of the regulator towards the regulation
(Amodu, 2008)	The degree to which the regulated public abides by the regulations; the method of enforcement applied by the agency to protect regulatory responsiveness
(Parker & Nielsen, 2017)	Complaints and complaint handling
(OECD, 2014; World Bank Group, 2013)	Number of building officials, including the number of successful prosecutions; reports on impromptu audits of structures by inspectors frequency of regulatory reviews (every 5 to 10 years); number of construction related deaths and injuries; number of structural collapses or other flaws in new structures compared to the number of the new building stock; information on structural defect; settlements in civil litigation against involved consultants, contractors; estimates of number illegal construction arrived at through random surveys; number of construction permits delivered; number of occupancy permits delivered; permit application timelines; associated permitting costs
(NCA, 2021)	Compliance levels to construction industry standards and regulations; compliance to the building code; compliance to the code of conduct; development and promotion of construction standards and best practices; budgetary allocation trend analysis; awareness levels

Source: Author compilation (2026)

To operationalise the measurement of regulatory compliance in the study, the various factors have been categorised into three. These are: (i) factors on the registration status of a construction project (RS); (ii) factors on conditions or activities occurring in a construction project site (PS); and (iii) factors on the status of the workforce engaged in a construction project site (CW).

2.8 Determinants of Regulatory Compliance

2.8.1 Suitability of the Project Legal Framework (SLF)

The effectiveness of any regulatory process hinges on the suitability of its prevailing legal framework. Several legal factors, identified in existing literature, that can significantly influence the level of regulatory compliance in a project include: (i) precision of regulatory mandate (Coglianese & Kagan, 2007); (ii) legal powers of implementing entity (Amodu, 2008; Heijden, 2019; Shirur & Torgal, 2014); (iii) specificity of legal standards (Albtoush et al., 2022; Amodu, 2008; Heijden, 2019); (iv) specificity of penalties (Albtoush et al., 2022; Amodu, 2008; Heijden, 2019); (v) consistency and reliability of legal interpretation (Hoyle, 2001); (vi) flexibility and/or adaptability of laws (Braithwaite, 2017; Coglianese & Kagan, 2007); (vii) predictability and specifity of laws (Laubscher, 2011; Twum-Darko & Mazibuko, 2015; USAID, n.d.; World Bank Group, 2013); (viii) stringency of regulatory mission (Amodu, 2008; Heijden, 2019; Shirur & Torgal, 2014); (ix) potency and immediacy of sanctions (Albtoush et al., 2022; Amodu, 2008; Heijden, 2019); (x) legal rights of the regulated (Albtoush et al., 2022; Amodu, 2008; Heijden, 2019); and (xi) legal rights of complainants (Albtoush et al., 2022; Amodu, 2008; Heijden, 2019).

2.8.2 Proactiveness of the Regulatory Agencies (PRA)

Regulatory agencies, established by law to oversee implementation, play a crucial role in the success of regulatory efforts. Their effectiveness and proactive approaches are paramount. The following elements related to the proactiveness of a regulator have been cited by different authors as important: (i) clarity of regulators mandate (Coglianese & Kagan, 2007); (ii) legal powers of the regulator (Amodu, 2008; Heijden, 2019; Shirur & Torgal, 2014); (iii) the clarity of the regulators implementation strategy (Fiene, 2016; Fiene, 2018); (iv) monitoring systems of the regulator (CIDB, 2011); (v) communication mechanisms of the regulator (Chin-Keng & Hamzah, 2011; Howarth & Greenwood, 2018); (vi) regulator performance in core in tasks (Heijden J. V., 2009); (vii) presence of oversight entities (Coglianese & Kagan, 2007); (viii) magnitude of recent catastrophes (Amodu, 2008); (ix) support or resistance by regulated governmental entities (Amodu, 2008); (x) clarity of regulators processes (Hoyle, 2001); (xi) presence of project and regulatory pressures (Liu et al., 2022); (xii) introduction of regulatory levy that is envisioned mainly to alter behaviour of firms and not certainly to generate revenue (Coglianese & Kagan, 2007); (xiii) determination and assertiveness of pro-regulation interests, inclinations of key political figures, and controversy over enforcement style (CIDB, 2011; Lovegrove, 2019); (xiv) management of political changes (Amodu, 2008; Heijden, 2019); (xv) socio-political pressures and acceptance (Lovegrove, 2019; Shirur & Torgal, 2014); (xvi) interference (CIDB, 2011); (xvii) leaders' policy beliefs (reactive vs. strong-minded) and beliefs concerning enforcement style (Agapiou & Yakubu, 2019; Amodu, 2008); (xviii) level of professionalism (Amodu, 2008; PMI, 2021); (xix) change management (Amodu, 2008; Hoyle, 2001; Mashwamaa et al., 2017; PMI, 2021); (xx) leadership style (Elbashir, 2018; Mahmood & Mohammed, 2008); (xxi) entity's approach to transparency, ethics, and associated reputational pressures (Agapiou & Yakubu, 2019; CIDB, 2011; Liu et al., 2016; Liu et al., 2022); (xxii) organizational structure including administrative procedures, geographical location, and workforce capacity characteristics, (Coglianese & Kagan, 2007; Heijden, 2009; Heijden, 2019; Parker & Nielsen, 2017); (xxiii) nature of building codes and standards (CIDB, 2011; FIDIC, 2011); and (xxiv) size and/or sophistication of regulated entities (Amodu, 2008).

2.8.3 Efficiency in Regulatory Processes (ERP)

The effectiveness and efficiency of regulatory processes and their management are crucial for achieving successful regulatory outcomes. Literature identifies several process-related factors that significantly influence the level of regulatory compliance to include: (i) predictability and availability of information on regulatory processes (Laubscher, 2011; Twum-Darko & Mazibuko, 2015; USAID, n.d.; World Bank Group, 2013;); (ii) simplicity of process (World Bank Group, 2013); (iii) the clarity of the regulators' implementation strategy (Fiene, 2016; Fiene, 2018); (iv) level of integration (Lovegrove, 2019); (v) display transparency (Fiene, 2018; World Bank Group, 2013); and (vi) flexibility and/or adaptability (World Bank, 2019).

2.8.4 Conduciveness of the Construction Task Environment (CTE)

Factors related to activities within the construction work environment constitute the broadest category of determinants for regulatory compliance. Various authors in the literature have emphasized the following task-related factors as significant for construction regulatory compliance: (i) significance of dangers to be averted (Amodu, 2008); (ii) policy environment in terms of perfection of legislation, application of regulation, severity of non-compliance sanctions, and interference levels (Liu et al., 2016); (iii) project pressures in terms of cost, time, quality, competition (Amodu, 2008; Liu et al., 2016; Mashwamaa et al. 2017); (iv) handling of technical issues of the project (Waje & Patil, 2012); (v) level of participation and/or involvement of the client, designers, construction management (Hoyle, 2001; PMI, 2021; Waje & Patil, 2012); (vi) level of planning involved (Waje & Patil, 2012); (vii) communication (Howarth & Greenwood, 2018; Mashwamaa et al., 2017; Waje & Patil, 2012); (viii) clear tasking stewardship in the project (PMI, 2021; Waje & Patil, 2012); (ix) changing nature of the work-time constraints (Shirur & Torgal, 2014); (x) level of risk planning (Lovegrove, 2019; PMI, 2021); (x) nature or adequacy supervision (Mashwamaa et al., 2017; Waje & Patil, 2012); (xi) technology in use (Lovegrove, 2019); (xii) the desired output (Stevens, 1996); (xiii) quality of design drawings (Adewale et al., 2019; Stevens, 1996); (xiv) quality management (Albtoush et al., 2022; Mashwamaa et al., 2017; PMI, 2021; Waje & Patil, 2012); (xv) safety culture created on site (Amodu, 2008; ILO, 2022; Shirur & Torgal, 2014); (xvi) collaborations (Mashwamaa et al., 2017); (xvii) contractual obligations (Adewale et al., 2019; CIDB, 2011; FIDIC, 2011; Mashwamaa et al., 2017); (xviii) general construction processes and planning (Basu, 2014; Chin-Keng & Hamzah, 2011; Elbashir, 2018; Howarth & Greenwood, 2018; Hoyle, 2001; PMI, 2021; Waje & Patil, 2012; Wawak et al., 2020); (xix) subcontracting (Chin-Keng & Hamzah, 2011); (xx) customer or client characteristics (Ashworth, 2010; Hoyle, 2001); and (xxi) quality of client guidance (AlBarami et al., 2020; Mahat & Adnan, 2018).

2.8.5 Characteristics of the Project Client (CPC)

A client refers to the legal or natural person(s) for whom a construction project is being undertaken. The client's attributes influence compliance through: (i) their willpower to comply (Amodu, 2008); (ii) their knowledge and skills, communication abilities, commitment, and ability to lead and manage especially at the early stages of a project (AlBarami et al., 2020); (iii) their level of involvement (Fu et al., 2023); (iv) ability/capacity to comply legally and/or economically (Heijden, 2009; Shirur & Torgal, 2014); (v) their familiarity with the regulations (Gelder, 1997; Heijden, 2009; Lovegrove, 2019; Parker & Nielsen, 2017); (vi) the nature of contracts they engage in (Mashwamaa et al., 2017); (vii) the social licence encompassing fear of detection, fear of humiliation, and internalized sense of duty (Amodu, 2008; Gunningham, 2015; Liu et al., 2022; Mahmood & Mohammed, 2008); (viii) individual traits like education and ethics (Agapiou & Yakubu, 2019; Emuze & Mhlwa, 2015; Liu et al., 2016; Mahmood & Mohammed, 2008); (ix) liberty to find a cost-effective way of fulfilling regulatory requirements with little or no misunderstanding (Coglianese & Kagan, 2007); (x) profiteering culture (Elbashir, 2018; Emuze & Mhlwa, 2015); (xi) client perceptions to compliance (Parker & Nielsen, 2017); and (xii) client influence (Ashworth, 2010; Emuze & Mhlwa, 2015; Hoyle, 2001; Mashwamaa et al., 2017; Stevens, 1996).

2.8.6 Competency of Project Leaders (CPL)

Project leadership is both an art and a science, essential for guiding teams toward successful project delivery. Although various types of project leaders contribute to a construction project, several competencies have been identified as crucial for determining a project's compliance levels. These include: (i) leaders' policy beliefs (Agapiou & Yakubu, 2019; Amodu, 2008); (ii) leadership style (Elbashir, 2018; Mahmood & Mohammed, 2008); (iii) level of participation and/or involvement of the client, designers, construction management (Hoyle, 2001; PMI, 2021; Waje & Patil, 2012); (iv) level of planning (Waje & Patil, 2012); (viii) stewardship in a project (PMI, 2021; Waje & Patil, 2012); (v) level of professionalism (Amodu, 2008; PMI, 2021); (vi) change management (Amodu, 2008; Hoyle, 2001; Mashwamaa et al., 2017; PMI, 2021); (vii) nature or adequacy of supervision (Mashwamaa et al., 2017; Waje & Patil, 2012); (viii) material handling (Ashworth, 2010; Elbashir, 2018; Stevens, 1996); (ix) quality of specifications (Basu, 2014; Elbashir, 2018; Mahmood & Mohammed, 2008; Mashwamaa et al., 2017; Stevens, 1996); (x) quality management strategies (Albtoush et al., 2022; Mashwamaa et al., 2017; PMI, 2021; Waje & Patil, 2012); (xi) factual approach to decision-making (Hoyle, 2001); (xii) individual traits like level of education, ethics and exposure (Agapiou & Yakubu, 2019; Emuze & Mhlwa, 2015; Liu et al., 2016; Mahmood & Mohammed, 2008); and (xiii) other factors such as influence, determination and assertiveness of pro-regulation interests.

2.8.7 Goodness of Construction Labour (GCL)

The quality of labour on a construction site significantly influences project outcomes, leading many regulators to increasingly focus on worker accreditation. Literature identifies several labour-related factors that determine the level of regulatory compliance to include: (i) workers competence or skill levels (Agapiou & Yakubu, 2019; Ashworth, 2010; ILO, 2022; Mashwamaa et al., 2017; Waje & Patil, 2012); (ii) issues associated with construction dispute resolution (Albtoush et al., 2022; Emuze & Mhlwa, 2015; Lovegrove, 2019); (iii) work attitudes (Lovegrove, 2019; Parker & Nielsen, 2017); (iv) document handling abilities (Basu, 2014; Elbashir, 2018; PMI, 2021); (v) supervision (Elbashir, 2018; Wawak, Ljevo, & Vukomanovi´c, 2020); (vi) established work inspection protocols (Elbashir, 2018); (vii) clear tasking and/or stewardship (PMI, 2021; Waje & Patil, 2012); and (viii) nature of the workforce - transient or permanent (Emuze & Mhlwa, 2015).

2.8.8 Stability of Prevailing Economic Environment (SEE)

Adverse economic factors are recognised as having significant implications for project delivery. Literature highlights several economic factors that can influence this include: (i) the broad economic licence to comply (Heijden J. V., 2009); (ii) liberty to find cost-effective way of fulfilling regulatory requirements (Coglianese & Kagan, 2007); (iii) actual cost of compliance (Amodu, 2008; Parker & Nielsen, 2017); (iv) ability to honour payments (NCA, 2020); (v) dynamic material prices (Stevens, 1996); and (vi) other project pressures (Liu et al., 2022).

2.8.9 Adherence to Ethical Factors (AEF)

The behaviour of project participants within the regulatory, design, and construction environment significantly impacts their regulatory compliance. Literature identifies several unethical manifestations in projects to include: (i) an interference culture (CIDB, 2011) (ii) undercutting (CIDB, 2011); (iii) profiteering culture (CIDB, 2011; Waje & Patil, 2012); (iv) falsifications (Figueroa-Fernandez, 2014; Oseghale et al., 2015); (v) dishonesty and fraud (Figueroa-Fernandez, 2014); (vi) compromise (Ahzahar et al., 2011; Asante & Sasu, 2018; Figueroa-Fernandez, 2014; NCA, 2020); (vii) involvement of unqualified persons who masquerade as professionals (Ahzahar et al., 2011); (viii) bribe-taking and hidden use of substandard materials (Ahzahar et al. 2011; Figueroa-Fernandez, 2014; NCA, 2020). Observation of ethical conduct was also noted to be influenced by (ix) the regulatee's ability and/or capacity to comply legally (Heijden, 2009); (x) the presence of oversight agents (Coglianese & Kagan, 2007; Heijden, 2019); and (xi) determination and assertiveness of pro-regulation interests, inclinations of key political figures, and controversy over enforcement style (CIDB, 2011; Lovegrove, 2019).

2.9 Some Models for Enhancement of Regulatory Compliance

2.9.1 Robust Decision Making (RDM) Model

Robust Decision-Making (RDM) encompasses a set of concepts, processes, and computational tools designed to enhance decision-making in the presence of profound uncertainty. It integrates elements from Decision Analysis, Assumption-Based Planning, Scenario Analysis, and Exploratory Modelling. The primary objective of RDM is to rigorously evaluate strategies across numerous plausible future trajectories. This evaluation then facilitates the identification of policy-relevant scenarios and the development of robust, adaptive strategies (Lempert, 2019).

Traditional regulatory approaches often rely on the imposition of enforcement sanctions following breaches, with the intention of deterring future non-compliance. However, evidence from behavioural science and empirical studies suggests that this strategy has limited efficacy in influencing behaviour (Mangalam et al., 2020).

Increasing the severity or frequency of fines is unlikely to significantly improve compliance, as human behaviour is often driven by automatic processes rather than purely rational deliberation, with individuals subsequently rationalising their actions. Furthermore, the application of excessive force on individuals who perceive themselves as attempting to comply with the law has been shown to diminish their future willingness to comply (Mangalam et al., 2020).

Many instances of non-compliance stem from individuals' inability to fully grasp detailed requirements, misunderstandings of obligations, lack of awareness, or insufficient resources to meet compliance standards. RDM addresses these challenges by investigating the underlying reasons for rule violations, identifying prevalent forms of non-compliance, and characterising the individuals or organisations involved. This shifts the regulatory focus from mere "enforcement" to "regulatory intervention," emphasising issues of awareness, motivation, and capacity (OECD, 2000; Mangalam et al., 2020). RDM aims to precisely identify the root causes of non-compliance and determine appropriate interventions to induce behavioural change. This model encourages regulators to continuously evaluate their strategies and develop a diverse range of hierarchical interventions to achieve successful regulatory outcomes, as depicted in Figure 2.15.

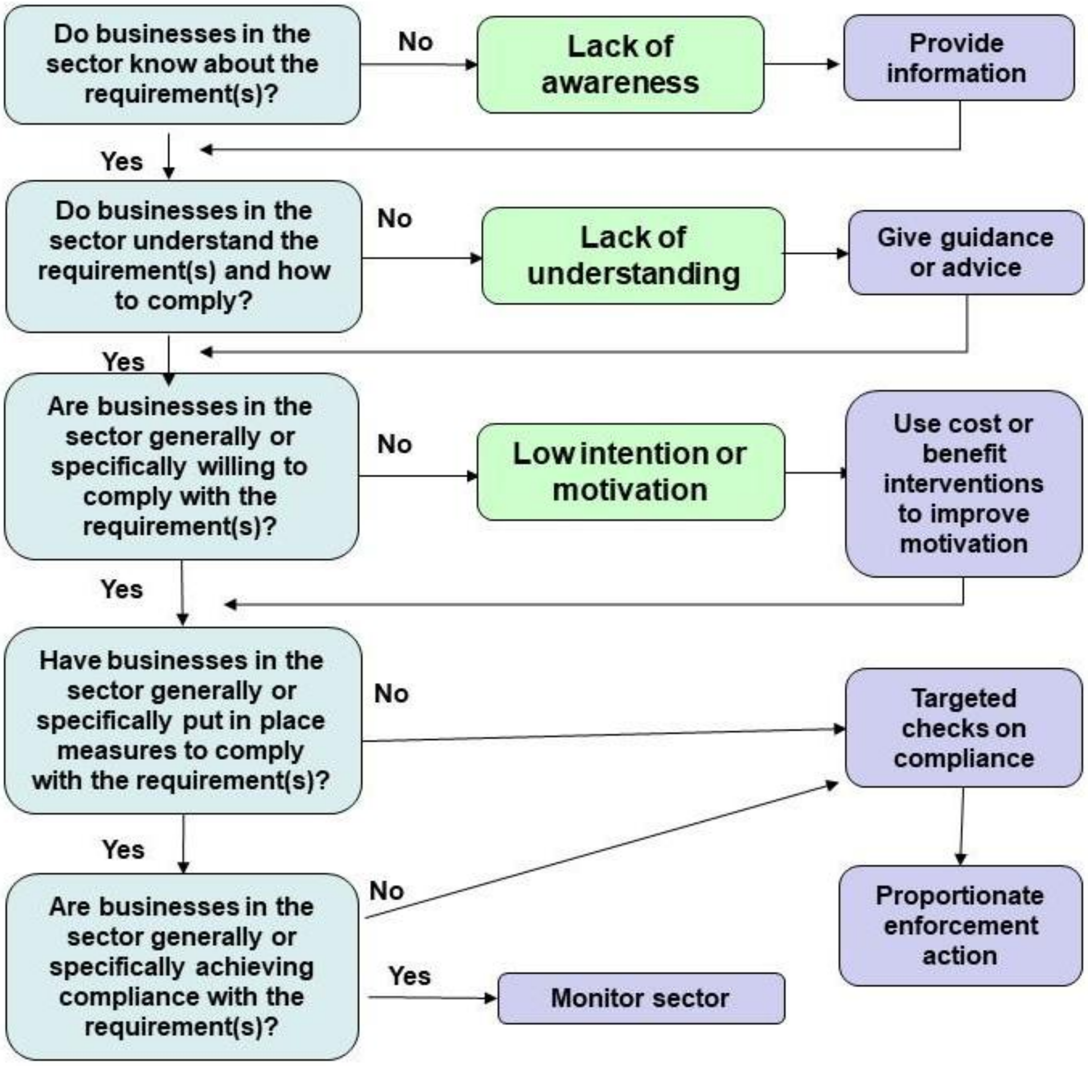

Figure 2.15: Sample Robust Decision Making (RDM) Model

Source: Mangalam et al. (2020)

Sutinen and Kuperan (1999) assert that flagrant violators must be subjected to rigorous enforcement. Failure to control such violations would convey a message that regulatory procedures are either inequitable or ineffective in achieving their stated objectives. This perception could subsequently erode overall compliance and potentially lead to a complete breakdown of the regulatory framework.

2.9.2 Construction Quality Assessment System (CONQUAS)

The Construction Quality Assessment System (CONQUAS), developed by Singapore's Building Control Authority (BCA), is a pragmatic instrument designed to foster superior building quality among contractors. While originating in Singapore, CONQUAS has seen widespread adoption in countries such as Malaysia, China, Thailand, Hong Kong, India, and Vietnam. Initially launched in 1989 under Singapore's Ministry of National Development, it served as a standardised quality assessment system for construction projects. Its design incorporated a sampling approach to evaluate and benchmark workmanship quality, meaning not all projects would undergo assessment. Between its inception in 1989 and 1996, over 2,238 public and private building projects, valued at more than S$81.9 billion, were assessed (BCA, 2023).

Within the CONQUAS framework, completed works are assigned scores reflecting the standard of quality achieved, with higher quality correlating to higher scores, up to a maximum of 100%. Consequently, achieving a high CONQUAS score necessitates the implementation of effective scheduling and control techniques to ensure project completion within established timelines and budgets, while simultaneously upholding safety standards and, crucially, guaranteeing excellent workmanship quality. To this end, the main contractor is obligated to ensure that employees are adequately trained to support the project. This training is often facilitated through a Quality Management Unit (QMU), which ultimately contributes to the realisation of a high CONQUAS score.

For a project to be considered for CONQUAS review, a contractor or developer must submit an application via the e-application platform prior to the commencement of construction, along with the requisite fee. Following this submission, a briefing is conducted to ensure the project team is meticulously familiar with the assessment requirements and processes, as illustrated in Figure 2.16.

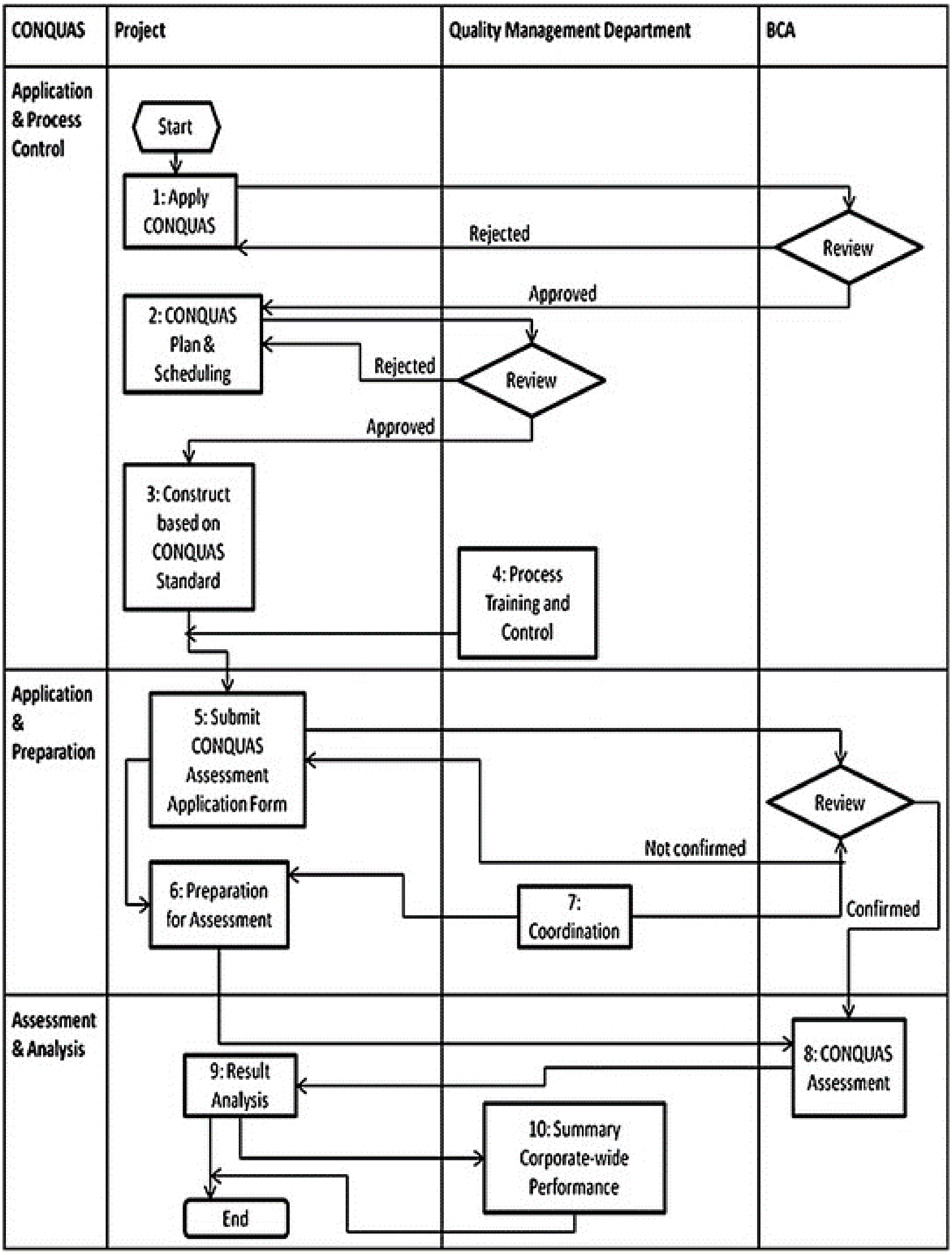

Figure 2.16: CONQUAS Processes

Source: Low and Ong (2014)

The CONQUAS mechanism integrates three core quality management approaches: quality by design, quality by process control or assurance, and quality by inspection.

Contractors and developers who submit their projects for CONQUAS assessment gain several key advantages. These benefits include the ability to benchmark construction workmanship, cultivate increased client confidence, and secure a competitive edge, especially for those who consistently achieve high CONQUAS scores. Furthermore, it leads to enhanced marketability and an improved corporate image.

Financial incentives and penalties are directly linked to CONQUAS performance: a bonus or penalty of 0.2% of the effective contract sum is applied for each point scored above or below a predetermined threshold (CIDB, 2011). To maintain quality standards, a contractor who accumulates more than five default CONQUAS points across their five latest contracts will automatically face a one-grade downgrade for a period of up to 12 months. Should a contractor accrue 10 or more default points in their five latest contracts, debarment is recommended (BCA, 2023). It's important to note that assessments are conducted by BCA Certified Quality Mark / CONQUAS Supervisors and Managers, with final CONQUAS scores typically released nine months after the project's certified completion date (BCA, 2023).

CONQUAS undergoes continuous review and updates to address emerging industry issues. Under the CONQUAS 21 system, which applies to building works, the final score is a cumulative result of three primary components: structural works (30%), architectural works (50%), and Mechanical & Electrical (M&E) works (20%). These weightings, however, may vary based on the specific project category, as detailed in Table 2.9. More importantly, scoring is based on first-time inspections of the works, emphasising the system's objective to encourage contractors to "do things right the first time" (UKEssays, 2018).

Table 2.9: Weightings by Categories of Buildings

	Category			
Component	A: Commercial. Industrial, institutional & others	B: Condominiums, institutional & others	C: Public housing	D: Landed properties
Structural works	30	35	45	40
Architectural works	50	55	50	55
M&E works	20	10	5	5
CONQUAS score	100	100	100	100

Source: Chileshe and Sim (2007)

CONQUAS is widely regarded as a successful and influential system that has significantly contributed to raising construction quality standards in Singapore and beyond. Its continuous evolution and focus on objective assessment and proactive quality management are key strengths.

2.10 Regulatory Reforms

A number of models have been adopted in different jurisdictions to enhance regulatory compliance in buildings, depending on policies and the policy process. Successful regulatory models strengthen legitimacy, fairness, and voluntary compliance (Sutinen & Kuperan, 1999). Participants who view the authority as legitimate, therefore, feel a strong obligation to comply even when the dictates of the authority are contrary to their self-interest, making procedural equity appear to be more important than outcome equity. According to prepositions of Gunningham (2015), Coglianese and Kagan (2007), Liu et al. (2022), and Sutinen and Kuperan (1999), compliance or violations thereof can be increased or decreased by one or a combination of the following: (i) an increase in the probability of detection and sanction; (ii) an increase in the size of penalty; (iii) an increase in the level of the individual's moral development; (iv) an increase in the legitimacy of the regulatory authority; (v) a decrease in the number of buildings constructed illegally; and (vi) a decrease in the number of aggregate violations.

Policymakers should therefore pay more attention to the fundamental issues of institutional design and legitimacy. Given that regulations are formulated to correct market failures, their implementation may embody some imperfections that should be corrected from time to time. Breyer (1979), in his seminal work on the analysis of regulatory failure, mismatches, alternatives, and reforms, classifies such government regulatory modifications into four: changes in the implementing agency's structure, improvements in the implementing agency's procedures, improvements in the quality of appointments, and changes in the substance of regulation. According to the National Audit Office (2021) and Stanley (2024), the decision on whether and how to regulate should be hinged on efficiency and the cost of regulation by comparison with the benefits it brings.

2.11 Theories related to Regulatory Compliance

To provide the multifaceted perspective necessary for evaluating the complex legal, political, and behavioural drivers of building regulatory compliance, this study triangulates five key theories: the Theory of Regulatory Compliance (TRC), Public Interest Theory of Regulation (PITR), Capture Theory (CT), Deterrence Theory (DT), and Social Cognitive Theory (SCT). The PITR establishes the foundational mandate for state intervention as a means to correct market failures and safeguard social welfare. DT and TRC are employed to evaluate the efficacy of enforcement mechanisms and compliance efforts, while CT addresses systemic barriers such as corruption and vested interests. Complementing these, SCT frames compliance as a learned social force, providing a basis for capacity-building initiatives through observational learning, modelling, and reinforcement. Collectively, these theories provide the evidential basis for a proposed shift from a purely punitive, deterrence-based status quo toward a responsive framework that prioritises stakeholder capacity and service-oriented regulatory interventions.

2.11.1 Theory of Regulatory Compliance

The development of the Theory of Regulatory Compliance (TRC) dates back over four decades, and it emphasises the critical importance of adherence to established rules and regulations (Fiene, 2016). This theory is predicated on the understanding that certain activities necessitate oversight and regulation to mitigate harm, foster equitable competition, and preserve public confidence.

Initially, a direct, linear relationship was hypothesised between regulatory compliance and the quality of outputs, suggesting that increased compliance would lead to a commensurate rise in quality, as illustrated in Figure 2.17 (a). However, the evolution of TRC, informed by numerous studies over the past four decades, has led to a refinement of this perspective. These studies revealed that while a linear relationship between compliance and quality holds true at lower levels of regulatory adherence, a notable decrease in quality is observed as compliance scores reach substantial levels and ultimately approach 100% obedience to rules and regulations. This revised understanding is depicted in Figure 2.17 (b) (Fiene, 2018). The implication is that an overly rigid focus on absolute rule adherence may inadvertently detract from broader best-practice ideals and overall quality.

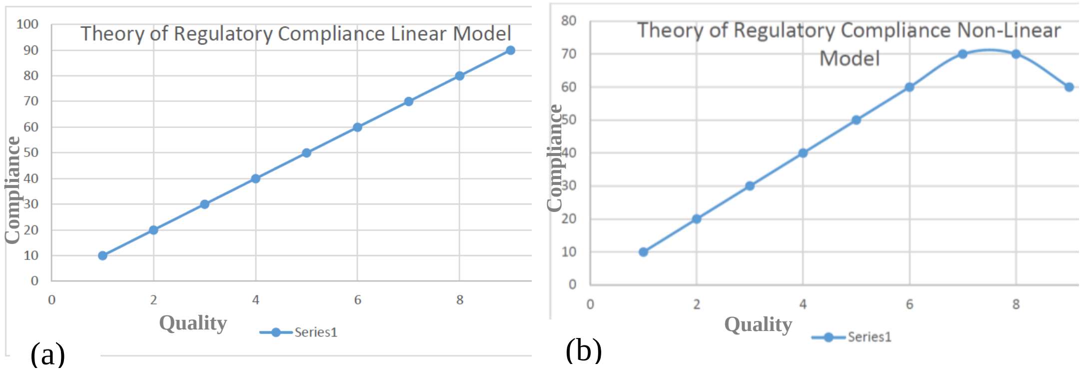

Figure 2.17: Relationship between Regulatory Compliance and Quality (Linear)

Source: Fiene (2018)

Contemporary research in the Theory of Regulatory Compliance (TRC) suggests that a stepped model, as depicted in Figure 2.18, offers a more accurate representation than a non-linear one. This model provides a more detailed explanation of how seemingly less significant rules can be crucial predictors of overall compliance and quality. The stepped model allows for greater flexibility in examining the complete regulatory landscape. Its primary focus is on identifying the "predictor" or "right" rules that serve as key indicators, driving progress from one level of compliance and quality to the next. Rather than concentrating on a single plateau, this model proposes the existence of multiple plateaus, acknowledging varying levels of achievement within the regulatory space.

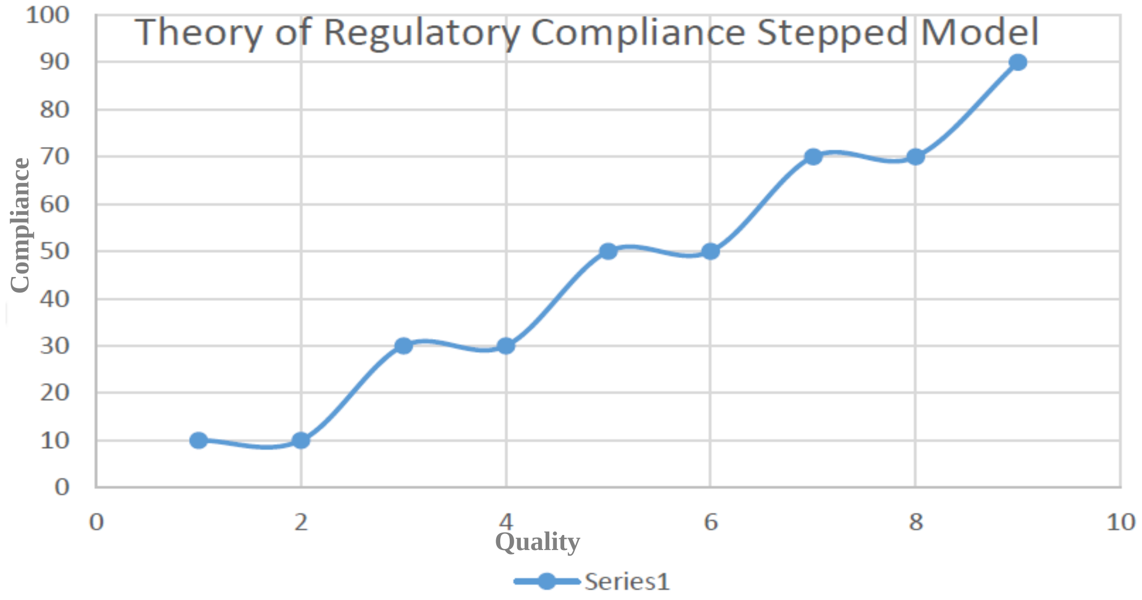

Figure 2.18: Relationship between Regulatory Compliance and Quality (Stepped)

Source: Fiene (2018)

The Theory of Regulatory Compliance (TRC) postulates that substantial regulatory compliance, rather than absolute adherence, represents a more effective and efficient public policy. This calls for identifying the "right" balance of rules and regulations. TRC acknowledges that not all rules and standards hold equal weight; they exert varying influences within a monitoring or licensing system, requiring optimisation (Fiene, 2016).

TRC therefore advocates for the phasing of policy implementation to ensure the identification of the ‘predictors’ and the right balance of rules defining a "sweet spot" as a point at a substantial compliance level where best practice scores and positive outcomes are normally at their highest levels. Consequently, TRC advocates for a phased approach to policy implementation. This allows for the identification of "predictors" – those key rules that define a "sweet spot." This "sweet spot" signifies a point of substantial compliance where best practice scores and positive outcomes typically reach their highest levels.

TRC aims to comprehend the motivations behind individuals' and organisations' decisions to comply or not comply with regulations. It analyses various factors influencing compliance behaviour, including the perceived legitimacy of regulations, trust in regulatory agencies, the presence of effective enforcement mechanisms, and the perceived costs and benefits of compliance (Fiene, 2023).

The theory underscores the importance of clear communication, consistent enforcement, and proportionate penalties to achieve higher compliance rates. Key constructs derived from TRC include: the specificity of legal standards, the regulatees ability and/or capacity to comply, familiarity and/or awareness with the regulations, training and continuous compliance efforts, communication of expectations, consistency of interpretation, transparency, and clarity of the implementation strategy, among others. These constructs highlight the multifaceted nature of compliance, moving beyond simple enforcement to encompass understanding, capacity, and clear guidance.

2.11.2 Public Interest Theory of Regulation (PITR)

The Public Interest Theory of Regulation (PITR), which remained dominant until the 1960s, posits that unregulated commercial markets inherently incline towards inefficiency. This inefficiency arises from a focus on the welfare of a select few, often at the expense of broader societal interests (Christensen, 2010). PITR operates on the fundamental assumption that governmental commitment lies in maximising public welfare through the remediation of market failures, thereby ensuring economic efficiency and promoting social well-being (Zhang, 2009). It further assumes that market failures are predominantly caused by monopolistic tendencies and that regulatory bodies possess sufficient information and enforcement capabilities to effectively advance the public interest.

PITR evolved from classical concepts of representative democracies and governmental functions. Consequently, it mandates governmental intervention through regulation to oversee and correct market imperfections (Christensen, 2010). This theory considers the regulation of industry as imperative, particularly within the construction sector, where contractors and their clients are responsible for erecting structures housing millions of individuals. According to PITR, the underlying rationale for state regulation is the protection of public interests from the potential excesses of private entities. It presumes the existence of a meritocratic bureaucracy operating strictly within the confines of public and administrative law (Christensen, 2010).

Critics of PITR contend that markets and private ordering mechanisms are capable of addressing most market failures without necessitating governmental intervention. Furthermore, they argue that government regulators are often incompetent, susceptible to corruption, or subject to regulatory capture, rendering them incapable of effectively resolving issues of market failure (Shleifer, 2005). To these critics, the public interest theory of regulation is an idealised construct lacking real-world applicability, as both the regulated entities and the regulators are driven by and seek to satisfy their interests.

Key constructs derived from PITR include: public interests and/or social welfare, competition and monopoly, enforcement power, and market correction.

2.11.3 Capture Theory

Capture Theory (CT) or regulatory capture theory, also known as "the economic theory of regulation," was introduced in the 1970s by George Stigler during the decline of PITR (Boyle, 2021; Xiao, 2015), as a critical reaction against PITR (Christensen, 2010). CT postulates that while regulations are ostensibly enacted to serve public needs, the very regulatory agencies responsible for their implementation can ultimately fall under the control of the industries they are meant to oversee (Zhang, 2009).

According to CT, industries generally prefer an unregulated environment for increased benefits or profits and actively resist oversight. This motivates them to dedicate substantial resources to influence regulatory bodies, a task that ordinary citizens are typically less equipped or motivated to undertake (Xiao, 2015). If successful, these captured regulators cease to perform their public duty, instead making decisions that favour the industries, thereby leading to regulatory failure.

Boyle (2021) suggests that regulatory capture can commence during the initial stages of regulatory development. Governments often recruit industry experts for their specialised knowledge, a practice that can create a "revolving door" effect as these experts return to the industry after their public service. Christensen (2010) further highlights a mistrust of politicians' intentions as regulatory policymakers, asserting their susceptibility to private interests. Proponents of CT argue that while collaboration between regulators and regulated entities can sometimes foster compliance, such cooperation may also lead agencies to abandon their public responsibilities in favour of the regulated firms' interests. Consequently, some scholars view the ratification of regulations as little more than "symbolic politics," given that politicians often prioritise announcing new regulatory agendas over adequately funding their implementation (Coglianese & Kagan, 2007). Thus, CT emphasises particularistic interests, portraying government regulation as a protective shield and questioning the neutrality of regulators.

This theory is underpinned by political environment factors, such as the preferences of political authorities and controversies surrounding enforcement (Heijden, 2019), as well as economic factors, including the actual cost of compliance (Amodu, 2008). Zhang (2009) contends that CT reflects the inherent limitations of public decision-making, fostering rent-seeking and rent-creating behaviours within the government's regulatory processes.

Critics, however, point out inherent weaknesses in CT. They question why consumers, also members of the public, cannot capture the industry to protect their interests, or why regulated industries cannot prevent the establishment of regulatory agencies in the first place (Xiao, 2015). Furthermore, Xiao (2015) argues that all parties—regulatory agencies, regulated entities, and the public—are self-interested, each with rational expectations of the others. It is also asserted that a regulatory agency's survival is dependent on satisfying the expectations of the regulated party; without the regulated party, regulators would become obsolete.

Key constructs identified within Capture Theory include: political influence in regulation, the interests of various parties, the effect of enforcement, the effect of the cost of compliance, and the dynamics of collaboration and/or cooperation.

2.11.4 Deterrence Theory

Deterrence Theory (DT) opines that the effectiveness of penalties in deterring undesirable behaviour is contingent upon four key factors: their certainty, severity, celerity (swiftness), and consistency. It further suggests that the actual motivation for compliance varies across individuals and situations. Originating during the Cold War as a strategy to prevent the use of dangerous weapons, classical DT is rooted in the work of Cesare Beccaria (1738-1794), widely recognised as the father of both criminal justice and DT (Abramovaite et al., 2023). Beccaria believed that if punishment is severe, certain, and swift, a rational individual would weigh potential gains against losses before engaging in illicit activities. They would be deterred if the perceived loss outweighed the gain, making compliance more reliant on an individual's moral inhibitions and persuasion.

However, Coglianese and Kagan (2007) argue that disparities in compliance cannot be solely explained by a fear of inspections and sanctions, as suggested by traditional deterrence theory. Instead, they contend it is better explained by the extent to which regulated entities possess a strong sense of duty to comply with regulatory norms. Notably, Bowles (1971) observed that approximately 20% of regulated organisations readily comply with regulations, 5% vigorously oppose them, while the remaining 75% comply as long as they are confident that the obstinate 5% will be identified and disciplined.

The deterrence model of regulatory compliance primarily focuses on the certainty and severity of sanctions, thus only partially explaining compliance behaviour, which is influenced by both tangible and intangible motivations (Sutinen & Kuperan, 1999). Amodu (2008), in further empirical studies, has noted that deterrence theories are largely untenable and poorly reflect enforcement practices. He advocates that prosecution, for example, should be viewed as a formal enforcement method but as an exception rather than the rule.

This theory underscores various factors as determinants of compliance, including: the legal factors (certainty, severity, celerity, and consistency), task, organizational, cultural, and human factors (motivations and moral inhibitions), and other factors such as the immediacy of sanctions, visibility of violations (Amodu, 2008), ethics, and social license, which encompasses fear of detection, fear of humiliation, and an internalized sense of duty (Liu et al., 2022). This broader perspective acknowledges the complex interplay of various influences beyond just the direct threat of punishment.

2.11.5 The Social Cognitive Theory

The Social Cognitive Theory (SCT), which evolved from Albert Bandura's Social Learning Theory (SLT) in the 1960s and was fully developed into SCT by 1986 (LaMorte, 2022), theorises that learning is a dynamic process occurring within a social context. This process involves a reciprocal interaction among an individual's personal factors, environmental influences, and behaviour.

SCT emphasises the significant role of social influence, driven by the interplay of external and internal social reinforcements. Through this interplay, individuals acquire, perform, and sustain specific behaviours. The theory also accounts for an individual's past experiences, which shape their reinforcements, expectations, and expectancies, ultimately influencing their engagement in and reasons for particular behaviours (LaMorte, 2022). This makes SCT particularly relevant to regulation, as regulators rely on societal cooperation with policies, rules, and guidelines. SCT places cooperation at its core, viewing it as a learned social force and a shared belief in the collective ability to achieve desired outcomes (Johnson & Johnson, 2015).

SCT explains how individuals regulate their behaviour through control and reinforcement to achieve goal-directed actions. Several key constructs have emerged from SCT to describe human decision-making: reciprocal determinism (the mutual interaction among personal factors, behaviour, and the environment), behavioural capability (an individual's ability to perform a behaviour, contingent on possessing the necessary knowledge and skills), observational learning (the capacity to witness, observe, learn, and reproduce a behaviour, as a major component of the theory), reinforcements (responses, whether self-initiated or environmental, that encourage or discourage the continuation of a behaviour), expectations (the anticipated consequences of an individual's behaviour), self-efficacy (a person's confidence in their ability to successfully perform a specific behaviour).

Traditionally, cooperation is fostered through modelling and coaching, providing a learning platform central to communities of practice (Johnson & Johnson, 2015). In the digital age, "modelling and coaching" can be scaled through EdTech such as video-based tutorials on proper site hoarding or PPE usage, facilitating the "retraining of players into the path of regulatory obedience". Despite its strengths, SCT has faced criticism for assuming that environmental changes will automatically lead to changes in an individual, potentially overlooking crucial aspects like inherent motivation.

2.12 Research Gap

2.12.1 Gap in Reviewed Literature

Construction regulation and compliance are not new concepts but rather dynamic practices with historical roots spanning centuries, traceable back to ancient Hammurabi's Code and beyond, which codified builders' duties, responsibilities, and corresponding penalties for non-compliance (Heijden, 2009; Heijden, 2019). These practices gained considerable momentum in the 20th century, propelled by democratic advancements and a shift in socio-legal research toward understanding regulatory procedures, their functions, and their intended and unintended impacts on individuals and businesses. This period also marked a crucial transition from prescriptive to performance-based regulation and from behaviour correction to behaviour formation (Halpern, 2019; Heijden, 2019).

More recently, scholars such as Eliantonio and Spendzharova (2017) and Radaelli (2018) have advocated for comprehensive, tailor-made solutions over generic "quick fixes," underscoring the necessity for context-specific and continuous regulatory reviews. This perspective is reinforced by Lovegrove (2019), who highlights the complexity and knowledge-intensive nature of effective regulatory application, and by Coglianese (2012), who emphasises the need for continuous evaluation to prevent the degradation of outcomes over time. These studies collectively present regulatory practice as a dynamic field necessitating continuous learning and adaptation.

To further emphasise the importance of context-specific solutions, the World Bank Group (2013) evaluated building regulation reforms across ten Western countries. Their findings stressed the critical role of reforms in processes, involved agencies, and performance measures, recommending reviews every five to ten years. Similarly, USAID (n.d.) and Shelter Cluster (2021) underscore the significance of consistently customising regulatory imperatives to align with diverse settings, such as humanitarian or traditional contexts, or to accommodate new approaches like a "whole-of-government" strategy. Achieving this necessitates a paradigm shift, attainable only through continuous review.

Despite the historical depth and evolving nature of construction regulation, empirical research on regulatory compliance remains notably sparse. Much of the pre-existing discourse relies predominantly on anecdotal evidence and subjective opinions rather than robust empirical data, consequently limiting the substantive depth of these studies. While recent research has focused on related subjects such as total quality management, cost of quality, and health and safety (Basu, 2014; CIDB, 2011; Wawak et al., 2020), the specific subject of compliance *per se* has received less direct attention. Furthermore, existing studies (e.g., Al-Musleh, 2010; Dagbjartsdótti, 2012; Syaj, 2015) are often highly specific to particular jurisdictions, and none have comprehensively evaluated compliance aspects from the distinct perspectives of various actors within the construction value chain, such as regulators, contractors, clients, or construction workers. This constitutes a significant research niche, particularly concerning regulatory compliance in the Kenyan construction industry.

In the local Kenyan context, a study by NCA (2020) inconclusively focused on building failures and collapses, identifying gaps for further study in the coordination of regulatory compliance. This is supported by assertions from NCRC (2021) regarding the need for clear, coordinated building regulatory roles among agencies, and the call for "enhanced" regulatory measures as documented by the Commissions of Inquiry (1996), NBI (2015), Omollo (2019), and Omollo (2020).

A consensus, therefore, emerges that: (i) while issues of regulatory compliance are global, their effective resolution is largely context-specific; (ii) no single study has provided, or can provide, exhaustive answers to all questions concerning this subject, especially within localised contexts; and (iii) the dynamic nature of regulatory compliance necessitates continuous inquiry. Previous scholarship, nonetheless, offers valuable preliminary insights into the subject of regulatory compliance, setting the stage for further investigation into these identified gaps.

2.12.2 Gap in Related Theories

The inherent dynamism of building regulatory practice, coupled with the multifaceted nature of its constituent elements, precludes any single theoretical framework from comprehensively explaining this subject. The five theories under consideration—namely, the theory of regulatory compliance, deterrence theory, capture theory, public interest theory of regulation, and social cognitive theory—each address distinct facets of the phenomenon. Furthermore, some of these theories have undergone internal evolution to incorporate emerging knowledge (e.g., the Theory of Regulatory Compliance), while others have developed as critical responses to existing theoretical paradigms (e.g., Capture Theory vis-à-vis the Public Interest Theory of Regulation). This ongoing theoretical fragmentation and refinement underscore the continued relevance and intellectual vibrancy of this field, ensuring it remains a subject of sustained scholarly interest.

2.13 Theoretical Framework

The existing literature identifies a diverse array of models that pinpoint variables influencing the degree of regulatory compliance within the construction industry. Parker and Nielsen (2017) categorise these broadly into spontaneous and enforced compliance factors, while Heijden (2009) further delineates determinants linked to physical or economic constraints, highlighting the critical roles of regulatory certainty and adaptability. Building upon Kagan's model of "regulatory variability," Amodu (2008) outlines essential determinants including legal design, task and political environments, and leadership factors. These are further augmented by contemporary research into organisational climate and cultural influences (Liu et al., 2022), economic pressures (Heijden, 2009), and human-induced factors (ILO, 2022).

These determinants are fundamentally underpinned by a suite of theories—specifically the Theory of Regulatory Compliance (TRC), Public Interest Theory of Regulation (PITR), Capture Theory (CT), Deterrence Theory (DT), and Social Cognitive Theory (SCT)—which collectively inform the derivation of the study's core constructs. These theories illuminate the performance of regulatory administrations operating within the public interest, emphasising the democratisation of processes, the economic costs of compliance, and the phasing of implementation. Key constructs derived from this theoretical intersection include the specificity, certainty, and celerity of protocols; the effectiveness of enforcement strategies; and the interplay between organisational culture, moral inhibitions, and behavioural self-efficacy as discussed in Section 2.11.

The theoretical framework for this study is structured as a multi-dimensional hierarchy designed to "funnel" abstract societal mandates into granular, individual decision-making processes within the construction sector. By synthesising core constructs with their respective theoretical underpinnings, this model illuminates the dynamic interactions and causal pathways that form the study’s analytical bedrock. The framework is interconnected through a series of directional arrows that demonstrate a causal funnel, moving from broad systemic theories to specific behavioural outcomes. This approach enables a comprehensive examination of compliance, ranging from the macro-societal level of regulatory intent to the micro-level of individual psychological drivers.

At the macro level, PITR and CT establish the tension between the intended purpose of safety regulations and the risk of institutional compromise or corruption, as illustrated in Figure 2.19. It also establishes the “rules” through the specificity of protocols; however, these factors do not automatically result in compliance. The arrows signify how these societal mandates are translated into concrete enforcement mechanisms, such as deterrence strategies and compliance protocols at the meso-level. These analyses the effectiveness of enforcement mechanisms and the perceived costs of non-compliance. Simultaneously, a horizontal synthesis occurs on the right side of the framework. Explicit arrows originate from the Determinants of Compliance identified in the literature, ranging from legal design and economic constraints to organisational climate. These determinants feed into a central "synthesis" column, indicating that empirical variables do not act in isolation but are filtered through the theoretical layers of the hierarchy.

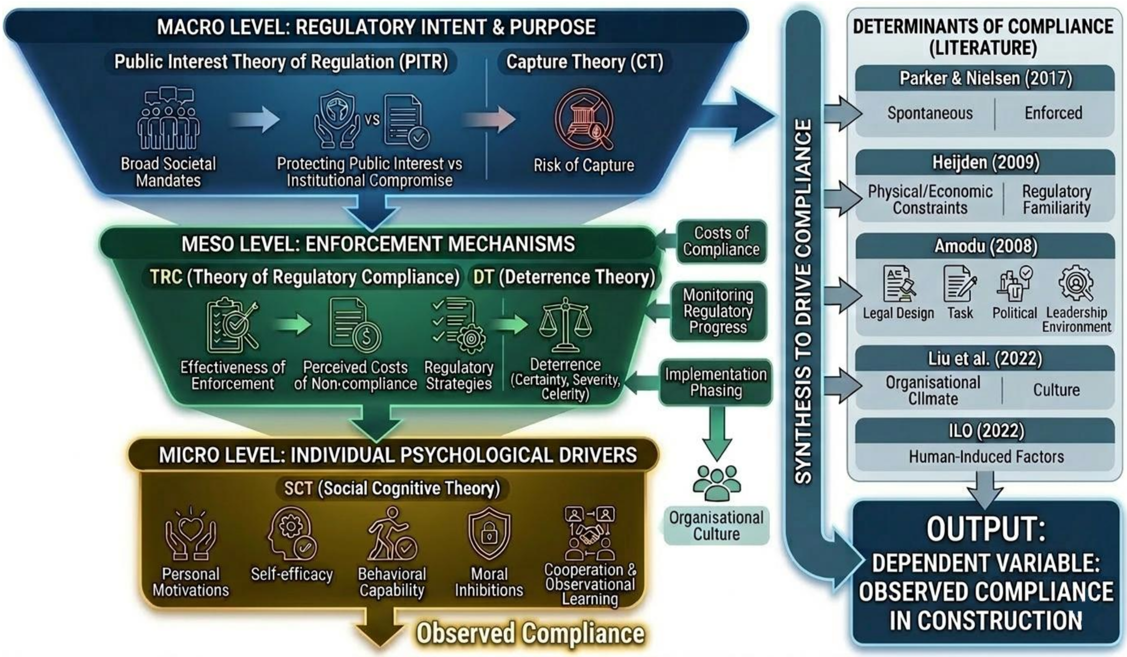

Figure 2.19: Theoretical Framework

The flow culminates at the Micro Level, where all superior systemic and institutional forces intersect with individual psychological drivers (personal motivations, peer influences, and environmental factors) that drive the behaviour of industry stakeholders. The transition from enforcement mechanisms to individual psychology represents the most critical junction in the framework, as it moves from external pressure to internalised decision-making. It shows how institutional forces must first be processed through the "human filter" before an outcome is realised. This shows how an individual’s behavioural capability, self-efficacy, and moral inhibitions determine whether they respond to enforcement or succumb to economic and task environment pressures, thus explaining why two workers under the same regulatory regime might behave differently.

The downward arrow emerging from SCT at the micro-level represents the final transition from theoretical constructs to human agency. This terminal arrow points directly to Observed Compliance, signifying that the ultimate dependent (outcome) variable of the study is the physical manifestation of these intersecting macro, meso, and micro forces. This hierarchy ensures that the study does not view compliance as a simple binary of "legal vs. illegal." Instead, it allows for an analysis that considers the purpose of the law (Public Interest), the integrity of the enforcement system (Capture/Compliance), and the motivation of the stakeholders on the ground (Deterrence/Social Cognitive), hence the levels of compliance. By following this path, the framework demonstrates that regulatory adherence in construction is not a binary state but a processed output of a multi-dimensional causal chain. As such, the study investigates specific determinants (the parts) and adopts a Gestalt-inspired holistic lens, recognising that the realisation of a safe built environment (the whole) is dependent on the integrated success of its constituent regulatory stages and stakeholder roles.

2.14 Conceptual Framework

The conceptual framework in this study is structured around the outcome variable which is the level of regulatory compliance in construction sites defined by among other: (i) the percentage number of registered ongoing projects; (ii) the percentage number of registered closed projects; (iii) the percentage number unregistered projects; (iv) the percentage number building collapses; (v) the number of construction related deaths and injuries; (vi) public perception; (vii) number of successful prosecutions; (viii) number and outcome(s) of inspections done; (ix) number of occupancy permits issued; (x) adherence to the charter and quality statements; (xi) budgetary allocation; (xii) sensitization and/or awareness levels; (xiii) trends of public complaints; (xiv) regulatory reviews; (xv) enforcement actions taken; (xvi) visibility of regulatory violations; (xvii) identified defects; and (xviii) the associated permitting costs. These are summarised as factors about project registration status (RS), project site conditions (SC), and project workforce status (WS), as influenced by the nine (9) explanatory variables, as shown in Figure 2.20.

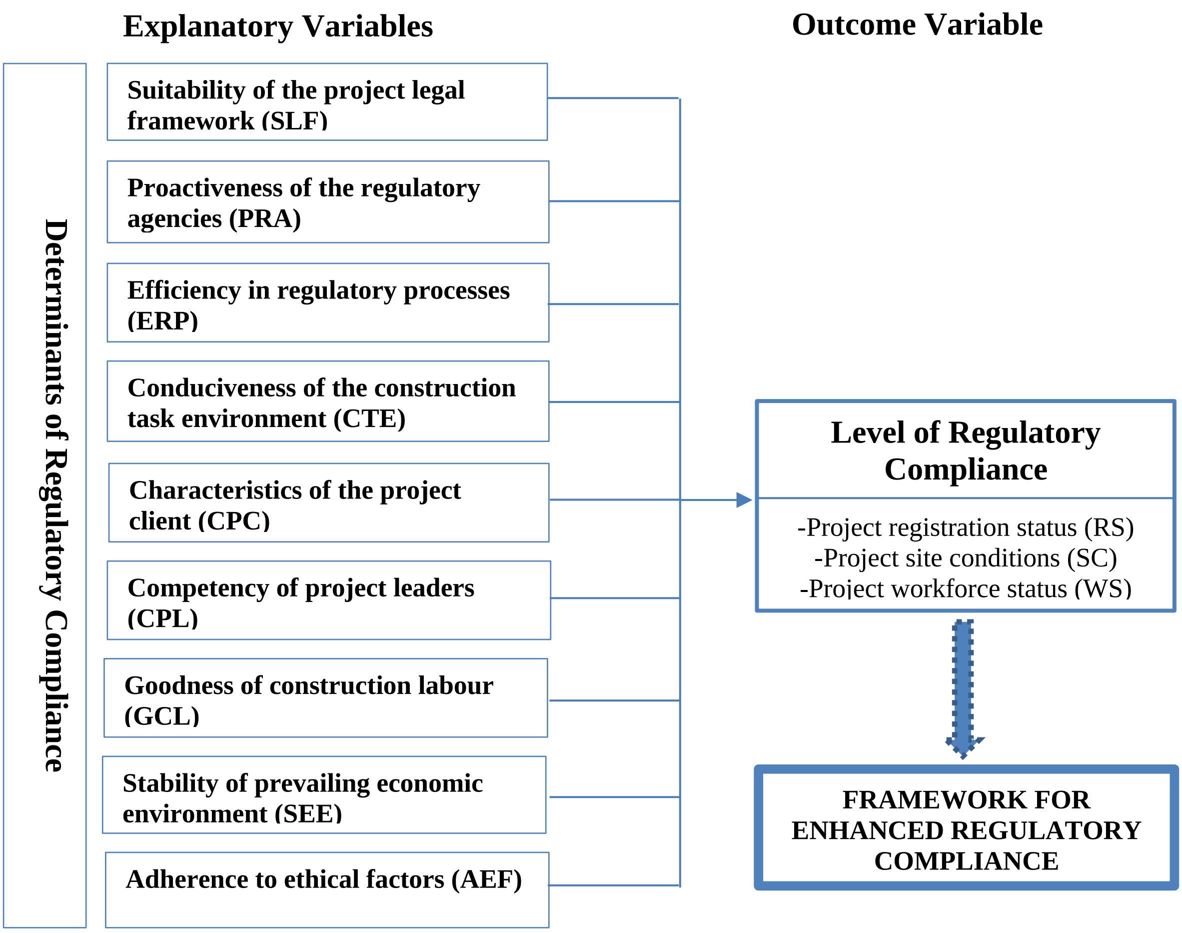

Figure 2.20: Conceptual Framework

The nine (9) explanatory variables are: (i) suitability of the project legal framework (SLF); (ii) proactiveness of the regulatory agencies (PRA); (iii) efficiency in regulatory processes (ERP); (iv) conduciveness of the construction task environment (CTE); (v) characteristics of the project client (CPC); (vi) competency of project leaders (CPL); (vii) goodness of construction labour (GCL); (viii) stability of prevailing economic environment (SEE); and (ix) adherence to ethical factors (AEF) defined by various surrogates captured in section 2.7 and 2.8. The hypothesised relationship is that each explanatory variable has a significant influence on the level of regulatory compliance.

Table 2.10 presents a comprehensive overview of the nine explanatory variables, each elucidated by a range of surrogate measures as defined by various contributing authors.

Table 2.10: Summary of the Determinants of Regulatory Compliance

Factor	*Surrogates*	*Author*
1. Suitability of the project legal framework (SLF)	• Precision of regulatory mandate	(Coglianese & Kagan, 2007)
	• Legal powers of the implementing entity; stringency of regulatory mission	(Amodu, 2008; Heijden, 2019; Shirur & Torgal, 2014)
	• Specificity of legal standards; specificity of penalties	(Albtoush et al., 2022; Amodu, 2008; Heijden, 2019)
	• Consistency and reliability of legal interpretation	(Hoyle, 2001)
	• Flexibility and/or adaptability of laws	(Braithwaite, 2017; Coglianese & Kagan, 2007)
	• Predictability and specificity of laws	(Laubscher, 2011; Twum-Darko & Mazibuko, 2015; USAID, n.d.; World Bank Group, 2013)
	• Potency and immediacy of sanctions	(Albtoush et al., 2022; Amodu, 2008; Heijden, 2019)
	• Legal rights of the regulated; legal rights of complainants	(Albtoush et al., 2022; Amodu, 2008; Heijden, 2019)
2. Proactiveness of the regulatory agencies (PRA)	• Clarity of regulators' mandate; presence of oversight entities; introduction of regulatory levy that is envisioned mainly to alter the behaviour of firms and not certainly to generate revenue	(Coglianese & Kagan, 2007)
	• Legal powers of the regulator	(Amodu, 2008; Heijden, 2019; Shirur & Torgal, 2014)
	• The clarity of the regulator’s implementation strategy	(Fiene, 2016; Fiene, 2018)
	• Monitoring systems of the regulator; interference	(CIDB, 2011)
	• Communication mechanisms of the regulator	(Chin-Keng & Hamzah, 2011; Howarth & Greenwood, 2018)
	• Regulator performance in core tasks	(Heijden, 2009)
	• Magnitude of recent catastrophes; support or resistance by regulated governmental entities; size and/or sophistication of regulated entities	(Amodu, 2008)
	• Clarity of regulators' processes	(Hoyle, 2001)
	• Presence of project and regulatory pressures	(Liu et al., 2022)
	• Determination and assertiveness of pro-regulation interests, inclinations of key political figures, and controversy over enforcement style	(CIDB, 2011; Lovegrove, 2019)
	• Management of political changes	(Amodu, 2008; Heijden, 2019)
	• Socio-political pressures and acceptance	(CIDB, 2011; Lovegrove, 2019; Shirur & Torgal, 2014)
	• Leaders’ policy beliefs (reactive vs. strong-minded) and beliefs concerning enforcement style	(Agapiou & Yakubu, 2019; Amodu, 2008)
	• Level of professionalism	(Amodu, 2008; PMI, 2021)
	• Change management	(Amodu, 2008; Hoyle, 2001; Mashwamaa et al., 2017; PMI, 2021)
	• Leadership style	(Elbashir, 2018; Mahmood & Mohammed, 2008)

Factor	***Surrogates***	***Author***
	• Entity’s approach to transparency, ethics, and associated reputational pressures	(Agapiou & Yakubu, 2019; CIDB, 2011; Liu et al., 2016; Liu et al., 2022)
	• Organisational structure, including administrative procedures, geographical location, and workforce capacity characteristics	(Coglianese & Kagan, 2007; Heijden, 2009; Heijden, 2019; Parker & Nielsen, 2017)
	• Nature of building codes and standards	(CIDB, 2011; FIDIC, 2011)
	• Information disclosures on products or processes	(Coglianese & Kagan, 2007)
3. Efficiency in regulatory processes (ERP)	• Predictability and availability of information on regulatory processes	(Laubscher, 2011; Twum-Darko & Mazibuko, 2015; USAID, n.d.; World Bank Group, 2013)
	• Simplicity of process; flexibility and/or adaptability	(World Bank Group, 2013)
	• The clarity of the regulator’s implementation strategy	(Fiene, 2016; Fiene, 2018)
	• Level of integration	(Lovegrove, 2019)
	• Display transparency	(Fiene, 2018; World Bank Group, 2013)
	• Information disclosures on products or processes	(Coglianese & Kagan, 2007)
	• Materials standards	(Ashworth, 2010; Basu, 2014; Elbashir, 2018; Stevens, 1996)
4. Conduciveness of the construction task environment (CTE)	• Significance of dangers to be averted	(Amodu, 2008)
	• Policy environment in terms of perfection of legislation, application of regulation, severity of non-compliance sanctions, and interference levels	(Liu et al., 2016)
	• Project pressures in terms of cost, time, quality, and competition	(Amodu, 2008; Liu et al., 2016; Mashwamaa et al. 2017)
	• Handling of technical issues of the project; level of planning involved	(Waje & Patil, 2012)
	• Level of participation and/or involvement of the client, designers, and construction management	(Hoyle, 2001; PMI, 2021; Waje & Patil, 2012)
	• Communication	(Howarth & Greenwood, 2018; Mashwamaa et al., 2017; Waje & Patil, 2012)
	• Clear tasking stewardship in the project	(PMI, 2021; Waje & Patil, 2012)
	• changing nature of the work-time constraints	(Shirur & Torgal, 2014)
	• Level of risk planning	(Lovegrove, 2019; PMI, 2021)
	• Nature or adequacy of supervision	(Mashwamaa et al., 2017; Waje & Patil, 2012)
	• Technology in use	(Lovegrove, 2019)
	• The desired output	(Stevens, 1996)
	• Quality of design drawings	(Adewale et al., 2019; Stevens, 1996)
	• Quality management	(Albtoush et al., 2022; Mashwamaa et al., 2017; Waje & Patil, 2012; PMI, 2021)
	• Safety culture created on site	(Amodu, 2008; ILO, 2022; Shirur & Torgal, 2014)
	• Collaborations	(Mashwamaa et al., 2017)
	• General construction processes and planning	(Basu, 2014; Chin-Keng & Hamzah, 2011; Elbashir, 2018; Howarth & Greenwood, 2018; Hoyle, 2001; PMI, 2021; Waje & Patil, 2012; Wawak et al., 2020)
	• Subcontracting	(Chin-Keng & Hamzah, 2011)
	• Customer or client characteristics	(Ashworth, 2010; Hoyle, 2001)

Factor	*Surrogates*	*Author*
	• Quality of client guidance	(AlBarami et al., 2020; Mahat & Adnan, 2018)
5. Characteristics of the project client (CPC)	• Their willpower to comply	(Amodu, 2008)
	• Their knowledge and skills, communication abilities, commitment, and ability to lead and manage, especially at the early stages of a project	(AlBarami et al., 2020)
	• Their level of involvement	(Fu et al., 2023)
	• Ability/capacity to comply legally and or/ economically	(Heijden, 2009; Shirur & Torgal, 2014)
	• Their familiarity with the regulations	(Gelder, 1997; Heijden, 2009; Lovegrove, 2019; Parker & Nielsen, 2017)
	• The nature of the contracts they engage in	(Mashwamaa et al., 2017)
	• The social licence encompassing fear of detection, fear of humiliation, and an internalised sense of duty	(Amodu, 2008; Gunningham, 2015; Liu et al., 2022; Mahmood & Mohammed, 2008)
	• Individual traits like education and ethics	(Agapiou & Yakubu, 2019; Emuze & Mhlwa, 2015; Liu et al., 2016; Mahmood & Mohammed, 2008)
	• Liberty to find a cost-effective way of fulfilling regulatory requirements with little or no misunderstanding	(Coglianese & Kagan, 2007)
	• Profiteering culture	(Elbashir, 2018; Emuze & Mhlwa, 2015)
	• Client perceptions of compliance	(Parker & Nielsen, 2017)
	• Client influence	(Ashworth, 2010; Emuze & Mhlwa, 2015; Hoyle, 2001; Mashwamaa et al., 2017; Stevens, 1996)
6. Competency of project leaders (CPL)	• Leaders' policy beliefs	(Agapiou & Yakubu, 2019; Amodu, 2008)
	• Leadership style	(Elbashir, 2018; Mahmood & Mohammed, 2008)
	• Level of participation and/or involvement of the client, designers, and construction management	(Hoyle, 2001; PMI, 2021; Waje & Patil, 2012)
	• Level of planning	(Waje & Patil, 2012)
	• Stewardship in a project	(PMI, 2021; Waje & Patil, 2012)
	• Level of professionalism	(Amodu, 2008; PMI, 2021)
	• Change management	(Amodu, 2008; Hoyle, 2001; Mashwamaa et al., 2017; PMI, 2021)
	• Nature or adequacy of supervision	(Mashwamaa et al., 2017; Waje & Patil, 2012)
	• Quality management strategies	(Albtoush et al., 2022; Ashworth, 2010; Chin-Keng & Hamzah, 2011; Mashwamaa et al., 2017; PMI, 2021; Waje & Patil, 2012)
	• Factual approach to decision-making	(Hoyle, 2001)
	• Individual traits like level of education, ethics and exposure	(Agapiou & Yakubu, 2019; Emuze & Mhlwa, 2015; Liu et al., 2016; Mahmood & Mohammed, 2008)
	• Material handling; material testing culture	(Ashworth, 2010; Elbashir, 2018; Stevens, 1996)
	• Quality of specifications	(Basu, 2014; Elbashir, 2018; Mahmood & Mohammed, 2008; Mashwamaa et al., 2017; Stevens, 1996)

Factor	*Surrogates*	*Author*
7. Goodness of construction labour (GCL)	• Workers' competence or skill levels	(Agapiou & Yakubu, 2019; Ashworth, 2010; ILO, 2022; Mashwamaa et al., 2017; Waje & Patil, 2012)
	• Issues associated with construction dispute resolution	(Albtoush et al., 2022; Emuze & Mhlwa, 2015; Lovegrove, 2019)
	• Work attitudes	(Lovegrove, 2019; Parker & Nielsen, 2017)
	• Document handling abilities and	(Basu, 2014; Elbashir, 2018; PMI, 2021)
	• Supervision	(Elbashir, 2018; Wawak et al., 2020)
	• Clear tasking and/or stewardship	(PMI, 2021; Waje & Patil, 2012)
	• Nature of the workforce -transient or permanent	(Emuze & Mhlwa, 2015).
8. Stability of prevailing economic environment (SEE)	• Economic licence to comply	(Heijden J. V., 2009)
	• Liberty to find cost-effective way of fulfilling regulatory requirements	(Coglianese & Kagan, 2007)
	• Cost of compliance	(Amodu, 2008; Parker & Nielsen, 2017)
	• Ability to honour payments	(NCA, 2020)
	• Dynamic material prices	(Stevens, 1996)
	• Other project pressures	(Liu et al., 2022)
9. Adherence to ethical factors (AEF)	• Interference and undercutting	(CIDB, 2011)
	• Profiteering	(CIDB, 2011; Waje & Patil, 2012)
	• Falsifications	(Figueroa-Fernandez, 2014; Oseghale et al., 2015)
	• Dishonesty and fraud	(Figueroa-Fernandez, 2014)
	• Compromise	(Ahzahar et al., 2011; Asante & Sasu, 2018; Figueroa-Fernandez, 2014; NCA, 2020)
	• Involvement of unqualified persons who masquerade as professionals	(Ahzahar et al., 2011)
	• Bribe-taking and hidden use of substandard materials	(Ahzahar et al., 2011; Figueroa-Fernandez, 2014; NCA, 2020)

2.15 Research Hypotheses

The study tests the primary hypothesis that the Level of Regulatory Compliance (y)—manifested through the three dimensions of Project Registration Status (RS), Project Site Conditions (SC), and Project Workforce Status (WS)—is significantly influenced by a suite of nine predictors (explanatory variables), denoted χ_1 to χ_9 being the suitability of the project legal framework *(χ_1)*, proactiveness of the regulatory agencies *(χ_2)*, efficiency in regulatory processes *(χ_3)*, conduciveness of the construction task environment (χ_4), characteristics of the project client *(χ_5)*, competency of project Leaders *(χ_6)*, the goodness of construction labour *(χ_7)*, stability of prevailing economic environment *(χ_8)*, and adherence to ethical factors (χ_9), and as defined by their various surrogates as captured in Section 2.8. This is expressed through the multiple regression equation:

$$y\ (RS, SC, WS) = \alpha + \beta_1\chi_1 + \beta_2\chi_2 + \beta_3\chi_3 + \beta_4\chi_4 + \beta_5\chi_5 + \beta_6\chi_6 + \beta_7\chi_7 + \beta_8\chi_8 + \beta_9\chi_9 + \varepsilon$$

Where;

$\boldsymbol{\alpha}$ is the constant

$\boldsymbol{\varepsilon}$ is the error term

$\boldsymbol{\beta_i}$is the $\boldsymbol{i}^{\text{th}}$ regression coefficient of the explanatory variable $\boldsymbol{\chi_i}$

Null Hypothesis (H_0): β_i = 0 for all regression coefficients of χ_i. his means that explanatory variables have no effect on the level of regulatory compliance.

Alternate Hypothesis (H_1): $\beta_i \neq 0$ for at least one of the regression coefficients of χ_i. This infers that at least one of the controlling variables affects the level of regulatory compliance.

2.16 Conceptual and Operational Definition of Variables

Several indicators or surrogates identified in the study have been operationalised and summarised as shown in Tables 2.11 and 2.12 for the outcome and the explanatory variables, respectively.

Table 2.11: Operationalisation of Outcome Variables

No.	Outcome	Conceptual Definition	Operational Definition
1.	Regulatory Compliance	Level of regulatory compliance with construction industry quality checks, laws, and regulations as defined by factors about the registration status of a construction project, factors on conditions or activities occurring in a construction project site, and factors on the status of the workforce engaged in a construction project site.	Measured in terms of 15 binary surrogates and 20 other surrogates, each on a scale of 1 – 7; aggregated to an overall scale of 1 – 140.

Source: Author (2026)

Table 2.12: Operationalisation of Explanatory Variables

No.	Explanatory Variables	Conceptual Definition	Operational Definition	Expected influence on 'y'
1.	Legal factors	Suitability of the project legal framework to meet compliance goals	Measured in terms of 7 surrogates, each on a scale of 1 – 7; aggregated to an overall scale of 1 – 49	Positive; (+r & +β)
2.	Regulatory agency factors	Proactiveness of the regulatory agencies in facilitating compliance	Measured in terms of 17 surrogates, each on a scale of 1 – 7; aggregated to an overall scale of 1 – 119	Positive; (+r & +β)
3.	Process-related factors	Efficiency in regulatory processes to promote compliance	Measured in terms of 9 surrogates, each on a scale of 1 – 7; aggregated to an overall scale of 1 – 63	Positive; (+r & +β)
4.	Task environment factors	The conduciveness of the construction task environment to facilitate compliance	Measured in terms of 20 surrogates, each on a scale of 1 – 7; aggregated to an overall scale of 1 – 140	Positive; (+r & +β)
5.	Client-related factors	Preparedness of the client to facilitate regulatory compliance	Measured in terms of 8 surrogates, each on a scale of 1 - 7; aggregated to an overall scale of 1 – 56	Positive; (+r & +β)
6.	Leadership-related factors	Competency of the project leaders to facilitate regulatory compliance	Measured in terms of 8 surrogates, each on a scale of 1 - 7; aggregated to an overall scale of 1 – 56	Positive; (+r & +β)
7.	Labour-related factors	Goodness of construction labour to facilitate regulatory compliance	Measured in terms of 14 surrogates, each on a scale of 1 – 7; aggregated to an overall scale of 1 – 98	Positive; (+r & +β)
8.	Economic-related factors	Stability of the prevailing economic environment to support regulatory compliance	Measured in terms of 8 surrogates, each on a scale of 1 - 7; aggregated to an overall scale of 1 – 56	Positive; (+r & +β)
9.	Ethical factors	Adherence to ethical factors to ensure regulatory compliance	Measured in terms of 12 surrogates, each on a scale of 1 - 7; aggregated to an overall scale of 1 - 84	Positive; (+r & +β)

Where: r is the correlation coefficient, and β is the regression coefficient
Source: Author (2026)

2.17. Chapter Summary

This chapter has provided a comprehensive review of the literature surrounding construction regulation and compliance. It traced the history of regulation from ancient codes to contemporary hybrid regimes, highlighting a critical philosophical contestation between Western 'control-oriented' models and African 'harmonyoriented' perspectives. The conceptual review established that building compliance is a knowledge-intensive mission involving complex interactions between quality management, health and safety, and enforcement strategies.

The examination of global best practices identified successful technology-driven and service-oriented models, such as Singapore’s CORENET and CONQUAS, which contrast sharply with the Kenyan construction sector’s "non-compliance culture" and its fragmented, uncoordinated multi-agency mandates. Through this review, nine explanatory variables—such as the suitability of the legal framework (SLF) and adherence to ethical factors (AEF)—were identified as the primary determinants of compliance.

The chapter culminated in a theoretical triangulation of five paradigms: The Theory of Regulatory Compliance, Public Interest Theory, Capture Theory, Deterrence Theory, and Social Cognitive Theory. These theories provided the basis for the conceptual framework, which hypothesises a direct positive relationship between the nine predictors and the level of regulatory compliance (y). This framework serves as the structural guide for the empirical testing and data analysis presented in the subsequent chapters.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter details the methodology employed in this study, encompassing the planning, collection, analysis, and presentation of data. It addresses the philosophical underpinnings of the study, the research strategy, research design, unit of analysis, study area, target population, sample size, and sampling techniques. Additionally, it outlines the data collection methods, data analysis procedures, data presentation techniques, reliability measures, validity tests, and ethical considerations, including details of the pilot study and its various components.

3.2 Philosophical Underpinnings

Philosophy defines the fundamental nature of knowledge, reality, and existence. Research philosophy pertains to the methodologies that the researcher uses to develop knowledge, shaped by beliefs and assumptions about the nature and validity of knowledge (epistemology), the nature of reality (ontology), and the nature of values (axiology). In this study on the compliance of construction sites with industry regulations in Kenya, several philosophical questions that cut across the nine explanatory variables being tested arise. For example, what is the necessity of construction law? Are the prescribed regulations feasible for regulatees to comply with? Who bears the primary responsibility for ensuring the development of compliant buildings? Who benefits most from building compliance? Does the person with the greatest responsibility stand to gain the most? Is the responsible party sufficiently incentivised to ensure compliance? Does a culture of compliance exist, or can it be cultivated? Can regulations that are imposed be truly adhered to? Are the rules and regulatory frameworks just? Is it better to enforce compliance, strengthen deterrence, or reduce risks during the building process? This array of questions, among others, raises dilemmas that regulators and regulatees must address.

3.2.1 Epistemological Considerations

Epistemology is the branch of philosophy dedicated to studying the nature of knowledge itself (Sol & Heng, 2022). It investigates what constitutes valid knowledge and the criteria by which we determine something to be true or false. This understanding profoundly shapes the relationship between a researcher and the subjects of their study, directly influencing the choice of data collection methods. Therefore, epistemological considerations guide the selection of appropriate knowledge for comprehending social phenomena, typically through positivist, interpretivist, or pragmatist lenses (Bryman, 2012; Sol & Heng, 2022). This study adopts a scientific approach, characterised by a clearly defined hypothesis and a methodology designed for testing it. It operates under the assumption that the responses provided by construction site supervisors accurately reflect the realities at the construction project sites.

The research's focus on societal functioning places it within the realm of social sciences, specifically aligning with a positivist epistemological stance. Positivism asserts that social realities, like natural phenomena, can be observed and understood through scientific methods. This approach emphasises objectivity, deductive reasoning, and the aggregation of verifiable truths to construct knowledge (Bryman, 2012). In this context, knowledge is presumed to be objective, quantifiable, representative, and generalizable, and is acquired through rigorous scientific inquiry (Sol & Heng, 2022). Such knowledge can then be discovered, explained, and potentially utilised to control and predict events (Eriksson & Kovalainen, 2011). Consequently, this epistemological position guided the methodological choices of the study, including the random selection of respondents and the use of surveys, supplemented by archival materials.

3.2.2 Ontological Considerations

Ontology refers to the real disposition or state of existence of matters under inquiry and the researcher's beliefs about the nature of that reality (Bryman, 2012; Sol & Heng, 2022). It delves into articulating the nature of reality, particularly as informed by the assumptions a researcher holds and their commitment to them—essentially, their view of the phenomena.

This study postulates that the factors under investigation exist external to the social actors within the institutions being examined. Consequently, these actors are believed to have no direct control over the processes and their conduct in executing their work. This perspective is particularly relevant for institutions such as the NCC, NEMA, NCA, WRA, DOSHS, and numerous contracting firms that employ the study's respondents (construction site supervisors). These institutions possess organisational cultures guided by a collection of values and social expectations, in the form of rules, laws, codes, guidelines, and standard operating procedures. Such institutions are typically engaged in continuous processes of innovation, origination, and reassessment aimed at improving performance within their respective roles.

According to Eriksson and Kovalaine (2011) and Bryman (2012), social entities involved in a study can be ontologically viewed as either objective, possessing a reality external to social actors (objectivism), or as social constructions, built from the opinions and actions of social actors (constructionism). This study adopts an objectivist view, primarily due to the numerous external factors beyond an individual's reach or control. As previously stated, respondents were identified from construction project sites owned by individuals or organisations that are fundamentally governed by specific rules and regulations they are expected to conform to.

This phenomenon stems from the widespread adoption of standardised operational procedures by various individuals and organisations within the construction sector. These procedures are crucial for maintaining efficiency on-site, particularly given that tasks are performed by personnel possessing diverse, yet specialised, qualifications and competencies for their respective roles. Therefore, the organisation cultivates a "culture" that shapes the conduct of its members, as it strives to maintain a consistent reality. Thus, this study is ontologically grounded in objectivism, where reality is perceived as singular, observable, ordered, and governed by laws that can be grasped through experience. In this study, the client's construction site supervisor was the unit of observation.

3.2.3 Axiology

Axiology examines the nature and role of values within the research process, highlighting their fundamental connection to actions in daily life (Sol & Heng, 2022). It specifically addresses how researchers manage their own values and those of their respondents, particularly concerning biases and ethics (Creswell & Creswell, 2018). This consideration directly influences data collection methods; for example, choosing questionnaires might imply a different valuing of personal interaction compared to opting for interviews.

In this study, the researcher adopted a value-neutral approach. The primary objective was to establish an objective reality by selecting the most effective methods for gathering high-quality information, all while operating within the constraints of available resources, time, and the study's scope. Furthermore, the study integrated both primary and secondary data, thereby combining objective knowledge with an in-depth investigation of archival information to develop a comprehensive understanding of the subject under inquiry.

3.3 Research Strategy

A research strategy can either be quantitative or qualitative. This study adopted a quantitative strategy because, apart from fitting within its broad definition where data is collected and analysed numerically, its philosophical underpinnings entailed a deductive approach to theory, integrated the rituals and customs of the natural scientific modelling and specifically of positivism, and finally personified the opinion of social reality as external and objective reality (Bryman, 2012). It sought to quantify the problem to comprehend its extent, and to measure cause and effect magnitudes to objectively interpret the statistical results (Creswell & Creswell, 2018). This aligns with deductive reasoning, where reality can be confirmed through self-evidence, a process crucial for enhancing the thinking process (Kenaphoom, 2021).

3.4 Research Design

Research design establishes the criteria used to collect and analyse data, ensuring the issues under investigation are adequately addressed. To answer the subject of inquiry in a valid, objective, accurate, and reasonable manner, this study employed a cross-sectional research design. This involved collecting data from several project sites at a single point in time, which were then examined to identify patterns of association (Kothari, 2013).

This specific research design was chosen due to its suitability for the study's structure, its cost-effectiveness, and its capacity to gather data on multiple variables, particularly those related to attitudes or behaviours. As noted by Yin (2002), selecting an appropriate research design is crucial for ensuring that collected evidence directly addresses research objectives and questions. It also helps in obtaining critical material with minimal expenditure of effort, time, and resources. Mugenda and Mugenda (2012) further emphasise the importance of comprehensively defining the research process to facilitate comprehension by other researchers. Consequently, this study was executed through five critical stages, as illustrated in Figure 3.1, and described in detail within the study.

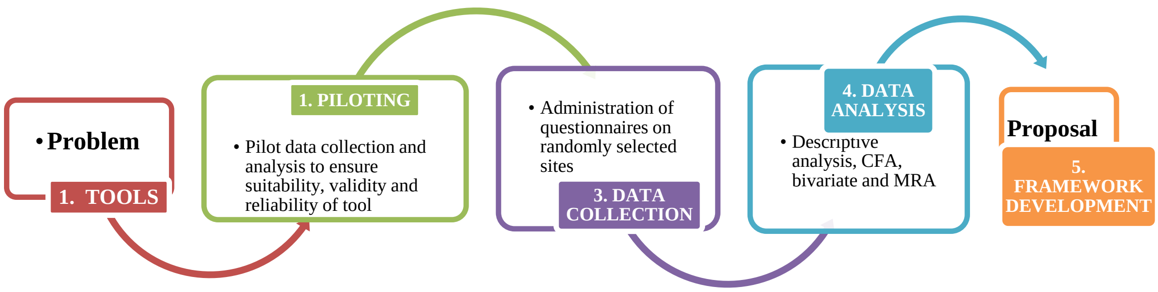

Figure 3.1: Research Process

Source: Author (2026)

3.5 Unit of Observation and Analysis

The unit of observation was a client's construction site supervisor, or any other qualified individual who had been involved with the project for a sufficient duration to possess a comprehensive understanding of its management, technical, and quality dimensions. This selection was based on the fact that a construction site supervisor or these other qualified persons may be entrusted with overseeing and coordinating all on-site aspects of a construction project. Their responsibilities typically encompass: overseeing project design and approval, workforce management, the coordination and direction of tasks, site safety inspections, quality control, management of supplies, labour organisation, scheduling of machinery and equipment, budgetary controls, communication, interpretation of blueprints, daily reporting of site activities, general problem-solving, and occasionally, worker counselling. In line with this, the unit of analysis was a construction project.

3.6 Study Area

This study was conducted in Nairobi City County (NCC), Kenya's sole city-county. Administratively, Kenya is divided into 47 county governments, and Nairobi was selected due to its well-established systems, which facilitate the evaluation of regulatory compliance processes. The National Construction Authority (NCA) has 14 regional offices across the country, which serve as the basis for project registration, incident reporting, and non-compliance reporting, as detailed in Table 3.1.

Table 3.1: No. of Reported Registered Projects, Incidents, and Fatalities per Region for 2023

	NCA Region	No. of registered projects	Percentage no. of projects	No of incidents	Percentage incidents	No of fatalities	Percentage fatalities
1.	Nairobi	816	20.28	5	27.78	5	45.45
2.	Central Eastern	256	6.36	1	5.56	0	0
3.	Central Nyanza	254	6.31	1	5.56	0	0
4.	Central Rift	152	3.78	3	16.67	1	9.09
5.	Coast	416	10.34	2	11.11	0	0
6.	Kajiado	471	11.71	0	0	0	0
7.	Kiambu	587	14.59	3	16.67	0	0
8.	Western	100	2.49	0	0	0	0
9.	Upper Eastern	43	1.07	0	0	0	0
10.	South Nyanza	195	4.85	1	5.56	0	0
11.	North Rift	142	3.53	0	0	0	0
12.	North Eastern	2	0.05	0	0	0	0
13.	Mount Kenya	212	5.27	2	11.11	5	45.45
14.	Lower Eastern	378	9.39	0	0	0	0
	TOTAL	**4,024**	**100%**	**18**	**100%**	**11**	**100%**

Source: Author compilation based on data obtained from NCA (2026)

The decision to choose NCC was multifaceted. Not only is it one of the 14 NCAs' regional offices, but it also consistently records the highest number of registered projects, unregistered projects, and reported incidences of building failures and collapses per square kilometre each financial year, elevating its risk profile. Additionally, NCC was offered better access to relevant regulatory data.

To effectively assess the level of regulatory compliance in NCC, the administrative zones, as defined by various stakeholders, were reviewed and mapped out. It was observed that while NCC management recognises 17 Sub-counties, aligning with its 17 constituencies, the national government administratively defines NCC by only 11 Sub-counties, as illustrated in Table 3.2 and Figures 3.2 and 3.3. Both sets of administrative units were adopted because each provided vital information necessary for explaining regulatory compliance levels. For instance, project registration under the NCA's Online Project Registration System (OPRS) is conducted per constituency, aligning with NCC structures. Conversely, critical data such as population census information, essential for drawing correlations, is organised at the sub-county level as delineated by the national government.

Table 3.2: Administrative Zones in Nairobi City County

Sub-counties as per NCC (Constituencies)	Sub-counties as per National Government	Area in Sq. KM	Population	Population Density (No. per Sq. Km)
1) Langata*	1) Langata*	216.8*	197,489	911
2) Kibra	2) Kibra	12.1	185,777	15,311
3) Makadara	3) Makadara	11.7	189,536	16,150
4) Starehe	4) Starehe	20.6	210,423	10,205
5) Mathare	5) Mathare	3.0	206,564	68,941
6) Dagoretti South	6) Dagoretti	29.1	434,208	14,908
7) Westlands 8) Dagoretti North	7) Westlands	97.5	308,854	3,167
9) Roysambu	8) Njiru	129.9	626,482	4,821
10) Ruaraka 11) Embakasi North 12) Kasarani	9) Kasarani	86.2	780,656	9,058
13) Kamukunji	10) Kamukunji	10.5	268,276	25,455
14) Embakasi Central 15) Embakasi East 16) Embakasi West 17) Embakasi South	11) Embakasi	86.3	988,808	11,460
	TOTAL	**703.7**	**4,397,073**	**AV. 6,247**

**A greater part of Langata Constituency/Subcounty lies within the Nairobi National Park*

Source: Adapted by Author (2026)

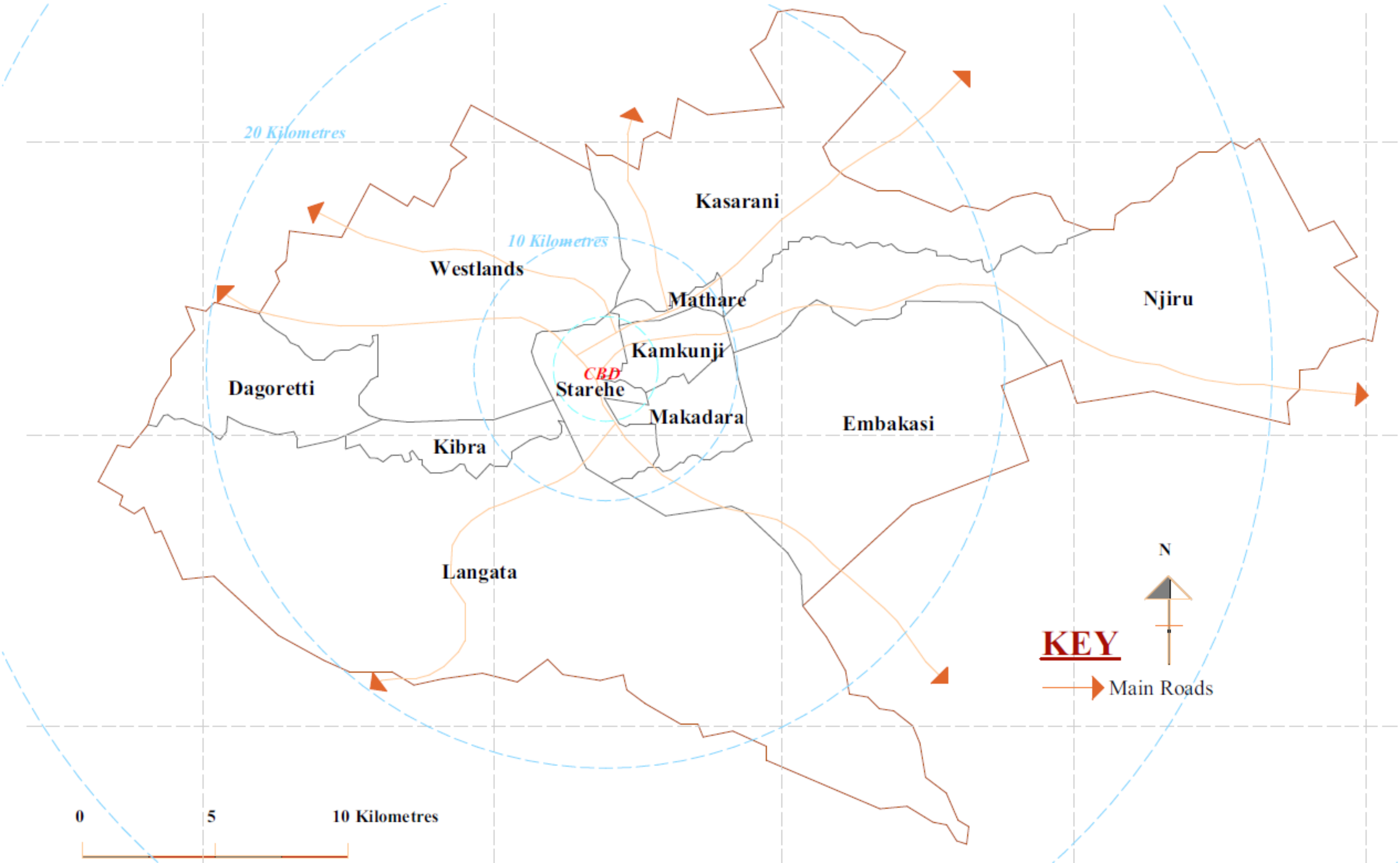

Figure 3.2: Sub-Counties as per National Government Administrative Units

Source: Adapted from City Population (2025)

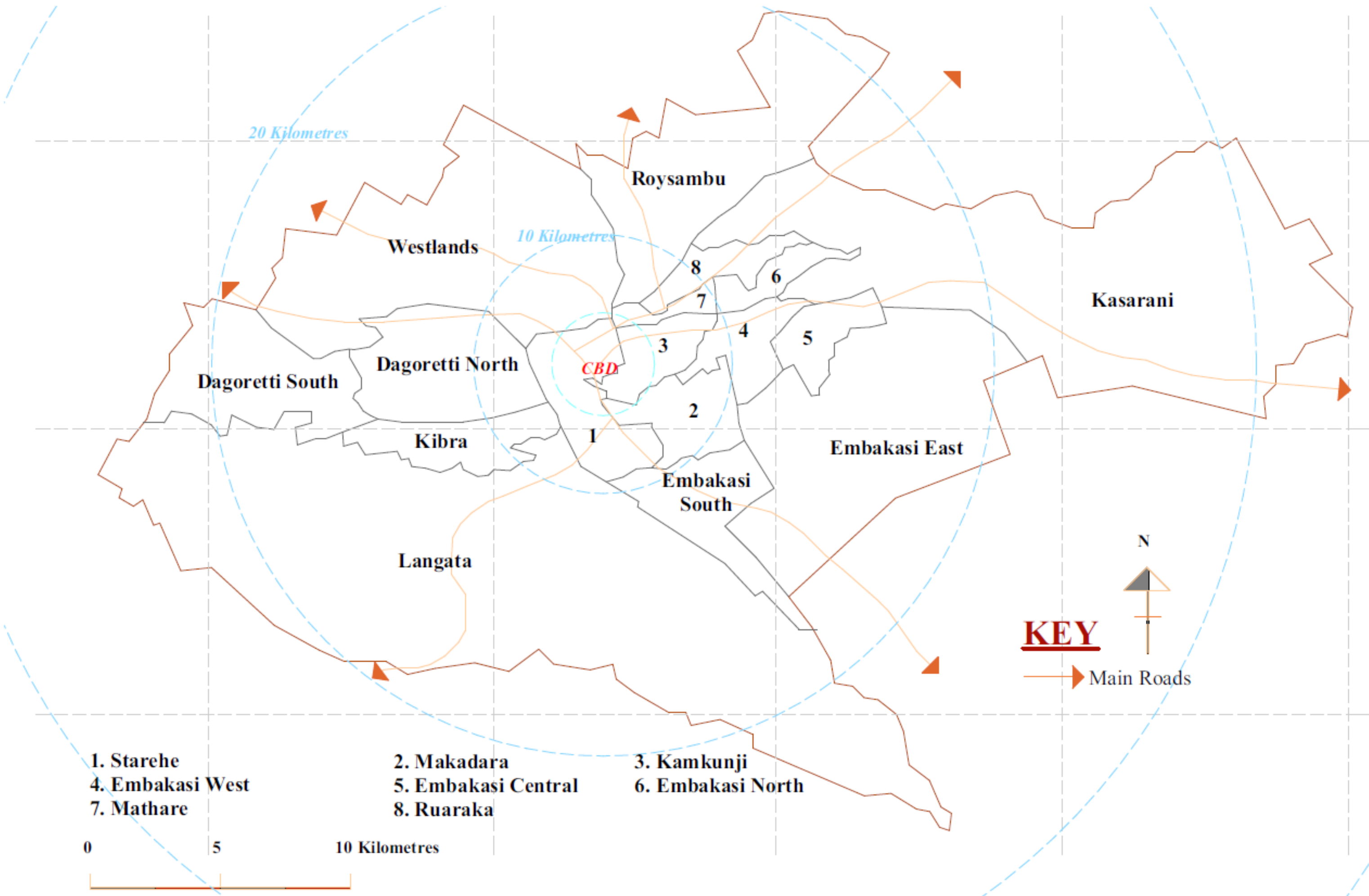

Figure 3.3: Sub-Counties as Per the NCC Political Administrative Units

Source: Adapted from OCHA Services (2025)

3.7 Target Population and Sample Size

The target population for this research comprised all construction projects within NCC's jurisdiction, as documented in the National Construction Authority's (NCA) Online Project Registration System (OPRS) for the calendar year 2023. This included both registered and unregistered projects. Projects from this specific period were sampled for several key reasons: (i) it represented the most current and comprehensive list of construction projects in NCC within the NCA's database (ii) most of these projects were still ongoing at the time of the research, allowing for on-site data collection., and (iii) project information from this period had not yet been archived, making it readily accessible.

As per the NCA's OPRS database, a total of 4,024 projects were registered across the country in 2023. Specifically, 816 building projects were registered within NCC's jurisdiction during that year, as summarised in Table 3.1. Regarding Quality Assurance (QA) activities on newly registered and ongoing projects, the Nairobi regional office conducted inspections on 6,645 projects within its jurisdiction in 2023. Of these, 1,742 were on validly registered projects, while 4,903 were unregistered.

3.8 Sampling Techniques

This study investigated documented registered (compliant) and non-compliant construction projects within Nairobi City County's jurisdiction, specifically focusing on those categorised as building projects. For the registered projects, sampling was employed due to its practicality, cost-effectiveness, convenience, and manageability in data collection. Conversely, a census was conducted on unregistered projects, using secondary data already collected by NCA.

The selection of the sample of registered projects was randomised using an output file from R programming, as detailed in Appendix VI. This approach aligns with the advice of Aguinis and Harden (2008), who advocate for large sample sizes to minimise sampling errors. Coglianese (2012) further supports this by proposing random sampling as the most effective technique for gauging progress on public policy issues.

Additionally, Bryman (2012), Creswell and Creswell (2018) and Kothari (2013) all recommend simple random sampling to minimise or eliminate bias.

To begin, the master list of automatically numbered projects registered nationwide for the calendar year 2023 was obtained from the NCA's Online Project Registration System (OPRS). This file contained 4,024 projects, ordered by their registration date and time. The list was then filtered using Microsoft Excel to retain only those projects registered under the NCA's Nairobi regional office, resulting in 816 projects that maintained their original order. These projects were subsequently renumbered from 1 to 816, forming the population of interest for this study. Cochran's (1977) formula for finite populations was then applied to determine the appropriate sample size, which resulted in the identification of 261 projects, as illustrated below.

Using Cochran's formula for finite population sample size (n) = $\dfrac{(Z^2 * p(1-p))/\,(\varepsilon^2)}{1+\frac{Z^2 * p(1-p)}{\varepsilon^2\, N}}$

The finite population identified was 816 construction projects, hence

N= 816

Z = score value for 95% confidence interval, which is 1.96

p=0.5

ε= margin of error at 95% confidence interval, which is 0.05

Thus;

$$n = \frac{(Z^2 * p(1-p))/\,(\varepsilon^2)}{1+\frac{Z^2 * p(1-p)}{\varepsilon^2\, N}}$$

$$n = \frac{(1.96)^2 * 0.5(0.5))/\,(0.05^2)}{1+\frac{1.96^2 * 0.5(0.5)}{0.05^2 * 816}}$$

n=261.19

n=261

This calculated sample size exceeded the guideline of 15 to 20 observations per explanatory variable, as proposed by Bartlett et al. (2001) for studies employing multiple regression analysis. Given that this study identified nine explanatory variables, an alternative recommended sample size would have been 180 projects, derived through the following calculation.

Sample size for finite population (n_2) = (20X)

Where X = No. of explanatory variables

$$n_2 = 20*9$$

$$\mathbf{n_2 = 180}$$

Bartlett et al. (2001) caution that increasing the sample size beyond what a sample size formula specifies raises the probability of a Type I error, where the true margin of error exceeds the acceptable threshold. However, aligning with the recommendations of Aguinis and Harden (2008), a larger sample is generally preferable since sampling error is inversely proportional to sample size. To confirm the adequacy of this sample, therefore, other formulas were consulted, as detailed in Appendix V, all yielding comparable sample sizes. As a result, the sample size derived from Cochran's formula was ultimately adopted.

The subsequent step involved the selection of 261 projects from the total population of 816. This selection was performed using R programming software through the following procedure:

Sample (1: N, 261, replace =False)

Sample (1:816, 261, r=F)

The sample of 261 selected projects is shown in Appendix VI.

Regarding the non-compliant projects documented as suspended during quality assurance activities, a census was undertaken based on available secondary data to identify reasons for non-compliance. OPRS data showed that a total of 6,645 inspections were undertaken within the NCC region during quality assurance checks, out of which 1,742 found compliant projects, while 4,903 discovered non-compliant projects, as shown in Table 3.3.

Table 3.3: Summary of Inspection Reports for Nairobi for the Calendar Year 2023

Item	*No. of site visits*	*Percentage of total*
1. No. of non-compliant sites (suspended)	4,903	73.78%
2. No. of compliant sites	1,742	26.22%
Total	**6,645**	**100%**

Source: Author compilation (2025)

During the quality assurance inspections, it's important to note that NCA utilises a 'checklist' of seven (7) items to define compliance. These are: (i) engagement of NCA registered contractor on site; (ii) erection of site board showing all approvals and the professionals engaged in the project; (iii) having safety signs on-site; (iv) adorning personal protective equipment (PPE) while on-site; (v) ensuring sufficient hoarding and fencing on sites; (vi) having a valid NCA Compliance Certificate; and (vii) engaging NCA accredited construction workers and site supervisors.

3.9 Data Collection Methods

This study employed both primary and secondary data collection methods. Primary data was gathered between March and April 2024 through the administration of questionnaires to construction site supervisors at the randomly selected project sites. Concurrently, secondary data was formally obtained from the National Construction Authority (NCA) through an official request. The complete list of documented projects was retrieved and cleaned in preparation for analysis. Information from literature was then used to explain the study's outcomes, as shown in Figure 3.4.

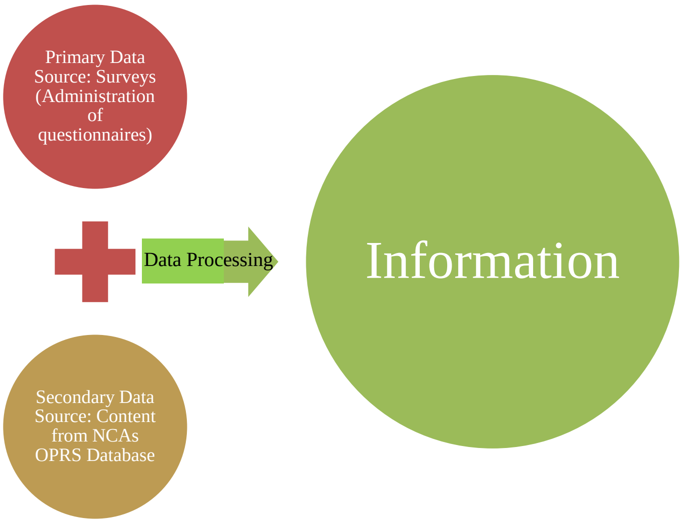

Figure 3.4: Research Data Sources

Source: Author (2026)

3.9.1 Survey

A four-part questionnaire, provided in Appendix VIII, was administered to construction site supervisors at randomly selected sites with the assistance of research assistants. Section 'A' gathered background information about the respondent and the project. Section 'B' focused on specific aspects of regulatory compliance (outcome variables), while Section 'C' was designed to capture data on factors influencing the level of regulatory compliance (explanatory variables). Section 'D' offered an open-ended space for respondents to add any general information.

Accordingly, Sections 'A', 'B', and 'C' primarily featured closed-ended questions, whereas Section 'D' contained open-ended questions. The questionnaire itself was developed following a comprehensive literature review, which identified three outcome variables, nine explanatory variables, and their corresponding surrogates, coded as shown in Table 3.4 and Table 3.5.

Table 3.4: Coding of Outcome Variables

Variable	Code	Surrogates	Total
1. Project registration status	RS	RS1 – RS5	5
2. Project site conditions	SC	SC1 – SC10	10
3. Project workforce status	WS	WS1 – WS5	5
		Total	**20**

Table 3.5: Coding of Explanatory Variables

Variable	Code	Surrogates	Total
1. Suitability of the project legal framework	SLF	SLF1- SLF7	7
2. Proactiveness of the regulatory agencies	PRA	PRA1 – PRA17	17
3. Efficiency in regulatory processes	ERP	ERP1 – ERP9	9
4. Conduciveness of the construction task environment	CTE	CTE1 – CTE20	20
5. Characteristics of the project client	CPC	CPC1 – CPC8	8
6. Competency of project leaders	CPL	CPL1 – CPL8	8
7. Goodness of construction labour	GCL	GCL1 – GCL14	14
8. Stability of prevailing economic environment	SEE	SEE1 – SEE8	8
9. Adherence to ethical factors	AEF	AEF1 – AEF12	12
		Total	**103**

Source: Author (2026)

This questionnaire effectively simplified information regarding local regulatory compliance status and approaches. While Section 'A' consisted of multiple-choice questions, Sections 'B' and 'C' presented simplified statements that respondents were asked to rate. These ratings were either on a binary scale of 'yes' or 'no' or on a Likert scale of 1-7, where '1' signified 'Fully disagree' and '7' indicated 'Fully agree'. The choice of a 7-point Likert scale over counterparts was necessitated by the need for heightened statistical granularity and sensitivity, particularly to satisfy the requirements of Multiple Regression Analysis (MRA) and Confirmatory Factor Analysis (CFA). These parametric techniques rely on data that closely approximates a continuous distribution to ensure robust results. By providing a broader range of options, the scale allowed respondents to express more precise intensities of agreement or disagreement, thereby enhancing the data's internal consistency and reliability. Furthermore, the inclusion of a neutral midpoint aligns with the study's objectivist grounding; it mitigates response bias by ensuring that the "objective reality" being captured was not compromised by forcing respondents into a binary choice, thus preserving the integrity of the data. The subsequent analysis helped to uncover relationships (both promoters and obstacles to compliance) and opportunities, which in turn aided the researcher in developing a framework for enhanced regulatory compliance.

To ensure standardised data collection and a comprehensive understanding of the research, data collectors underwent thorough training. This training covered the research instrument, the study's aim and objectives, the specific sample population, and the characteristics of the respondents. Furthermore, the training emphasised critical ethical considerations, particularly the importance of securing informed consent from participants. It also prepared data collectors for potential challenges they might encounter during the process. This comprehensive training regimen was significantly shaped by valuable insights gained during the pilot study.

3.9.2 Archival Research

Regulators in the building sub-sector gather substantial data on regulatory compliance each year. However, due to limitations in budget and time, this study only reviewed data collected by the National Construction Authority (NCA) during the 2023 calendar year. This specific decision did not in any way compromise data integrity since it primarily supplemented primary data obtained through questionnaires. Furthermore, these reports are routinely discussed in Multi-Sectoral Agency Consultative Committee (MSACC) meetings, which convene all major industry regulators, ensuring a broader contextual understanding.

The two categories of secondary data collected and analysed in this study were:

a) *Compiled data:* This category encompassed pre-existing data, specifically annual reports and returns compiled by compliance officers at the NCA's Nairobi Regional Office. This includes documented compliance levels within the county and findings from inquiries into particular projects of interest.
b) *Uncompiled data:* This category comprises data accessible through the Online Project Registration System (OPRS) concerning Quality Assurance (QA) activities, specifically pertaining to individual construction projects that were either ongoing, completed, or suspended by the NCA, as detailed in Section 3.7.

To obtain this data, the researcher submitted a formal request to the NCA, accompanied by all requisite supporting documentation, including a permit from NACOSTI and relevant student identification.

3.9.3 Field Challenges and Mitigation Measures

The research process involved several logistical and social challenges that necessitated proactive mitigation strategies to ensure the quality and reliability of the primary data. A primary challenge was the unpredictable reception encountered by data collectors when visiting construction sites. To mitigate potential distrust or resistance, the data collection team underwent training on professional etiquette and ethical protocols. Furthermore, the team utilised a verifiable research permit from NACOSTI and a formal introductory letter to establish legitimacy, transparency, and to obtain informed consent from site supervisors.

To address the risk of respondent attrition and ensure a robust response rate, the study prioritised physical administration of questionnaires on-site rather than remote surveys. This face-to-face approach was supplemented by scheduled and consistent follow-up calls, which directly contributed to the high response rate of 88.9%. Additionally, the data collection coincided with the rainy season, a period of heightened regulatory surveillance and increased site sensitivity due to the risk of structural collapses. While this created environmental constraints, it allowed the researcher to capture the objective reality of site conditions during a critical phase of the building lifecycle.

Finally, preliminary challenges regarding the suitability and reliability of the research instrument were identified and mitigated through a pilot study conducted in January 2024. This "mock analysis" allowed for the identification of ambiguous questions and the elimination of variables showing signs of multicollinearity, ensuring that the final field investigation utilised a refined and stable tool. By implementing these methodological and ethical safeguards, the researcher maintained the procedural integrity of the study while ensuring the safety and anonymity of all participants.

3.10 Data Analysis and Interpretation

The collected data was analysed using various statistical methods to identify trends, patterns, and relationships. Quantitative data were examined through descriptive statistics, confirmatory factor analysis (CFA), correlation analysis, and multiple regression analysis (MRA). Conversely, qualitative data was analysed using word frequency diagrams and text search query outputs. The software utilised for this analysis included IBM SPSS v26, Microsoft Excel, JASP v0.18.3, R programming 4.3.0 version 4.2, and Python 3.12.2.

3.10.1 Descriptive Statistics

Descriptive statistics were used to summarise and define the primary characteristics of the data, including measures of central tendency (MCT), variability, and distribution. This was important in the presentation of findings from the first section of the questionnaire, which gathered demographic and general information. For each variable, the following descriptive statistics were calculated: mean, standard deviation, minimum and maximum values, skewness, and kurtosis.

While the median is often the most 'stable and robust' MCT because its position in the distribution is not fundamentally altered by outliers or skewness, the choice of mean was a deliberate methodological choice based on the requirements of the analysis. In Section 4.7, the mean and standard deviation (SD) were essential for conducting

ANOVA and Pairwise Comparisons, which are parametrically dependent on the mean. In Section 4.9, the empirical data showed low variability (SD mostly < 1.158), suggesting that the 'distortion' risk from outliers was minimal for these outcome variables. Furthermore, the Coefficient of Variation (CV) was introduced to provide a granular assessment of relative consistency across different compliance indicators, a metric that the median cannot support. Thus, while the median served as a diagnostic 'safety check' for outliers in Section 4.3, the mean, SD, and CV provided the statistical depth required for the comparative and empirical assessments in the subsequent sections.

To display the distribution of both categorical variables (e.g., age group, sex, educational level, typically found in Section 'A' of the questionnaire) and continuous variables (those whose values were obtained through measurement), frequency tables and histograms were employed. The data acquired through this process helped address objective one, which sought to determine the level of regulatory compliance in Kenyan construction projects, and objective two, which aimed to establish factors influencing regulatory compliance in construction projects.

3.10.2 Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) was employed to determine if the measures of a construct aligned with the researcher's understanding of that construct's nature. This allowed for an assessment of how well the observed data fit the specified model, thereby providing evidence for the validity of the proposed factor structure. In CFA, the researcher defines the number of latent factors and how each observed variable loads onto these factors, along with any constraints or relationships among the factors. The analysis then estimates model parameters and evaluates the model's fit to the observed data. A well-fitting CFA model suggests that the hypothesised factor structure is supported by the data, providing a basis for subsequent hypothesis testing or structural equation modelling extensions.

This study utilised CFA to test a predefined model derived from existing theory and literature. Nine explanatory variables were conceptualised, each possessing a varying number of surrogates, ranging from a minimum of seven (for SLF) to a maximum of twenty (for CTE). This met the minimum requirement of three indicators per single factor, as suggested by Hair et al. (2010). The study employed a factor loading threshold of 0.50 as the benchmark for item retention. Following the guidelines established by Hair et al. (2014), loadings above this level indicate that the factor accounts for a sufficient portion of the item's variance, thereby confirming the construct validity of the measurement scale. Further, the hypothesis was tested at a 0.05 level of significance and applied to objective two, aiming to simplify datasets by examining the observed covariances among the variables.

3.10.3 Correlation Analysis

Pearson's correlation coefficients were utilised to examine the relationships between pairs of continuous variables within the dataset. Correlation matrices were constructed to visually represent both the strength and direction of these relationships. For a correlation coefficient to be considered statistically significant, its p-value had to be less than 0.05. Additionally, all coefficients were required to fall within the range of $-1 \leq r \leq +1$, where a value of 0 indicates no relationship whatsoever between the data. This analysis also adhered to the common rule of thumb for interpreting correlation coefficients: values between 0 and 0.3 suggested a weak correlation, 0.3 to 0.5 were considered moderate, and values above 0.5 indicated a strong correlation. Negative values represented a negative correlation of equivalent strength (Krehbiel, 2004).

Correlation analysis was crucial for revealing meaningful relationships and interdependencies among different factors. This method was applied to the study's second and third objectives, which aimed to identify factors influencing regulatory compliance in construction projects and to establish the relationship between compliance in construction projects and the explanatory variables.

3.10.4 Multiple Regression Analysis

Multiple Linear Regression Analysis (MRA) was utilised to address objective three, allowing for the examination of relationships between the conceptualised explanatory and outcome variables. MRA also facilitated the determination of the model's overall fit (i.e., the variance explained) and the unique contribution of each predictor to the total explained variance. For the MRA to be valid, several statistical assumptions had to be met. These included tests for normality, linearity, homoscedasticity, and multicollinearity.

a) Normality

A crucial requirement for Multiple Regression Analysis (MRA) is that the residuals of the regression model must be normally distributed (Hair et al., 2014). To confirm this, a normality test was conducted, where the error was defined as the difference between the observed and predicted values. The expectation was that the mean of these errors would be zero. This assumption was visually inspected by plotting the residuals and numerically by computing their skewness values. This choice of using residuals to examine normality is supported by Williams, Grajales, and Kurkiewicz (2013), who assert that normality tests should be applied to residuals rather than directly to the response and explanatory variables. This normality test was critical in ensuring the collected data's suitability for MRA.

b) Linearity

A linear relationship must exist between the outcome and the explanatory variable to be able to conduct multiple linear regression analysis. This assumption was checked by conducting a correlation analysis linking the level of regulatory compliance (outcome) and each of the explanatory variables. Additionally, a scatter plot was drawn to reveal whether a linear relationship existed between the outcome and each of the explanatory variables. Pearson correlation coefficients (r) were used to test this assumption, where values closer to 1 or -1 indicated stronger linear relationships. The use of Pearson's correlation is deemed appropriate to check for the assumption of linearity. According to Casson and Farmer (2014), Pearson’s correlation coefficient is a widely utilised correlation measure with a value of zero suggesting no linearity, while values greater or less than zero imply the presence of linear association.

c) Homoscedasticity

Homoscedasticity, also known as the equality of variance, is a fundamental requirement for Multiple Regression Analysis (MRA). This assumption posits that the variance of the error terms remains constant across all levels of the explanatory variables. In essence, any change in residual errors should be consistent, regardless of variations in the independent variables. This assumption was visually inspected by plotting the residuals against the mean line. For homoscedasticity to be present, the distribution of points both above and below the mean line needs to be approximately equal. As supported by Cho et al. (2022), the use of residual plots is an appropriate method for assessing the equality of variance.

d) Multicollinearity

This assumption in regression analysis stipulates that explanatory variables should not be highly correlated with one another. While some degree of association among these variables might exist, its strength should not be substantial. This condition is typically assessed using either the Pearson correlation coefficient or the Variance Inflation Factor (VIF). VIF values specifically quantify the extent of multicollinearity in a regression analysis. A VIF of 1 indicates that a variable is not correlated with others. VIF values ranging from 1 to 5 suggest a moderate correlation, whereas a VIF of 5 or greater signals the presence of multicollinearity (James et al., 2021). It is worth noting that the VIF is the reciprocal of the tolerance value. The formula for VIF for a particular independent variable X_i is calculated using the formula VIF = $1/(1-R_i^{2)}$. According to Myers (1990), a tolerance value below 0.1 strongly suggests a serious multicollinearity problem.

3.10.5 Qualitative Data Analysis

The qualitative responses from Section ‘D’ were analysed using systematic methods, including content, narrative, and thematic analysis, facilitated by Microsoft Word and Python 3.12.2. This analytical process was designed to reinforce the study's quantitative orientation; rather than pursuing deep narrative interpretation, the analysis focused on determining word frequencies and emerging trends. By converting qualitative feedback into quantifiable metrics—presented through Frequency Tables and Word Clouds—the data effectively identified the most prevalent objective barriers and strategies perceived by the industry. This approach aligns with a positivist framework, which necessitates that knowledge be quantifiable and generalizable, ultimately utilising qualitative data to serve the primary goal of establishing a comprehensive, objective reality.

3.10.6 Data Interpretation

Data interpretation synthesises statistical and qualitative findings into meaningful outcomes that address the study's objectives within the specific context of the construction sector. By evaluating quantitative associations and qualitative themes through the lens of established literature and theoretical triangulation—encompassing TRC, DT, PITR, CT, and SCT—the study identifies the underlying determinants and barriers driving non-compliance. This rigorous process provides the empirical and logical foundation necessary to expose regulatory loopholes, redesign construction procedures, and formulate the five-stage holistic framework presented in Chapter Five.

3.11 Data Presentation

Data was presented using descriptive content, tables, graphs, and analytical diagrams to simplify interpretation and enhance understanding. Table 3.6 provides a summary of the research objectives, along with the methods, tools, and techniques employed for recording, analysing, and presenting data for each objective.

3.12 Reliability

Reliability refers to the stability and repeatability of a study's results (Bryman, 2012) or, more simply, the degree to which a measure of a construct is consistent and dependable (Kubai, 2019). Data collected using a research instrument can be affected by random or systematic errors, which can lead to inconsistent measures across multiple administrations. In this study, the subject of inquiry remained constant. To ensure reliability, the researcher developed a questionnaire informed by existing literature, various theories, and relevant concepts. The procedures for selecting respondents, administering questionnaires, and analysing data were also clearly outlined. These measures were sufficient to guarantee the reliability and replicability of the findings. Furthermore, the internal consistency of the questionnaires was assessed using Cronbach's alpha (α). An acceptable reliability level was set at 0.7. Values below 0.6 were considered poor, while those exceeding 0.8 were deemed good (Bryman, 2012; Kubai, 2019).

Table 3.6: Research Tools and Analytical Frameworks

Objective	Data collection methods	Data analysis techniques	Data Presentation	Software/ program
1. To establish the level of regulatory compliance in construction projects in NCC.	-Surveys -Documentary search	-Descriptive statistics	-Textual -Frequency tables, histograms -Maps	-MS Word -MS Excel -IBM SPSS -ArchiCAD
2. To establish factors that affect the level of regulatory compliance in construction projects within NCC.	-Surveys -Documentary search	-Descriptive statistics -ANOVA -CFA	-Tables, graphs, analytical diagrams -Word clouds/ sentiment analysis	-MS Word -MS Excel -IBM SPSS -Python
3. To establish the relationship between regulatory compliance in construction projects within NCC and its influencing factors.	-Surveys -Documentary search	-Correlations -MRA	-Tables, graphs, and analytical diagrams -Word clouds/ sentiment analysis	-MS Word -IBM SPSS -Python
4. To formulate a framework for enhancing the regulatory compliance of construction projects in Kenya.	A framework was developed based on the outcomes of objectives one, two, and three			

Source: Author (2026)

3.13 Validity

Validity speaks to the soundness and integrity of a study's results and conclusions. In the context of research instruments, it gauges the extent to which an instrument truly measures what it claims to measure, or how well it represents the underlying construct it's designed to assess. For an instrument to be valid, it must first be reliable (Hair et al., 2014). Bryman (2012) identifies four key types of validity: measurement validity, internal validity, external validity, and ecological validity. Equally, Kubai (2019) broadly categorises validity into construct validity and criterion-related validity.

This study assessed validity using both theoretical and empirical evidence. Recognising that the integrity of the results and inferences hinged on the quality of the tools, the questionnaire underwent thorough review and testing prior to its deployment. Specifically, the following validity measures were undertaken in this study:

3.13.1 Construct Validity

Construct validity, also known as measurement validity, ensures that the measures used in a study accurately represent the concepts they intend to assess. This means verifying that the measures of a concept are both stable and genuinely valid. Kubai (2019) suggests that construct validity can be established through various means, including face validity, content validity, concurrent and predictive validity, and convergent and discriminant validity. In this study, construct validity was achieved through a meticulous and transparent elaboration of the research methods, spanning from the literature review to the development and administration of data collection tools. A pilot study was conducted to identify and refine potential issues within the research instrument.

Furthermore, confirmatory factor analysis (CFA) was employed to examine the surrogates of the factors, confirming that the items loaded onto their intended factors. This process led to carefully rephrasing some questions to ensure they accurately captured the intended constructs, while others were either eliminated or integrated into different variables, particularly if they exhibited signs of multicollinearity. Additionally, subject matter experts were consulted at various stages of questionnaire development to review its content before final deployment in the field.

3.13.2 Face Validity

Face validity refers to the subjective evaluation of a measure's suitability based on its outward appearance (Dubey & Kothari, 2022). It's an intuitive process where other individuals assess if a measure genuinely captures the concept it intends to (Dubey & Kothari, 2022). Essentially, it gauges or tests the perceived relevance and coverage of the concept. In this study, face validity was evaluated during the initial stages of questionnaire development. Academicians and construction industry professionals were engaged to review the draft instrument before its final administration. Additionally, the preliminary questionnaire was piloted on a representative sample of the target population to gather feedback prior to full deployment.

3.13.3 Content Validity

Content validity, a crucial aspect of measurement validity, refers to the degree to which a measure encompasses all facets of a particular construct (Creswell & Creswell, 2018). Although a formal content validity index (CVI) was not calculated in this study, its assurance was achieved through a comprehensive review of existing literature. This thorough review ensured that the data collection instruments adequately covered all relevant dimensions of regulatory compliance.

3.13.4 Internal Validity

Internal validity focuses on confirming that a deduced causal relationship between explanatory and outcome variables is genuine and not attributable to extraneous factors. To mitigate the risk of spurious correlations, this study employed randomisation during sampling and exercised statistical controls, including manipulation, elimination, and inclusion of variables.

3.13.5 External Validity

External validity addresses whether the findings of a study can be generalised beyond its specific research context. For instance, can the attitudes observed in one group of respondents be applied to a broader population? Achieving external validity ensures that the results are applicable to the entire population. In this study, external validity was achieved through the random selection of respondents, which helped eliminate bias. Additionally, efforts were made to reduce respondent attrition, for example, by physically administering questionnaires on-site.

3.14 Ethical Considerations

Maintaining ethical standards is paramount in research, as it guides the conduct of participants in their interactions throughout the study. This particular study identified and addressed several key ethical considerations: preventing injury to participants, ensuring informed consent, protecting privacy, and avoiding deceptive practices. While interconnected, each of these ethical aspects manifests uniquely and requires proactive measures to anticipate and mitigate potential breaches.

Exposure to harm in a fieldwork setting, for instance, presents a significant ethical concern affecting both the research team and respondents. Such harm can manifest physically, economically, or emotionally, leading to diminished self-esteem, stress, or subjection to disrespectful acts. Similarly, a lack of informed consent, an invasion of privacy, or the use of deceptive approaches can readily inflict various forms of harm. Ethically, research participants must receive sufficient information to make autonomous and informed decisions about their involvement, particularly concerning factors that might influence their willingness to participate (Bryman, 2012).

To safeguard participant privileges, the following measures were meticulously implemented:(i) The researcher secured the requisite verifiable research permit from the National Commission for Science, Technology and Innovation (NACOSTI), as appended in Appendix IX. This legally mandated permit served as a formal introduction for the research team, thereby helping to prevent deception, facilitate consent acquisition, guarantee privacy, and pre-empt any foreseeable harm; (ii) The data collection team received comprehensive training on professional etiquette and was mandated to accurately disclose the research's purpose to respondents before any engagement, and provide reassurance thereafter; (iii) A letter soliciting consent was appended to every questionnaire. Each questionnaire also featured a dedicated page providing detailed study information and clear guidelines for participant involvement. This included a confidentiality statement explicitly stating the voluntary nature of participation and the commitment to maintaining information confidentiality; (iv) No personally identifying information was requested from participants. The researcher personally managed all confidential research data, ensuring that any data shared with third parties, such as professional data analysts, was meticulously coded. Furthermore, third parties were required to commit to confidentiality in strict adherence to Kenya's Data Protection Act, 2019; (v) Codes were employed to identify information files, and these files were securely stored separately from the list of participants and their corresponding identifier codes.

Generally, independence during data collection was maintained through the application of a randomised sampling technique and the engagement of an independent, third-party data collection team, which minimised researcher bias during respondent interaction. Furthermore, participation was strictly voluntary; no incentives, financial rewards, or inducements of any kind were offered to respondents. These protocols ensured that the data collected remained untainted by external pressures, providing an unbiased and reliable reflection of the industry’s regulatory environment.

3.15 Pilot Study

The initial questionnaire was piloted in January 2024 to assess its suitability. While the target for this pilot exercise was 10% of the actual sample size of 261 respondents (approximately 26 observations), to ensure broad representation, two questionnaires were administered to construction site supervisors in each of Nairobi's 17 sub-counties. Of the 34 questionnaires issued, 29 were completed and returned, yielding a response rate of 85.3%.

Generally, the collected data demonstrated good reliability, with acceptable Cronbach's Alpha values as presented in Table 3.7. However, the variable "Goodness of construction labour (GCL)" showed a low Cronbach's Alpha of 0.480, while "Quality of construction materials (QCM)" had an adequate Cronbach's Alpha of 0.774. The lower value for GCL suggested that some survey questions might not have consistently measured the intended underlying concept.

Table 3.7: Cronbach's Alpha by Component of the Pilot

No.	Variable	Cronbach's Alpha	Number of Items	Internal consistency
1.	Regulatory Compliance (combined outcome variable)	.949	15	Good
2.	Suitability of the project legal framework (SLF)	.921	7	Good
3.	Proactiveness of the regulatory agencies (PRA)	.952	17	Good
4.	Efficiency in regulatory processes (ERP)	.916	9	Good
5.	Conduciveness of the construction task environment (CTE)	.927	20	Good
6.	Characteristics of the project client (CPC)	.877	8	Good
7.	Competency of project leaders (CPL)	.941	8	Good
8.	Goodness of construction labour (GCL)	.480	14	Poor
9.	Quality of construction materials (QCM)	.774	7	Adequate
10.	Stability of prevailing economic environment (SEE)	.947	8	Good
11.	Adherence to ethical factors (AEF)	.805	12	Good

Regarding normality, tests indicated that the data was not normally distributed, exhibiting a slight negative skew (skew to the left). This implied that the tail of the distribution was longer on the left side of its peak, with the mean being lower than the median due to extremely low values. Nevertheless, based on the Central Limit Theorem, which posits that the distribution of sample means approaches a normal distribution as the sample size increases (regardless of the population distribution's shape), this was expected to change once the full data collection was completed.

Based on the outcomes of this mock analysis, certain questions were either removed or carefully rephrased to ensure they accurately captured and measured the intended constructs. Notably, one explanatory variable, "Quality of construction materials," was eliminated due to its tendency towards multicollinearity, and some of its surrogates were integrated into the remaining variables. This refinement reduced the total number of explanatory variables from 10 to nine, and the cumulative number of surrogates for the explanatory variables from 110 to 103. With these modifications, the questionnaire was deemed ready and suitable for comprehensive data collection. Consequently, the pilot study data were excluded from the final analysis to preserve procedural integrity. This separation ensured that the primary field investigation utilised a stable, refined instrument, thereby safeguarding the validity and reliability of the research outcomes.

3.16 Chapter Summary

This chapter detailed the methodological framework employed to investigate the determinants of regulatory compliance in Kenya's construction industry. Grounded in positivism and objectivism, the study adopted a quantitative research strategy and a cross-sectional research design to ensure the collection of objective, quantifiable, and generalizable data. The research was centred in Nairobi City County, utilising a sample of 261 construction projects randomly selected from the National Construction Authority's 2023 registration database.

The data collection process integrated primary data obtained through structured questionnaires administered to construction site supervisors and secondary data sourced from archival records. To ensure the integrity of the findings, the research instrument underwent rigorous reliability and validity testing, including a pilot study that led to the refinement of the 103 explanatory surrogates.

It also proposes a statistical analysis procedure that follows a systematic progression, proposing to utilise descriptive statistics for objective one, Confirmatory Factor Analysis (CFA) for objective two, and Stepwise Multiple Regression Analysis (MRA) for objective three to test the research hypotheses. This robust methodological approach provided the empirical foundation necessary for the analysis and interpretation of the results presented in Chapter 4.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This study had four specific objectives namely: (i) to establish the levels of regulatory compliance in construction projects within Nairobi City County (NCC); (ii) to establish factors that affect the level of regulatory compliance in construction projects within NCC; (iii) to establish the relationship between regulatory compliance in construction projects within NCC and its influencing factors; (iv) to formulate a framework for enhancing the regulatory compliance of construction projects in Kenya.

This chapter provides a comprehensive analysis, interpretation, and discussion of the study’s findings. It begins by examining the response rate and subsequently details the rigorous data integrity checks performed, including evaluations for missing values, outliers, and evidence of straight-lining, alongside tests for reliability, adherence to pertinent statistical assumptions and confirmatory factor analysis (CFA). The chapter further presents an analysis of the respondents' demographic characteristics. Following this, a detailed analysis, interpretation, and discussion of the data collected to address the first three study objectives is provided. Data pertinent to the first and second objectives were analysed using descriptive statistics. The third objective is addressed through correlations and multiple regression analysis. Specifically, this chapter investigates the level of regulatory compliance in construction projects, identifies the determinants of regulatory compliance, conducts hypothesis testing, explores barriers to regulatory compliance, and reviews empirical strategies for enhancing regulatory compliance.

4.2 Response to Questionnaires

4.2.1 Response Rate

The study targeted 261 respondents, out of which 232 responses were received, as shown in Table 4.1. This reflects an 88.9% response rate, which was adequate for the study. This response rate is attributed to the engagement of well-trained data collectors and the adoption of scheduled and consistent follow-up methodologies. These strategies align with findings from Thorpe et al. (2008), whose analysis of response rate enhancement strategies, utilising odds ratios, indicated that follow-up calls after questionnaire distribution increased response rates by 1.44 times.

Furthermore, the survey was administered to participants associated with registered projects. This context likely fostered a perception among respondents that they were compliant and actively upholding the values and beliefs of their industry, thereby encouraging their participation. This willingness to respond is supported by the theory of cognitive dissonance, which suggests individuals are motivated to reduce discomfort arising from conflicting beliefs or attitudes, potentially leading them to align their actions (responding to the survey) with their perceived compliance and professional values.

Table 4.1: Response Rate

Sample Size	Total Respondents	Response Rate
261	232	88.9%

4.2.2 Missing Values and Outliers

Before analysis, the collected data underwent rigorous scrutiny to ensure the integrity and reliability of the study's findings. Following the guidelines of Hair et al. (2014), observations with more than 15% missing data were removed. For cases with missing data below this threshold, values were imputed using the mean for variables measuring various explanatory constructs. Any missing background information from respondents was excluded from the analysis, given the unique and non-substitutable nature of the required data. Additionally, the dataset was meticulously examined for instances of straight-lining and the presence of outliers to prevent any compromise to the analytical outcomes.

The box plot shown in Figure 4.1 provides a comprehensive visualization of the distributions of all explanatory variables: suitability of legal framework (SLF), proactiveness of regulatory agencies (PRA), efficiency in regulatory processes (ERP), conduciveness of the construction task environment (CTE), characteristics of the project client (CPC), competency of project leaders (CPL), goodness of construction labour (GCL), stability of prevailing economic environment (SEE), and adherence to ethical factors (AEF). In this graphical representation, outliers are denoted as individual points situated beyond the whiskers of each box.

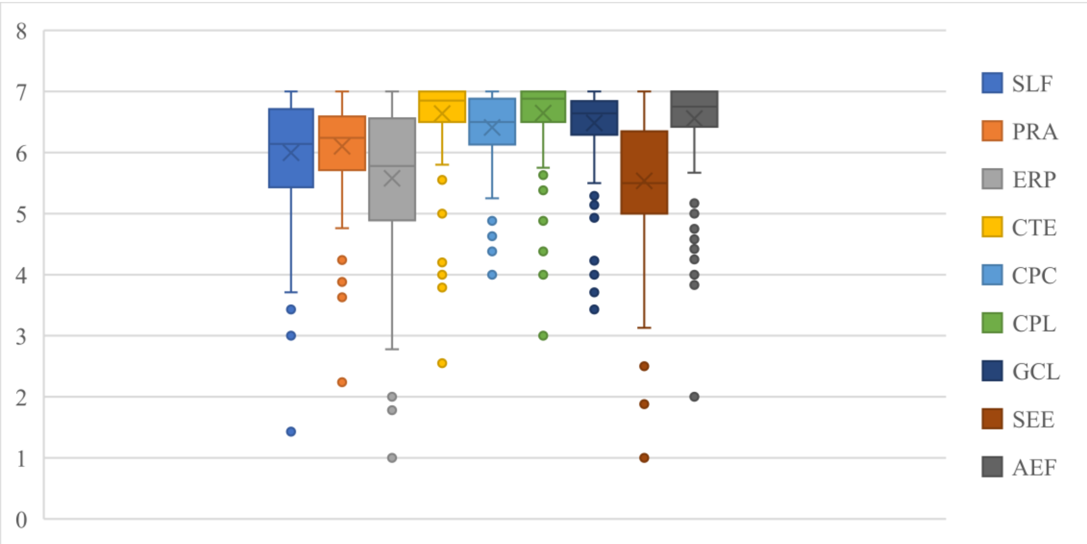

Figure 4.1: Box Plot for Outliers

The study defined outliers using the 1.5 times the interquartile range (IQR) method. These outliers represent data points that substantially deviate from the majority of the dataset. Points situated beyond the whiskers were identified as extremes. The decision to use this measure, alongside medians, was based on its robustness in identifying significant deviations while ensuring that the overall analysis of central trends remained stable and representative of the population. Specifically, SLF, ERP and SEE exhibited three outliers each, while PRA and CPC each had five outliers, all of which fall below their respective lower whiskers. The others are CTE with six, CPL and GCL with seven, and AEF with nine.

Despite these deviations, the presence of outliers does not significantly alter the overall analysis. The key statistical measures of central tendency (medians) and dispersion (interquartile ranges) for each variable remain stable and robust (Woolrich, 2008). Hair et al. (2010) note that while outliers are critical for understanding variability and detecting anomalies, they do not fundamentally alter the conclusions drawn from the dataset. It was taken that the analysis focuses on central trends and distributions, with outliers highlighting the data extremes without influencing core findings.

4.3 Reliability Analysis

Reliability, which is a consistency check undertaken on the tool to ensure that the findings of the research are reproducible or replicable, was undertaken using the Cronbach alpha. The regulatory compliance variable comprised project registration status (RS), project site conditions (SC) and project workforce status (WS). For each of the three, the Cronbach alpha values were 0.964, 0.986, and 0.949, respectively. The findings suggest a high internal consistency in the outcome variables. The Cronbach alpha values for the explanatory variables ranged between 0.814 and 0.986. As discussed by Bryman (2012) and Kubai (2019), these values fall above 0.7, implying that the items possessed good internal consistency, as shown in Table 4.2.

Table 4.2: Cronbach's Alpha per Variable

Item	**No. of Items**	**Cronbach Alpha Value**	**Internal Consistency Remark**
Outcome variables (regulatory compliance)			
a) Project registration status (RS)	4	0.964	Good
b) Project site conditions (SC)	7	0.986	Good
c) Project workforce status (WS)	5	0.949	Good
Explanatory variables			
a) Suitability of the project legal framework (SLF)	7	0.941	Good
b) Proactiveness of the regulatory agencies (PRA)	17	0.903	Good
c) Efficiency in regulatory processes (ERP)	9	0.948	Good
d) Conduciveness of the construction task environment (CTE)	20	0.968	Good
e) Characteristics of the project client (CPC)	8	0.814	Good
f) Competency of project leaders (CPL)	8	0.921	Good
g) Goodness of construction labour (GCL)	14	0.898	Good
h) Stability of prevailing economic environment (SEE)	8	0.882	Good
i) Adherence to ethical factors (AEF)	12	0.953	Good

4.4 Tests for Statistical Assumptions

4.4.1 Normality

In research, normality refers to the statistical assessment used to determine whether sample data originates from a normally distributed population. According to Hair (2014), verifying this distribution is a critical prerequisite for ensuring that collected data is suitable for Multiple Regression Analysis (MRA).

In this study, normality was evaluated by examining the residuals—the differences between predicted and observed values—rather than the raw variables themselves. This approach aligns with the recommendations of Williams et al. (2013), who argue that the assumption of normality applies specifically to the error terms (residuals) in a model rather than the independent or dependent variables. As illustrated in Figure 4.2, the distribution of residuals appears normal, with the majority of errors clustering around a mean of zero.

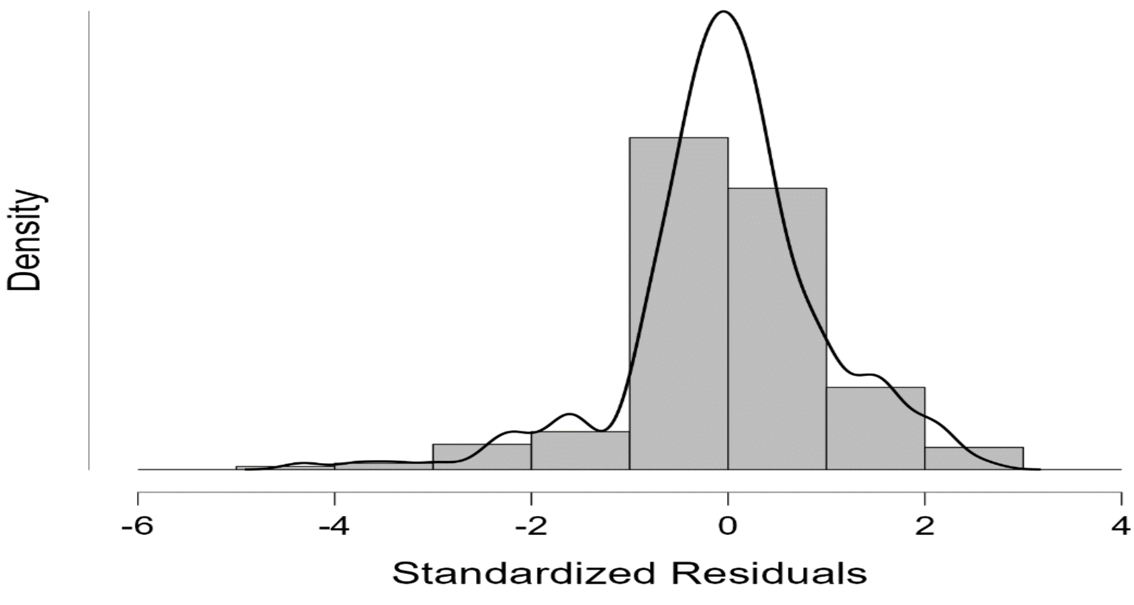

Figure 4.2: Standardised Residuals Histogram

Testing these assumptions was a vital step in validating the model's overall suitability. While some diagnostics, such as multicollinearity, can only be performed after the initial regression is run—since they rely on the observed relationships between independent variables—addressing normality beforehand ensured the model is grounded on a sound statistical foundation. By assessing these assumptions as an integrated part of the analytical process, the researcher could confidently finalise a model that meets all necessary conditions for valid inference.

The errors obtained from the predicted and actual values of the regression model were assessed using skewness and kurtosis values. According to Omega Graduate School (2023), a skewness value between -1 and +1 is generally acceptable for normal distribution, while a kurtosis value between 2 and 4 (or -1 to +1 for excess kurtosis) falls under the generally acceptable bounds. Table 4.3 showed that the skewness value was -0.015, which is closer to zero, while the kurtosis value was 3.02, signifying that the distribution is mesokurtic, hence normally distributed.

Table 4.3: Mesokurtic Distribution of Residuals

	Skewness	**Kurtosis**
Error	-0.015	3.02

4.4.2 Multicollinearity

Multicollinearity checks how well one explanatory variable can be represented by other explanatory variables using the variance inflation factors (VIF), which in this case had values ranging from 1.374 to 3.443, as shown in Table 4.4. According to James et al. (2021), VIFs greater than five are considered problematic, those below 5 are acceptable, while those closer to 1.0 are ideal. The VIF (VIF = $1/(1-R_i^{2)}$) is usually the reciprocal of the tolerance value. According to Myers (1990), a tolerance value below 0.1 suggests a serious multicollinearity problem.

Table 4.4: Multicollinearity Diagnostics

		Tolerance	**VIF**
a)	Suitability of the project legal framework (SLF)	0.380	2.63
b)	Proactiveness of the regulatory agencies (PRA)	0.275	3.63
c)	Efficiency in regulatory processes (ERP)	0.407	2.46
d)	Conduciveness of the construction task environment (CTE)	0.575	1.74
e)	Characteristics of the project client (CPC)	0.840	1.19
f)	Competency of project leaders (CPL)	0.538	1.86

		Tolerance	VIF
g)	Goodness of construction labour (GCL)	0.408	2.45
h)	Stability of prevailing economic environment (SEE)	0.596	1.68
i)	Adherence to ethical factors (AEF)	0.738	1.36

The factor Characteristics of the Project Client (CPC) exhibited the lowest multicollinearity within the model, with a tolerance of 0.840 and a Variance Inflation Factor (VIF) of 1.19. These values indicate that CPC is relatively independent of other predictors. Conversely, the factor Proactiveness of the Regulatory Agencies (PRA) showed the highest degree of correlation in the set, with a tolerance of 0.275 and a VIF of 3.63. Despite this higher level of association, the PRA factor remained well within the established safety thresholds, confirming that multicollinearity does not pose a significant threat to the integrity of the regression results.

The variable "Goodness of construction labour (GCL)" showed moderate multicollinearity with a tolerance of 0.408 and a VIF of 2.45, suggesting a moderate degree of correlation with other variables. The factor "Efficiency in regulatory processes (ERP)" also showed moderate multicollinearity with a tolerance of 0.407 and a VIF of 2.46. These results suggest that while there is some multicollinearity among the predictors, they are within acceptable limits for all variables. Further, the tolerance values observed for all independent variables were greater than 0.2, further implying no serious issue of multicollinearity.

4.4.3 Homoscedasticity

Homoscedasticity, also referred to as equality of variance, refers to a condition in which the error term in a regression model is constant. This assumption requires that the variance of the error term remains constant across all levels of the explanatory variables. This was assessed through a visual inspection of the Residuals versus Predicted Values Scatter Plot, as shown in Figure 4.3.

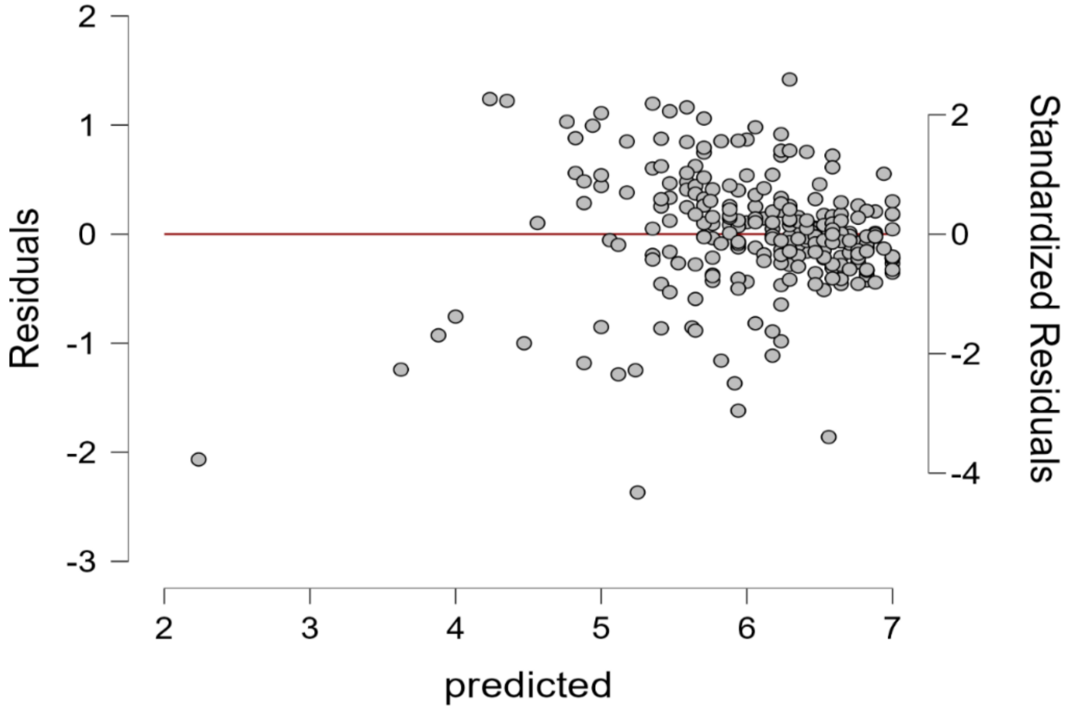

Figure 4.3: Residuals versus Predicted Values Scatter Plot

According to Cho et al. (2022), the use of residual plots is an appropriate approach for assessing equality of variance. As illustrated, the residuals are randomly dispersed along the horizontal axis, centred around zero, and form a consistent band without any discernible order or systematic pattern. This lack of a structured shape—such as a fan or a curve—indicates that the model satisfies the assumption of homoscedasticity, confirming that the error variance remains constant across all levels of the independent variables.

4.4.4 Linearity

A linearity checks are tests undertaken to determine the model of the relationship between the explanatory and outcome variables. In this study, the linearity of the collected data for each explanatory variable was checked using scatter plots. Figures 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, and 4.11 and 4.12 show a positive linear association between the level of compliance and the suitability of the project legal framework (SLF), the efficiency in regulatory processes (ERP), the conduciveness of the construction task environment (CTE), the proactiveness of the regulatory agencies (PRA), the characteristics of the project client (CPC), the competency of project leaders (CPL), the goodness of construction labour (GCL), the stability of prevailing economic environment (SEE), and the adherence to ethical factors (AEF) respectively.

Despite the presence of outliers within the dataset, a consistent positive linear relationship was observed across all variables. Specifically, as factors such as SLF, ERP, CTE, PRA, CPC, CPL, GCL, SEE, and AEF increase, there is a corresponding upward trend in the level of compliance. This suggests that improvements in these predictive dimensions are systematically associated with enhanced regulatory adherence.

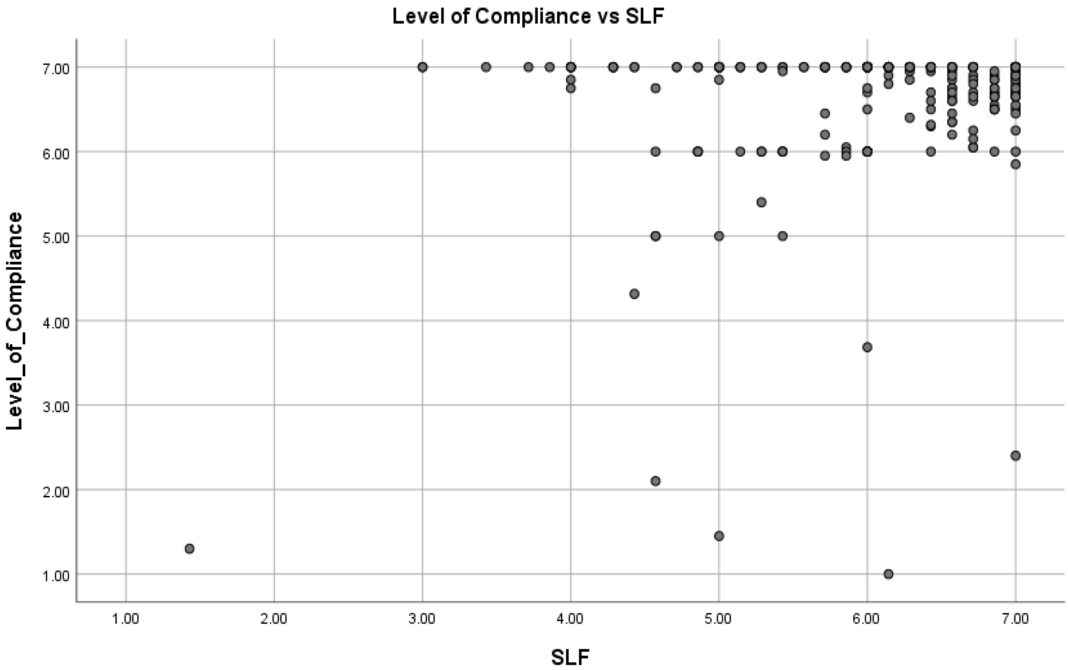

Figure 4.4: SLF and Compliance Level

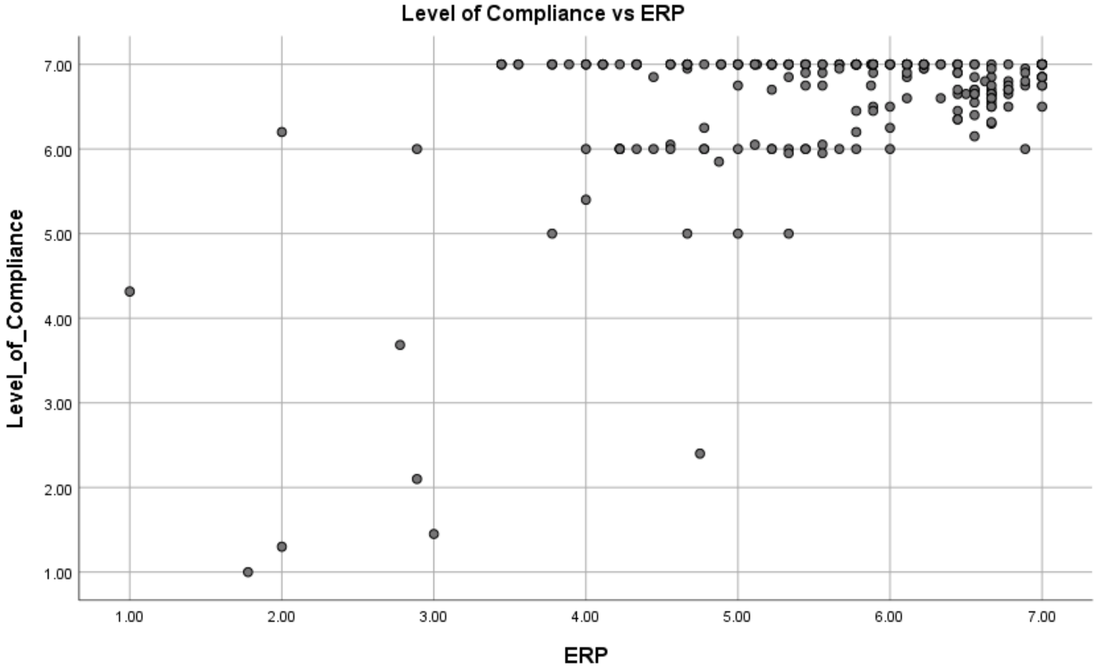

Figure 4.5: ERP and Compliance Level

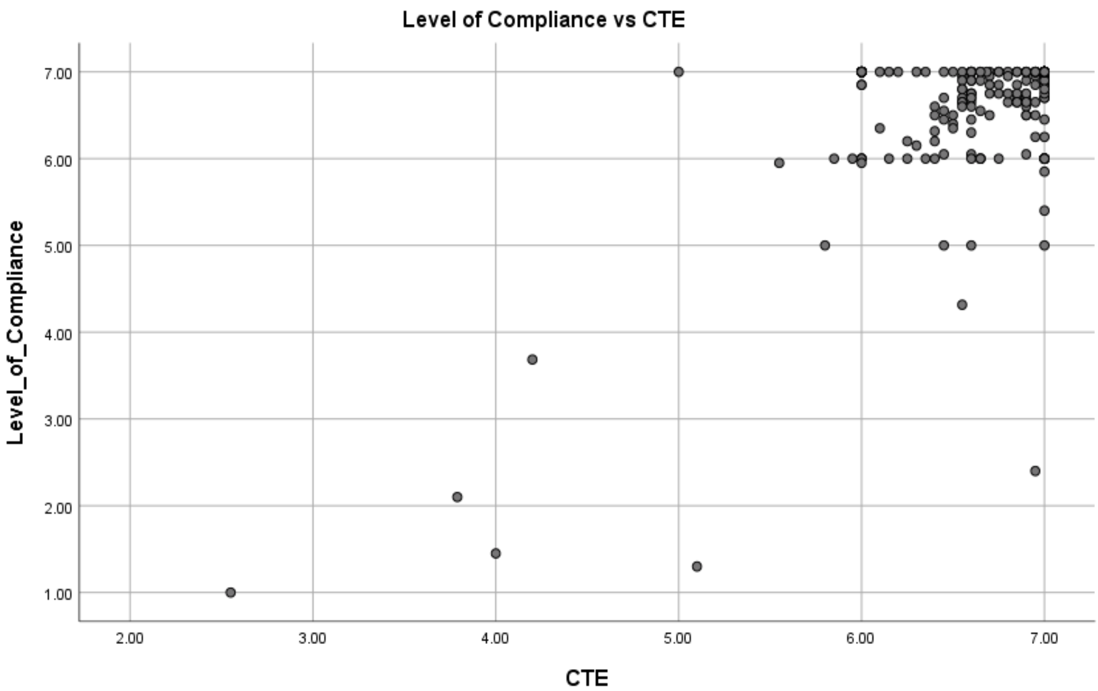

Figure 4.6: CTE and Compliance Level

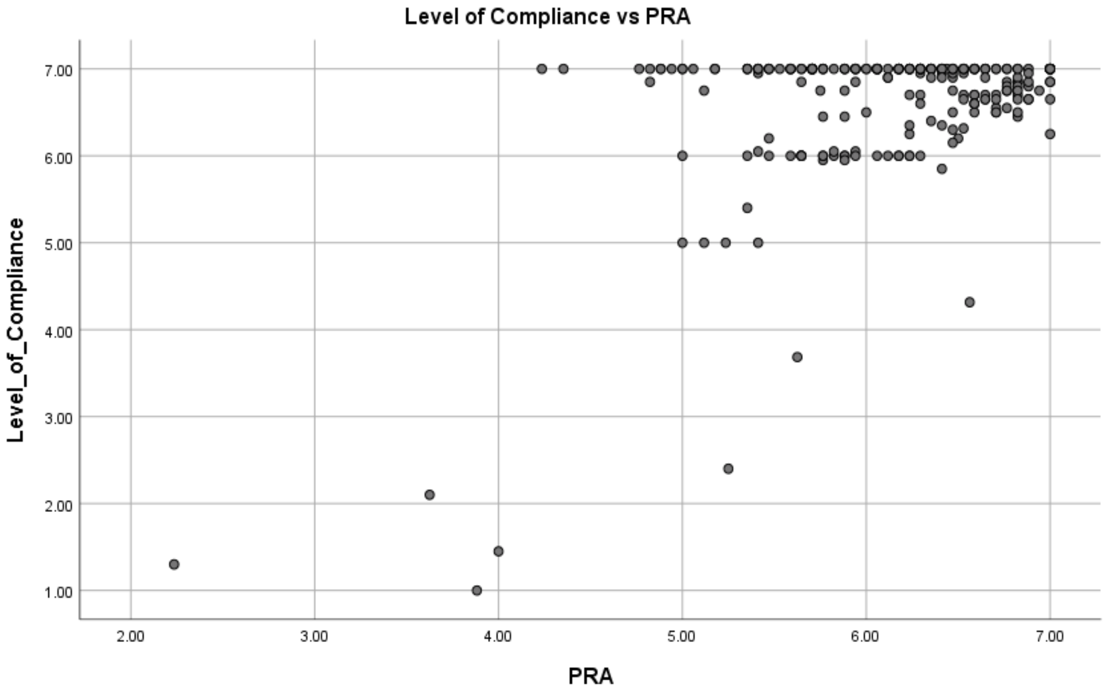

Figure 4.7: PRA and Compliance Level

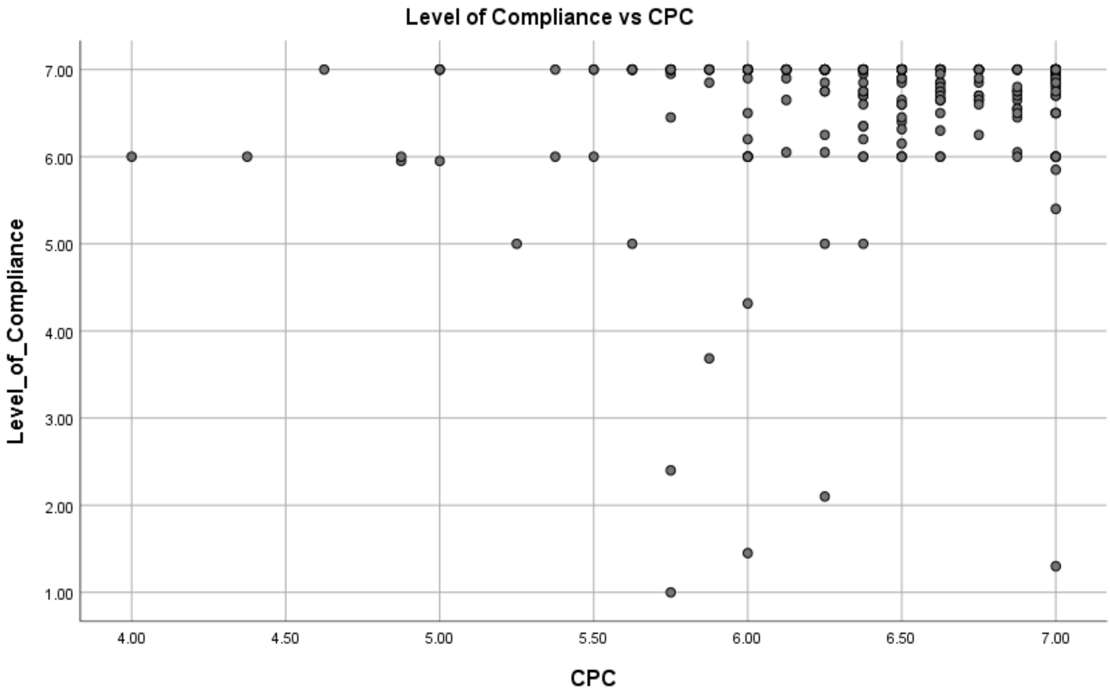

Figure 4.8: CPC and Compliance Level

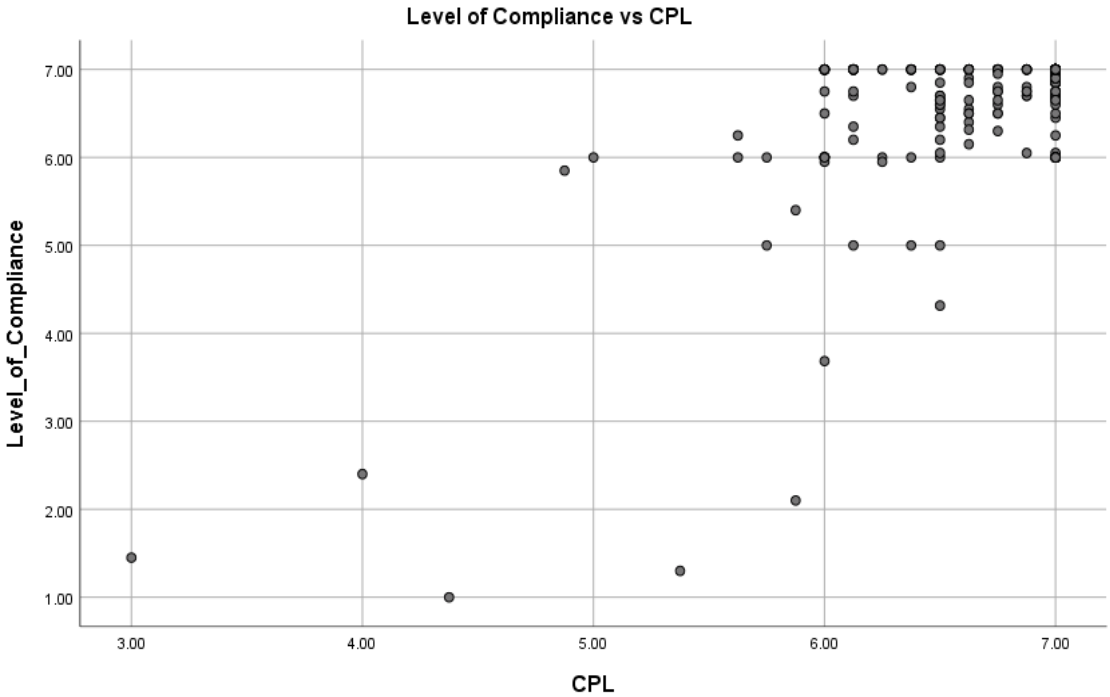

Figure 4.9: CPL and Compliance Level

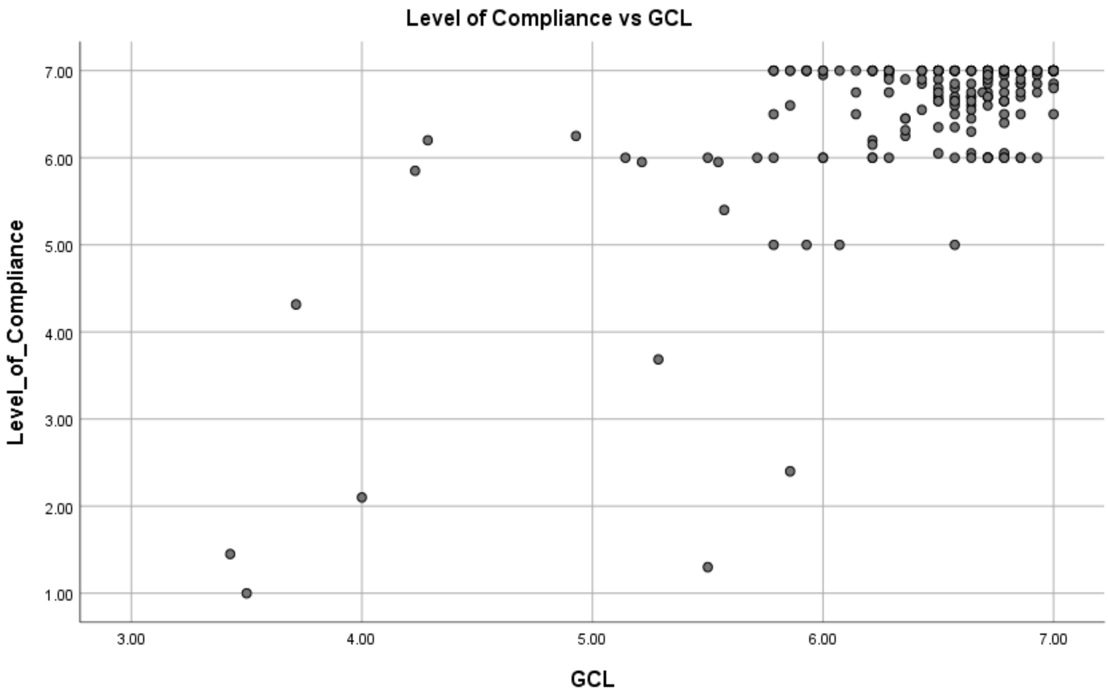

Figure 4.10: GCL and Compliance Level

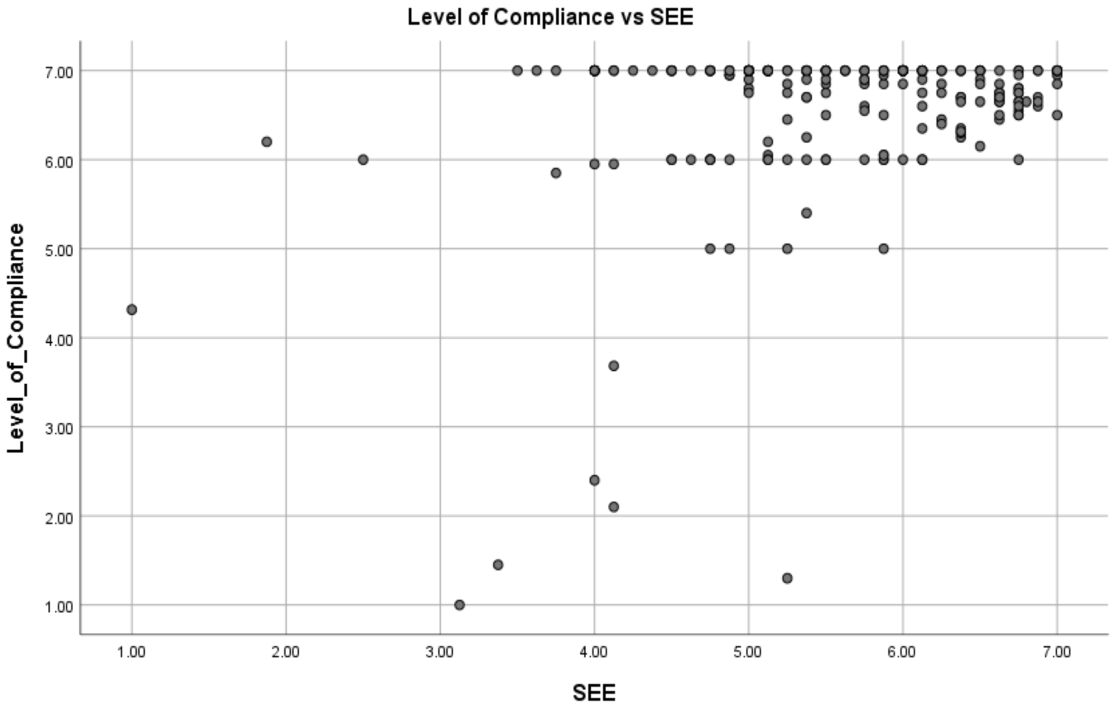

Figure 4.11: SEE and Compliance Level

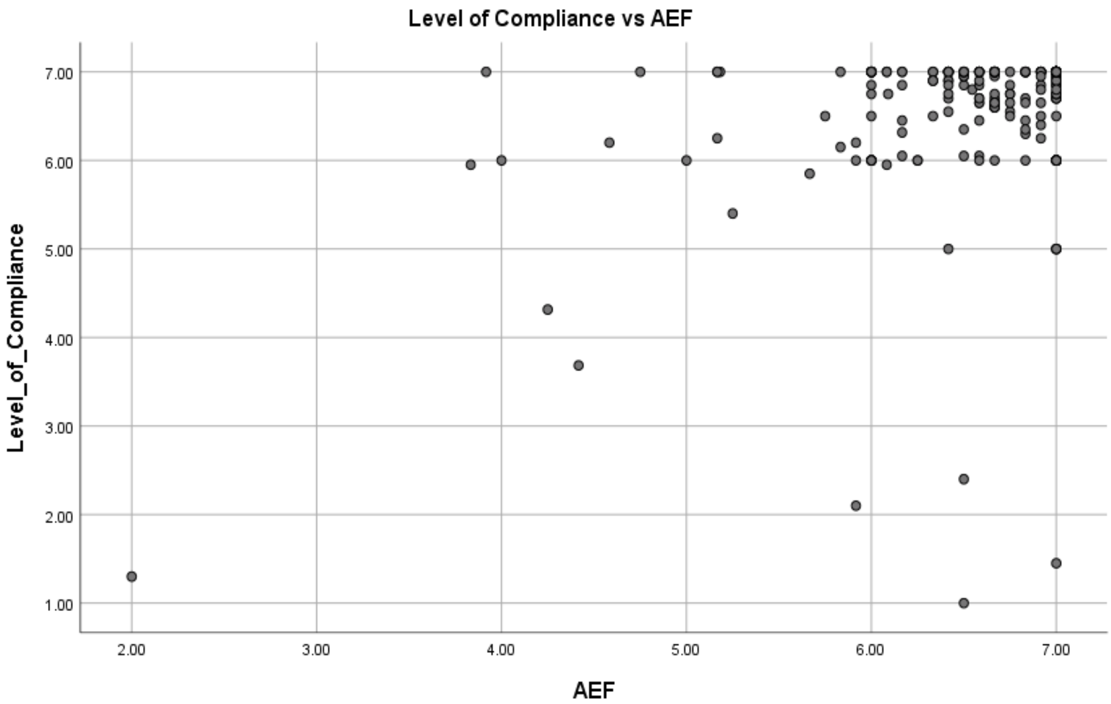

Figure 4.12: AEF and Compliance Level

4.5 Confirmatory Factor Analysis for Construct Validity

Confirmatory Factor Analysis (CFA) was used to test whether measures of each construct were consistent with the researcher's understanding of information extracted from theory and literature for the specified latent factors of the model. As a condition for CFA, according to Hair et al. (2010), each construct is required to have at least three surrogates, a condition which was met by all the explanatory factors, with the least factor (SLF) having seven surrogates and the highest (CTE) having 20. The hypothesis for CFA was thus formulated as follows:

> Null Hypothesis (H_0): $\beta=0$; There is no significant relationship between the indicator(s) (surrogate) and the construct. The indicator(s) do not accurately represent the underlying construct.
>
> Alternate Hypothesis (H_1): $\beta\neq0$; There is a significant relationship between the indicator(s) (surrogate) and the construct. The indicator(s) accurately represent the underlying construct.

The hypothesis was tested at the 0.05 level of significance. The confidence interval was also used to determine the upper and lower limits of the estimates. The difference between the estimates' upper and lower limits was determined by selecting the 95% confidence interval. The accepted difference of the estimates was 1.96 standard deviations of the mean. The choice of these limits or the selection of a 95% confidence interval was based on the fact that the level strikes a balance in preventing Type I errors while not excessively increasing the risk of Type II errors (Steiger & Fouladi, 2016).

4.5.1 Suitability of the Project Legal Framework (SLF)

The CFA results for the "suitability of the project legal framework" indicate strong and statistically significant factor loadings for all indicators, with all p-values being less than 0.001, as shown in Table 4.5. The estimates range from 0.770 to 0.957, showing substantial relationships between each indicator and the underlying factor. The indicator "penalties for non-compliance are clear" had the highest factor loading

(0.957) and the narrowest confidence interval (0.937 to 0.976), suggesting it as a particularly strong measure of the legal framework's suitability.

Similarly, other indicators, such as "the laws applicable to this project are very clear to me" and "the interpretation of applicable laws is consistent across regulatory agencies," also show high factor loadings (0.910 and 0.901, respectively) and high z-values, reinforcing their significance. The relatively high lower bounds of the confidence intervals for all indicators (ranging from 0.741 to 0.937) further confirm their robustness. The estimates are statistically significant, suggesting that the indicators were valid measures of the construct, and the project's legal framework is perceived as suitable and clear among the respondents.

Table 4.5: CFA Depicting Factor Loadings of SLF

							95% Confidence Interval	
Factor		**Indicator**	**Estimate**	**Std. Error**	**z-value**	**p**	**Lower**	**Upper**
Suitability of the Project Legal Framework (SLF)	a)	I am aware of construction regulations applicable to this project	0.770	0.015	52.612	< .001	0.741	0.799
	b)	The laws applicable to this project are very clear to me	0.910	0.012	78.908	< .001	0.888	0.933
	c)	The interpretation of applicable laws is consistent across regulatory agencies	0.901	0.011	80.376	< .001	0.879	0.922
	d)	Penalties for non-compliance are clear	0.957	0.010	95.155	< .001	0.937	0.976
	e)	Penalties for non-compliance are specific to an issue	0.929	0.010	91.329	< .001	0.909	0.949
	f)	In my view the existing laws are adaptable for all projects	0.911	0.013	71.754	< .001	0.886	0.936
	g)	Existing laws support quality implementation of works in this project	0.920	0.013	69.471	< .001	0.894	0.946

4.5.2 Proactiveness of the Regulatory Agencies (PRA)

The confirmatory factor analysis (CFA) results for the "proactiveness of the regulatory agencies" reveal a diverse range of factor loadings, all of which are statistically significant ($p < .001$) as shown in Table 4.6. The factor loadings span from 0.175 to

0.917, indicating varying degrees of association between each indicator and the underlying construct. Indicators such as "the regulators guided us procedurally leading to compliance" (0.917) and "regulatory agencies are always accessible for consultation" (0.869) exhibit the highest loadings, suggesting strong perceptions of regulatory agency proactiveness in these areas.

Conversely, indicators like "quality is a priority for regulators in this construction site" (0.175) and "clear communication by regulators is ensured at all times" (0.269) have the lowest loadings, indicating weaker associations with the construct. However, the indicators were not eliminated since their p-value was less than 0.05, suggesting a significant relation with the construct. The confidence intervals for these low-loading items are also relatively narrow, underscoring their statistical precision despite lower estimates. Notably, items related to procedural guidance, opportunities for compliance, and clear monitoring measures show robust loadings above 0.8, indicating these aspects represent regulatory proactiveness.

Table 4.6: CFA Depicting Factor Loadings of PRA

							95% Confidence Interval	
Factor		**Indicator**	**Estimate**	**Std. Error**	**z-value**	**p**	**Lower**	**Upper**
Proactiveness of the Regulatory Agencies (PRA)	a)	I am aware of the different building regulatory agencies	0.790	0.015	53.855	< .001	0.762	0.819
	b)	The mandates of the different regulatory agencies are clear to me	0.832	0.014	58.832	< .001	0.805	0.860
	c)	Good coordination amongst regulators is ensured at every stage of the project	0.561	0.020	27.801	< .001	0.522	0.601
	d)	There is a general acceptance of regulatory agencies role in project delivery	0.765	0.015	51.984	< .001	0.736	0.794
	e)	The regulators guided us procedurally leading to compliance	0.917	0.013	69.332	< .001	0.891	0.943
	f)	The regulators gave us adequate opportunities to comply	0.822	0.013	62.016	< .001	0.796	0.848
	g)	The regulators have put in place clear project monitoring and evaluation measures	0.789	0.014	57.120	< .001	0.762	0.816

Factor	Indicator		Estimate	Std. Error	z-value	p	95% Confidence Interval Lower	Upper
	h)	Regulatory agencies are proactive	0.746	0.018	42.340	< .001	0.712	0.781
	i)	This project is frequently inspected by the regulators	0.780	0.019	40.670	< .001	0.742	0.817
	j)	Safety is a priority for regulators in this construction site	0.812	0.021	39.108	< .001	0.771	0.852
	k)	Quality is a priority for regulators in this construction site	0.175	0.020	8.920	< .001	0.137	0.214
	l)	Clear communication by regulators is ensured at all times	0.269	0.022	12.465	< .001	0.227	0.312
	m)	Regulatory agencies carry out sensitization programs frequently	0.812	0.015	53.485	< .001	0.782	0.842
	n)	Regulatory agencies are always accessible for consultation	0.869	0.015	57.363	< .001	0.840	0.899
	o)	The regulators ensure a clear administrative procedure for all parties involved	0.757	0.016	47.909	< .001	0.726	0.788
	p)	In my view regulatory agencies apply building laws strictly	0.668	0.019	34.261	< .001	0.629	0.706
	q)	In my view all regulatory agencies are necessary	0.628	0.020	31.179	< .001	0.589	0.668

4.5.3 Efficiency in Regulatory Processes (ERP)

The confirmatory factor analysis (CFA) results for "efficiency in regulatory processes" demonstrate robust and statistically significant factor loadings for all indicators, with all their p-values being less than 0.001, as shown in Table 4.7. The factor loadings range from 0.712 to 0.972, indicating a strong relationship between the indicators and the underlying factor. The highest loadings are observed for "the regulatory processes are integrated across agencies" (0.972), "the regulatory approvals are issued in a timely manner" (0.905), and "information on regulatory processes is readily available" (0.897), suggesting that these aspects are highly indicative of perceived efficiency. Other indicators, such as "the regulatory processes are simple" (0.934) and "the regulatory processes helped to identify constructability challenges" (0.884), also exhibit high loadings, underscoring their importance in the overall efficiency perception.

Table 4.7: CFA Depicting Factor Loadings of ERP

Factor		Indicator	Estimate	Std. Error	z-value	p	95% Confidence Interval	
							Lower	Upper
Efficiency in regulatory processes (ERP)	a)	The regulatory processes are simple	0.934	0.009	99.792	< .001	0.916	0.952
	b)	The regulatory processes are integrated across agencies	0.972	0.009	107.681	< .001	0.954	0.990
	c)	The regulatory processes are predictable	0.836	0.011	74.316	< .001	0.814	0.858
	d)	The regulatory approvals are issued in a timely manner	0.905	0.010	94.000	< .001	0.886	0.924
	e)	Information on regulatory processes is readily available	0.897	0.010	85.876	< .001	0.877	0.918
	f)	The regulatory processes require good documentation	0.896	0.011	80.761	< .001	0.874	0.917
	g)	The regulatory processes helped to identify constructability challenges	0.884	0.013	68.785	< .001	0.859	0.909
	h)	Regulatory processes helped to resolve constructability challenges in this project	0.862	0.015	58.092	< .001	0.833	0.891
	i)	The regulatory processes helped to avoid design errors	0.712	0.020	36.202	< .001	0.673	0.750

Indicators related to constructability challenges and design errors, while still significant, have lower loadings, with "the regulatory processes helped to avoid design errors" having the lowest estimate at 0.712. The narrow confidence intervals, particularly for the highest-loading items (e.g., "the regulatory processes are integrated across agencies" with a confidence interval (CI) of 0.954 to 0.990), affirm the precision and reliability of these estimates. These results suggest that while most aspects of regulatory processes are perceived as efficient, there is variability in how strongly different aspects contribute to this perception, with process simplicity, integration, predictability, and timeliness being the most critical factors.

4.5.4 Conduciveness of the Construction Task Environment (CTE)

The confirmatory factor analysis (CFA) results for "conduciveness of the construction task environment" indicate statistically significant factor loadings for all indicators, with p-values less than 0.001, as shown in Table 4.8. The factor loadings range from

0.727 to 0.964, highlighting varying degrees of association with the underlying construct. The highest loadings are found in indicators such as "teamwork is always demonstrated by the project team" (0.964), "we set realistic project objectives" (0.950), and "we make sure every new assignment is clear before executing" (0.937), suggesting these practices are strongly perceived as contributing to a conducive construction task environment.

Table 4.8: CFA Depicting Factor Loadings of CTE

							95% Confidence Interval	
Factor		**Indicator**	**Estimate**	**Std. Error**	**z-value**	**p**	**Lower**	**Upper**
Conduciveness of the Construction Task Environment (CTE)	a)	We make sure every new assignment is clear before executing	0.937	0.008	111.228	< .001	0.921	0.954
	b)	We set realistic project objectives	0.950	0.009	110.792	< .001	0.933	0.967
	c)	We keep a copy of all site instructions	0.934	0.009	108.556	< .001	0.917	0.951
	d)	Teamwork is always demonstrated by the project team	0.964	0.008	121.065	< .001	0.948	0.979
	e)	Site safety briefings are conducted regularly	0.929	0.009	109.267	< .001	0.912	0.946
	f)	Team leaders work side by side with the workers	0.903	0.009	102.808	< .001	0.885	0.920
	g)	Workers are always given reasonable work targets	0.873	0.010	89.702	< .001	0.854	0.892
	h)	Workers are assigned duties based on their skills and competence	0.912	0.009	96.396	< .001	0.893	0.931
	i)	Workers are encouraged to collaborate when implementing works	0.928	0.009	102.643	< .001	0.910	0.945
	j)	Workers are encouraged to contribute ideas on how to best carry out the works	0.860	0.010	86.682	< .001	0.841	0.879
	k)	There are clear decision-making procedures for tasks in the project	0.919	0.009	103.681	< .001	0.902	0.937
	l)	There are clear communication channels for matters related to the project	0.925	0.009	104.511	< .001	0.908	0.942

Factor	Indicator		Estimate	Std. Error	z-value	p	95% Confidence Interval	
							Lower	Upper
	m)	The building technology we use does not affect quality of the works	0.831	0.011	75.269	< .001	0.809	0.852
	n)	There are clear contractual obligations for each party involved in the project	0.870	0.010	84.954	< .001	0.850	0.890
	o)	We use technologies like BIM and MS Project to ensure quality	0.747	0.013	58.814	< .001	0.722	0.771
	p)	Defective work is always reworked	0.727	0.012	60.812	< .001	0.703	0.750
	q)	We normally invite regulatory agencies for staged inspections and approvals	0.840	0.012	72.103	< .001	0.817	0.862
	r)	Design changes during project execution are communicated to regulators	0.863	0.010	82.782	< .001	0.843	0.883
	s)	Dangers identified in the project are communicated	0.911	0.010	94.025	< .001	0.892	0.930
	t)	Force majeure (unforeseen natural occurrences) measures are factored to the project	0.917	0.009	99.479	< .001	0.899	0.935

Conversely, the lowest loading for "defective work is always reworked" (0.727), indicating a relatively weaker association with the construct. Despite the lower loading, this indicator still significantly contributes to the overall factor. Indicators related to clear procedures, safety briefings, and realistic project objectives have moderate loadings, reinforcing their importance in creating a conducive environment. The narrow confidence intervals for high-loading items, such as "teamwork is always demonstrated by the project team" with a CI of 0.948 to 0.979, affirm the reliability and precision of these estimates. Overall, the results suggest a multifaceted perception of the construction task environment, with a strong emphasis on regulatory collaboration, worker engagement, and leadership presence as key elements for a conducive task environment.

4.5.5 Characteristics of the Project Client (CPC)

The confirmatory factor analysis (CFA) results for "characteristics of the project client" show that all indicators have statistically significant factor loadings ($p < .001$), with estimates ranging from 0.397 to 0.803, as shown in Table 4.9. The highest loadings are for "quality of planning of the work depends on the client" (0.794) and "the client appreciates the consequences associated with non-compliance of projects" (0.803), indicating these aspects are strongly associated with the client's characteristics. Other indicators, such as "the client always seeks advice from the project team" (0.751) and "the client does not influence construction process unduly" (0.744), also exhibit high loadings, reinforcing their importance.

Table 4.9: CFA Depicting Factor Loadings of CPC

Factor		Indicator	Estimate	Std. Error	z-value	p	95% Confidence Interval	
							Lower	Upper
Characteristics of the project client	a)	The client is closely involved at every aspect of this project	0.717	0.035	20.214	< .001	0.648	0.787
	b)	The client is aware of all construction-related regulatory requirements	0.397	0.036	11.169	< .001	0.327	0.466
	c)	The client has always been willing to comply with all regulatory requirements	0.668	0.039	17.300	< .001	0.593	0.744
	d)	The client always seeks advise from the project team	0.751	0.032	23.186	< .001	0.688	0.815
	e)	Quality of planning of the work depends on the client	0.794	0.030	26.436	< .001	0.736	0.853
	f)	The client does not influence construction process unduly	0.744	0.031	24.362	< .001	0.684	0.804
	g)	The client often shares opinion on the project with the project team	0.716	0.028	25.827	< .001	0.662	0.770
	h)	The client appreciates the consequences associated with non-compliance of projects	0.803	0.031	25.745	< .001	0.742	0.864

Conversely, the lowest loading is for "the client is aware of all construction-related regulatory requirements" (0.397), suggesting a weaker but still significant association with the underlying factor. The narrow confidence intervals, particularly for high-loading items (e.g., "quality of planning of the work depends on the client" with a CI of 0.736 to 0.853), confirm the reliability of these estimates. Overall, these results suggest that while client involvement, regulatory awareness, and willingness to comply are all relevant, the client's active engagement in seeking advice and influencing planning quality are perceived as the most critical characteristics impacting the project.

4.5.6 Competency of Project Leaders (CPL)

The confirmatory factor analysis (CFA) results for "competency of project leaders" reveal statistically significant factor loadings for all indicators, with all p-values being less than 0.001, as shown in Table 4.10. The factor loadings range from 0.826 to 0.943, indicating strong associations between the indicators and the underlying construct. The highest loadings are for "the consultants involved are committed to quality delivery of work" (0.943) and "project team leaders ensure a clear implementation strategy" (0.910), suggesting that commitment to quality and a clear strategy are strongly perceived as key aspects of leader competency. Other indicators, such as "the client has engaged a dedicated project manager for the project" (0.896) and "project consultants always offer good supervision" (0.868) also exhibit substantial loadings, reinforcing their importance.

Conversely, the indicator "project consultants are always available for consultation" has the lowest loading at 0.826, indicating a slightly weaker yet still significant association with leader competency. The narrow confidence intervals, particularly for high-loading items (e.g., "the consultants involved are committed to quality delivery of work" with a CI of 0.907 to 0.979), affirm the precision of these estimates. Overall, the findings suggest that commitment to quality, a clear implementation strategy, and professional supervision are crucial for the perceived competency of project leaders, while availability for consultation, though important, contributes to a lesser extent.

Table 4.10: CFA Depicting Factor Loadings of CPL

Factor		Indicator	Estimate	Std. Error	z-value	p	95% Confidence Interval Lower	Upper
Competency of project leaders (CPL)	a)	All the selected project team leaders are professionally trained	0.873	0.019	45.724	< .001	0.836	0.910
	b)	The consultants involved are committed to quality delivery of work	0.943	0.018	51.824	< .001	0.907	0.979
	c)	Project team leaders always believe in collective responsibility over the works	0.844	0.019	43.428	< .001	0.806	0.882
	d)	Project consultants are always available for consultation	0.826	0.020	41.459	< .001	0.787	0.865
	e)	Project consultants always offer good supervision	0.868	0.019	45.573	< .001	0.831	0.906
	f)	Changes in project consultants are handled procedurally	0.860	0.019	45.530	< .001	0.823	0.897
	g)	Project team leaders ensure a clear implementation strategy	0.910	0.018	49.900	< .001	0.874	0.946
	h)	The client has engaged a dedicated project manager for the project	0.896	0.020	44.795	< .001	0.857	0.935

4.5.7 Goodness of Construction Labour (GCL)

The confirmatory factor analysis (CFA) results for "goodness of construction labour" show that all indicators have statistically significant factor loadings ($p < .001$), with estimates ranging from 0.239 to 0.900 as shown in Table 4.11. The highest loadings are for "construction workers involved in this project are competent" (0.900), "construction workers are given reasonable work targets" (0.879), and "there exist mechanisms for resolving disputes among workers" (0.878), indicating these factors are strongly associated with the quality of construction labour. Other high-loading indicators include "capacity of a worker is assessed before assigning of duties" (0.873) and "there is a mechanism to address welfare issues of workers" (0.862), reinforcing their importance.

Table 4.11: CFA Depicting Factor Loadings of GCL

Factor		Indicator	Estimate	Std. Error	z-value	p	95% Confidence Interval	
							Lower	Upper
Goodness of Construction Labour (GCL)	a)	Capacity of a worker is assessed before assigning of duties	0.873	0.016	56.124	< .001	0.842	0.903
	b)	Construction workers are given reasonable work targets	0.879	0.015	56.936	< .001	0.848	0.909
	c)	Construction workers involved in this project are competent	0.900	0.015	60.352	< .001	0.871	0.929
	d)	Workloads are fairly distributed among construction workers	0.842	0.017	50.012	< .001	0.809	0.875
	e)	Workers are remunerated based on their expertise	0.781	0.018	43.080	< .001	0.746	0.817
	f)	There is a clear plan of payment for all construction worker	0.751	0.018	40.636	< .001	0.715	0.787
	g)	Workers are often rewarded for excellent work	0.754	0.017	44.371	< .001	0.721	0.788
	h)	Continuous training of workers is ensured	0.783	0.018	43.374	< .001	0.748	0.818
	i)	Workers have a high level of satisfaction	0.782	0.018	44.320	< .001	0.748	0.817
	j)	This site does not experience high worker rate of replacement	0.821	0.018	46.683	< .001	0.786	0.855
	k)	There exist mechanisms for resolving disputes among workers	0.878	0.016	55.696	< .001	0.847	0.909
	l)	There is a mechanism to address welfare issues of workers	0.862	0.015	55.700	< .001	0.831	0.892
	m)	Cases of negligence among workers are subjected to disciplinary action	0.840	0.017	50.843	< .001	0.807	0.872
	n)	There is a positive view of regulatory compliance among construction workers	0.239	0.026	9.363	< .001	0.189	0.289

Conversely, lower loadings are observed for "there is a positive view of regulatory compliance among construction workers" (0.239), suggesting a relatively weaker yet still significant association with the construct. The narrow confidence intervals for high-loading items, such as "construction workers involved in this project are competent" with a CI of 0.871 to 0.929, confirm the reliability of these estimates. Overall, the findings highlight that competence, reasonable targets, and effective dispute resolution mechanisms are critical for ensuring the quality of construction labour, while the perception of regulatory compliance and disciplinary actions, though important, have a lesser impact.

4.5.8 Stability of Prevailing Economic Environment (SEE)

The confirmatory factor analysis (CFA) findings for "stability of prevailing economic environment" indicate that all indicators have statistically significant factor loadings, with p-values less than 0.001, as shown in Table 4.12. The factor loadings range from 0.801 to 0.954, indicating varying degrees of association with the underlying construct. The highest loadings are for "the cost of construction labour is reasonable" (0.954) and "the permitting costs are predictable" (0.944), suggesting these aspects are strongly perceived as critical factors for the stability of the economic environment in construction projects. Other high-loading indicators include "the costs associated with material testing are reasonable" (0.898) and "the main contractor has adequate cash-flow" (0.916), reinforcing their importance in ensuring economic stability.

Table 4.12: CFA Depicting Factor Loadings of SEE

						95% Confidence Interval	
Factor	**Indicator**	**Estimate**	**Std. Error**	**z-value**	**p**	**Lower**	**Upper**
Stability of prevailing economic environment (SEE)	a) The costs associated with regulatory compliance are realistic	0.847	0.016	53.952	< .001	0.816	0.877
	b) The permitting costs are predictable	0.944	0.010	95.782	< .001	0.924	0.963
	c) Taxes do not affect project delivery	0.869	0.011	77.619	< .001	0.847	0.891

Factor	Indicator		Estimate	Std. Error	z-value	p	95% Confidence Interval	
							Lower	Upper
	d)	The cost of construction labour is reasonable	0.954	0.010	95.528	< .001	0.935	0.974
	e)	The costs associated with material testing are reasonable	0.898	0.010	85.854	< .001	0.877	0.918
	f)	Profit margins don’t determine how work is done	0.883	0.011	78.907	< .001	0.861	0.905
	g)	The main contractor has adequate cash-flow	0.916	0.011	84.343	< .001	0.895	0.938
	h)	The costs associated with regulatory compliance are realistic	0.870	0.012	70.872	< .001	0.846	0.894
	i)	The costs associated with regulatory compliance are realistic	0.893	0.013	71.353	< .001	0.868	0.917
	j)	The permitting costs are predictable	0.918	0.012	73.777	< .001	0.894	0.942
	k)	Taxes do not affect project delivery	0.861	0.013	67.898	< .001	0.837	0.886
	l)	The cost of construction labour is reasonable	0.801	0.013	61.858	< .001	0.776	0.827

On the lower end, "Profit margins don’t determine how work is done" (0.883) and "taxes do not affect project delivery" (0.861) show weaker but still significant associations. The confidence intervals for high-loading items, such as "the cost of construction labour is reasonable", with a CI of 0.935 to 0.974, confirm the precision and reliability of these estimates. Overall, the results emphasise that reasonable costs for labour and materials, along with predictable permitting costs, are paramount for maintaining a stable economic environment in construction, while factors like profit margins and cash flow, though important, contribute to a lesser extent.

4.5.9 Adherence to Ethical Factors (AEF)

The confirmatory factor analysis (CFA) findings for "adherence to ethical factors" demonstrate that all indicators have statistically significant factor loadings, with p-values less than 0.001, as shown in Table 4.13. The factor loadings range from 0.801 to 0.954, indicating the strength of association with the underlying construct. The highest loadings are for "the regulatory permitting processes are carried out transparently" (0.954) and "I have never encountered incidences of corruption in this construction site" (0.944), suggesting these aspects are strongly associated with adherence to ethical factors in construction projects. Other high-loading indicators include "staff of regulatory agencies have never asked for bribes" (0.869) and "I have never encountered collusion between regulatory officers and project team" (0.898), reinforcing the importance of transparency and integrity in regulatory processes.

Table 4.13: CFA Depicting Factor Loadings of AEF

							95% Confidence Interval	
Factor		**Indicator**	**Estimate**	**Std. Error**	**z-value**	**p**	**Lower**	**Upper**
Adherence to ethical factors (AEF)	a)	The regulatory permitting processes are carried out transparently	0.944	0.010	95.782	< .001	0.924	0.963
	b)	Staff of regulatory agencies have never asked for bribes	0.869	0.011	77.619	< .001	0.847	0.891
	c)	I have never encountered incidences of corruption in this construction site	0.954	0.010	95.528	< .001	0.935	0.974
	d)	I have never encountered collusion between regulatory officers and project team	0.898	0.010	85.854	< .001	0.877	0.918
	e)	Regulatory agencies do not approve technically deficient drawings	0.883	0.011	78.907	< .001	0.861	0.905
	f)	I have never seen cases of falsifications of project documents	0.916	0.011	84.343	< .001	0.895	0.938
	g)	The building plans being implemented are as approved	0.870	0.012	70.872	< .001	0.846	0.894
	h)	Construction workers do not hide poor quality works	0.893	0.013	71.353	< .001	0.868	0.917
	i)	The client has never disregarded consultants advise	0.918	0.012	73.777	< .001	0.894	0.942
	j)	The client complied to regulations because she or he believes the project is visible	0.861	0.013	67.898	< .001	0.837	0.886
	k)	The expected profit margins do not affect adherence to regulatory processes	0.801	0.013	61.858	< .001	0.776	0.827
	l)	There has not been any political interference on this project	0.847	0.016	53.952	< .001	0.816	0.877

On the lower end, "the expected profit margins do not affect adherence to regulatory processes" (0.801) and "there has not been any political interference on this project" (0.847) show weaker yet still significant associations. The confidence intervals for these indicators, such as for "the regulatory permitting processes are carried out transparently" with a CI of 0.935 to 0.974, confirm the reliability of these estimates. Overall, the results highlight the critical role of transparent regulatory processes, the absence of corruption, and integrity in maintaining ethical standards in construction projects, while factors like political interference and profit margins have a lesser impact but remain significant.

4.6 Analysis of Demographic Characteristics of Respondents

4.6.1 Respondents' Level of Education

The distribution of respondents by educational attainment indicates a workforce with diverse technical backgrounds, as illustrated in Figure 4.13. A small minority of respondents (4%) reported having no formal academic qualifications, while 20% held trade test certifications. Vocational training represented a significant portion of the sample, with 28% of respondents reaching the certificate level and the largest group (36%) possessing diplomas. Additionally, those with bachelor's degrees accounted for 12% of the total respondents.

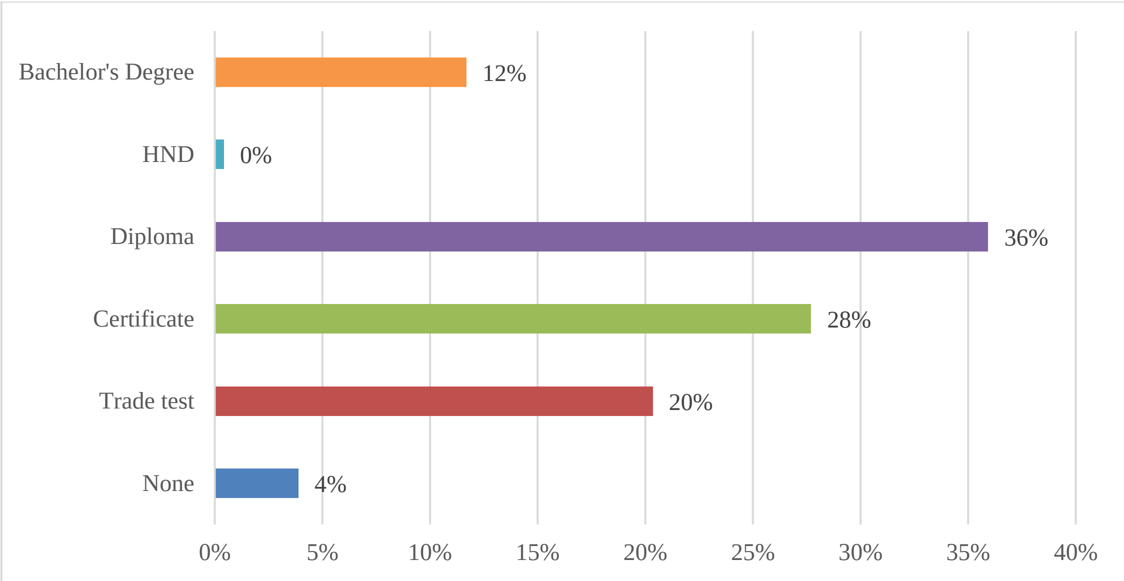

Figure 4.13: Respondents' Level of Education

The level of reportage of compliance across education levels was checked using ANOVA, as shown in Table 4.14. The analysis revealed a statistically significant effect of education level on the average compliance level, $F(5, 229)=2.664$, $p=0.023$.

Table 4.14: ANOVA on Level of Compliance across Education Levels

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.844	5	2.369	2.664	.023
Within Groups	222.285	224	.889		
Total	234.129	229			

The pairwise comparison revealed that projects involving individuals with no education had the lowest level of compliance (M=6.22, SD=1.87), as shown in Table 4.15. Certificate holders had an average compliance level of 6.35 (SD=1.31). Those with the qualification of trade test had the highest compliance level (M=6.87, SD=0.30), followed by those with a Bachelor's Degree (M=6.62, SD=0.54). Those with HND had an average compliance level of 6.60 (SD=0.00), while those with a diploma had an average compliance level of 6.64 (SD=0.65). This suggests that specialised vocational training (trade test) is a more potent predictor of site-level adherence than general academic education.

Table 4.15: Pairwise Comparison of Compliance across Different Education Levels

	N	Mean	SD	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Min	Max
None	9	6.2167	1.87383	.62461	4.7763	7.6570	1.30	7.00
Trade test	47	6.8681	.30350	.04427	6.7790	6.9572	6.00	7.00
Certificate	64	6.3508	1.31035	.16379	6.0235	6.6781	1.00	7.00
Diploma	83	6.6412	.64676	.07099	6.4999	6.7824	2.10	7.00
HND	1	6.6000	.	.	.	.	6.60	6.60
Bachelor's Degree	27	6.6235	.53808	.10355	6.4106	6.8363	4.68	7.00
Total	231	6.5881	.91158	.05998	6.4699	6.7063	1.00	7.00

4.6.2 Respondents' Age Group

The findings of the study revealed that 2% of the respondents were between 20 and 24 years of age, while 7% were between 25 and 29 years, as shown in Figure 4.14. Further, 19% of the respondents were aged between 30 and 34 years, while most (23%) of the respondents were between 35 and 39 years. Respondents who were between 40 and 44 years of age were 19%, while 17% were between 45 and 49 years. Further, 10% of the respondents were aged above 50 years.

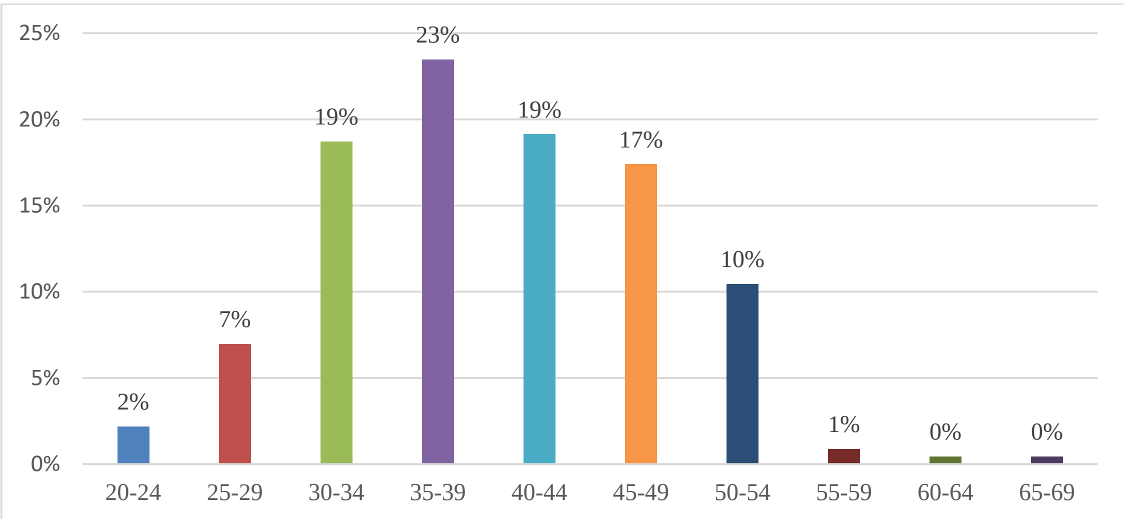

Figure 4.14: Respondents' Age Group

The level of reportage of compliance across age groups was conducted using ANOVA. The test revealed a statistically significant difference in average compliance level between age groups, F (9, 229) =15.899, p<0.01, as shown in Table 4.16.

Table 4.16: ANOVA on the Level of Compliance by Age Group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	75.352	9	8.372	15.899	.000
Within Groups	115.854	220	.527		
Total	191.206	229			

The comparison of compliance levels across different age groups revealed significant variations, as shown in Table 4.17, with the highest mean compliance reportage observed in the 35-39 age group (M = 6.78, SD = 0.34), followed by the 30-34 (M = 6.64, SD = 0.89) and 40-44 age groups (M = 6.74, SD = 0.59). Conversely, the 55-59 (M = 2.28, SD = 1.17) and 65-69 (M = 1.00) age groups exhibited the lowest compliance levels. The 25-29 age group showed the highest variability in compliance (SD = 1.25). This suggests that mid-career professionals possess the optimal balance of physical site presence and cognitive maturity required for rigorous oversight. The dramatic decline in compliance noted in the 55–59 (M=2.28) and 65–69 (M=1.00) age groups implies that older personnel may be less involved in active, ground-level regulatory implementation or may be relying on outdated practices that do not align with modern practices.

Table 4.17: Pairwise Comparison of Compliance across Different Age Groups

	N	Mean	SD	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
20-24	5	6.3700	.35107	.15700	5.9341	6.8059	5.85	6.70
25-29	16	6.1709	1.25370	.31343	5.5028	6.8389	2.10	7.00
30-34	43	6.6419	.89309	.13620	6.3670	6.9167	1.30	7.00
35-39	54	6.7781	.34019	.04629	6.6852	6.8709	6.00	7.00
40-44	44	6.7435	.58946	.08886	6.5643	6.9228	4.32	7.00
45-49	40	6.7125	.40521	.06407	6.5829	6.8421	6.00	7.00
50-54	24	6.5118	1.13147	.23096	6.0341	6.9896	2.40	7.00
55-59	2	2.2750	1.16673	.82500	-8.2076	12.7576	1.45	3.10
60-64	1	6.6500	.	.	.	.	6.65	6.65
65-69	1	1.0000	.	.	.	.	1.00	1.00
Total	230	6.5909	.91376	.06025	6.4722	6.7096	1.00	7.00

4.6.3 Respondents Job Description

The distribution of respondents based on the description of their roles in a construction project showed that 42% played their roles as site foremen while 50% played their roles as site supervisors, as shown in Figure 4.15. Additionally, 7% of the respondents were clerks of works, while 1% comprised site managers, construction project managers, and technologists.

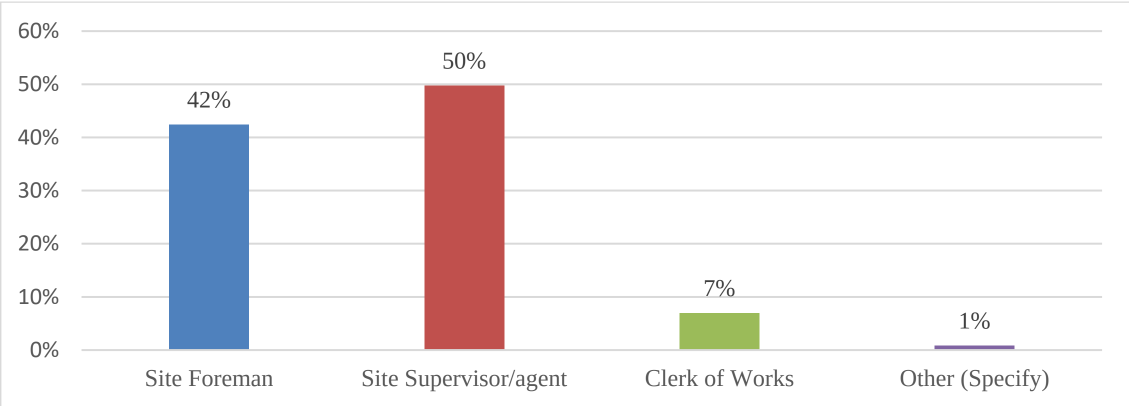

Figure 4.15: Respondents' Description in the Project

The level of reportage of compliance across job descriptions was conducted using ANOVA. At 95% confidence level, the test revealed that there was a statistically significant difference in average compliance level between job positions, $F(3, 230) = 3.896$, $p = 0.010$, as shown in Table 4.18.

Table 4.18: ANOVA on level of Compliance by Respondent's Job Description

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.367	3	3.122	3.896	.010
Within Groups	181.923	227	.801		
Total	191.291	230			

The descriptive statistics for the level of compliance across different roles show that the mean compliance level was highest among those in the "Other" category (M = 7.00, SD = 0.00), comprising site managers, construction project managers, and technologists. This was followed by Site Supervisors/Agents (M = 6.77, SD = 0.42) and Clerks of Works (M = 6.65, SD = 0.46). Site Foremen had the lowest mean compliance level (M = 6.36, SD = 1.28) as shown in Table 4.19. This implies that higher-level management achieves better compliance because they wield the administrative authority and professional training required to enforce standards. In contrast, Site Foremen with the lowest mean could be likely because they are closer to the "production pressures" of the site, where they may feel forced to compromise on regulations to meet deadlines.

Table 4.19: Pairwise Comparison of Compliance across Different Job Titles

					95% Confidence Interval for Mean			
	N	**Mean**	**SD**	**Std. Error**	**Lower Bound**	**Upper Bound**	**Min**	**Max**
Site Foreman	98	6.3592	1.28071	.12937	6.1024	6.6159	1.00	7.00
Site Supervisor/agent	115	6.7707	.41565	.03876	6.6939	6.8475	4.68	7.00
Clerk of Works	16	6.6479	.45655	.11414	6.4046	6.8911	5.85	7.00
Other (Specify)	2	7.0000	.00000	.00000	7.0000	7.0000	7.00	7.00
Total	231	6.5896	.91197	.06000	6.4714	6.7078	1.00	7.00

4.6.4 Respondents' Years of Experience

Regarding years of experience, 7% of the respondents had below three years of experience, while 15% possessed between four and seven years of experience, as shown in Figure 4.16. Individuals with work experience spanning between eight and 11 years were 13%, while a majority of 36% possessed experience of between 12 and 15 years of experience. Further, respondents with experience ranging between 16 and 19 years constituted 20% of the total, while those with over 20 years of experience were 10%.

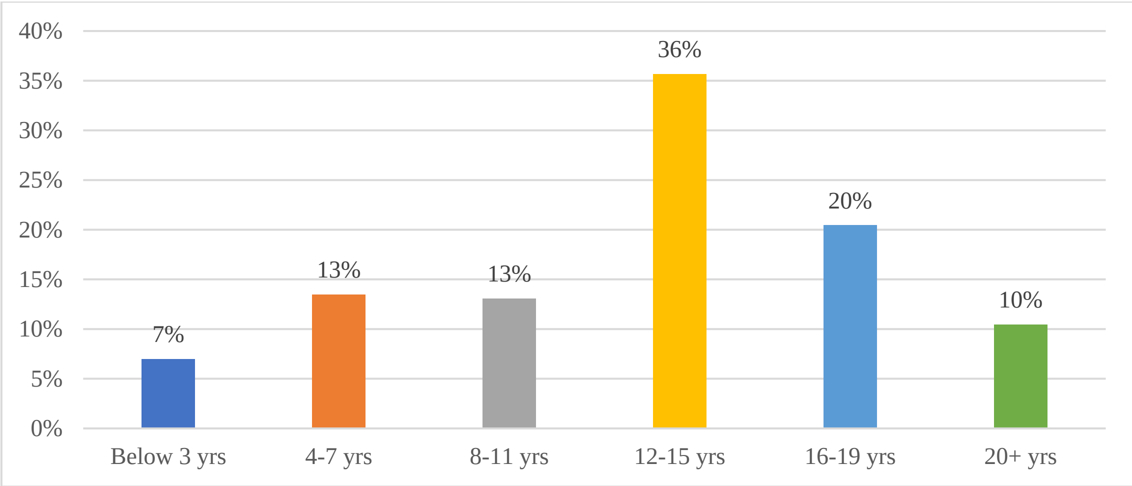

Figure 4.16: Years of Work Experience

The level of compliance across respondents' years of work experience was examined using ANOVA. At 95% confidence level, the test revealed that there was a statistically significant difference in average compliance level between respondents' years of work experience, $F(5, 229) = 4.538$, $p=0.001$, as shown in Table 4.20.

Table 4.20: ANOVA on Level of Compliance by Respondent's Age Group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.578	5	3.516	4.538	.001
Within Groups	173.547	224	.775		
Total	191.125	229			

The descriptive data for the level of compliance based on years of experience show that the mean compliance level was highest among participants with 12-15 years of experience (M = 6.77, SD = 0.43) indicating a level of mastery over site dynamics and regulatory expectations, followed by those with 4-7 years (M = 6.68, SD = 0.29) and 16-19 years (M = 6.74, SD = 0.73) as shown in Table 4.21. Participants with below 3 years of experience had a mean compliance level of 6.12 (SD = 1.22), and those with 20+ years had the lowest mean compliance level (M = 5.95, SD = 1.77). These findings emphasise the need for continuous education and refresher training, as long-term industry players may become resistant to new regulatory technologies or stricter enforcement regimes while new entrants may lag due to inexperience.

Table 4.21: Pairwise Comparison of Compliance across Different Age Groups

	N	Mean	SD	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Min	Max
Below 3 yrs	16	6.1240	1.21765	.30441	5.4752	6.7729	2.10	7.00
4-7 yrs	31	6.6839	.29394	.05279	6.5761	6.7917	5.60	7.00
8-11 yrs	30	6.5077	1.13408	.20705	6.0842	6.9312	1.30	7.00
12-15 yrs	82	6.7744	.42718	.04717	6.6805	6.8683	5.00	7.00
16-19 yrs	47	6.7351	.73240	.10683	6.5201	6.9501	2.40	7.00
20+ yrs	24	5.9493	1.76883	.36106	5.2024	6.6963	1.00	7.00
Total	230	6.5880	.91357	.06024	6.4694	6.7067	1.00	7.00

4.6.5 Value of Projects where Respondents Worked

The findings revealed that most of the projects (30%) had an estimated value of between 51 million and 100 million, followed by projects (19%) with an estimated value of 101 million to 200 million, as shown in Figure 4.17. Additionally, 16% of the projects had an estimated value falling between 21 million and 50 million.

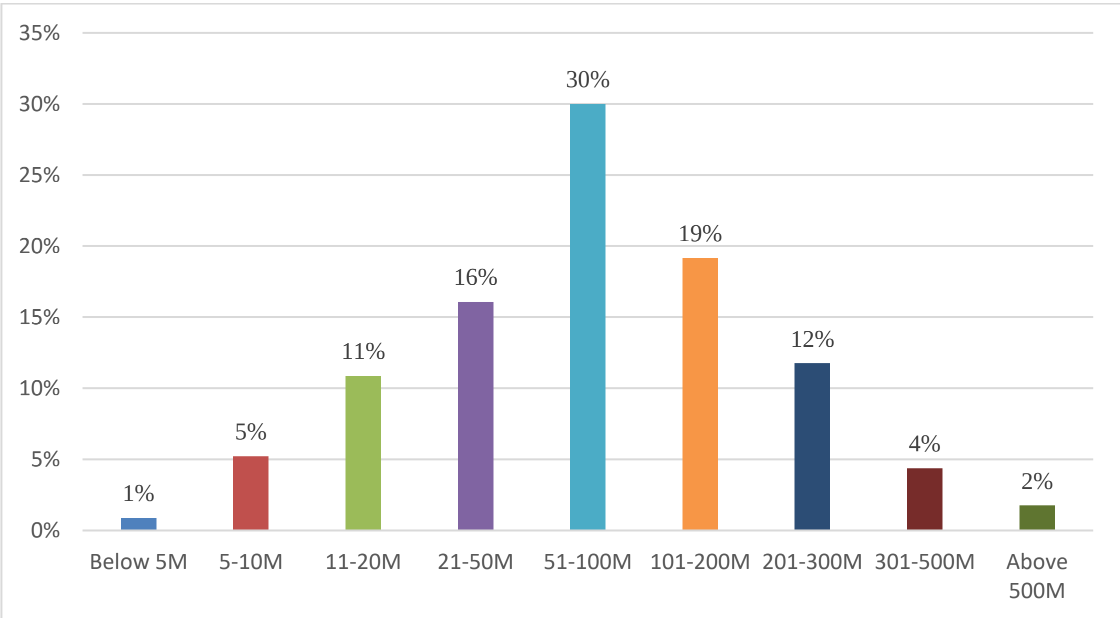

Figure 4.17: Estimated Project Value

Twelve per cent (12%) of the projects had an estimated value of between 201 million and 300 million, while 11% of the projects had an estimated value falling between 11 million and 20 million. Projects with a value falling between five million and 10 million were 5%. Additionally, 4% of the projects had an estimated cost of 301 Million and 500 Million, 2% had an estimated value above 500 Million, while another 1% had a value below 5 Million.

The ANOVA findings revealed that at 95% confidence level, there was no statistically significant difference in compliance level among projects of different values, $F(8, 229)=1.762$, $p=0.086$, as shown in Table 4.22. Therefore, no pairwise comparison was conducted. This is a crucial finding because it suggests that regulatory compliance is not a luxury of high-budget projects. Whether a project is worth 5 million or 500 million, the level of adherence is driven by human and institutional factors, such as the competency of leaders and the proactiveness of agencies, rather than the project's financial scale.

Table 4.22: ANOVA on the Level of Compliance of Projects of Different Values

	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	11.448	8	1.431	1.762	.086
Within Groups	179.507	221	.812		
Total	190.955	229			

4.7 Objective One: Levels of Regulatory Compliance in Construction Projects

As discussed in Chapter Two, compliance refers to the extent to which regulated entities adhere to established regulations. This adherence is often subtly demonstrated through the behavioural and attitudinal responses of individuals and organisations toward regulations, taking into account their institutional characteristics, capacities, and decision-implementation resources, among other factors (Amodu, 2008).

The level of regulatory compliance was assessed based on the prevailing legal framework. This assessment utilised both objective secondary data and primary data collected specifically for this study, focusing on three major factors identified in existing literature and their corresponding proxies. Analysis of objective secondary data from the NCA's OPRS system indicates that regulatory compliance in Kenyan construction projects unfolds in two distinct stages mandated by the NCA Regulations (2014): initial compliance during project registration, and sustained compliance throughout the execution phase.

Under section 17 of the NCA Regulations (2014), developers are required to register all construction projects at least 30 days before commencement. This is currently done through the NCAs Online Project Registration System (OPRS), and is only possible after a developer has satisfied a number of requirements outline in Section 2.6.1 (d) that include (i) obtaining a construction approval permit from the relevant county planning department in the form of physical planning forms (county approval permits/ letters/PPA2); and (ii) obtaining an EIA/ESIA licence from NEMA (if the project is worth more than KSh. 10,000,000); (iii) engaging a contractor and/or sub-contractor who must be registered with NCA and must have a valid practicing license; (iii) engaging project consultants (the engineer (s), architect, and quantity surveyor) who must also be duly registered with the respective professional regulatory body and possess valid practicing licenses; (iv) other statutory and regulatory approvals such as EPRA, WRA and KCAA licenses (where applicable); (v) bill of quantities summary page duly signed and stamped by a registered quantity surveyor; (vi) copy of developer's Kenya Revenue Authority (KRA) Personal Identification Number (PIN); (vii) signed contract/tender form or signed agreement between developer and the contractor; and (vii) supervision commitment letters by consultants and/or agreements/contract by developer with consultants. Satisfying these requirements presents the first level of regulatory compliance.

The second level of regulatory compliance, which is the main component of building regulatory compliance, occurs during project execution. This is where NCA carries out continuous quality assurance activities that entail random visits to construction sites and inputting the data to the OPRS using rugged phones. To measure Compliance in this second tier, NCA uses a seven (7) item checklist. These include ensuring: (i) engagement of NCA registered contractor on site; (ii) erection of site board showing all approvals and the professionals engaged in the project; (iii) having safety signs on-site; (iv) adorning personal protective equipment (PPE) while on-site; (v) ensuring sufficient hoarding and fencing of site; (vi) possessing a valid NCA Compliance Certificate; and (vii) engaging NCA accredited skilled construction workers and construction site supervisors in construction activities as shown in Appendix III. During this stage, some of the projects that had earlier been registered in stage one as compliant can be suspended, while others that had not been previously registered but found to have all the necessary documentation could be registered.

To assess the level of regulatory compliance in Nairobi, the two administrative arrangements (constituency and sub-county modules) outlined in the definition of the study area in Section 3.6 were adopted. This is because while project registration under the OPRS is undertaken per constituency, critical information, such as population data, necessary for drawing correlations required in this study, is documented and available per sub-county. To eliminate ambiguity, correlations of compliance and population were only undertaken for Sub-counties where the delineated zones were found to match at the national and county level, as shown in Table 3.1, Figures 3.2. and 3.3 covered in chapter three. Further, to effectively communicate the findings of the study, four levels or scales of compliance were adopted as shown in Figure 4.18. These are low compliance (0-30%), medium compliance (31-69%), high compliance (70-99%), and full compliance (100%). These scales have been applied in the description of the findings of the study.

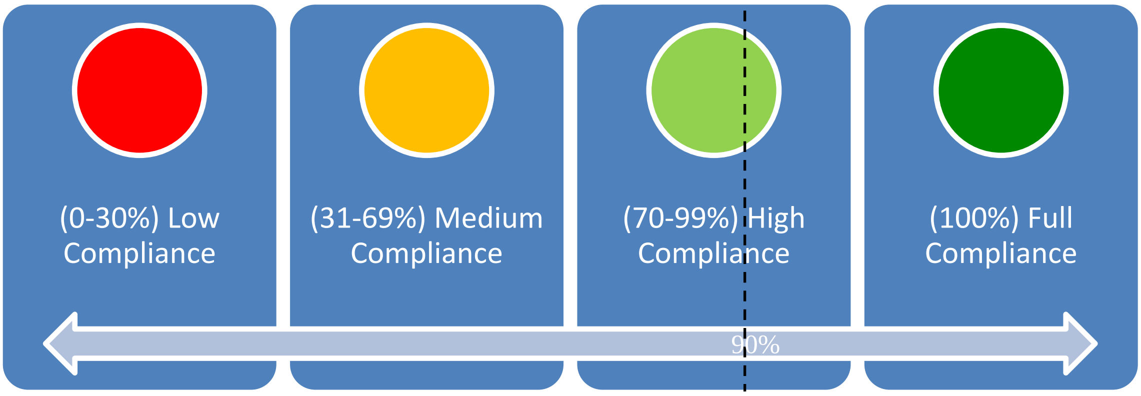

Figure 4.18: Compliance Scale

Source: Author Construct, 2026

4.7.1 Levels of Project Compliance by Registration

a) Level of Compliance per Constituency

The data shown in Table 4.23 presents the number of registered and unregistered projects across the 17 constituencies in Nairobi City County as captured in the NCAs OPRS between January and December 2023. From the data, 1,742 (26.22%) of the assessed projects were registered, while 4,903 (73.78%) were not, indicating low overall compliance. Kasarani had the highest total number of projects at 1,542, with a significant portion (n=1,365) being unregistered. Embakasi East follows with a total of 994 projects, predominantly unregistered (n=848). Conversely, Kibra had the lowest tally of only 19 projects, out of which only eight were registered. Other notable constituencies include Westlands and Roysambu with a total of 590 (n=270 registered, n=320 unregistered) and 586 (n=159 registered, n=427 unregistered) projects, respectively. Dagoretti South had a relatively balanced distribution of projects, although still skewed towards the unregistered (n=285) and (n=68) for the registered.

Table 4.23: Levels of Compliance of the Project at Registration per Constituency

Constituencies	No. of Registered	%	No. of Unregistered	%	Total
Starehe	168	67.20	82	32.80	250
Makadara	26	28.26	66	71.74	92
Kamukunji	237	49.48	242	50.52	479
Embakasi West	28	8.59	298	91.41	326
Embakasi Central	19	8.64	201	91.36	220
Embakasi North	2	8.70	21	91.30	23
Mathare	11	22.45	38	77.55	49
Ruaraka	27	20.45	105	79.55	132
Dagoretti South	68	19.26	285	80.74	353
Dagoretti North	141	52.42	128	47.58	269
Embakasi East	146	14.69	848	85.31	994
Embakasi South	51	20.40	199	79.60	250
Kasarani	177	11.48	1365	88.52	1542
Kibra	8	42.11	11	57.89	19
Langata	204	43.31	267	56.69	471
Roysambu	159	27.13	427	72.87	586
Westlands	270	45.76	320	54.24	590
Grand Total	1,742	(26.22)	4,903	(73.78)	6,645

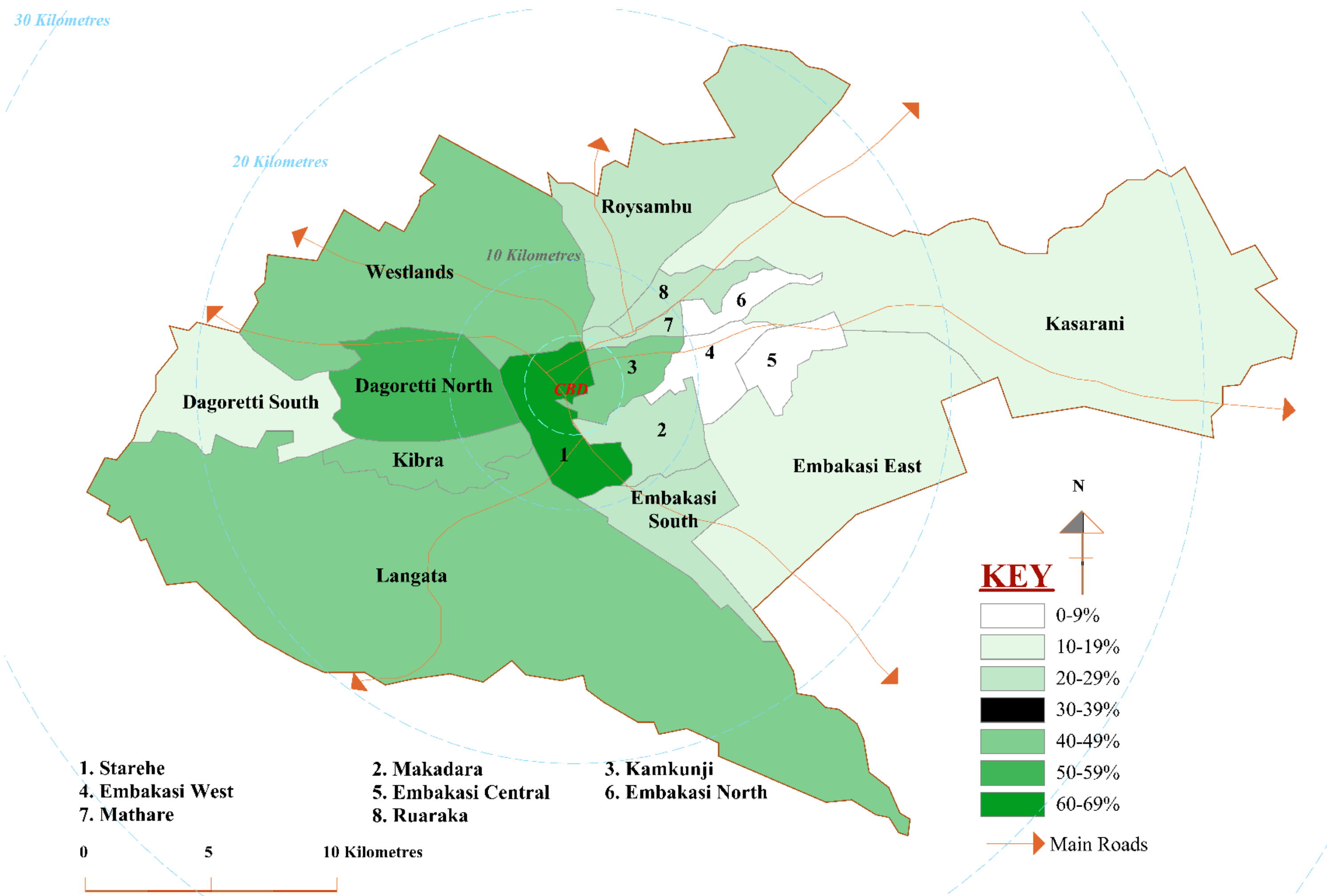

Figure 4.19: Mapped out Percentage Compliance Levels of Projects by Registration

Source: Author 2026

Figure 4.19 shows the gradient map of compliance levels at project registration. It is noted that while constituencies close to the central business district (CBD) showed better compliance rates due to actual and perceived visibility to regulators, the compliance generally varied with population density, with more dense constituencies located to the East of the CBD registering lower compliance rates compared to those to the West.

This variation is further shown by the correlation between compliance levels and demographic indicators, specifically population density. Data on population density in Nairobi City County was obtained from the Kenya National Bureau of Statistics (KNBS) 2019 report on population and housing census, as shown in Table 3.1, and correlated with these findings. The analysis revealed a weak negative correlation between compliance levels and population density at registration, with a Pearson correlation coefficient of -0.373 as shown in Table 4.24 and Figure 4.20.

The statistical analysis indicated that the relationship between the variables was not statistically significant (p=0.288). This outcome was anticipated because the project registration phase primarily involves planning, securing approvals, engaging stakeholders, and establishing the project's foundation. During this stage, compliance predominantly centres on adhering to regulatory requirements and obtaining necessary permits. Consequently, population density has minimal influence on these activities, as they are largely administrative and preparatory in nature.

Table 4.24: Pearson's Correlations of Compliance Levels at Registration per Constituency

			Pearson's r	p
Population density	-	Compliance Level	-0.373	0.288

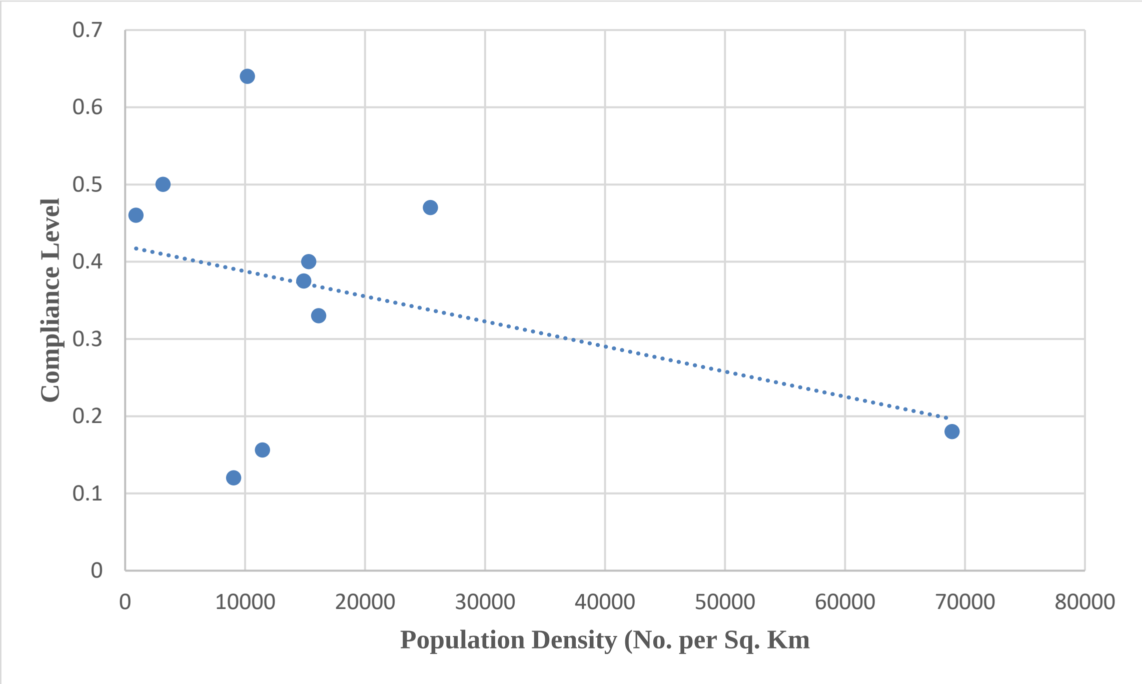

Figure 4.20: Relationship between Level of Compliance and Population Density at Project Registration

b) Overall Compliance per Checklist Item

The analysis of the site compliance checklist recordings on OPRS revealed significant areas where construction sites were lacking in compliance, as shown in Figure 4.21. A significant number of sites (74%) did not have compliance certificates issued upon project registration, 71% failed to demonstrate the presence of adequate oversight or proof of supervision, 75% of sites did not provide adequate safety signs, and 75% engaged unaccredited construction workers on site, contrary to the law. Compliance with signage requirements was also low, with 67% of sites not displaying signboards that should show all approvals and professionals engaged in the project. Additionally, 73% of the sites showed inadequate use of personal protective equipment (PPEs), while 58% of construction sites did not provide sufficient hoarding and fencing, hence leaving sites inadequately secured.

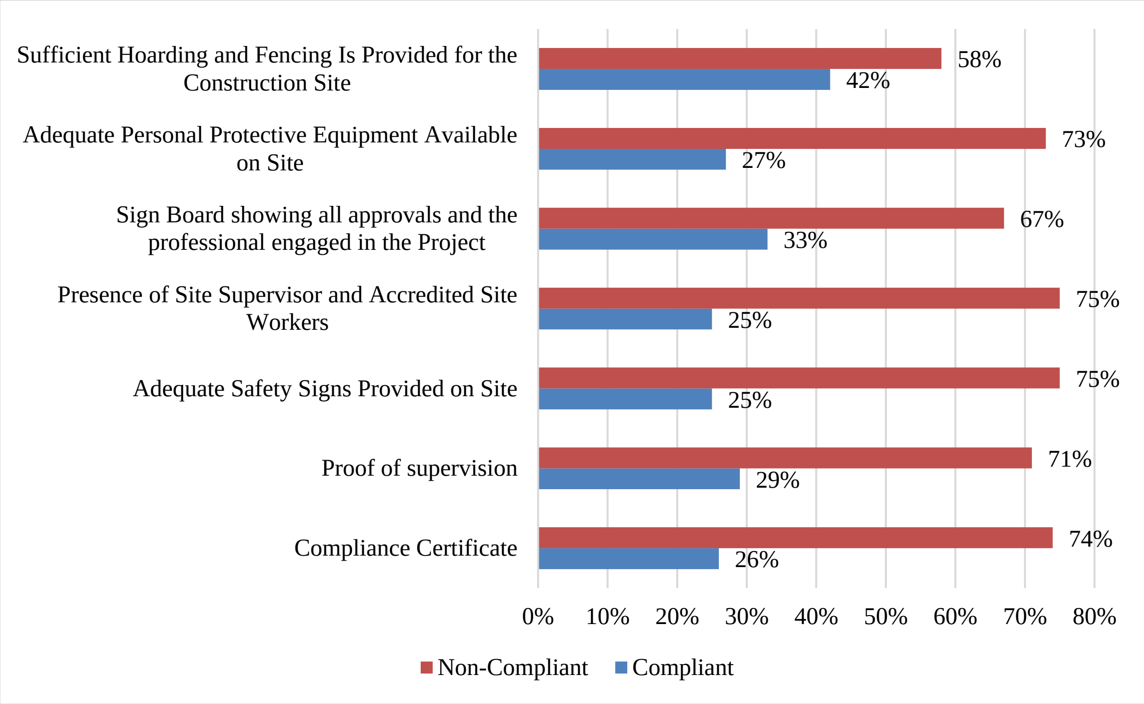

Figure 4.21: Site Compliance by Checklist Items

c) Compliance Status per Checklist Items by Constituency

The assessment of compliance in the various documented construction sites per constituency in line with the seven (7) checklist items revealed varying levels of compliance, as shown in Table 4.25. In terms of the requirement to register all projects, Starehe constituency had medium compliance of 67%, followed by Dagoretti North with 52%. Kamukunji, Kibra, Langata, and Westlands showed moderate compliance with levels of 49%, 42%, 43%, and 46%, respectively. On the other hand, areas like Embakasi Central, Embakasi North, and Embakasi West displayed very low compliance at only 9%. Embakasi South and Ruaraka also had a low compliance rate of 20%. Overall, the compliance level on this item was low at 26%.

In terms of proof of supervision by project consultants, Starehe constituency had a medium compliance rate of 67%, followed by Dagoretti North and Westlands at 50%. Conversely, 10 out of the 17 constituencies exhibited low compliance, with areas such as Embakasi North and Embakasi West attaining 9% and 10% compliance, respectively. Others include Kasarani (12%), Embakasi Central (14%), and Mathare (18%). Overall, 71% of construction sites across these constituencies lacked proof of supervision, leaving only 29% of projects compliant. In terms of the requirement to provide adequate safety signs on construction sites, a considerable disparity across various constituencies was noted. The presence of safety signs was more prevalent in Starehe and Dagoretti North, with 54% and 51% of sites, respectively, having adequate signs. However, several constituencies, such as Embakasi North and Embakasi Central, displayed significant deficiencies, where only 4% and 6% of sites, respectively, had proper safety signage. Embakasi West, Kasarani, and Embakasi East also showed high non-compliance rates of 7%, 9%, and 14%, respectively. Overall, 75% of construction sites across these constituencies lacked adequate safety signs, while only were 25% compliant.

In terms of engagement of accredited construction site supervisors and skilled construction workers, Starehe stood out with 61% of sites being compliant, followed by Dagoretti North at 46%, Westlands at 45%, and Kamukunji at 40%. On the flip side, Embakasi North and Embakasi West exhibited the lowest compliance of 4% and 6%, respectively, with Kasarani and Mathare both registering 10% compliance. Overall, 75% of construction sites across all constituencies did not engage accredited construction workers, with only 25% meeting the requirements. The prerequisite to display a signboard showing all approvals and the professionals engaged in a project at the construction sites varied significantly across different constituencies. Embakasi South stood out with a 78% compliance, followed by Starehe with 69%. Dagoretti North and Westlands showed a medium compliance with 53% of sites displaying the required information. Kamukunji came fourth with 52% compliance. On the downside, Embakasi North showed the lowest compliance with only 4% of documented projects having necessary signboards, followed closely by Embakasi Central and Embakasi West with 10% and 11% compliance, respectively. Overall, 67% of construction sites across these constituencies lacked signboards required to display details of approvals and the details of engaged supervision professionals, with only 33% meeting this requirement.

The availability of adequate personal protective equipment (PPE) on construction sites also showed significant variability across different constituencies. Starehe and Dagoretti North stood out with medium compliance rates of 56% and 54%, respectively, while Westlands and Langata had a 46% compliance rate. The lowest compliance rates were registered in Embakasi North (4%), Embakasi Central (7%), and Mathare (8%). Overall, 73% of construction sites across these constituencies lacked adequate use of PPE, while only 27% met this critical safety requirement.

The provision of sufficient hoarding and fencing at construction sites registered the best compliance result of all seven checklist items. Starehe showed the highest compliance, with 77% of sites reported as adequately fenced and hoarded, followed by Dagoretti North and Westlands at 69% and 66%, respectively. Langata and Kamukunji also displayed medium compliance, with 62% and 59% of sites, respectively, meeting the requirement. Conversely, Kasarani and Embakasi West exhibited the lowest compliance, with only 19% and 80% of sites lacking sufficient hoarding and fencing. Embakasi Central, Embakasi East, Embakasi North, and Ruaka also had high non-compliance rates of 22%, 23%, 26%, and 29%, respectively. Overall, 58% of construction sites across all constituencies lacked sufficient hoarding and fencing, while only 42% met this essential safety and security requirement.

Overall, Starehe performed best in terms of compliance at 64%, followed by Dagoretti North at 54% and Westlands at 50%. The worst-performing constituency in terms of overall compliance was Embakasi North at 9%, followed by Kasarani and Embakasi Central at 12%. In terms of checklist items, provision of sufficient hoarding and fencing scored a mean of 42% compliance to register the highest compliance average, while sufficient signage and engagement of accredited workers scored an average low of 25% each. A detailed analysis of this compliance performance per constituency and per checklist item is captured in Table 4.25.

Table 4.25: General Levels of Project Compliance per Checklist Item

Constituency	Compliance Checklist								
	No. of projects	*Valid NCA Compliance certificates*	*Proof of supervision by project consultants*	*Provision of adequate safety signs*	*Presence of accredited construction workers*	*Signboard showing all approvals and the professional engaged in the project*	*Provision of adequate PPEs on site*	*Provision of sufficient hoarding and fencing*	*Average*
	Level of Compliance								
1. Starehe	250	67%	67%	54%	61%	69%	56%	77%	64%
2. Makadara	92	28%	34%	33%	32%	32%	35%	40%	33%
3. Kamukunji	479	49%	49%	39%	40%	52%	39%	59%	47%
4. Embakasi West	326	9%	10%	7%	6%	11%	10%	20%	10%
5. Embakasi Central	220	9%	14%	6%	13%	10%	7%	22%	12%
6. Embakasi North	23	9%	9%	4%	4%	4%	4%	26%	9%
7. Mathare	49	22%	18%	8%	10%	16%	8%	43%	18%
8. Ruaraka	132	20%	21%	19%	18%	23%	20%	29%	21%
9. Dagoretti South	353	19%	20%	16%	17%	20%	16%	37%	21%
10. Dagoretti North	269	52%	50%	51%	46%	53%	54%	69%	54%
11. Embakasi East	994	15%	17%	14%	15%	15%	15%	23%	16%
12. Embakasi South	250	20%	23%	21%	18%	78%	25%	30%	31%
13. Kasarani	1542	11%	12%	9%	10%	13%	10%	19%	12%
14. Kibra	19	42%	32%	42%	31%	42%	42%	47%	40%
15. Langata	471	43%	44%	42%	39%	48%	46%	62%	46%
16. Roysambu	586	27%	29%	24%	25%	29%	27%	38%	28%
17. Westlands	590	46%	50%	42%	45%	53%	46%	66%	50%
Overall Compliance Level	**6,645**	26%	29%	25%	25%	33%	27%	42%	30%

KEY (0-30%) Low Compliance (31-69%) Medium Compliance

4.7.2 Levels of Project Compliance during Execution

a) Level of Compliance per Constituency

The compliance status of registered construction projects across various constituencies reveals a generally high adherence to regulations, as shown in Table 4.26 and Figure 4.22. Out of a total of 1,742 projects, 64.75% were found to be compliant, while 35.25% were non-compliant, meaning they were suspended during execution. Notably, Makadara constituency achieved the highest compliance rate at 84.62%, followed closely by Westlands (75.93%) and Dagoretti North (74.47%). On the other hand, Mathare exhibited the lowest compliance rate at 36.36%, followed by Embakasi West (46.43%) and Kasarani (49.72%). Additionally, several constituencies, such as Embakasi North, Kibra, and Kasarani, had equal percentages of compliant and non-compliant projects.

Table 4.26: Project Compliance Levels per Constituency during Execution

	Registered Projects				
Constituency	**No. of Compliant Projects**	**Percentage**	**No. of Non-Compliant Projects**	**Percentage**	**Total**
Starehe	97	57.74%	71	42.26%	168
Makadara	22	84.62%	4	15.38%	26
Kamukunji	132	55.70%	105	44.30%	237
Embakasi West	13	46.43%	15	53.57%	28
Embakasi Central	10	52.63%	9	47.37%	19
Embakasi North	1	50.00%	1	50.00%	2
Mathare	4	36.36%	7	63.64%	11
Ruaraka	18	66.67%	9	33.33%	27
Dagoretti South	42	61.76%	26	38.24%	68
Dagoretti North	105	74.47%	36	25.53%	141
Embakasi East	105	71.92%	41	28.08%	146
Embakasi South	35	68.63%	16	31.37%	51
Kasarani	88	49.72%	89	50.28%	177
Kibra	4	50.00%	4	50.00%	8
Langata	135	66.18%	69	33.82%	204
Roysambu	112	70.44%	47	29.56%	159
Westlands	205	75.93%	65	24.07%	270
Grand Total	**1,128**	**(64.75%)**	**614**	**(35.25%)**	**1,742**

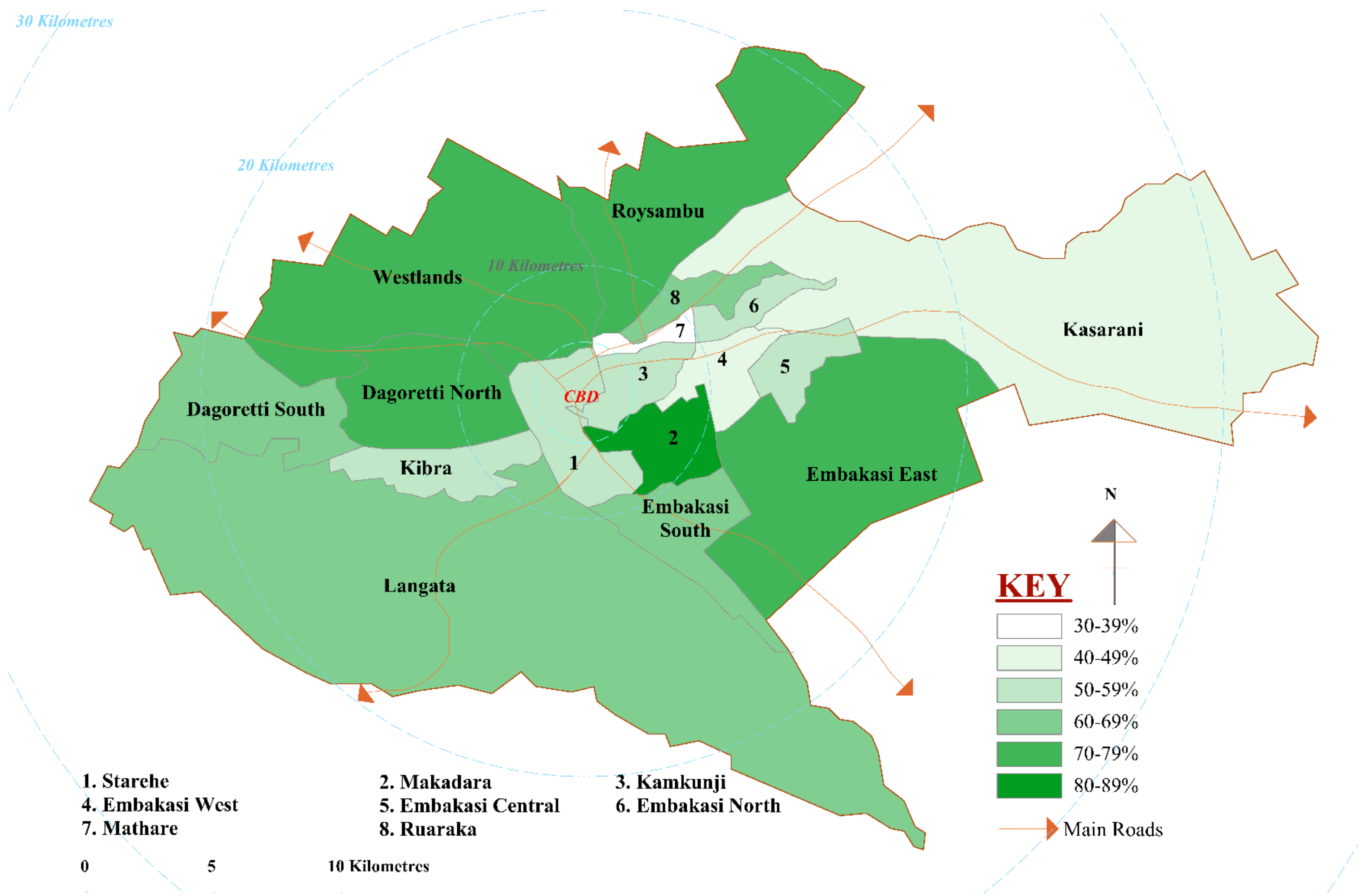

Figure 4.22: Mapped out Percentage Compliance Levels of Projects during Implementation

It was observed that compliance rates varied with population density, with more dense areas located to the East of the CBD registering lower compliance rates compared to those to the West of the CBD. The variation in compliance levels across different constituencies was further assessed by examining the correlation between compliance levels and demographic indicators, specifically population density. Data on population density by constituency in Nairobi County, presented in Section 3.6, was sourced from the Kenya National Bureau of Statistics (KNBS) 2019 population and housing census report. The analysis revealed a strong negative correlation between compliance levels and population density, with a Pearson correlation coefficient of -0.818 (p=0.004), indicating that as population density (X) increases, compliance levels (Y) decline, as shown in Table 4.27.

Table 4.27: Pearson's Correlations at Project Execution

Pearson's Correlations			
		Pearson's r	**p**
Population density	Compliance Level	-0.818	0.004

A scatter plot further illustrates this trend, showing a clear negative linear relationship between population density and compliance levels, as shown in Figure 4.23. According to the KNBS Report (2019), Mathare constituency had the highest population density, with 68,941 people per square kilometre, and also recorded the lowest compliance level at 56%. Conversely, constituencies like Westlands and Lang'ata, which had lower population densities of 911 and 3,167 people per square kilometre, respectively, exhibited higher compliance levels, with Westlands at 91% and Lang'ata at 89% (Table 4.28). From the scatter, there is a point that deviates from the rest of the dataset. The data point is a representation of Mathare constituency, which holds the highest population density. This point was deemed a natural or true non-problematic outlier, which is informative given that it shows a lower level of compliance compared to other regions, which influences the significance of the relationship between population density and compliance. Gibbert et al. (2018) argue that it is important to closely examine outliers rather than discarding them, as some cases reveal important patterns or prompt the refinement of existing models. In this case, the researcher chose to keep this point, given its significance.

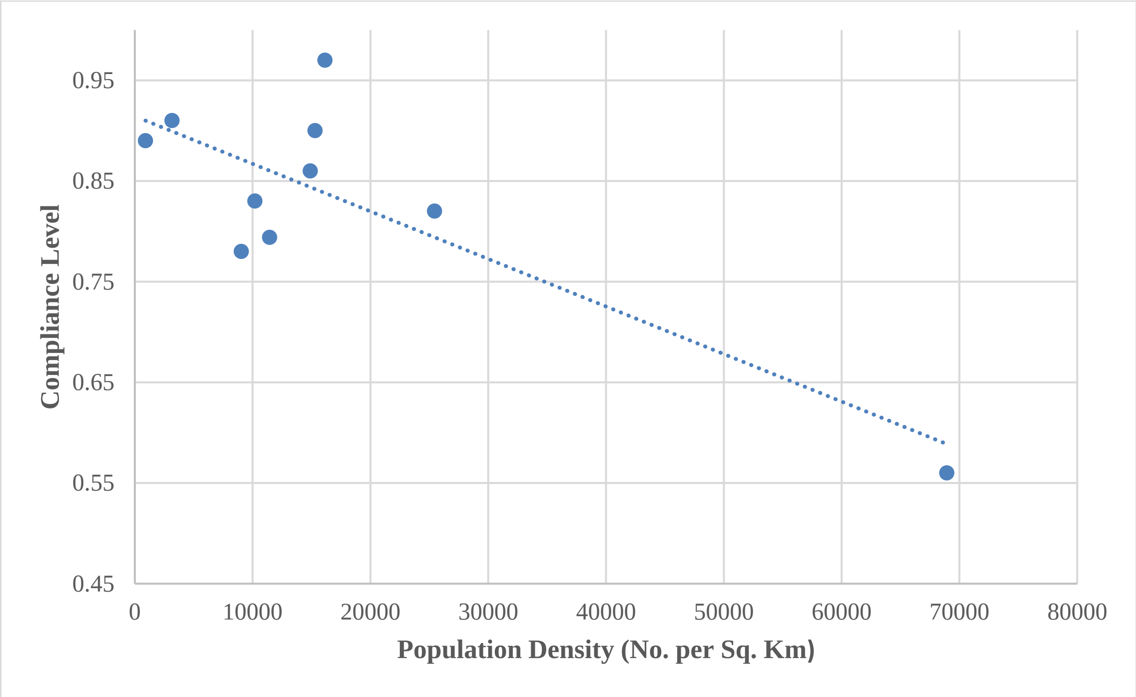

Figure 4.23: Relationship between Compliance Level and Population Density at Execution

b) Project Compliance per Checklist Item during Execution

The findings based on the seven-item checklist shown in Figure 4.24 indicate that the presence of a signboard showing all approvals and the professionals engaged in a project had the highest compliance rate at 94%, indicating strong adherence in this area. Proof of supervision and adequate hoarding and fencing also scored high at 89% and 91%, respectively, suggesting that these aspects are well-managed. Further, compliance rates on the use of adequate personal protective equipment on site and the installation of adequate safety scored 82% and 80%, respectively. The lowest compliance rate was 79% relating to the engagement of construction site supervisors and accredited skilled construction workers. Overall, the compliance rates were generally fair; however, focusing on the lower-scoring areas can further enhance project compliance, site safety, and supervision from high compliance to full compliance.

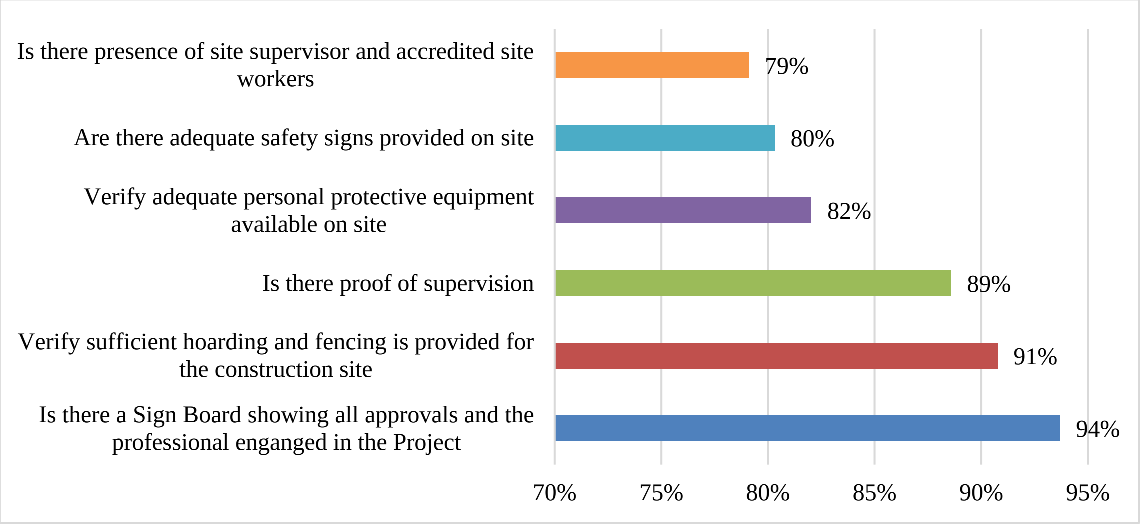

Figure 4.24: Compliance Levels per Checklist Item

c) Project Compliance per Checklist Item by Constituency during Execution

Proof of supervision in a project is a parameter satisfied through documentary evidence, such as minutes of site meetings and site instructions. Projects in Makadara, Embakasi North, and Ruaraka excelled in this area with a perfect compliance score of 100%, as shown in Table 4.28. Other constituencies such as Langata, Roysambu, Embakasi South, and Starehe also showed high compliance levels, ranging from 90% to 95%. The lowest compliance scores were observed in Embakasi Central (79%) and Kasarani (81%), indicating that these areas might need more stringent supervision practices. The overall compliance level for proof of supervision among registered projects stood at 89%.

In terms of the provision of adequate safety signs at construction sites, Kibra and Makadara led with a full score of 100%. Conversely, Mathare had low compliance at 36%, followed by Embakasi North at a medium of 50%, highlighting a significant area for improvement. Most other constituencies hovered around the 70%-90% compliance range, indicating generally better practices. Overall, the compliance level on this item was 80%.

The requirement to engage accredited construction site supervisors and skilled construction workers showed a varied compliance level, with the highest compliance being recorded in Makadara (96%), followed by Westlands (89%) and Embakasi East

(83%). Embakasi North and Mathare had the lowest scores at 50% and 36%, respectively, suggesting a critical need for enhanced workforce management and training. The average compliance score stood at 79%.

Signboards displaying all necessary approvals and professionals engaged in a project had a high overall compliance of 94%. Kibra stood out with a perfect score of 100%, followed closely by Embakasi South and Westlands with 98% and 97% respectively. Embakasi North and Mathare lagged with 50% and 73%, respectively, indicating a need for better adherence to regulatory signage requirements.

In terms of ensuring adequate provision and usage of personal protective equipment (PPEs) on site, an overall compliance score of 82% was registered. Kibra, Makadara, and Ruaraka were the top performers, each with a compliance score of 100%. In contrast, Embakasi North and Mathare scored the lowest at 50% and 36%, respectively. This indicates a critical need to prioritise the availability and use of PPE to enhance worker safety.

With regard to the provision of sufficient hoarding and fencing around construction sites overall compliance level of 91% was registered. Kibra and Ruaraka achieved perfect scores of 100%, demonstrating excellent site security and safety measures. On the other hand, Mathare and Embakasi North had the lowest scores at 73% and 50%, respectively, indicating a substantial need for improvement in securing construction perimeters.

Cumulatively, the average score of the registered 1,742 projects on all six (6) checklist items observed during quality assurance when assessed separately was noted to be 86%, as shown in Table 4.28. However, the actual cumulative compliance when all factors are jointly assessed drops to 64.75%, as shown in Table 4.26. This means that once registered, the developers don’t fully implement the conditions of the compliance certificate. As a result, most of these projects end up being suspended and/or closed for non-compliance.

Table 4.28: Performance of Registered Projects during Quality Assurance at Execution

Constituency	*No. of registered projects*	*Proof of supervision by project consultants*	*Provision of adequate safety signs on site*	*Presence of accredited construction workers on site*	*Presence of a Sign board showing all approvals and the professional engaged in the project*	*Provision of adequate PPEs on site*	*Provision of sufficient hoarding and fencing on site*	*Average score*
	Level of Compliance							
1. Starehe	168	90%	72%	82%	91%	73%	91%	83%
2. Makadara	26	100%	100%	96%	92%	96%	96%	97%
3. Kamukunji	237	88%	75%	73%	93%	73%	88%	82%
4. Embakasi West	28	86%	86%	61%	96%	82%	86%	83%
5. Embakasi Central	19	79%	68%	74%	89%	68%	84%	77%
6. Embakasi North	2	100%	50%	50%	50%	50%	50%	58%
7. Mathare	11	82%	36%	36%	73%	36%	73%	56%
8. Ruaraka	27	100%	89%	81%	93%	93%	100%	93%
9. Dagoretti South	68	82%	78%	75%	88%	76%	88%	81%
10. Dagoretti North	141	89%	91%	80%	96%	91%	96%	91%
11. Embakasi East	146	85%	86%	83%	94%	88%	88%	87%
12. Embakasi South	51	90%	90%	82%	98%	96%	98%	92%
13. Kasarani	177	81%	69%	70%	93%	73%	84%	78%
14. Kibra	8	75%	100%	63%	100%	100%	100%	90%
15. Langata	204	90%	85%	81%	95%	88%	94%	89%
16. Roysambu	159	90%	83%	80%	95%	86%	91%	88%
17. Westlands	270	94%	84%	89%	97%	86%	94%	91%
Overall Compliance Level	**1,742**	**89%**	**80%**	**79%**	**94%**	**82%**	**91%**	**86%**

KEY (70-99%) High Compliance (31-69%) Medium Compliance

4.7.3 Empirical Assessment of the Levels of Regulatory Compliance

Primary data, gathered from a sample of construction projects, was used to assess regulatory compliance across three key dimensions identified in existing literature: project registration status (RS), project site conditions (SC), and project workforce status (WS). Each dimension was evaluated using multiple proxy measures and rated on a 7-point Likert scale. These were assessed using the mean (μ), standard deviation (σ), and the coefficient of variation (CV), which is a ratio of the standard deviation to the mean. The CV was employed to determine the consistency and relative variability in compliance rankings, providing a normalised measure of dispersion.

The analysis under Project Registration Status (RS) revealed that the highest compliance in terms of consistency was associated with the provision of space for public utilities such as wayleaves and road reserves (Mean = 6.58, SD = 0.95, CV = 14%), ranked as first. This was followed by regular site compliance checks conducted by NCA inspectors (Mean = 6.60, SD = 0.99, CV = 15%) and full implementation of the project's Environmental Management Plan (EMP) (Mean = 6.58, SD = 1.03, CV = 16%). Regular site inspections by county government inspectors (CV = 17%) and compliance monitoring by NEMA (CV = 18%) ranked lower due to relatively higher variability, despite all proxies scoring above 6.5. These findings suggest that while mean scores were uniformly high, consistency in regulatory enforcement was slightly more variable for external monitoring agencies.

Based on Project Site Conditions (SC), the most consistent compliance was reported in the rejection of poor-quality materials (Mean = 6.61, SD = 0.93, CV = 14%), procedural handling of changes in project specifications (Mean = 6.65, SD = 0.94, CV = 14%), and the adequacy of hoarding/netting/fencing (Mean = 6.65, SD = 0.95, CV = 14%). These were closely followed by appropriate handling of construction materials to maintain quality (Mean = 6.61, SD = 0.96, CV = 15%) and maintaining material test records (Mean = 6.58, SD = 0.98, CV = 15%). The highest variability in this category was seen in dumping debris at approved sites (Mean = 6.59, SD = 1.05, CV = 16%). Overall, SC indicators showed relatively uniform adherence, with CVs ranging from 14% to 16%, indicating strong but moderately variable enforcement of quality and environmental protocols.

For the project workforce, the most consistent compliance was noted in the use of personal protective equipment (PPE) by construction workers (Mean = 6.68, SD = 0.87, CV = 13%), which ranked 1st overall across all variables. Regular site visits by consultants (CV = 14%) and accreditation of skilled workers (CV = 14%) also exhibited high compliance and consistency. However, relatively higher variability was observed in the presence of a trained first aider (CV = 17%) and the involvement of a registered NEMA expert in EMP implementation (CV = 17%).

In summary, based on the Coefficient of Variation, the workforce-related indicators, particularly PPE use, demonstrated the highest consistency in compliance as indicated in Table 4.29. Project registration and site condition indicators also reflected strong adherence, although external oversight variables showed slightly more variability. These findings underscore a commendable level of regulatory compliance across all dimensions, with most CV values falling below 17%, indicating low variability and strong alignment with regulatory standards.

This subjective data from the questionnaire shows that a majority of respondents agreed with key regulatory compliance items, with most ratings falling above 5 on the 7-point Likert scale. This compares favourably to findings from the objective data on registered projects during execution, which indicated an overall compliance level of 86%.

Despite the NCA’s strategic vision to achieve 90% compliance by 2025 (NCA, 2021), the findings based on this objective reveal that regulatory adherence in Nairobi remains a "deepening problem." At the initial phase, a disturbingly low 26.22% of projects are validly registered, suggesting that most developers operate without a legal foundation. This deficit indicates that regulators lack the "sufficient information or enforcement powers" essential for promoting the public interest (Heijden, 2013; Christensen, 2010). Even among registered projects, compliance at implementation averages only 64.75%, indicating that over one-third of "compliant" sites are subsequently suspended for violations. This trend underscores a failure to maintain standards once physical work begins, supporting Parker and Nielsen's (2017) assertion that regulatory effectiveness depends on individual adherence. The current framework, therefore, has seemingly failed to address market failures (Eliantonio & Spendzharova, 2017; Heijden, 2019) and requires a review to bolster monitoring and surveillance (Sutinen & Kuperan, 1999).

Table 4.29: Empirical Data on the Level of Regulatory Compliance

Project registration status (RS)	N	Mean	SD	CV	Rank
a) NEMA conducts regular compliance monitoring of the site	232	6.53	1.158	18%	1
b) County government inspectors undertake regular staged site inspections	232	6.53	1.085	17%	2
c) We implement the projects environment management plan (EMP) fully	232	6.58	1.033	16%	3
d) NCA inspectors undertake regular site compliance checks	230	6.6	0.992	15%	4
e) Space e.g. way leaves and road reserves for public utilities have been adequately provided	232	6.58	0.946	14%	5
Project site conditions (SC)					
a) All debris and excavated materials are dumped on sites approved by the county	232	6.59	1.053	16%	1
b) General environmental protection is ensured at all times	232	6.58	1.029	16%	2
c) Material tests are conducted at all relevant stages of this project	232	6.57	0.995	15%	3
d) Safety signs are adequately displayed in this construction site	232	6.62	0.99	15%	4
e) Materials are always inspected for quality before admission to site	232	6.57	0.982	15%	5
f) A record of all material test results is kept	232	6.58	0.981	15%	6
g) All construction materials are handled appropriately to maintain quality	232	6.61	0.961	15%	7
h) Hoarding/netting/fencing has been adequately provided on site	232	6.65	0.947	14%	8
i) Changes project specifications are handled procedurally	231	6.65	0.942	14%	9
j) Poor quality materials are not stored in this construction site	231	6.61	0.931	14%	10
a) There is always a trained first aid person on site	232	6.63	1.125	17%	1
b) A validly registered NEMA expert helps in the implementation of EMP	232	6.51	1.077	17%	2
c) The skilled construction workers on site are accredited	232	6.59	0.922	14%	3
d) Consultants e.g. engineers, architects regularly visit the site for inspections	232	6.58	0.894	14%	4
e) Construction workers adorn adequate personal protective equipment (PPE)	232	6.68	0.865	13%	5

Significant disparities at sub-county level further complicate this landscape. While compliance in Makadara reached 84.62%, it plummeted to 36.36% in Mathare, revealing a strong negative correlation ($r=-0.818$, $p=0.004$) between population density and adherence. Such gaps contradict the Public Interest Theory of Regulation (PITR), which assumes state mandates effectively safeguard social welfare (Zhang, 2009), but reinforces compliance as a "learned social force", where even a "non-compliance culture" is reinforced by observing others circumvent rules in line with the presuppositions of the Social Cognitive Theory (SCT) (LaMorte, 2022). This also mirrors Bowles' (1971) observation that the majority of regulatees (75%) only comply when they are confident that the "obstinate" minority (5%) will be disciplined. Notably, the lowest adherence among registered sites was the engagement of accredited skilled workers (79%), confirming that even "compliant" sites struggle with workforce management due to the temporary nature of labour and perceived indifference to quality also exhibited by empirical data (Chin-Keng & Hamzah, 2011).

These results also challenge Deterrence Theory (DT), as the prevalence of unregistered sites suggests that current sanctions lack the "certainty and celerity" required to discourage violations (Abramovaite et al., 2023). In such a situation, Coglianese and Kagan (2007) propose a dynamic enforcement approach that prioritises "substantial compliance" over rigid adherence, provided the threat of punishment remains a credible backdrop (Liu et al., 2022; Gunningham, 2015). These findings, therefore, align with the recommendations of the Theory of Regulatory Compliance (TRC), which advocates for a balanced and incremental application of predictor rules to realise the "sweet spot" achievable through service-oriented frameworks rather than pure deterrence (Heijden, 2013). Given that the NCA Regulations (2014) are now over a decade old, these findings provide a timely impetus for periodic review—recommended every 5 to 10 years by the World Bank (2013) among others—to improve and simplify regulatory guidelines (USAID, n.d.).

4.8 Objective Two: Assessment of Determinants and Barriers of Regulatory Compliance

4.8.1 Determinants of Regulatory Compliance

i) Suitability of the Project Legal Framework (SLF)

The findings indicate that respondents generally perceive the legal framework governing regulatory compliance in the construction project site positively, as shown in Table 4.30.

Table 4.30: Empirical Data on the Suitability of the Project's Legal Framework

Factor		N	Min	Max	Mean	SD	Rank
a.	Existing laws support quality implementation of works in this project	232	1	7	6.32	0.980	1
b.	In my view the existing laws are adaptable for all projects	232	1	7	6.13	1.028	2
c.	I am aware of construction regulations applicable to this project	232	1	7	5.98	1.259	3
d.	Penalties for non-compliance are specific to an issue	232	1	7	5.97	1.123	4
e.	Penalties for non-compliance are clear	232	1	7	5.95	1.179	5
f.	The laws applicable to this project are very clear to me	232	3	7	5.9	1.168	6
g.	The interpretation of applicable laws is consistent across regulatory agencies	232	1	7	5.78	1.159	7

The statement "existing laws support quality implementation of works in this project" received the highest agreement (M = 6.32, SD = 0.98), indicating strong consensus on the effectiveness of current laws in ensuring quality. This could be attributed to the fact that most respondents are aware of the necessity of building regulations in guiding construction activities and the delivery of quality outcomes. The adaptability of existing laws for various projects was also highly rated (M = 6.13, SD = 1.03). Awareness of applicable construction regulations (M = 5.98, SD = 1.26) and the specificity of penalties for non-compliance (M = 5.97, SD = 1.12) were similarly endorsed, reflecting a good understanding and acceptance of regulatory measures. The clarity of penalties (M = 5.95, SD = 1.18) and the laws themselves (M = 5.90, SD =

1.17) were also acknowledged positively, albeit slightly lower. This points to the need to ensure precision of regulatory mandate as argued by Coglianese & Kagan (2007), predictability and specificity of laws as argued by World Bank Group (2013), USAID n.d., Laubscher (2011) and Twum-Darko & Mazibuko (2015), and consistency and reliability of legal interpretation (Hoyle, 2001). The lowest rating was for the consistency of law interpretation across regulatory agencies (M = 5.78, SD = 1.16), suggesting some perceived variability in interpretation and enforcement. Albtoush et al. (2022), Amodu (2008), and Heijden (2019) emphasise the need for specificity of legal standards to ensure the elimination of ambiguity and ultimately lead to better compliance.

The effectiveness of regulatory frameworks is fundamentally tethered to the synergy between policy intent and public adherence. As Parker and Nielsen (2017) observe, while regulations are designed to fulfil specific socio-economic objectives, their success is dictated by the degree to which individual citizens and businesses comply with established mandates. In the context of Nairobi, this relationship is notably strained; despite decades of sustained investment in legislation and strategic policies aimed at fortifying the built environment, empirical data and World Bank (2019) reports reveal persistent systemic shortcomings. This disconnect highlights a significant "implementation gap" where, as Nyangweso (2007) critically asserts, Kenya’s building regulatory landscape remains promising in theory but often proves deceptive and ineffective in practice.

Addressing these failures requires a shift toward more inclusive and transparent governance. According to Heijden (2013) as well as Agapiou and Yakubu (2019), high levels of regulatory acceptability can only be achieved when regulatees are actively involved in the development process. This ensures that stipulations are not only clear and predictable but also highly specific to the localised issues they intend to resolve. Furthermore, contemporary regulatory philosophy, supported by Halpern (2019) and Heijden (2019), emphasises a transition from reactive behaviour correction to proactive behaviour formation. Such a harmonised legal framework aligns with the Public Interest Theory of Regulation (PITR), which posits that providing regulators with robust information and enforcement powers is essential to protecting social welfare and correcting the market malfunctions that lead to structural building failures (Christensen, 2010).

To bridge the gap between policy and safety in Nairobi, the regulatory process must evolve to prioritise accountability and verifiable outcomes. This necessitates the documentation of clear, standardised outputs that demonstrate unequivocal compliance with legal provisions. Ultimately, as proposed by Elbashir (2018), these efforts should culminate in the adoption of a comprehensive Quality Management Plan (QMP), transforming the regulatory process from a static set of rules into a dynamic, continuous system of oversight and safety assurance.

ii) Proactiveness of the Regulatory Agencies (PRA)

The success of a regulatory endeavour is reliant on the proactiveness of the regulatory agency. According to the findings of the study, indicators used to measure PRA in construction project sites reflected a positive outcome in terms of its contribution to regulatory compliance, with mean scores of surrogates ranging between 5.14 and 6.7 on a 7-point scale. The findings reflect a strong agreement among respondents regarding the proactiveness of regulatory agencies in influencing compliance on construction project sites, as shown in Table 4.31.

Table 4.31: Empirical Data on the Proactiveness of the Regulatory Agencies

Factor		N	Min	Max	Mean	SD	Rank
a.	Safety is a priority for regulators in this construction site	232	2	7	6.7	0.729	1
b.	Clear communication by regulators is ensured at all times	232	2	7	6.67	0.707	2
c.	Quality is a priority for regulators in this construction site	231	2	7	6.65	0.725	3
d.	This project is frequently inspected by the regulators	232	2	7	6.61	0.770	4
e.	Regulatory agencies are proactive	232	2	7	6.44	0.876	5
f.	Good coordination amongst regulators is ensured at every stage of the project	232	2	7	6.41	0.801	6
g.	In my view regulatory agencies apply building laws strictly	232	2	7	6.33	0.997	7
h.	I am aware of the different building regulatory agencies	232	2	7	6.02	1.069	8
i.	The regulators ensure a clear administrative procedure for all parties involved	232	2	7	5.93	1.171	9
j.	The regulators have put in place clear project monitoring and evaluation measures	232	1	7	5.91	1.155	10

Factor		N	Min	Max	Mean	SD	Rank
k.	The mandates of the different regulatory agencies are clear to me	232	2	7	5.89	1.117	11
l.	Regulatory agencies carry out sensitization programs frequently	232	2	7	5.71	1.312	12
m.	The regulators guided us procedurally leading to compliance	228	1	7	5.7	1.241	13
n.	The regulators gave us adequate opportunities to comply	232	1	7	5.66	1.303	14
o.	Regulatory agencies are always accessible for consultation	231	2	7	5.53	1.338	15
p.	There is a general acceptance of regulatory agencies role in project delivery	231	2	7	5.14	1.558	16

Frequent inspections by regulators (M = 6.61, SD = 0.77) and the proactiveness of regulatory agencies (M = 6.44, SD = 0.88) also scored well, demonstrating active regulatory engagement. Coordination among regulators (M = 6.41, SD = 0.80) and the strict application of building laws (M = 6.33, SD = 1.00) were also positively perceived. Awareness of regulatory agencies and their mandates was generally high, though lower scores were observed in areas like sensitisation programs (M = 5.71, SD = 1.31) and opportunities for compliance (M = 5.66, SD = 1.30).

The lowest level of agreement concerned the general acceptance of the regulator's role in project delivery (M = 5.14, SD = 1.56), indicating a significant need to improve stakeholder perceptions. This resistance may stem from the inherent friction of regulatory oversight, particularly regarding penalties and sanctions, as well as the broad legal powers vested in these agencies (Amodu, 2008; Heijden, 2019; Shirur & Torgal, 2014). Furthermore, external socio-political pressures likely influence the degree of public and professional acceptance (Lovegrove, 2019; Shirur & Torgal, 2014).

Under Public Interest Theory (PITR), the proactiveness of regulatory agencies is an essential obligation to safeguard social welfare and mitigate market failures, such as building collapses (Christensen, 2010). The high impact of this proactiveness—evidenced by frequent inspections (M = 6.61)—is further supported by Deterrence Theory (DT). This theory posits that the "certainty of discovery" during inspections is a more potent motivator for compliance than the mere severity of financial penalties (Sutinen & Kuperan, 1999). Finally, through the lens of Social Cognitive Theory

(SCT), proactive agencies facilitate "behaviour formation" by providing the modelling and communication necessary for stakeholders to adopt compliant practices, ultimately supporting a transition toward "assisted compliance" (LaMorte, 2022).

iii) Efficiency in Regulatory Processes (ERP)

The indicators used to measure ERP in construction project sites reflected a positive evaluation in terms of its contribution to regulatory compliance, with mean scores of surrogates ranging between 4.86 and 6.47 on a 7-point scale. The findings indicate that respondents generally perceive the efficiency of regulatory processes in the construction project site positively, although there are areas for improvement, as shown in Table 4.32.

Table 4.32: Empirical Data on the Efficiency in Regulatory Processes

Factor		N	Min	Max	Mean	SD	Rank
a.	The regulatory processes helped to avoid design errors	232	1	7	6.47	1.068	1
b.	Regulatory processes helped to resolve constructability challenges in this project	232	1	7	6.16	1.232	2
c.	The regulatory processes helped to identify constructability challenges	231	1	7	5.9	1.267	3
d.	The regulatory processes require good documentation	229	1	7	5.62	1.442	4
e.	The regulatory processes are simple	232	1	7	5.31	1.302	5
f.	The regulatory approvals are issued in a timely manner	230	1	7	5.3	1.387	6
g.	Information on regulatory processes is readily available	231	1	7	5.29	1.468	7
h.	The regulatory processes are integrated across agencies	232	1	7	5.28	1.391	8
i.	The regulatory processes are predictable	232	1	7	4.86	1.622	9

The highest-ranked statement, "the regulatory processes helped to avoid design errors," received a mean score of 6.47 (SD = 1.068), suggesting a strong consensus on the effectiveness of these processes in preventing design mistakes. This could be attributed to regulators' insistence on the engagement of qualified professionals in construction processes and continued pursuit to ensure their actual participation at the construction sites. Similarly, regulatory processes were seen as helpful in resolving (M = 6.16, SD = 1.23) and identifying (M = 5.90, SD = 1.29) constructability challenges, further indicating their beneficial role in project management. However, the need for good documentation (M = 5.61, SD = 1.46) and the availability of information (M = 5.31, SD = 1.48) scored lower, pointing to potential areas where the regulatory process could be streamlined or made more accessible. The simplicity (M = 5.23, SD = 1.33) and integration (M = 5.23, SD = 1.41) of processes across agencies, along with the timeliness of approvals (M = 5.19, SD = 1.49), were rated moderately, suggesting a need for improvement in these areas. Capture Theory (CT) suggests that the "lengthy approval processes" and "bureaucratic barriers" associated with ERP may be evidence of "rent-seeking" or "symbolic politics," where regulatory efficiency is compromised by the self-serving interests of the regulated or inefficient "revolving door" dynamics, and as such must be addressed (Zhang, 2009).

The lowest agreement score concerned the predictability of regulatory processes (M = 4.83, SD = 1.62), signalling perceived inconsistency in agency actions. Literature suggests that predictability is intrinsically linked to the availability of information (Laubscher, 2011; USAID, n.d.) and the simplicity of the process itself (World Bank Group, 2013). Furthermore, a successful regulatory mission depends on a transparent implementation strategy (Fiene, 2016, 2018), high levels of transparency (World Bank Group, 2013), and the flexibility to adapt to changing project environments (World Bank, 2019).

iv) Conduciveness of the Construction Task Environment (CTE)

The indicators used to measure CTE in construction project sites, with mean scores of surrogates ranging between 6.44 and 6.75 on a 7-point scale, indicate a highly favourable perception of the conduciveness of the construction task environment in influencing regulatory compliance on the project sites. As shown in Table 4.33, respondents strongly agree that realistic project objectives are normally set (M = 6.75, SD = 0.52) and that dangers identified in the project are effectively communicated (M = 6.72, SD = 0.57). These findings suggest a high degree of robust project planning and clear task stewardship (PMI, 2021; Waje & Patil, 2012). Furthermore, these scores reflect the adequacy of supervisory oversight and the strength of collaborative frameworks within the projects studied (Mashwama et al., 2017; Waje & Patil, 2012).

Table 4.33: Empirical Data on the Conduciveness of the Construction Task Environment

Factor		N	Min	Max	Mean	SD	Rank
a.	We set realistic project objectives	232	4	7	6.75	0.518	1
b.	Teamwork is always demonstrated by the project team	232	2	7	6.72	0.618	2
c.	Dangers identified in the project are communicated	232	4	7	6.72	0.567	3
d.	Force majeure	231	3	7	6.72	0.660	4
e.	Site safety briefings are conducted regularly	231	1	7	6.71	0.646	5
f.	We keep a copy of all site instructions	232	1	7	6.69	0.738	6
g.	There are clear communication channels for matters related to the project	232	2	7	6.69	0.658	7
h.	We make sure every new assignment is clear before executing	232	4	7	6.68	0.568	8
i.	Workers are encouraged to collaborate when implementing works	232	1	7	6.67	0.655	9
j.	There are clear decision-making procedures for tasks in the project	232	1	7	6.67	0.718	10
k.	Team leaders work side by side with the workers	232	1	7	6.65	0.687	11
l.	Design changes during project execution are communicated to regulators	232	2	7	6.64	0.755	12
m.	Workers are always given reasonable work targets	232	2	7	6.62	0.673	13
n.	Workers are assigned duties based on their skills and competence	231	2	7	6.61	0.636	14
o.	We normally invite regulatory agencies for staged inspections and approvals	232	1	7	6.59	0.838	15
p.	Workers are encouraged to contribute ideas on how to best carry out the works	231	2	7	6.57	0.736	16
q.	There are clear contractual obligations for each party involved in the project	232	1	7	6.56	0.776	17
r.	Defective work is always reworked	232	4	7	6.54	0.760	18
s.	The building technology we use does not affect quality of the works	232	1	7	6.53	0.821	19
t.	We use technologies like BIM and MS Project to ensure quality	232	1	7	6.44	0.970	20

The consideration of force majeure (M = 6.72, SD = 0.66) and consistent teamwork (M = 6.72, SD = 0.62) were also highly rated, highlighting robust team dynamics and risk management. Regular safety briefings (M = 6.71, SD = 0.65) and maintaining copies of all site instructions (M = 6.69, SD = 0.74) further reflect strong organisational practices as advocated by Amodu (2008), ILO (2022), and Shirur & Torgal (2014). Communication channels (M = 6.69, SD = 0.66) and clarity in assignments (M = 6.68, SD = 0.57) were similarly praised, underscoring effective information flow.

The use of modern technologies like BIM and MS Project to ensure quality, while still favourable, received the lowest agreement (M = 6.44, SD = 0.97), suggesting an area for potential improvement. This could be attributed to the fact that the local construction industry has yet to fully embrace the use of technology. While Lovegrove

(2019) advocates for the use of technology in construction, Kenya currently lacks a comprehensive policy where some of the progressive ideas can be anchored. According to Liu et al. (2016), the policy environment should advocate for the perfection of legislation, application of regulation, severity of non-compliance sanctions, and reduced interference levels.

v) Characteristics of the Project Client (CPC)

The indicators used to measure CPC illustrate that the project client is perceived very positively in terms of influencing regulatory compliance on a construction project, with mean scores of surrogates ranging between 6.15 and 6.69 on a 7-point scale, as shown in Table 4.34. These align with the findings of Amodu (2008), who notes that attributes of the project client affect compliance through their willpower to comply. Their knowledge, skills, communication abilities, and commitment are pivotal in executing compliant projects (AlBarami et al., 2020). This is further supported by the findings of Heijden (2009) and Shirur & Torgal (2014), who note the client's ability/capacity to comply legally and/or economically as critical in defining the compliance status of construction projects. Individual traits like education and ethics also become significant factors (Agapiou & Yakubu, 2019; Emuze & Mhlwa, 2015; Liu et al., 2016; Mahmood & Mohammed, 2008).

Table 4.34: Empirical Data on the Characteristics of the Project Client

Factor		N	Min	Max	Mean	SD	Rank
a.	The client is closely involved at every aspect of this project	232	4	7	6.69	0.572	1
b.	The client is aware of all construction-related regulatory requirements	232	4	7	6.63	0.589	2
c.	The client appreciates the consequences associated with non-compliance of projects	232	4	7	6.59	0.728	3
d.	The client has always been willing to comply with all regulatory requirements	232	4	7	6.44	0.724	4
e.	The client often shares opinion on the project with the project team	232	4	7	6.37	0.847	5
f.	The client always seeks advise from the project team	232	4	7	6.23	0.890	6
g.	Quality of planning of the work depends on the client	232	3	7	6.17	1.013	7
h.	The client does not influence construction process unduly	232	1	7	6.15	1.079	8

The most highly ranked statement, "the client is closely involved in every aspect of this project" (M = 6.69, SD = 0.57), indicates the need for strong client engagement. Indeed, Fu et al. (2023) specify the level of involvement of a client in a project as pivotal. This extends to their familiarity with the regulations and the need to comply (Gelder, 1997; Heijden, 2009; Lovegrove, 2019; Parker & Nielsen, 2017); and their perceptions of compliance (Parker & Nielsen, 2017). The client's awareness of all construction-related regulatory requirements (M = 6.63, SD = 0.59) and their appreciation of the consequences of non-compliance (M = 6.59, SD = 0.73) were also rated highly, suggesting a well-informed and conscientious client. Willingness to comply with regulatory requirements (M = 6.44, SD = 0.72) and frequent sharing of opinions with the project team (M = 6.37, SD = 0.85) further underscore the client's proactive and collaborative approach. The client’s tendency to seek advice from the project team (M = 6.23, SD = 0.89) and their significant role in the quality of project planning (M = 6.17, SD = 1.01) also received strong agreement.

Although the statement "the client does not influence the construction process unduly" received the lowest score (M = 6.15, SD = 1.08), it nonetheless underscores the significant perceived impact of clients as the originators and eventual owners of a construction. Capture Theory (CT) warns that, as "self-seeking" entities, clients may attempt to manipulate construction processes to prioritize profit over safety. This risk justifies the study’s recommendation, grounded in Public Interest Theory (PITR), to formally confer regulatory responsibility upon the client to safeguard social welfare. In this context, a "social license"—comprised of the fear of detection, fear of humiliation, and an internalized sense of duty—becomes a critical driver of compliance (Amodu, 2008; Gunningham, 2015; Liu et al., 2022). Consequently, the high ratings for CPC suggest it is a vital factor for regulators to integrate into building frameworks. The current practice, where project team leaders indemnify clients who may ultimately subjugate them, must be re-examined to ensure clients bear responsibility as the primary initiators and decision-makers.

Howarth and Greenwood (2018) identify the client as one of five key actors with primary Quality Assurance (QA) responsibilities, alongside the designer, manufacturer, contractor, and end-user. Because a construction project’s character is largely defined by the client's leadership, communication, and commitment, especially during the early stages, their competence is critical to success (AlBarami et al., 2020). Consequently, improving construction sector performance requires equipping clients with specialized knowledge through conferences, targeted training, or professional certifications (AlBarami et al., 2020; Fu et al., 2023). This model of client accountability is well-established internationally; for example, in the UK, where building owners are legally responsible for securing permits and notifying surveyors of any design modifications (World Bank Group, 2013).

vi) Competency of Project Leaders (CPL)

The indicators used to measure the CPL in construction project sites reflect a positive assessment in terms of its contribution to regulatory compliance, with the mean scores of surrogates ranging between 6.54 and 6.78 on a 7-point scale shown in Table 4.35.

Table 4.35: Empirical Statistics on the Competency of Project Leaders

Factor		N	Min	Max	Mean	SD	Rank
a.	The client has engaged a dedicated project manager for the project	232	3	7	6.78	0.560	1
b.	The consultants involved are committed to quality delivery of work	232	1	7	6.71	0.690	2
c.	Project team leaders always believe in collective responsibility over the works	232	3	7	6.69	0.603	3
d.	Project team leaders have ensured a clear implementation strategy	232	3	7	6.66	0.630	4
e.	All the selected project team leaders are professionally trained	232	1	7	6.65	0.699	5
f.	Project consultants always offer good supervision	232	3	7	6.57	0.729	6
g.	Changes in project consultants are handled procedurally	232	3	7	6.57	0.741	7
h.	Project consultants are always available for consultation	232	3	7	6.54	0.732	8

The highest-ranked statement indicates that the client engages dedicated project managers (M = 6.78, SD = 0.56), suggesting strong leadership commitment. This confirms that leaders policy beliefs (Agapiou & Yakubu, 2019; Amodu, 2008), leadership style (Elbashir, 2018; Mahmood & Mohammed, 2008), level of participation and/or involvement of the client, designers, construction management (Hoyle, 2001; PMI, 2021; Waje & Patil, 2012), and their level of planning (Waje & Patil, 2012) are critical for project compliance. Consultants' commitment to quality (M = 6.71, SD = 0.69) and the belief in collective responsibility among project team leaders (M = 6.69, SD = 0.60) also scored highly, underscoring a collaborative and quality-focused approach. The clarity in the implementation strategy ensured by team leaders (M = 6.66, SD = 0.63) and the professional training of selected team leaders (M = 6.65, SD = 0.70) further emphasise the competence and preparedness of the leadership team.

Procedural handling of changes in project consultants (M = 6.57, SD = 0.74) and the provision of good supervision by project consultants (M = 6.57, SD = 0.73) indicate effective project management practices. This falls under what Amodu (2008), Hoyle (2001), Mashwamaa et al. (2017), and PMI (2021) refer to as change management, which is critical in ensuring continued compliance of construction projects during execution. Lastly, while the availability of consultants for consultation received a high score (M = 6.54, SD = 0.73), it was the lowest-ranked item in its category. This suggests that even with strong performance, the accessibility and support provided by project leaders remain an area requiring targeted improvement. These findings reinforce the necessity of high professionalism (Amodu, 2008; PMI, 2021) and the consistent adequacy of supervision throughout the project lifecycle (Mashwama et al., 2017; Waje & Patil, 2012). These findings confirm professional stewardship as essential in safeguarding social welfare, as postulated by Public Interest Theory (PITR). Moreover, such stewardship serves as a critical defence against regulatory capture, preventing behaviours that often lead to the abdication of regulatory responsibilities.

vii) Goodness of Construction Labour (GCL)

The indicators used to measure GCL indicate a highly favourable perception of the construction labour force's contribution to regulatory compliance in a project, with mean scores of surrogates ranging between 5.38 and 6.14 on a 7-point scale, as shown in Table 4.36.

Table 4.36: Empirical Data on the Goodness of Construction Labour

Factor		N	Min	Max	Mean	SD	Rank
a.	Construction workers are given reasonable work targets	232	1	7	6.71	0.703	1
b.	Workloads are fairly distributed among construction workers	232	4	7	6.68	0.576	2
c.	Construction workers involved in this project are competent	231	1	7	6.67	0.800	3
d.	Cases of negligence among workers are subjected to disciplinary action	232	1	7	6.65	0.724	4
e.	Capacity of a worker is assessed before assigning of duties	232	2	7	6.64	0.688	5
f.	There is a clear plan of payment for all construction worker	232	2	7	6.64	0.682	6
g.	Workers are remunerated based on their expertise	232	4	7	6.63	0.589	7
h.	There is a mechanism to address welfare issues of workers	231	2	7	6.58	0.866	8
i.	There exist mechanisms for resolving disputes among workers	232	2	7	6.55	0.815	9
j.	This site does not experience high worker rate of replacement	232	1	7	6.47	0.967	10
k.	Continuous training of workers is ensured	230	1	7	6.41	1.019	11
l.	Workers have a high level of satisfaction	232	1	7	6.4	0.920	12
m.	Workers are often rewarded for excellent work	232	1	7	6.37	0.971	13
n.	There is a positive view of regulatory compliance among construction workers	231	1	7	5.38	1.847	14

The highest agreement was with the statement that construction workers are given reasonable work targets (M = 6.71, SD = 0.70), suggesting equitable work target management. PMI (2021) and Waje & Patil (2012) outline the critical need for clear tasking and/or stewardship in project implementation in a manner that parties to an action can be retraced. The fairness of workloads (M = 6.68, SD = 0.58) and the implementation of disciplinary actions for negligence (M = 6.65, SD = 0.72) were also highly rated, indicating strong performance management and accountability measures. This could be attributed to proactive measures put in place by regulators to train and accredit construction workers, eventually contributing to an improvement in worker competence or skill levels as outlined by Agapiou & Yakubu (2019), Ashworth (2010), ILO (2022), Mashwamaa et al. (2017), and Waje & Patil (2012).

Competence of workers (M = 6.67, SD = 0.80) and a clear payment plan (M = 6.64, SD = 0.68) further reflect well-structured labour practices. Remuneration based on expertise (M = 6.63, SD = 0.59) and assessment of worker capacity before the assignment of duties (M = 6.64, SD = 0.69) highlight the emphasis on skill-based allocation and fairness. Welfare mechanisms (M = 6.58, SD = 0.87) and dispute resolution processes (M = 6.55, SD = 0.82) also received strong support. Although slightly lower, the aspects of continuous training (M = 6.41, SD = 1.02) and worker satisfaction (M = 6.40, SD = 0.92) are positively perceived, indicating ongoing development and contentment among workers. Training and accreditation are also associated with several critical project improvement aspects, including dispute resolution (Albtoush et al., 2022; Lovegrove, 2019), work attitudes (Parker & Nielsen, 2017), and document handling (PMI, 2021). Furthermore, these qualifications enhance supervisory oversight, establish robust inspection protocols (Elbashir, 2018), and facilitate a shift toward a more permanent, skilled workforce (Emuze & Mhlwa, 2015).

Despite the strengths in the preceding section, the lowest agreement was found regarding workers' positive views of regulatory compliance (M = 5.38, SD = 1.85), suggesting a lack of perceived direct benefit from the process or from regulators. Nevertheless, the generally high mean scores across various surrogates indicate a competent and satisfied labour force. Through the lens of Social Cognitive Theory (SCT), these scores reflect strong "behavioural capability," where the possession of requisite skills serves as the foundation for compliant actions.

viii) Stability of Prevailing Economic Environment (SEE)

The indicators used to measure SEE in construction project sites reflect a generally positive perception of its influence on regulatory compliance at a construction project, with a mean score of surrogates ranging between 4.69 and 5.96 on a 7-point scale, as shown in Table 4.37.

Table 4.37: Empirical Statistics on the Stability of the Prevailing Economic Environment

Factor		N	Min	Max	Mean	SD	Rank
a.	The client has adequate financial capacity for the project	231	1	7	5.96	1.137	1
b.	Profit margins don't determine how work is done	231	1	7	5.88	1.461	2
c.	The main contractor has adequate cash-flow	231	1	7	5.84	1.144	3
d.	The costs associated with material testing are reasonable	232	1	7	5.63	1.290	4
e.	The cost of construction labour is reasonable	232	1	7	5.57	1.362	5
f.	The costs associated with regulatory compliance are realistic	232	1	7	5.52	1.147	6
g.	The permitting costs are predictable	232	1	7	5.16	1.528	7
h.	Taxes do not affect project delivery	232	1	7	4.69	1.658	8

The highest agreement was with the statement that the client has adequate financial capacity for the project (M = 5.96, SD = 1.14), indicating confidence in the client's financial stability. Similarly, the notion that profit margins don't determine how work is done (M = 5.88, SD = 1.46) and that the main contractor has adequate cash flow (M = 5.84, SD = 1.14) were also highly rated, reflecting a stable financial environment for the project. The reasonableness of costs associated with material testing (M = 5.63, SD = 1.29) and construction labour (M = 5.57, SD = 1.36) received moderate agreement, indicating satisfactory but improvable cost conditions.

While participants expressed greater confidence in other domains, the predictability of permitting costs (M = 5.16, SD = 1.53) and the impact of taxes on project delivery (M = 4.69, SD = 1.66) received notably lower ratings, signalling specific pockets of economic unpredictability and financial strain. The relatively high standard deviations across these factors suggest a significant lack of consensus among respondents, likely driven by the diverse and sensitive nature of the indicators involved—such as profit margins, client financial capacity, and cash flow. These elements are inherently vulnerable to fluctuating market conditions and varying operational scenarios, which contribute to a broad spectrum of responses and reflect the volatile financial environment in which these projects operate.

In light of these instabilities, the Public Interest Theory of Regulation (PITR) posits that government intervention is essential to correct market malfunctions, such as volatile material prices and financial instability, thereby safeguarding social welfare and preventing the negative externalities that arise when profit margins are prioritized over safety standards (Zhang, 2009). Complementing this view, Deterrence Theory (DT) suggests that financial and resource constraints heavily influence the "rational calculation" of industry actors; specifically, high compliance costs or diminished financial capacity may tempt firms or individuals to circumvent legal requirements (Sutinen & Kuperan, 1999).

In the end, a project's compliance status is shaped by a complex interplay of economic factors: the broad economic "license to comply" (Heijden, 2009), the liberty to seek cost-effective fulfillment of regulatory mandates (Coglianese & Kagan, 2007), and the tangible costs of compliance (Amodu, 2008; Parker & Nielsen, 2017), among others. When combined with the fundamental ability to honour payments (NCA, 2020), dynamic material pricing (Stevens, 1996), and general project pressures (Liu et al., 2022), it becomes clear that financial feasibility is a primary determinant of regulatory adherence. Consequently, to improve compliance levels, regulatory bodies must remain acutely aware of these economic drivers and proactively address the financial pressures that influence industry behaviour.

ix) Adherence to Ethical Factors (AEF)

The indicators used to measure AEF in construction project sites reflect a positive evaluation in terms of its contribution to regulatory compliance, with mean scores of surrogates ranging between 6.42 and 6.74 on a 7-point scale, as shown in Table 4.38. These also suggest a very high level of adherence to ethical standards on construction project sites, which positively influences regulatory compliance.

Table 4.38: Empirical Data on the Adherence to Ethical Factors

Factor		N	Min	Max	Mean	SD	Rank
a.	There has not been any political interference on this project	232	3	7	6.74	0.641	1
b.	I have never seen cases of falsifications of project documents	232	2	7	6.62	0.740	2
c.	The building plans being implemented are as approved	232	1	7	6.62	0.807	3
d.	Regulatory agencies do not approve technically deficient drawings	232	1	7	6.58	0.889	4
e.	Staff of regulatory agencies have never asked for bribes	230	1	7	6.57	0.847	5
f.	I have never encountered incidences of corruption in this construction site	232	2	7	6.55	0.82	6
g.	I have never encountered collusion between regulatory officers and project team	232	1	7	6.55	0.910	7
h.	The client complied to regulations because she or he believes the project is visible	232	3	7	6.55	0.725	8
i.	The expected profit margins do not affect adherence to regulatory processes	232	2	7	6.55	0.820	9
j.	The client has never disregarded consultants advise	232	2	7	6.47	0.816	10
k.	The regulatory permitting processes are carried out transparently	232	1	7	6.46	0.847	11
l.	Construction workers do not hide poor quality works	231	1	7	6.42	0.937	12

The strongest agreement was with the statement that there has been no political interference (M = 6.74, SD = 0.64), indicating a politically neutral environment. Indeed, the ethical disposition of players in the construction value chain has been noted to have a huge impact on project regulatory compliance, with some of its manifestations being a culture of interference and undercutting (CIDB, 2011). The absence of document falsification (M = 6.62, SD = 0.74) and adherence to approved building plans (M = 6.62, SD = 0.81) were also highly rated, emphasizing integrity and procedural compliance. This affirms the findings that falsifications (Figueroa-Fernandez, 2014; Oseghale et al., 2015), dishonesty and fraud (Figueroa-Fernandez, 2014), and compromise (Ahzahar et al., 2011; Asante & Sasu, 2018; Figueroa-Fernandez, 2014; NCA, 2020) can have a devastating effect on a project's compliance status.

The non-approval of technically deficient drawings by regulatory agencies (M = 6.58, SD = 0.89) and the insignificance of profit margins in affecting adherence to regulatory processes (M = 6.55, SD = 0.82) further reflect a commitment to quality and compliance over financial gain. Undeniably, the profiteering culture (CIDB, 2011; Waje & Patil, 2012) and bribe-taking and hidden use of substandard materials (Ahzahar et al., 2011; Figueroa-Fernandez, 2014; NCA, 2020) have been documented by researchers as some of the leading reasons for non-compliance.

The client's respect for consultants' advice (M = 6.47, SD = 0.82) and the transparency of regulatory permitting processes (M = 6.46, SD = 0.85), though ranked low, further reinforce the project's ethical environment. Lastly, the commitment of construction workers to expose poor quality work (M = 6.42, SD = 0.94) indicates a culture of accountability and quality assurance. However, given that compliance and related costs are actions required of clients, all project players should demand it as the bare minimum for project execution. Additionally, the presence of oversight agents (Coglianese & Kagan, 2007; Heijden, 2019), the determination and assertiveness of pro-regulation interests, and inclinations of key political figures (CIDB, 2011; Lovegrove, 2019) remain pivotal in monitoring the conduct of construction players.

Under Capture Theory (CT), the qualitative identification of corruption, bribery, and collusion as significant barriers warns that regulatory agencies can be compromised by private interests, leading to the failure of regulation (Boyle, 2021). Conversely, the finding that project environments remain largely free from political interference supports the Public Interest Theory of Regulation (PITR), which assumes the existence of a "merit bureaucracy" necessary to protect social welfare. Deterrence Theory (DT) suggests that the adherence to approved building plans and the rejection of profit-driven shortcuts are driven by "moral inhibitions" and an "internalized sense of duty," which act as effective deterrents even when formal sanctions are not present (Shleifer, 2005). Finally, Social Cognitive Theory (SCT) views the commitment of construction workers to expose poor-quality work as a "learned social force," where ethical conduct is acquired and maintained through modelling and reinforcement within the reciprocal site environment (Johnson & Johnson, 2015). This alignment of ethical factors across theories underscores that AEF is a vital component in reaching substantial regulatory adherence.

4.8.2 Barriers to Construction Regulatory Compliance

The data collection questionnaire, provided in Appendix VIII, was structured into four distinct sections. Section D was specifically designed to elicit qualitative data through open-ended questions, enabling respondents to offer deeper insights. Question 23 focused on identifying perceived barriers to regulatory compliance in building projects. The qualitative responses, detailed in Appendix X (Q 23), were subsequently subjected to thematic analysis using frequencies. This rigorous analysis facilitated the identification of several critical barriers to compliance within a construction project. A summary of the most frequently occurring words from these responses is presented in Table 4.39.

Table 4.39: Commonly used Words for Barriers to Compliance

Word	*Frequency*	*Word*	*Frequency*
construction	49	awareness	13
regulations	46	enforcement	12
corruption	44	especially	12
compliance	42	noncompliance	11
lack	32	process	11
can	30	among	10
regulatory	29	leading	10
may	22	limited	10
time	16	projects	10
workers	15	efforts	9

The pervasive recurrence of specific terminology within the dataset underscores critical impediments to regulatory compliance in the construction sector. Notably, "corruption" and "regulatory" appear with frequencies of 44 and 29 times, respectively, signifying that corruption and intricate regulatory frameworks pose considerable challenges. The terms "compliance" (42 instances) and "noncompliance" (11 instances) further highlight persistent difficulties in adhering to construction regulations. These findings are visually summarised in a word cloud, presented as Figure 4.25, which encapsulates the salient barriers to building regulatory compliance.

Figure 4.25: Word Cloud Summarising Key Words on Barriers to Regulatory Compliance

The frequent use of words such as "time," "process," "lack," and "limited" suggests that bureaucratic delays, operational inefficiencies, and resource limitations are prevalent obstacles within the approval processes. The presence of "awareness" and "enforcement" indicates that insufficient knowledge among the workforce and inadequate regulatory oversight contribute to non-compliance. The term "workers" highlights a critical vulnerability: frontline construction personnel may lack the essential information or specialised training necessary to navigate complex regulatory requirements effectively.

Overall, findings indicate that systemic issues, such as corruption, alongside operational challenges including inefficient processes and inadequate enforcement, are primary impediments to achieving compliance in a construction project. Consequently, four key aspects explaining the barriers to construction regulatory compliance have been identified to include regulatory and bureaucratic barriers (encompassing complexities and inefficiencies within the existing regulatory frameworks and administrative processes), corruption and mismanagement (highlighting the detrimental impact of illicit practices and poor administrative oversight on compliance), financial and resource constraints (referring to limitations in funding and essential resources that hinder adherence to regulations), and resistance to change (alluding to an unwillingness or inability to adapt to new or stricter compliance requirements).

a) Regulatory and Bureaucratic Barriers

The study reveals that regulatory and bureaucratic barriers present formidable challenges to effective compliance and enforcement. Central to these difficulties is the complexity and frequent change in regulations, which creates a "moving target" for businesses and necessitates constant operational adaptations. This instability is exacerbated by inconsistent enforcement across or within jurisdictions, fostering a climate of uncertainty and perceived unfairness. Consequently, the suitability of the legal framework—defined by regulatory precision (Coglianese & Kagan, 2007), specificity (Albtoush et al., 2022), and reliability (Hoyle, 2001) remains a critical determinant of a well-functioning regulatory system.

Furthermore, bureaucratic inefficiencies such as lengthy approval processes drain valuable time and resources, often delaying critical innovation and business activities (World Bank Group, 2013). The high cost of obtaining these approvals creates an additional layer of hardship, particularly for smaller firms that may struggle to afford necessary compliance measures, a challenge echoed by Amodu (2008), Heijden (2009), and Parker and Nielsen (2017). Collectively, these hurdles undermine the efficiency of compliance efforts, resulting in sporadic and unpredictable enforcement. Beyond these structural issues, other persistent obstacles include excessive paperwork, the temporary nature of the construction workforce, a perceived indifference toward quality standards, and the inherent complexities of subcontracting and ineffective communication (Chin-Keng & Hamzah, 2011).

b) Corruption and Mismanagement

The respondents consistently identified corruption within regulatory bodies and ineffective management practices as significant impediments to the regulatory process. These issues reportedly complicate compliance efforts due to the operational inefficiencies they create. Recurring themes in respondent feedback included direct references to "corruption," specifically citing "corruption by regulatory bodies/agencies officials," "corruption by regulatory personnel and officials," "corrupt agencies," and the combination of "corruption and bureaucracy that makes the process excessively complicated." Additional concerns raised included the "total cost and corruption" and the presence of "unqualified and corrupt agency agents."

These discoveries support the findings of CIDB (2011), which noted that ethical manifestations such as undercutting, corruption, political interference, institutional barriers, procurement-related hurdles, weak capacities, and weak monitoring systems have a huge impact on the regulatory compliance of construction projects. Other similar manifestations of ethical issues reported by other authors include falsifications by Oseghale et al. (2015), dishonesty and fraud (Figueroa-Fernandez, 2014), and bribe-taking and hidden use of substandard materials by Ahzahar et al. (2011) and NCA (2020). Similarly, operational and managerial issues flagged by previous studies include the clarity of the regulators' implementation strategy (Fiene, 2016; Fiene, 2018) and display of transparency, flexibility, and/or adaptability (World Bank, 2019). This implies that it is critical to seal corruption loopholes and address management issues to ensure the success of regulatory interventions.

c) Financial and Resource Constraints

Financial and resource limitations related to the adversity of economic factors emerged as a significant barrier, substantially hindering firms' capacity for effective regulatory compliance. Respondents specifically highlighted "financial constraints and limited resources" as a going concern to regulatory compliance, supporting findings of Amodu (2008), Heijden (2009), and Parker and Nielsen (2017). The "high costs of approvals within various regulatory bodies" exacerbated an already challenging situation, especially for smaller firms operating with constrained budgets. These financial limitations can result in either partial or complete non-compliance, as firms may lack the requisite capital to navigate the intricate and often expensive regulatory environment. Furthermore, the scarcity of resources not only constrains the financial capacity to meet regulatory demands but also impacts the availability of necessary personnel and specialized expertise required for managing compliance processes. This dual pressure on both financial and human resources impedes firms from fully adhering to regulatory standards, thereby potentially exposing them to significant legal and operational risks (Liu et al., 2022).

d) Resistance to Change

Resistance to change within the industry was a pervasive theme, often driven by the inertia of established practices and the perceived burdens of new regulations. As the text notes, "lack of clarity in the regulations" can exacerbate this resistance, as the industry may find it difficult to understand and implement new, unsubstantiated requirements as outlined by Coglianese and Kagan (2007). Additionally, "poor communication between stakeholders," a finding also shared by Howarth and Greenwood (2018), was noted to further entrench resistance, given that the intended benefits of regulatory changes would not be effectively conveyed. This resistance is compounded by the fact that "approvals take long to process" and that the "cost of approval is high," making the adoption of new regulations seem daunting and costly. The interplay of these factors creates a significant barrier to change, where the effort to adapt is seen as outweighing the potential advantages.

Resistance to change within the construction industry remains a pervasive barrier to regulatory compliance, driven largely by the inertia of established practices and the perceived burdens of adapting to new mandates. This resistance is frequently exacerbated by a lack of regulatory clarity, which leaves stakeholders struggling to implement requirements they perceive as unsubstantiated. Furthermore, poor communication between stakeholders often entrenches this opposition, as the strategic benefits of new regulations are rarely conveyed effectively to those expected to follow them. Beyond mere logistical hurdles, the specific culture, philosophy, or operational environment of a project can act as a significant generator of resistance (Mahmood & Mohammed, 2008). In a broader conceptual sense, McKenzie (1973) highlights that fundamental differences in how different cultures perceive the nature of "becoming"—and the relationship between past, present, and future—must be reconciled to achieve genuine local buy-in.

Drawing on Social Cognitive Theory (SCT), compliance is understood as a "learned social force." Consequently, if there is a failure to transform the underlying site culture or philosophy, actors will instinctively default to established, non-compliant behaviours rather than adopting new ones. To overcome this, the literature suggests that successful regulatory changes must move beyond simple "behaviour correction" and instead focus on "behaviour formation," fostering a deeper, internalised commitment to new standards (Halpern, 2019).

4.9 Objective Three: Examining the Relationship between Regulatory Compliance and Its Determinants

4.9.1 Hypothesis Testing

The research hypothesis that regulatory compliance (denoted as $\boldsymbol{y}$) is influenced by nine explanatory variables (denoted $\boldsymbol{\chi_1}$ to $\boldsymbol{\chi_9}$) being the suitability of the project legal framework *($\boldsymbol{\chi_1}$)*, proactiveness of the regulatory agencies *($\boldsymbol{\chi_2}$)*, efficiency in regulatory processes *($\boldsymbol{\chi_3}$)*, conduciveness of the construction task environment ($\boldsymbol{\chi_4}$), characteristics of the project client *($\boldsymbol{\chi_5}$)*, competency of project Leaders *($\boldsymbol{\chi_6}$)*, the goodness of construction labour *($\boldsymbol{\chi_7}$)*, stability of prevailing economic environment *($\boldsymbol{\chi_8}$)*, and adherence to ethical factors ($\boldsymbol{\chi_9}$) was tested using multiple regression analysis and the hypothesized relationships were found to be statistically significant at 5% level of significance. The respondents generally positively perceived all the explanatory factors: SLF, ERP, CTE, PRA, CPC, CPL, GCL, SEE, and AEF as affecting regulatory compliance. Consequently, the **Null Hypothesis ($\mathbf{H_0}$)** that explanatory variables do not affect the level of regulatory compliance (β_i *= 0)* was rejected.

4.9.2 Correlation Analysis

Table 4.40 shows the Pearson correlation coefficients on the relationship between the three outcome variables (Y1, Y2, and Y3) and the nine explanatory variables. Y1 consisted of 20 factors categorised into project registration status (RS), project site conditions (SC), and project workforce status (WS), each rated on a scale from one (1) to seven (7) before combination into a single variable (Y1) through data computation in SPSS. Y2 was composed of 15 factors, which were also grouped into project registration status (RS), project site conditions (SC), and project workforce status (WS). This was initially measured on a binary scale but subsequently transformed into a single continuous variable. Y3, on the other hand, measured the level of compliance of construction projects with Kenya's construction industry regulations, using a scale from one (1) to ten (10).

The analysis of variable associations with Y1(Variable 10), shown in Table 4.40, reveals a generally strong positive correlation with several variables. Notably, CPL, CTE, GCL, and PRA show significant positive correlations with Y1, indicating that these variables are strongly related to Y1. The correlations are robust, with CPL and GCL both exhibiting high positive correlations ($r = 0.663$), and CTE also showing a strong link ($r = 0.637$). Other variables, such as ERP and SEE, also demonstrate moderate positive associations with Y, further highlighting the strong relationships among these variables.

Regarding Y2 (Variable 11), as shown in Table 4.40, the analysis indicates moderate to strong positive correlations with several key variables. CPL, CTE, ERP, GCL, and PRA showed significant positive relationships with Y2, reflecting their notable associations. Specifically, CPL and CTE exhibit strong correlations ($r = 0.661$ and $r = 0.632$, respectively), while PRA and GCL also show considerable positive links. The moderate positive correlations with variables like SEE further suggest that Y2 is closely related to these key variables, though the association with CPC is notably weak.

For Y3 (Variable 12), as shown in Table 4.40, the analysis highlights strong positive correlations with several variables, indicating significant relationships. CPL, CTE, ERP, GCL, and PRA show robust positive correlations with Y3, with correlations as high as $r = 0.652$ for CPL and $r = 0.672$ for CTE. These strong associations suggest that Y3 is closely linked with these variables. Although the correlation with SEE and SLF is moderate to weak, the overall strong correlations with CPL, CTE, ERP, GCL, and PRA emphasise Y3's significant positive relationships within the dataset.

Table 4.40: Linearity Tests Using Pearson Correlation

Pearson's Correlations

Variable		**SLF**	**PRA**	**ERP**	**CTE**	**CPC**	**CPL**	**GCL**	**SEE**	**AEF**	**Y2**	**Y3**	**Y1**
1. SLF	Pearson's r	—											
	p-value	—											
2. PRA	Pearson's r	0.773 ***	—										
	p-value	< .001	—										
3. ERP	Pearson's r	0.557 ***	0.676 ***	—									
	p-value	< .001	< .001	—									
4. CTE	Pearson's r	0.228 ***	0.473 ***	0.425 ***	—								
	p-value	< .001	< .001	< .001	—								
5. CPC	Pearson's r	0.287 ***	0.323 ***	0.283 ***	0.220 ***	—							
	p-value	< .001	< .001	< .001	< .001	—							
6. CPL	Pearson's r	0.163 *	0.391 ***	0.390 ***	0.499 ***	0.307 ***	—						
	p-value	0.013	< .001	< .001	< .001	< .001	—						
7. GCL	Pearson's r	0.188 **	0.389 ***	0.531 ***	0.565 ***	0.212 **	0.587 ***	—					
	p-value	0.004	< .001	< .001	< .001	0.001	< .001	—					
8. SEE	Pearson's r	0.273 ***	0.331 ***	0.529 ***	0.246 ***	0.244 ***	0.316 ***	0.522 ***	—				
	p-value	< .001	< .001	< .001	< .001	< .001	< .001	< .001	—				
9. AEF	Pearson's r	0.092	0.173 **	0.363 ***	0.265 ***	0.077	0.286 ***	0.413 ***	0.336 ***	—			
	p-value	0.163	0.008	< .001	< .001	0.241	< .001	< .001	< .001	—			
10. Y2	Pearson's r	0.200 **	0.500 ***	0.463 ***	0.632 ***	0.150 *	0.661 ***	0.664 ***	0.299 ***	0.385 ***	—		
	p-value	0.002	< .001	< .001	< .001	0.022	< .001	< .001	< .001	< .001	—		
11. Y3	Pearson's r	0.206 **	0.522 ***	0.450 ***	0.672 ***	0.124	0.652 ***	0.642 ***	0.287 ***	0.341 ***	0.972 ***	—	
	p-value	0.002	< .001	< .001	< .001	0.060	< .001	< .001	< .001	< .001	< .001	—	
12. Y1	Pearson's r	0.193 **	0.496 ***	0.458 ***	0.637 ***	0.153 *	0.663 ***	0.663 ***	0.295 ***	0.376 ***	0.999 ***	0.971 ***	—
	p-value	0.003	< .001	< .001	< .001	0.019	< .001	< .001	< .001	< .001	< .001	< .001	—

* p < .05, ** p < .01, *** p < .001

It is important to note that all coefficients were required to fall within $-1 \leq r \leq +1$ threshold, where a result of 0 would mean that there was no relation between the data whatsoever. A common rule of thumb for interpreting correlation coefficients is that a value between 0 and 0.3 indicates a weak correlation, 0.3 to 0.5 is considered moderate, and above 0.5 is considered a strong correlation, with negative values representing a negative correlation of the same strength (Krehbiel, 2004).

4.9.3 Multiple Regression Analysis

a) Enter Regression Analysis Method

Enter Method is the multiple regression technique where all explanatory variables are entered into the model simultaneously in a single step. The enter method indicated that ERP, SEE, and AEF were not statistically significant, with p-values of 0.914, 0.137, and 0.160, respectively, as shown in Table 4.41. Since these p-values exceeded the 0.05 significance level, they were not reliable predictors and, therefore, could not be included in the final regression model. To assess and ensure a progressive improvement in model performance, a stepwise regression analysis was employed, allowing for the systematic inclusion or exclusion of variables based on their statistical significance.

Table 4.41: Coefficients Table for Enter Regression Analysis Method

Model		Unstandardized	Standard Error	Standardized	t	p
H_0	(Intercept)	6.594	0.058		113.275	< .001
H_1	(Intercept)	-3.105	0.642		-4.834	< .001
	SLF	-0.177	0.061	-0.191	-2.916	0.004
	PRA	0.458	0.099	0.354	4.637	< .001
	ERP	-0.005	0.048	-0.007	-0.108	0.914
	CTE	0.344	0.082	0.216	4.172	< .001
	CPC	-0.156	0.069	-0.096	-2.265	0.024
	CPL	0.517	0.086	0.311	6.023	< .001
	GCL	0.417	0.091	0.275	4.588	< .001
	SEE	-0.067	0.045	-0.074	-1.492	0.137
	AEF	0.143	0.059	0.107	2.426	0.160

b) Stepwise Regression Analysis Method

A stepwise regression analysis examined the impact of the suitability of the project legal framework (SLF), proactiveness of the regulatory agencies (PRA), efficiency in regulatory processes (ERP), conduciveness of the construction task environment (CTE), characteristics of the project client (CPC), competency of project leaders (CPL), goodness of construction labour (GCL), stability of prevailing economic environment (SEE) and adherence to ethical factors (AEF) on level of compliance. The explanatory variables were added one at a time at each step to improve the overall performance of the model.

The level of compliance had three measures (Y1, Y2, and Y3). Y1 consisted of 20 factors categorised into three groups: Project Registration Status (RS), Project Site Conditions (SC), and Project Workforce Status (WS). Each factor was rated on a scale from one (1) to seven (7). These factors were then combined into a single variable (Y1) through data computation in SPSS, resulting in a weighted mean for each observation. Y2 was composed of 15 factors, also grouped into Project Registration Status (RS), Project Site Conditions (SC), and Project Workforce Status (WS). These factors were initially measured on a binary scale but were subsequently transformed into a single continuous variable. Y3 measured the level of compliance of the construction project with Kenya's construction industry regulations, using a scale from one (1) to ten (10).

The regression analysis selected the first Y1 as the outcome variable due to its strong relationship with the explanatory variables. The choice was validated by its superior R-squared value ($R^2 = 0.683$) compared to Y2 ($R^2 = 0.666$) and Y3 ($R^2 = 0.391$). The model with a greater R-squared was selected. The R-squared usually measures the amount of variation in the outcome variable that is explained by the explanatory variable in a regression model. A greater R-squared, therefore, suggests that a greater portion of the variance is explained by the model, hence making it a good fit for the observed data (Gao, 2024). For this reason, the model with a greater R-squared was selected as it demonstrated a greater explanatory power.

The model summary from the stepwise regression analysis indicates a progressive improvement in model performance as additional predictors are included. Initially, Model 1, which lacks predictors, demonstrates no predictive power ($R^2 = 0.000$). With the inclusion of variables in subsequent models, the R^2 value rises, indicating that a greater proportion of the variability in the outcome variable (Y1) is explained by the predictors. By Model 7, the R^2 value reaches 0.678, and the Adjusted R^2 improves to 0.669, reflecting a strong fit of the model to the data. Additionally, the Root Mean Square Error (RMSE) decreases from 0.232 in Model 1 to 0.134 in Model 7, suggesting a reduction in the average error of the model's predictions. The stepwise regression analysis was concluded after reaching Model 7 because the Adjusted R^2 had its highest peak, and some additional predictors were not showing a lot of improvement.

The adjusted R^2 takes into consideration the number of predictors and only gets higher if the new predictor also allows for a better explanation of the model (Sharma & Yu, 2015). By Model 7, the adjusted R^2 increased to 0.669, which is a reasonable value as it indicates a relatively good fit with little error present (RMSE = 0.134). Applying any more predictors after Model 7 was unnecessary as they would add little or no value and, worse still, cause a reduction of the adjusted R^2, rendering it useless due to overfitting. For these reasons, Model 7 is well designed as it achieves the highest level of adjusted R^2, providing a well-fitted model composed of CTE, CPL, GCL, PRA, CPC, and SLF. This progression demonstrates that each added variable contributes to a more accurate and reliable model, enhancing the predictive power over successive iterations as shown in Table 4.42.

Table 4.42: Model Summary Table for Stepwise Regression Analysis Method

Model Summary – Level of Compliance					
Model	**R**	**Explanatory Variables**	**R^2**	**Adjusted R^2**	**RMSE**
1	0.000	Intercept	0.000	0.000	0.232
2	0.672	CTE	0.452	0.449	0.172
3	0.765	CTE, CPL	0.585	0.582	0.150
4	0.786	CTE, CPL, GCL	0.617	0.612	0.145
5	0.799	CTE, CPL, GCL, PRA	0.639	0.632	0.141
6	0.813	CTE, CPL, GCL, PRA, CPC	0.661	0.654	0.137
7	0.823	CTE, CPL, GCL, PRA, CPC, SLF	0.678	0.669	0.134

The ANOVA Table 4.43 results reveal that the regression models significantly improve as more predictors are added. In Model 7, the F-statistic of 71.072 with a p-value less than 0.001 indicates that the model significantly explains variance in the level of compliance, F (6, 225) =71.072, p<0.001.

Table 4.43: ANOVA Table for Stepwise Regression Analysis Method

Model		Sum of Squares	df	Mean Square	F	p
	Regression	118.874	6	19.812	71.072	< .001
	Residual	62.722	225	0.279		
	Total	181.597	231			

Note. The intercept model is omitted, as no meaningful information can be shown.

The coefficients in Table 4.44 from the stepwise regression models provide critical insights into the individual contributions of each predictor. While the intercept in this model is statistically significant, it is considered both statistically valid and contextually relevant within the Kenyan construction regulatory landscape. A significant intercept implies a baseline level of regulatory compliance that persists even when the specific indicators measured in the study are at a zero level. From a statistical perspective, the intercept captures these unobserved institutional effects, which are essential for maintaining unbiased estimates within regression modelling (Azubuike & Tobechukwu, 2020). Consequently, a significant intercept was not only expected but also serves as a clear indicator of the deeply embedded regulatory mechanisms that naturally influence construction practices in Kenya.

In Model 2, only the variable CTE is significant, with a coefficient of 0.280 and a standardised coefficient of 0.672, indicating a substantial positive effect on compliance level. As more variables are added in subsequent models, the significance of predictors like CTE, CPL, GCL, PRA, and CPC becomes evident. For example, by Model 6, PRA and CPC also exhibit significant effects with standardised coefficients of 0.209 and 0.163, respectively. By Model 7, which includes the highest number of predictors, the coefficients for all variables—CTE, CPL, GCL, PRA, CPC, and SLF—remain statistically significant. This model shows that PRA had the highest impact on compliance level with a coefficient value of 0.392, followed by CPL (β=0.305), CTE (β=0.294), GCL (β=0.215), SLF (β=0.213), and CPC (β=0.146) in that order. ERP, SEE, and AEF were not included in the final regression model since their p-values were greater than 0.05.

Table 4.44: Coefficients Table for Stepwise Regression Analysis Method

Model		Unstandardized	Standard Error	Standardized	t	p
1	(Intercept)	1.870	0.015		122.675	< .001
2	(Intercept)	0.014	0.135		0.104	0.917
	CTE	0.280	0.020	0.672	13.770	< .001
3	(Intercept)	-0.626	0.139		-4.488	< .001
	CTE	0.192	0.020	0.462	9.408	< .001
	CPL	0.184	0.021	0.421	8.584	< .001
4	(Intercept)	-0.721	0.136		-5.300	< .001
	CTE	0.156	0.021	0.375	7.317	< .001
	CPL	0.141	0.023	0.324	6.196	< .001
	GCL	0.095	0.022	0.240	4.367	< .001
5	(Intercept)	-0.790	0.134		-5.902	< .001
	CTE	0.133	0.022	0.319	6.104	< .001
	CPL	0.129	0.022	0.296	5.753	< .001
	GCL	0.088	0.021	0.222	4.132	< .001
	PRA	0.057	0.016	0.170	3.652	< .001
6	(Intercept)	-0.528	0.146		-3.609	< .001
	CTE	0.133	0.021	0.320	6.305	< .001
	CPL	0.144	0.022	0.332	6.529	< .001
	GCL	0.087	0.021	0.220	4.224	< .001
	PRA	0.071	0.016	0.209	4.522	< .001
	CPC	0.069	0.018	0.163	-3.890	< .001
7	(Intercept)	-0.482	0.144		-3.357	< .001
	CTE	0.122	0.021	0.294	5.858	< .001
	CPL	0.133	0.022	0.305	6.069	< .001
	GCL	0.085	0.020	0.215	4.227	< .001
	PRA	0.133	0.024	0.392	5.559	< .001
	CPC	0.062	0.017	0.146	-3.553	< .001
	SLF	0.052	0.015	0.213	-3.383	< .001

Note. The following covariates were considered but not included: ERP, SEE, AEF

The regression model generated is as follows:

$$\begin{aligned} &Regulatory\ Compliance\ Level\ (RCL) \\ &\quad = -0.482 + 0.122(CTE) + 0.133(CPL) + 0.085(GCL) \\ &\quad + 0.133(PRA) + 0.062(CPC) + 0.052(SLF) \end{aligned}$$

c) Backward Regression Analysis

To confirm that the selected stepwise regression method was the most robust approach for this study, a backward regression analysis was also performed. This process ensured that the final model was rigorously validated by systematically removing less significant variables to verify the consistency and accuracy of the predictors. The backward regression analysis began with a full model (M_0) that included all nine explanatory variables, achieving an R-value of 0.800, an R^2 of 0.641, and an Adjusted R^2 of 0.627. These values indicate that approximately 62.7% of the variance in the outcome variable—regulatory compliance—was explained by the initial set of predictors. In the next step (Model M_1), the variable Efficiency in Regulatory Processes (ERP) was excluded due to its lack of statistical significance, resulting in a minimal change to the model's performance ($R^2 = 0.639$; Adjusted $R^2 = 0.627$). Further refinement in Model M_2 involved the exclusion of Stability of the Economic Environment (SEE), which slightly improved the model's Adjusted R^2 to 0.628 and reduced the Root Mean Square Error (RMSE) to 0.557. This progression suggests that removing non-significant predictors enhanced the model's parsimony without compromising its explanatory power.

The ANOVA results across the three models consistently demonstrated that each regression model was statistically significant ($p < .001$). In Model M_0, the F-statistic was 47.529, showing that the predictors collectively had a significant effect on the dependent variable. As the backward regression progressed, the F-statistics improved, rising to 53.401 in Model M_1 and further to 61.080 in Model M_2. These increasing F-values indicate that the regression models became more efficient and effective in explaining variability in compliance as non-significant variables were removed. The improvement in the mean square values and reduction in error variance across models also suggest enhanced precision in the estimation process, validating the backward elimination method.

The coefficient tables also provided insights into the individual contributions of each predictor across the models. In Model M_0, significant predictors included Suitability of Legal Framework (SLF) ($\beta = -0.230$, $p < .001$), Proactiveness of Regulatory Agencies (PRA) ($\beta = 0.393$, $p < .001$), Conduciveness of Task Environment (CTE) ($\beta = 0.252$, $p < .001$), Characteristics of the Project Client (CPC) ($\beta = -0.107$, $p = 0.013$), Competency of Project Leaders (CPL) ($\beta = 0.292$, $p < .001$), and Goodness of Construction Labour (GCL) ($\beta = 0.190$, $p = 0.002$). ERP, SEE, and AEF were statistically insignificant, with p-values above 0.05, justifying their removal in subsequent models. In the final model (M_2), all remaining predictors—SLF, PRA, CTE, CPC, CPL, and GCL—were statistically significant, with PRA having the strongest impact ($\beta = 0.415$, $p < .001$), followed by CPL and CTE. This final model represents a statistically robust and interpretable framework, identifying the core factors influencing compliance levels in Kenya's construction sector, as shown in Tables 4.45, 4.46, and 4.47.

Table 4.45: Model Summary - Y for Backward Regression Analysis

Model	R	R2	Adjusted R2	RMSE
M_0	0.800	0.641	0.627	0.558
M_1	0.800	0.639	0.627	0.558
M_2	0.799	0.639	0.628	0.557

Table 4.46: ANOVA Table for Backward Regression

Model		Sum of Squares	df	Mean Square	F	p
M_0	Regression	133.109	9	14.790	47.529	< .001
	Residual	74.682	240	0.311		
	Total	207.790	249			
M_1	Regression	132.847	8	16.606	53.401	< .001
	Residual	74.943	241	0.311		
	Total	207.790	249			
M_2	Regression	132.689	7	18.956	61.080	< .001
	Residual	75.102	242	0.310		
	Total	207.790	249			

Table 4.47: Coefficients Table for Backward Regression

Model		Unstandardized	Standard Error	Standardized	t	p
M_0	(Intercept)	-2.354	0.621		-3.789	< .001
	SLF	-0.219	0.057	-0.230	-3.852	< .001
	PRA	0.522	0.095	0.393	5.491	< .001
	ERP	0.044	0.048	0.055	0.917	0.360
	CTE	0.406	0.080	0.252	5.081	< .001
	CPC	-0.179	0.072	-0.107	-2.496	0.013
	CPL	0.476	0.089	0.292	5.372	< .001
	GCL	0.259	0.084	0.190	3.089	0.002
	SEE	-0.043	0.045	-0.049	-0.958	0.339
	AEF	0.103	0.060	0.079	1.710	0.088
M_1	(Intercept)	-2.526	0.592		-4.268	< .001
	SLF	0.216	0.057	0.226	3.799	< .001
	PRA	0.556	0.087	0.418	6.371	< .001
	CTE	0.414	0.080	0.257	5.200	< .001
	CPC	0.178	0.072	0.106	2.476	0.014
	CPL	0.470	0.088	0.289	5.322	< .001
	GCL	0.268	0.083	0.196	3.215	0.001
	SEE	0.031	0.043	0.035	0.714	0.476
	AEF	0.109	0.059	0.084	1.838	0.067
M_2	(Intercept)	-2.459	0.584		-4.212	< .001
	SLF	0.218	0.057	0.229	3.859	< .001
	PRA	0.552	0.087	0.415	6.343	< .001
	CTE	0.419	0.079	0.260	5.298	< .001
	CPC	0.185	0.071	0.110	2.594	0.010
	CPL	0.470	0.088	0.289	5.325	< .001
	GCL	0.246	0.078	0.180	3.174	0.002

d) Comparison of Enter, Stepwise, and Backward Regression Methods

This study explored three multiple regression techniques—Enter, Stepwise, and Backward methods—to evaluate the impact of various predictors on the level of regulatory compliance in construction projects.

The Enter method involves entering all explanatory variables into the regression model simultaneously, regardless of their statistical significance. This method assumes that all predictors are theoretically important and thus deserve inclusion. However, the results from the Enter method revealed that several variables, including Efficiency in Regulatory Processes (ERP), Stability of the Economic Environment (SEE), and Adherence to Ethical Factors (AEF), were not statistically significant ($p > 0.05$). Their presence in the model inflated the error and reduced clarity in identifying the most influential factors. Therefore, while comprehensive, the Enter method lacked refinement in model parsimony and could not effectively distinguish between impactful and non-impactful predictors.

The Backward regression method starts with all variables in the model and removes the least significant ones step-by-step. In this study, the backward elimination process led to the exclusion of ERP and SEE across iterations. Although the model's Adjusted R^2 slightly improved (from 0.627 in M_0 to 0.628 in M_2), the changes were marginal, and one non-significant variable (AEF) remained in the final model. While the Backward method improved efficiency compared to the Enter method, it did not guarantee the most optimal set of predictors, as it did not consider the possibility of variables becoming significant when others are included or excluded.

The Stepwise method, in contrast, combines the strengths of both forward selection and backward elimination. Predictors are added one at a time based on their statistical significance, with each addition evaluated for its contribution to improving model fit. Variables can also be removed if they become redundant in the presence of new predictors. In this analysis, the Stepwise method demonstrated a progressive and substantial improvement in model performance. By Model 7, the Stepwise model achieved an R^2 of 0.678 and an Adjusted R^2 of 0.669, outperforming both the Enter and Backward models. It also achieved the lowest RMSE (0.134), indicating the smallest prediction error. Moreover, all included variables in the final stepwise model—CTE, CPL, GCL, PRA, CPC, and SLF—were statistically significant ($p < .001$), confirming their importance in predicting regulatory compliance.

4.10 Summary of Empirical Findings (Objectives 1–3)

The empirical findings of this study establish a consolidated evidence base for the framework developed in subsequent chapters by detailing the current levels, factors, and relationships defining regulatory compliance in Nairobi's construction sector. Regarding the first objective, the research identified a significant "compliance gap" between the project registration and execution phases. Specifically, only 26.22% of construction projects documented in the OPRS were validly registered with the National Construction Authority, representing a critically low baseline for formal sector entry. Among registered projects, compliance at implementation averages only 64.75%, indicating that over one-third of initially "compliant" sites are subsequently suspended for violations. This trend underscores a failure to maintain standards once physical work begins, leading to a significant fall below the industry's 90% vision. These compliance levels also exhibited a distinct spatial disparity, as projects in high-density areas East of Nairobi's Central Business District consistently performed poorer than those in the West. Furthermore, while physical site security measures like hoarding and fencing showed high adherence, the engagement of accredited construction workers and the provision of adequate safety signs remained significant weaknesses in the registered project lifecycle.

Investigation into the second objective revealed a multifaceted array of nine theoretical factors that practitioners perceive as significant influencers of compliance outcomes. These factors include the suitability of the legal framework, regulatory agency proactiveness, process efficiency, task environment conduciveness, client characteristics, leader competency, labour goodness, economic stability, and ethical adherence. Beyond these structured factors, qualitative feedback identified deep-seated barriers such as corruption, mismanagement, bureaucratic hurdles, and financial constraints that frequently impede progress toward national strategic goals.

To address the third objective, multiple regression analysis was employed to isolate the most potent drivers of compliance, demonstrating that six significant predictors—Proactiveness of Regulatory Agencies (PRA), Competency of Project Leaders (CPL), Conduciveness of the Task Environment (CTE), Goodness of Construction Labour

(GCL), Suitability of the Legal Framework (SLF), and Characteristics of the Project Client (CPC)—collectively account for 67.8% of variability in regulatory compliance (R^2=0.678). Among these, the PRA emerged as the most influential determinant of site adherence. These results, which led to the rejection of the null hypothesis at a 0.05 level of significance, suggest that the current deterrence-based regulatory model is insufficient for moving the sector toward higher standards. Consequently, these empirical conclusions necessitate the transition to the holistic, service-oriented framework proposed in Chapter Five, which seeks to leverage these six critical predictors to foster a sustainable "culture of compliance" and eliminate building failures in Kenya.

4.11 Empirical Basis for Regulatory Enhancement

As previously outlined, the data collection questionnaire (Appendix VIII) comprised four sections. Specifically, Q 24 under Section D was designed to elicit respondent-proposed strategies for improving regulatory compliance in construction projects. The qualitative responses to this, detailed in Appendix X (Q 24), underwent thematic analysis based on word frequencies. This identified several key factors that could enhance compliance within construction projects. Table 4.48 presents some of the most frequently used terms derived from this analysis.

Table 4.48: Commonly Used Words for Strategies for Enhancing Compliance

Word	*Frequency*	*Word*	*Frequency*
construction	47	reduce	11
regulations	44	approval	9
compliance	33	corruption	9
practices	14	government	9
regulatory	14	process	9
time	14	stakeholders	9
regular	13	training	9
rules	13	awareness	8
standards	12	offer	8
inspections	11	technology	8

The high frequency of words such as “practices”, “standards”, “regular”, and “inspections” suggests that improving practices, standards, and conducting regular inspections are essential measures for enhancing compliance. The frequent appearance of training and awareness highlights the need for capacity-building initiatives for stakeholders within the construction industry.

Moreover, the emphasis on “rules” and “regulatory” suggests a need for clear and transparent regulatory frameworks. The mention of “technology”, “government”, and “stakeholders” indicates that collaborative efforts between the government, industry stakeholders, and technological advancements are crucial for enhancing compliance. The presence of “reduce” and “approval” suggests a focus on streamlining processes to cut down delays and bureaucratic inefficiencies. Addressing corruption and improving regulatory practices through technology and stakeholder engagement can thus create a conducive environment for higher compliance levels. A word cloud summarising keywords on strategies for enhancing regulatory compliance was generated, as shown in Figure 4.26.

Figure 4.26: Word Cloud of Keywords on Strategies for Enhancing Regulatory Compliance

Five primary themes emerged for enhancing regulatory compliance: public awareness and sensitisation, education and training, technology integration and automation, the development of a comprehensive regulatory framework, and the fostering of industry-wide collaboration and coordination.

4.11.1 Public Awareness and Sensitisation

Increasing public awareness about construction regulations is crucial for enhancing compliance. According to the feedback received, sensitisation campaigns can educate stakeholders on the importance of adhering to regulations, thereby fostering a culture of compliance. As noted, "creating awareness" and "public awareness" are some of the key proposals that emerged out of thematic analysis.

OECD (2000) and Mangalam et al. (2020) indeed propose shifting the focus from ‘enforcement’ to ‘regulatory intervention,’ involving awareness creation, motivation, and capacity enhancement. Sutinen & Kuperan (1999), however, note that flagrant violators should be controlled through enforcement; otherwise, their actions would send the wrong signals that could erode compliance gains. Enhanced public awareness and sensitisation initiatives would foster a comprehensive understanding among both the general populace and industry professionals regarding the advantages of compliance and the inherent risks of non-compliance. This, in turn, is anticipated to promote more widespread adherence to regulations.

4.11.2 Education and Training

Establishing comprehensive training programs for construction professionals is vital to ensuring they are well-versed in current regulatory standards and best practices. Feedback from respondents underscored a critical need to "establish training programmes" and "encourage continuous education" within the sector. This approach aligns with Social Cognitive Theory (SCT), which posits that learning occurs within a social context through the dynamic, reciprocal interaction of the person, their environment, and their behaviour (LaMorte, 2022). To reinforce this learning, education must be coupled with regular audits and inspections to maintain high industry standards.

Methods for such skill advancement include attending conferences, participating in specialised training courses, and obtaining professional certifications (AlBarami et al., 2020; Fu et al., 2023). Parker and Nielsen (2017) categorise these as "spontaneous compliance measures"—initiatives that motivate adherence even in the absence of direct government intervention. These measures are further bolstered by support systems, grievance-handling strategies, and robust monitoring frameworks. A successful precedent for this is seen in the CORENET initiative, which utilised a massive educational campaign featuring digital "how-to" modules and virtual workshops to ensure deep stakeholder ownership.

In the end, cooperation within the industry is a by-product of modelling and coaching, providing a learning platform at the heart of the community of practice (Johnson & Johnson, 2015). By ensuring professionals remain current with evolving regulations, continuous education enhances individual job performance and fosters a more competent, adaptable, and compliant workforce.

4.11.3 Technology Integration and Automation

Integrating technology into regulatory compliance processes has the potential to significantly streamline operations and mitigate corruption by reducing the extent of direct human interaction. The suggestion to "automate approvals all the way from County to avoid corruption" underscores the potential trust placed on technology to enhance efficiency and transparency. Additionally, "digitise systems run by compliance bodies and regulators" emerged as a proposal meant to minimise approval times and make the processes more user-friendly. This stakeholder's desire to "digitise systems" is not merely for administrative ease but for the deployment of specific RegTech solutions like e-permitting portals and automated inspection scheduling to eliminate human-induced corruption and bureaucratic delays. Indeed, the effectiveness and efficiency of regulatory processes and their associated management are crucial for supporting the successful realisation of regulatory objectives.

Fiene (2018) underscores the significance of transparency within regulatory frameworks. Extending this concept, Heijden (2019) connects this imperative for transparency to organisational structure, particularly emphasising administrative procedures designed to achieve compliance. Both authors implicitly or explicitly suggest that technology can be effectively utilised to enhance compliance outcomes. A noticeable practical illustration of technology's transformative potential in regulatory processes is observed in Singapore's strategic initiatives during the early

1990s. The Government of Singapore initiated a comprehensive master plan aimed at integrating information technology (IT) solutions to bolster productivity across all essential national sectors. This foresight led to the development of the Construction and Real Estate Network (CORENET), an online platform designed to streamline building approvals (World Bank Group, 2013). Some of the key capabilities of this platform included the establishment of digital back-office systems, the categorisation of project approvals based on risk levels, and the integration, simplification, and standardisation of all approval requirements and processes (Government of Singapore, 2016).

Prior to the implementation of CORENET, the approval process for construction projects was characterised by significant inefficiencies. This was marked by the submission of multiple applications to various government agencies, leading to considerable delays, redundant interactions, and escalated costs associated with printing, transportation, and physical document storage (Government of Singapore, 2016). CORENET mitigated these challenges by enabling online applications and verifications, thereby enhancing the quality and agility of construction approvals. This case study also underscores how technology can be used to facilitate continuous compliance through massive educational campaigns involving digital modules, regular audits and inspections, ensuring adherence to regulatory standards. Similarly, the modernisation of the UK's building regulatory system involved transitioning to a flexible, performance-based Building Code that prioritised innovation. This shift was followed by a restructuring of the building control regime, allowing home builders to choose between local authority inspectors and private approved inspectors, such as those engaged by the National House Building Council (NHBC) (World Bank Group, 2013).

4.11.4 Comprehensive Regulatory Framework

Creating a clear and comprehensive regulatory framework is essential for ensuring that construction projects can easily adhere to safety and quality standards. The recurring need for "clear communication" and regulations that are "easy to be adhered to by construction managers" underscores the critical importance of simplicity and transparency in regulatory documentation. This necessity is further highlighted by the findings of Nyangweso (2007), who characterises Kenya's building regulatory system as one filled with "good but deceptive promises." Such a framework, often defined by outdated policies and inconsistent implementation, has historically led to the persistent incidences of building failure and collapse reported by the National Construction Authority (NCA, 2020). Establishing a streamlined, modern framework is therefore not just a matter of administrative efficiency, but a fundamental requirement for public safety.

Gunningham (2015) asserts that an effective regulator should facilitate and mobilise the involvement of second and third parties to enhance regulatory outcomes. Supporting this, Twum-Darko and Mazibuko (2015) emphasise that regulators must periodically assess whether stakeholders fully understand their roles. By simplifying frameworks, identifying measurable attributes, ensuring proper documentation, and maintaining clear communication, authorities can significantly reduce misunderstandings and streamline compliance. These measures empower firms and individuals to meet their obligations more effectively, particularly since regulatory control is traditionally exerted through monitoring, surveillance, and enforcement (Sutinen & Kuperan, 1999).

A successful regulatory model is characterised by a nuanced blend of rules and persuasion, threats and education, and firmness tempered by compromise (Coglianese & Kagan, 2007; Heijden, 2019). Research indicates that applying excessive force against individuals who are genuinely attempting to comply can diminish their future willingness to adhere to the law (Mangalam et al., 2020). Consequently, there is a growing recommendation for emerging approaches, such as Responsive Decision-Making (RDM), which shift the focus from strict enforcement to "regulatory intervention." This paradigm emphasises building awareness, motivation, and capacity as essential precursors to compliance (OECD, 2000; Mangalam et al., 2020), operating on the principle that cooperation is ultimately more cost-effective and beneficial than punishment.

4.11.5 Collaboration and Coordination

Encouraging collaboration among industry stakeholders can improve coordination and commitment to compliance. The responses suggested that "all construction regulators should be under one body for ease of processes" and emphasised "clear communication, collaboration, and coordination." This observation aligns with the findings of the NCA (2020) report, which indicated that despite Kenya possessing a fairly comprehensive regulatory framework encompassing both national and county levels, there was no overarching policy coordination leading to fragmented and inconsistent application of existing laws. Further, the Commissions of Inquiry (1996), NBI (2015), NCA (2020), and Omollo (2020), underscore the Kenyan construction industry as one defined by complex, uncoordinated, and overlapping regulatory mandates.

Globally, regulatory bodies within the built environment sector are progressively reorienting their practices towards collaborative models. The World Bank Group (2013) highlights a growing trend among these regulators to embrace partnerships that introduce alternative, multi-sectoral approaches, necessitating enhanced coordination and collaboration. For such transformative changes to endure, effective institutional capacities are essential, which, as articulated by the EAC Secretariat (2016), are fostered through the harmonisation of policy, legal, and regulatory frameworks. By consolidating the actions of various regulatory bodies and cultivating a collaborative environment, the industry can achieve more consistent and efficient compliance outcomes.

4.12 Chapter Summary

This chapter has presented a detailed analysis of data collected from 232 construction site supervisors in Nairobi City County, achieving a robust response rate of 88.9%. Preliminary diagnostics, including Cronbach's Alpha and tests for statistical assumptions, confirmed that the data was reliable and suitable for multivariate analysis. The demographic analysis revealed that compliance reportage is significantly influenced by personnel education, age, and professional role, while project value does not statistically differentiate compliance levels.

The findings for Objective One highlighted a critical "deepening problem" in the industry: a low compliance rate of 26.22% at the registration stage, contrasted with a medium compliance level of 64.75% during project execution. Spatially, the study established a strong negative correlation ($r=-0.818$) between population density and compliance, with high-density areas East of the CBD registering the lowest adherence to regulations.

Regarding Objectives Two and Three, the study empirically validated nine determinants of compliance. The Stepwise Multiple Regression Analysis culminated in a model where six significant predictors—Proactiveness of Agencies (PRA), Competency of Project Leaders (CPL), Conduciveness of the Task Environment (CTE), Goodness of Labour (GCL), Suitability of the Legal Framework (SLF), and Characteristics of the Client (CPC), accounted for 67.8% of the variability in regulatory compliance. Qualitative insights further identified corruption, bureaucratic delays, and financial constraints as the primary barriers to adherence. These empirical results also provide the necessary evidence base for the mixed, service-oriented framework proposed in Chapter Five to enhance safety and eliminate building failures in Kenya’s construction sector.

CHAPTER FIVE

A FRAMEWORK FOR ENHANCING THE REGULATORY COMPLIANCE OF CONSTRUCTION PROJECTS

5.1 Introduction

The study aimed to develop a framework for improving compliance of building construction projects with industry regulations in Kenya, to promote quality and safety on sites, and to prevent building failures. The first three objectives focused on determining the levels of regulatory compliance in construction projects, identifying factors that influence compliance, and examining the relationship between compliance and these factors. This chapter introduces the proposed framework for enhancing regulatory compliance in construction projects; its development, proposed implementation roadmap, underlying principles, benefits, and the related potential challenges. Since a building regulatory compliance mechanism already exists, the study sought to create a more effective compliance strategy by first assessing the current processes, systems, and standards. A rationale guided by five questions was established to highlight the key findings of the study, including an evaluation of the current compliance levels, contributing factors, the industry's vision, and the strategic actions needed to achieve it.

5.2 Rationale of the Framework

The formulated framework relies on an evaluation of the current level of regulatory compliance and uses findings from the study and key lessons drawn from the literature and desk studies to propose a strategy for enhanced regulatory compliance. A five-stage framework development process was adopted, as shown in Figure 5.1. First, the current status of Nairobi City County (NCC) building regulatory compliance levels established in line with the first objective of the study was interrogated. This included an examination of the factors that affect the level of regulatory compliance in construction projects, and the inherent relationships as outlined in the respective second and third objectives of the study. These helped put the outcomes of the study into perspective by contrasting them with the desired regulatory compliance - the vision for the building sector. With the requisite information on status collected, the sector's mission was also studied to establish what should be done to achieve the desired level of building regulatory compliance. Key strategies and the priority areas of action deemed necessary for the realisation of the desired level of building regulatory compliance were outlined. With these, the specific tasks, actions, actors, and initiatives necessary for the conceptualisation of the enhanced regulatory framework were developed.

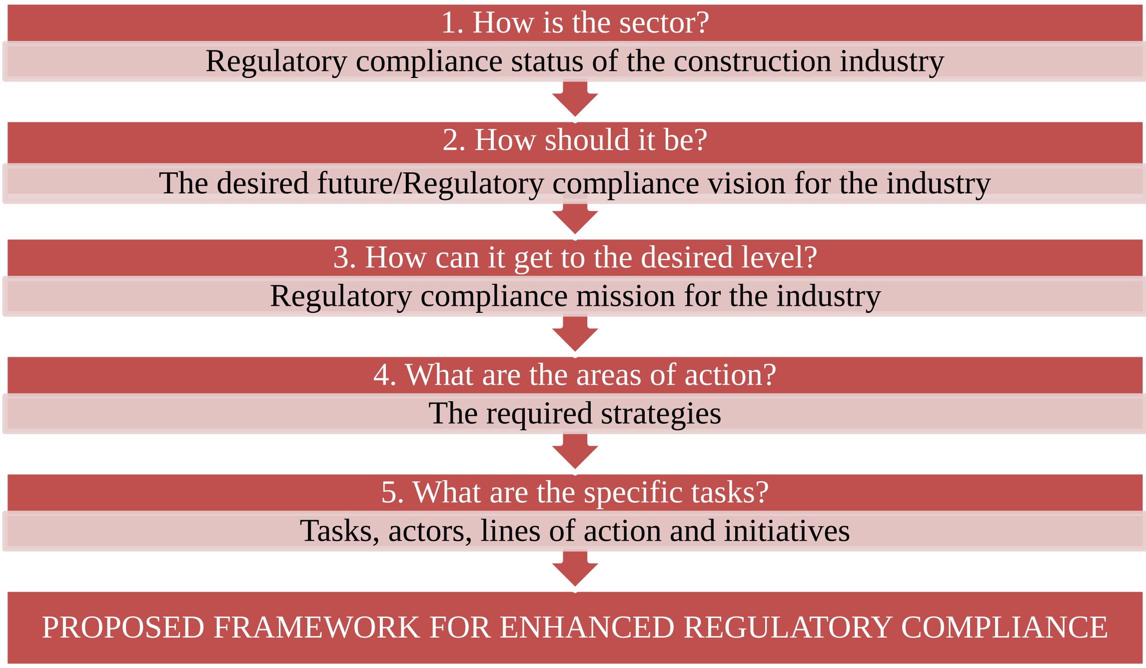

Figure 5.1: Conceptualisation of the Enhanced Regulatory Compliance Framework

5.2.1 Regulatory Compliance Status of the Construction Industry

In this study, regulatory compliance is quantitatively assessed using two primary indicators: first, project registration, which must be completed at least 30 days prior to the commencement of works; and second, the project executioners' demonstrated capacity to maintain continuous compliance throughout the construction phase by adhering to a predefined set of minimum requirements. Both indicators were assessed using objective data from projects identified in 2023 and recorded in the National Construction Authority's (NCA) Online Project Registration System (OPRS). The findings, illustrated in Figure 5.2, revealed a low compliance rate of 26.22% for project registration. Among the projects that were registered, only 64.75% demonstrated compliance during the execution phase. Notably, both compliance rates show a clear negative linear relationship with population density.

Figure 5.2: Current Compliance Status of The Building Industry

This is supported by findings from subjective data collected from the sample of 231 registered projects where compliance was assessed using three variables: the project registration status (RS), the project site conditions (SC), and the project workforce status (WS) rated on a 7-point Likert scale. While the data showed that these factors registered higher mean values, ranging between 6.68 and 6.51, overall actual compliance was still low when checked against the prevailing regulatory aspirations.

These compliance outcomes are characteristic of complex and uncoordinated sectors where requisite quality assurance levels are difficult to attain, and where robust measures should be put in place to eliminate redundancies. Given that the National Construction Authority (NCA) has been tasked to regulate the construction and coordinate its development, any such measures should be anchored within it (NCLR, 2023). It is also noteworthy that while Section 5 (2) (g) of the NCA Act (2011) states that the Authority shall *"(g) promote and ensure quality assurance in the construction industry"*, there is no publicly available policy document explicitly stipulating how this is to be realised. This observation from the evaluation of the existing regulatory framework indicates the need to address the industry's regulatory challenges beginning at the policy level to ensure seamless coordination of the regulatory endeavour.

5.2.2 Regulatory Compliance Vision for the Industry

This study adopted NCA's vision, which is to develop *"an innovative, well-coordinated and prosperous construction industry".* As part of this vision, the NCA in its strategic plan (SP 2020-2025) targets to ensure 90% compliance with building standards and regulations by the year 2025 (NCA, 2021). Four years into this timeline, however, the Authority still records under 30% regulatory compliance performance to the regulations by registration, and slightly over 60% compliance among registered projects at project execution, as shown in Figure 5.3. These rates are way below the established international aspirations and signal an industry that is fraught with danger.

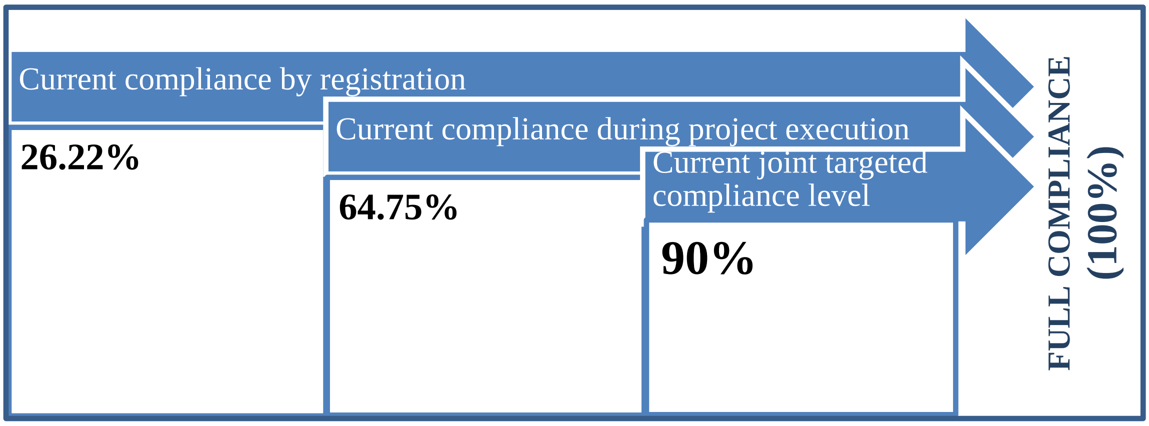

Figure 5.3: Regulatory Vision

Note that to effectively convey the study's findings on regulatory compliance, given the varied assessment frameworks used across various jurisdictions, a specific scale was adopted. This scale classifies compliance into four clear levels: low compliance (0-30%), medium compliance (31-69%), high compliance (70-99%), and full compliance (100%). The framework proposed in this study acknowledges the prevailing circumstances in formulating its recommendations for improved regulatory compliance. Ideally, the industry should aim for nearly 100% compliance with building regulations, striving for zero incidents of building failures and collapses, and recording zero fatalities. This ambitious goal is attainable only through the implementation of an innovative, efficient, inclusive, sustainable, and well-coordinated regulatory framework. As Fiene (2018) postulated in the Theory of Regulatory Compliance (TRC) care should be taken while setting regulatory compliance targets given that at the lower ends of regulatory compliance, there's bound to be a linear relationship linking compliance to quality, but as compliance scores rise to considerable levels of obedience to rules and regulations, there is a likely drop in quality. Substantial regulatory compliance is therefore recommended as more effective and efficient for public policy. As such, regulatory 'predictors' should be phased to ensure positive outcomes are maintained at their highest levels.

5.2.3 Regulatory Compliance Mission for the Industry

Addressing the need to elevate regulatory compliance necessitates a definitive mission statement outlining the requisite actions. As proposed in the succeeding section, the study adopted NCA's mission statement, which is *"to regulate, facilitate and build capacity in the construction industry through strategic interventions and partnerships for sustainable socio-economic development".* The approach to achieving enhanced regulatory compliance is guided by the study's findings, specifically the current compliance levels and their determinants, alongside a review of literature on best practices. These three elements collectively inform a continuous, tripartite process of planning, communicating, implementing, and reviewing compliance outcomes, as illustrated in Figure 5.4. This is in line with the constructs of the Public Interest Theory of Regulation (PITR), which postulates that governments should maximise the pursuit of public interests through a continuous process of elimination of market malfunctions to ensure efficiency and promotion of social welfare (Zhang, 2009). It also aligns with the suppositions of the Social Cognitive Theory (SCT) and Capture Theory (CT) that advocate for continuous learning and avoidance of regulatory capture, respectively. This process is therefore obligatory, particularly given that buildings are inhabited by millions of people.

Figure 5.4: How to Achieve Improved Regulatory Compliance

a) Best Practices

Historically, various compliance and enforcement strategies have been documented in academic literature and implemented across jurisdictions grappling with low compliance rates. This study advocates for the adoption of a mixed strategy within the new regulatory compliance model, marking a significant departure from the current deterrence-based approach. The proposed mixed strategy champions a responsive regulatory model that initially favours less punitive and restrictive measures, ideally in combination.

Within this framework, effective regulation is believed to stem from establishing synergy between punishment and persuasion, fostering a collaborative relationship between the regulatory body and the regulated entities. It also empowers the controller to judiciously select from a range of sanctions. Consequently, this strategy enables tactical decision-making in resource allocation, target setting, and outcome monitoring. Furthermore, it introduces flexibility in applying a pyramid of sanctions, progressing from less punitive aspects of restorative justice to deterrence, and ultimately to incapacitation for incompetent or irrational actors (Braithwaite, 2017).

b) Compliance Procedures and Processes

Compliance is a shared function between the national and county governments, with the national government agencies ideally expected to spearhead policy development while offering checks and balances, while the counties ensure policy implementation.

Some inherent overlaps, however, have resulted in undue confusion and inefficiencies, which in effect create avenues for non-compliance. This dual authority leads to duplicated permitting requirements, conflicting interpretations of the building codes and laws, and uncoordinated inspections. Consequently, developers face lengthy bureaucratic approval processes and multiple fees, fostering inefficiencies and creating loopholes for non-compliance. This fragmented oversight ultimately compromises building quality and safety, contributing to the persistent issue of structural failures across the country. Further, the various regulators fail to share valuable information, leading to communication difficulties and workarounds.

Figure 2.12, illustrated earlier in Chapter 2, depicts the relationships in the current building regulatory compliance space. Questions such as Where does building regulatory compliance begin? How is regulatory compliance measured? Or, who is responsible for regulatory compliance at different stages have been raised. According to the findings of this study, the top two reasons for non-compliance are the regulatory and bureaucratic barriers, as well as corruption and mismanagement. The developed framework, therefore, seeks to ensure there is clarity in the regulatory endeavour. Its effective implementation will require strong political will, capacity building at the county level, and robust inter-governmental coordination mechanisms.

As a beginning point under the new framework, building construction processes have been mapped out, and critical milestones associated with building regulatory compliance have been identified. Wawak et al. (2020) break down the building process into five stages: (i) project initiation; (ii) project planning; (iii) project execution; (iv) project monitoring and control; and (v) project closure, as analysed in Table 5.1. The inherent quality of a project primarily originates from its initial four phases. The final phase, conversely, serves as a crucial juncture where the accomplished quality of work can be objectively assessed. Consequently, all five stages offer significant opportunities for reinforcing regulatory compliance through systematic review, coupled with the application of appropriate rewards or sanctions. NCA (2020) classifies these stages into the planning and design stage, construction stage, and maintenance stage; however, the former is chosen due to its detailed nature. Howarth and Greenwood (2018) further build on these studies by identifying the five actors with major compliance and quality assurance (QA) responsibilities as the client(s), the designer(s), the manufacturer(s), the contractor(s), and the user(s). To ensure the realisation of regulatory compliance aspirations, regulatory aspects at every stage and the applicable laws have been identified and mapped out. The actors have also been identified and assigned responsibilities as shown in Table 5.1.

Table 5.1: Critical Regulatory Compliance Actors per Stage

Stage	Regulatory Aspects	Actor in the project	Applicable laws	Regulating entity
(i) Project initiation	-Ensuring land ownership documents are in order -Confirming land uses	-The Client	-NLC Act 2013, Land Reg. Act, 2012, Lands Act 2012 -PLUPA 2019 -Zoning Ordinances	-NLC -CG
(ii) Project planning	-Preparation of technical designs -Building plan approval (permitting) -Approval of EMP through EIA/ESIA -Geotechnical reports -Wayleave's approval	-The Client -Project consultants	-PLUPA 2019 -EMCA 1999 -Building Code 2024 -Water Act 2016 -Cap. 525 -Engineers Act 2011	-CG -NEMA -WRA -NCA -BORAQS -EBK
(iii) Project execution	-Project registration with NCA (engagement of a registered contractor in good standing, engagement of registered consultants in good standing, ensuring sufficient hoarding and fencing of project sites, ensuring the erection of a site board showing all approvals and the professionals engaged in the project, evidence of an EMP, overall project execution plan, and project registration as a workplace)	-The Client -Project consultants -Contractor	-NCA Act 2011 -OSH Act 2007 -Cap. 525 -Engineers Act 2011 -National Building Code 2024 -EMCA 1999	-NCA -DOSHS -BORAQS -EBK -NEMA
(iv) project monitoring and control	-Quality assurance controls (adequate material and process specifications, staged project supervision, engagement of accredited skilled construction workers and construction site supervisors in good standing, use of adequate personal protective equipment (PPEs) while on-site, adequacy of safety signs on site, evidence of adequate material testing, implementation of EMP, and evidence adequate supervision through site meeting minutes and site instructions).	-The Client -Project consultants -Contractor -Construction site supervisor -Skilled construction workers	-PLUPA 2019 -NCA Act 2011 -Standards Act 1974 -Building Code 2024 -EMCA 1999 -Cap. 525 -Engineers Act 2011 -OSH Act 2007	-CG -NCA -KEBS -DOSHS -BORAQS -EBK -NEMA
(v) project closure	-Certificate of project completion -Filing of as-built designs -Occupation certificate -Maintenance certificate	-The Client -Project consultants -The contractor	-PLUPA 2019 -National Building Code 2024 -NCA Act 2011 -Cap. 525 -Engineers Act 2011	-CG -NCA -BORAQS -EBK

Addressing areas of functional overlap, particularly concerning building quality assurance, is imperative. Clear delineation of responsibilities among all stakeholders is necessary to foster process ownership and encourage behavioural change. This necessitates the institutionalisation of Quality Management Systems (QMS), as advocated by Hoyle (2001), to facilitate data-driven processes, robust decision-making, and precise duty allocation.

Furthermore, a crucial element of the regulatory quality assurance process involves the explicit identification of project-specific milestones, the assignment of compliance roles to individual parties, and the formal documentation of these during the project approval phase. Consequently, the project execution plan becomes an indispensable instrument for regulatory appraisal.

c) Continuous Assessment of Compliance Outcomes

The current levels of compliance of 26.22% by registration and 64.75% among registered projects during project execution are indicative of low and medium compliance levels, respectively. The findings of the study established that 67.8% of regulatory compliance is explained by: (i) the conduciveness of the construction task environment (CTE); (ii) the competency of project leaders (CPL); (iii) the goodness of construction labour (GCL); (iv) the proactiveness of the regulatory agencies (PRA); (v) the characteristics of the project client (CPC); and (vi) the suitability of the project legal framework (SLF). To elevate compliance levels, critical questions touching on the above areas should be asked. For instance, how suitable is the regulatory compliance framework? Or, how proactive are the regulatory agencies in ensuring compliance? Consequently, it has been proposed that binding legal responsibilities be conferred upon clients and developers, recognising their critical roles as project initiators, financiers, and ultimate decision-makers.

The qualitative data collected in the study also establishes four (4) broad areas as barriers to construction regulatory compliance: (i) regulatory and bureaucratic barriers; (ii) corruption and mismanagement; (iii) financial and resource constraints; and (iv) resistance to change. In the same breath, five (5) strategies that can be used to enhance the level of regulatory compliance in construction projects emerged from the qualitative data of the study as (i) improved public awareness and sensitization; (ii) improved stakeholder education, and training; (iii) leveraging on technological integration and automation; (iv) ensuring adoption of a comprehensive regulatory framework; and (v) encouraging collaboration and coordination.

Continuously addressing these issues and integrating feedback into the system is anticipated to significantly enhance compliance levels. Drawing from best practices, this study proposes the implementation of new oversight mechanisms. These include the mandatory submission of a comprehensive project execution plan (PEP) during initial project registration. Furthermore, to bolster compliance, it is suggested that project contractors be incentivised through a system of rewards and sanctions, which would be factored into their license renewal or upgrade assessments. The regulatory space should also shift to one where clients/developers equally bear responsibility over project outcomes as initiators, financiers, and apex decision-makers in projects.

5.2.4 Regulatory Compliance Enhancement Strategies

The study identifies a total of six priority areas of action that explain 67.8% of regulatory variability. These are: (i) the conduciveness of the construction task environment (CTE); (ii) the competency of project leaders (CPL); (iii) the goodness of construction labour (GCL); (iv) the proactiveness of the regulatory agencies; (PRA); (v) the characteristics of the project client (CPC); and (vi) the suitability of the project legal framework (SLF). All these explanatory factors were defined by an elaborate list of surrogates. Addressing issues under these six (6) priorities areas is expected to yield better compliance results. Table 5.2 outlines the main proxies of each of the variables, detailing the associated action points.

Table 5.2: Priority Areas of Action

Item	Aspects	Formulated action(s)	Actors
(i)the conduciveness of the construction task environment (CTE)	-Regulatory aspects of every new assignment should be clear before execution -Realistic project objectives should be set -A copy of all site instructions should be kept -Teamwork should be demonstrated by the project team -Site safety briefings should be conducted regularly -Team leaders should work side by side with the workers -Workers should be assigned work based on their skills -Workers should be encouraged to collaborate when implementing work -Workers should be encouraged to contribute ideas on how to best carry out the work -There should be clear decision-making procedures for tasks in the project -There should be clear communication channels for matters related to the project -The building technology used should not affect the quality of the work -There should be clear contractual obligations for each party involved in the project -Projects should leverage technologies like BIM and MS Project to ensure quality -Defective work should be reported and reworked -Regulatory agencies should always be engaged for staged inspections and approvals -Design changes during project implementation should be communicated to the regulators -Dangers identified in the project should be communicated to supervisors -Force majeure (unforeseen natural occurrences) measures should be factored in in all projects	-Submit a project execution plan with clear M&E tools as part of approval and registration -Use of technology in project monitoring not passively but as an active monitoring ecosystem that uses mobile apps and automated reminders to preserve regulatory gains. -Execute contracts with clear obligations for each party -Enforce staged inspections and approvals -Establish and display the regulators' reporting lines at each construction site -Entrench daily procedural toolbox talks	-NCA -CG -DOSHS -Client -Project consultants -Contractor
ii) the competency of project leaders (CPL)	-All the selected project team leaders should be professionally trained -The consultants involved in a project should commit to quality delivery -Project team leaders should assume collective responsibility for the works -Project consultants should always be available for consultation and supervision -Changes in project consultants should be handled procedurally -Project team leaders should ensure a clear implementation strategy for regulatory requirements -The Client should engage a dedicated project manager for the works	-Establish a framework for appraisal of project consultants based on project outcomes -Projects of a given value to have an in-house project manager(s) responsible for quality assurance	-NCA -DOSHS -NEMA -EBK -BORAQS -Project consultants -Contractor
(iii) the goodness of construction labour (GCL)	-The capacity of a worker should be assessed before assigning duties -Construction workers should be given reasonable work targets -Workloads should be fairly distributed among construction workers with the same expertise -Workers should be remunerated based on their expertise -There should be a clear plan of payment for construction workers -Workers should often be rewarded for excellent work -Continuous training of workers should be ensured	-Entrenchment of M&E tools -Develop worker welfare frameworks for each site as part of the project execution plan -Adhere to the construction	-Client -NCA -DOSHS -Contractor

Item	Aspects	Formulated action(s)	Actors
	-Cases of high worker replacement rates should be addressed -There should be mechanisms for resolving disputes among workers -There should be mechanisms for addressing the welfare issues of workers -Cases of negligence among workers should be subjected to disciplinary action	industry code of conduct	
(iv) the proactiveness of the regulatory agencies (PRA)	-Roles/mandates of the different building regulatory agencies should be explicit -Good coordination amongst regulators at every stage of the project should be ensured -The regulators should guide stakeholders procedurally on compliance -Regulators should give adequate opportunities to comply -Regulators should put in place clear project monitoring and evaluation measures -Regulators should put in place mechanisms to ensure all projects are frequently inspected -Clear communication by regulators should be ensured at all times -Regulatory agencies should carry out frequent sensitisation programs -Regulators should always be available for consultation -The regulators should ensure a clear administrative procedure for all parties involved in a project	-Establish a clear framework for regulatory compliance -Undertake continuous M&E using a custom robust decision-making (RDM) tool to guide regulatory plans -Recruit Compliance Field Assistants (CFAs) to help drive "assisted compliance" -Leverage RegTech to monitor, assist, and improve compliance.	-NCA -CG -DOSHS -WRA -NEMA
(v) the characteristics of the project client (CPC)	-Ensure close client involvement in every aspect of the project -Ensure the client is aware of all construction-related regulatory requirements -Ensure the quality of planning of the work has client support -Ensure the client does not influence the construction process unduly -Ensure the client appreciates the consequences associated with non-compliance	-Establish a clear compliance role for project Clients -Ensure continuous stakeholder assessment and education.	-Client -NCA -CG -DOSHS -WRA -NEMA
(vi) the suitability of the project legal framework (SLF)	-create awareness on applicable construction regulations -ensure clarity of applicable laws -ensure consistency in the interpretation of laws across regulatory agencies -ensure penalties for project non-compliance are clear and specific to the issue -ensure laws are adaptable for all projects e.g. public and private (residential and commercial)	-Have a clear sensitisation framework -Ensure clarity, suitability, and adaptability of laws	-NCA -CG -DOSHS -WRA -NEMA

To ensure the consistent monitoring of factors affecting compliance, the action areas detailed in Table 5.2 mandate the evaluation and enhancement of existing policies, procedures, and/or standards. This will necessitate the creation of updated compliance checklists and forms for implementation during project registration and throughout the project's execution. Achieving desired strategic compliance outcomes will depend on effective dissemination of information, thorough training initiatives, stringent enforcement, and ongoing auditing processes.

5.2.5 Areas of Action for Enhanced Regulatory Compliance

a) Proposed Framework for Enhanced Regulatory Compliance

The tasks outlined in this section represent a comprehensive identification of the activities and stakeholders anticipated to collectively contribute to an enhanced regulatory compliance framework, as illustrated in Figure 5.5. This framework systematically maps the five stages of building, as delineated by Wawak et al. (2020), against the existing building regulatory process. It pinpoints crucial milestones necessitating compliance and proposes mechanisms designed to achieve superior outcomes through the use of technology and the adoption of a balanced strategy encompassing opportunity, punishment, and persuasion.

The framework is inspired by the surrogates of all six factors (CTE, CPL, GCL, PRA, CPC, and SLF) previously identified as significant contributors to regulatory variability. Key to this proposal is the fact that while the study investigates specific determinants (the parts), it adopts a Gestalt-inspired holistic lens, recognising that the realisation of a safe built environment (the whole) is dependent on the integrated success of its constituent regulatory stages and stakeholder roles.

i) Stage I: Project Initiation

The initial phase of the framework, encompassing project initiation and pre-feasibility, mandates the project client or developer to commence the building process by validating pertinent land ownership documents. These documents may include certificates of title, lease agreements, land use permits, or other instruments necessary to ascertain the availability and suitability of the proposed project site.

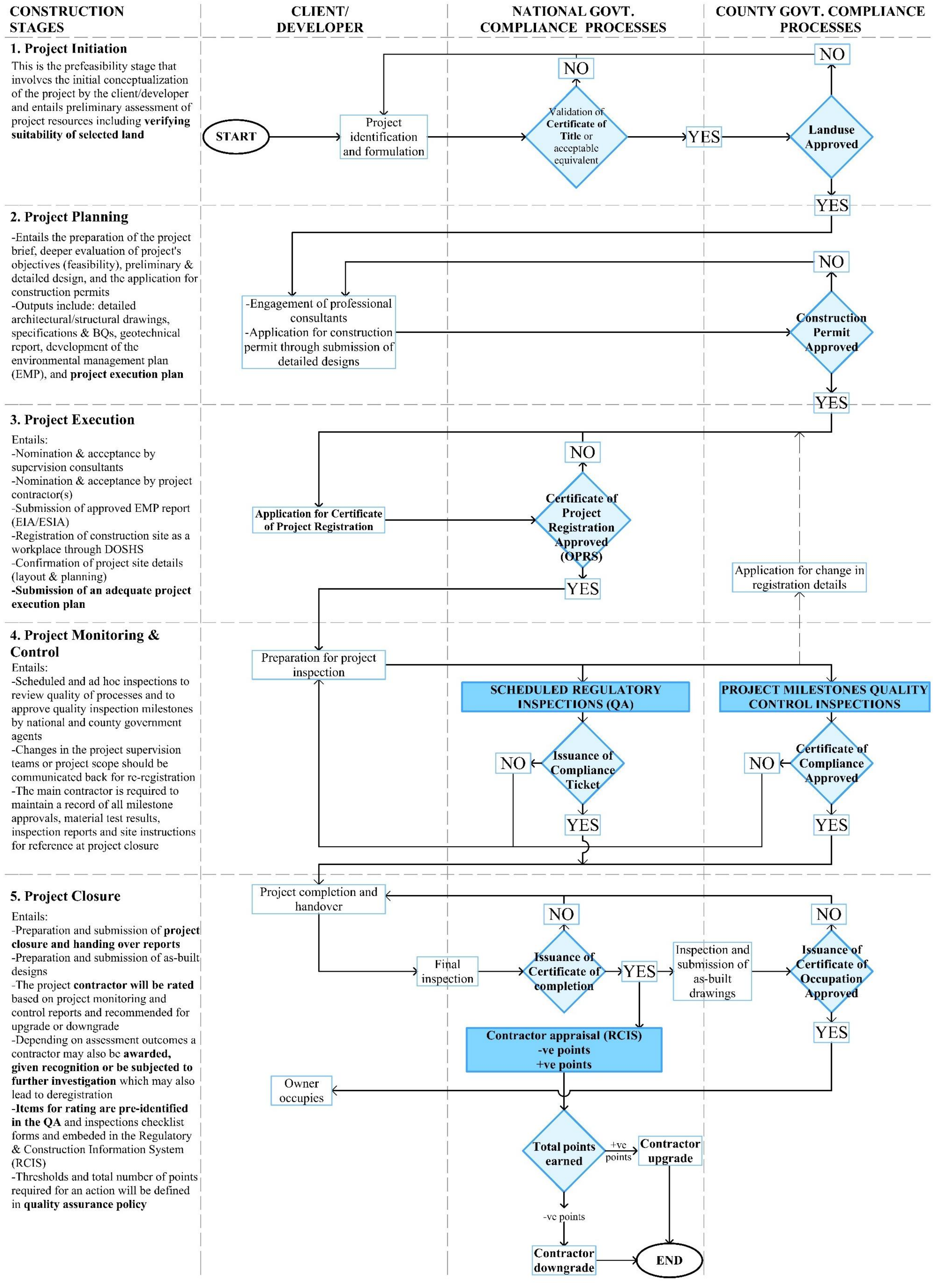

Figure 5.5: Proposed Framework for Building Regulatory Compliance

Research findings indicate that the characteristics of the project client (CPC) significantly influence regulatory variability. Key attributes that emerged emphasise the necessity of the client's close involvement in all project facets, including planning, a comprehensive understanding of regulatory measures, and an awareness of the consequences associated with non-compliance. At the point of submitting the intent to develop, concurrent with the validation of ownership and site suitability, the client should receive explicit advisement on all applicable regulatory measures.

The Social Cognitive Theory (SCT) identifies regulatory cooperation as a learned social force and a shared belief in the collective power to produce desired results, and a product of modelling (Johnson & Johnson, 2015). Regulatory agencies should therefore not exclude developers from the regulatory mission, as is currently the case where professionals indemnify them; rather, they should be sensitised and be conferred regulatory responsibilities.

ii) Stage II: Project Planning

The second phase of the framework encompasses project planning, specifically the feasibility and post-feasibility stages. During this phase, the client or developer is required to formally engage professional consultants. These are consultants responsible for developing the project brief or concepts, preparing presentation drawings, producing schematic designs and bills of quantities, conducting geotechnical reports for the project site, and formulating Environmental Management Plans (EMPs). This stage is paramount for ensuring regulatory compliance.

The research indicates that the competency of project leaders (CPL) significantly contributes to regulatory variability. Key factors under this include project consultants' commitment to regulatory adherence, their availability for consultation and supervision, the development of a comprehensive regulatory roadmap, and a general commitment to quality deliverables. A new requirement proposed within this framework mandates that project consultants develop a project execution plan (PEP). This plan will detail, among other elements, the resources required during execution and the regulatory compliance strategy for the project supervision team, with tasks assigned to specific personnel.

While the primary regulatory milestones at this stage are the approval of project production drawings and the securing of the construction permit from the county planning unit, deterrence measures against non-compliance must be instituted. Beyond the learning construct postulated by Social Cognitive Theory (SCT), the development of a robust regulatory compliance strategy is expected not only to serve as a deterrence measure as espoused in Deterrence Theory (DT), but also to safeguard regulatory agencies against regulatory capture. Regulatory capture occurs when regulated entities attempt to manipulate and induce the abdication of regulatory mandates (Xiao, 2015).

iii) Stage III: Project Execution

The third phase, project execution, mandates the developer to submit the approved designs and formally nominate the project supervision team members and a contractor via the online project registration system (OPRS). Paramount at this stage is the safeguarding of public interests through the mitigation of market inefficiencies. Consistent with the Public Interest Theory of Regulation (PITR), state regulation fundamentally aims to protect public welfare from the potential excesses of private entities.

Each consultant is individually required to accept nominations and formally commit to project supervision. This phase necessitates the proactiveness of regulatory agencies (PRA), particularly concerning the application of compliance measures, the clarity of administrative procedures, and robust monitoring and evaluation processes. As a notable departure from the existing framework, the client or developer will now be required to nominate a regulatory compliance champion. This individual will be responsible for submitting and continuously monitoring the project execution plan (PEP).

The regulatory compliance outcome of this stage is the Certificate of Project Registration. This certificate has been specifically renamed from the current "Certificate of Compliance" issued by the National Construction Authority (NCA) due to observed interpretation ambiguities within the building regulatory domain. The data collected at this juncture will form the foundational basis for all subsequent regulatory requirements.

iv) Stage IV: Project Monitoring and Control

The fourth stage, project monitoring and control, represents the most critical phase for quality assurance, wherein all six significant explanatory variables are actively engaged and come into play. Based on the study's findings, the suitability of the legal framework (SLF), specifically its flexibility, clarity, and interpretability, is of principal importance. Furthermore, the conduciveness of the construction task environment (CTE)—encompassing aspects such as project objectives, occupational safety, skill recognition, goal setting, communication and reporting, and inspection/approval of works—is equally crucial. Additionally, the goodness of construction labour (GCL), defined by factors including training, capacity/experience, wage structures, and dispute resolution mechanisms, is deemed critical.

This stage introduces a clear distinction between the inspection roles of national and county government agencies. National government agencies will focus on developing policies and overseeing the building control aspects of quality assurance. Conversely, county government agencies will concentrate on policy implementation and the development control aspects of quality assurance. Under this revised framework, national government agencies will conduct periodic scheduled or ad hoc inspections to verify compliance. In contrast, county government agencies will perform scheduled quality inspection checks at specific project milestones.

Based on the outcomes of these inspections, the study proposes the issuance of interim compliance tickets to both the contractor and the developer. These tickets, which must be legally sanctioned, will subsequently be used for project assessment prior to the issuance of a Certificate of Occupation to the client, and for the appraisal of the project contractor and consultants. Any changes, therefore, in the project supervisory teams or key project parameters will necessitate communication for re-registration.

v) Stage V: Project Closure

The fifth and final stage of the framework is project closure. During this phase, project consultants are responsible for preparing and submitting comprehensive project closure reports, handover documentation, and as-built designs and specifications. Two critical processes are proposed for this stage. The first is a comprehensive final inspection of the completed works to be conducted prior to the submission of as-built designs, culminating in the issuance of a Certificate of Occupation. The second is the formal evaluation of the contractor's and project consultants' performance during project execution. This assessment will involve the review, validation, and processing of interim compliance reports generated during the fourth stage. These reports include the general regulatory form, completed by national-level regulators, and the interim compliance certificates, which cover key project milestones such as setting out, substructure works, superstructure works, roofing, and finishes, completed by county government agents.

To illustrate the operationalisation of the proposed framework, consider the case of a contractor. Contractors are required to renew their licenses annually, during which they may request upgrades or downgrades in their registration category based on their demonstrated experience and capacity. This allows them to undertake projects of varying value. Furthermore, a contractor must maintain good standing and ensure their project sites meet specific safety and regulatory standards. This includes adequately hoarding or fencing the site, prominently displaying sufficient safety signage, and verifying that all engaged construction workers are accredited and in good standing. Contractors are also obligated to display a signboard indicating all necessary approvals and engaged professionals, and ensure the consistent and adequate use of Personal Protective Equipment (PPE) on site. Additionally, contractors are mandated to retain records of all material test results and provide proof of project supervision for every stage, evidenced through meeting minutes and staged approvals by project consultants. Finally, they must ensure the thorough implementation of environmental management plans.

To maximise the utility of pre-existing regulatory requirements, the proposed framework recommends a mathematical model to quantify a contractor's level of compliance. Instead of merely enforcing compliance during project execution, this model assigns points for adherence and deducts points for non-compliance, as illustrated in Figure 5.6. Cumulatively, a contractor would earn a predetermined number of points (e.g., 100), based on an agreed-upon computation, to become eligible for upgrades or recognition-based incentives, such as expedited permitting, public awards, and fiscal considerations.

This will ensure that even top-tier firms such as NCA are continuously incentivised to maintain high standards of safety and quality. Conversely, a cumulative loss of the same number of points (e.g., 100) would trigger automatic category downgrades, sanctions, or even deregistration. This mathematical assessment model is intended to be integrated into the Regulatory and Construction Information System (RCIS). A similar framework is also proposed for other project consultants, ensuring their project execution experience directly contributes to fostering regulatory compliance.

The framework should undergo continuous review, especially during the initial years of implementation, to identify shortcomings and facilitate necessary adjustments. This will then form an integral part of monitoring and evaluation activities. Comprehensive training programs should also be conducted to ensure all stakeholders understand the compliance requirements, processes, and expected outcomes, including the deterrent effects and consequences of non-compliance. Ultimately, this framework advocates for a service-oriented regulatory philosophy, prioritising assisted compliance as a primary approach.

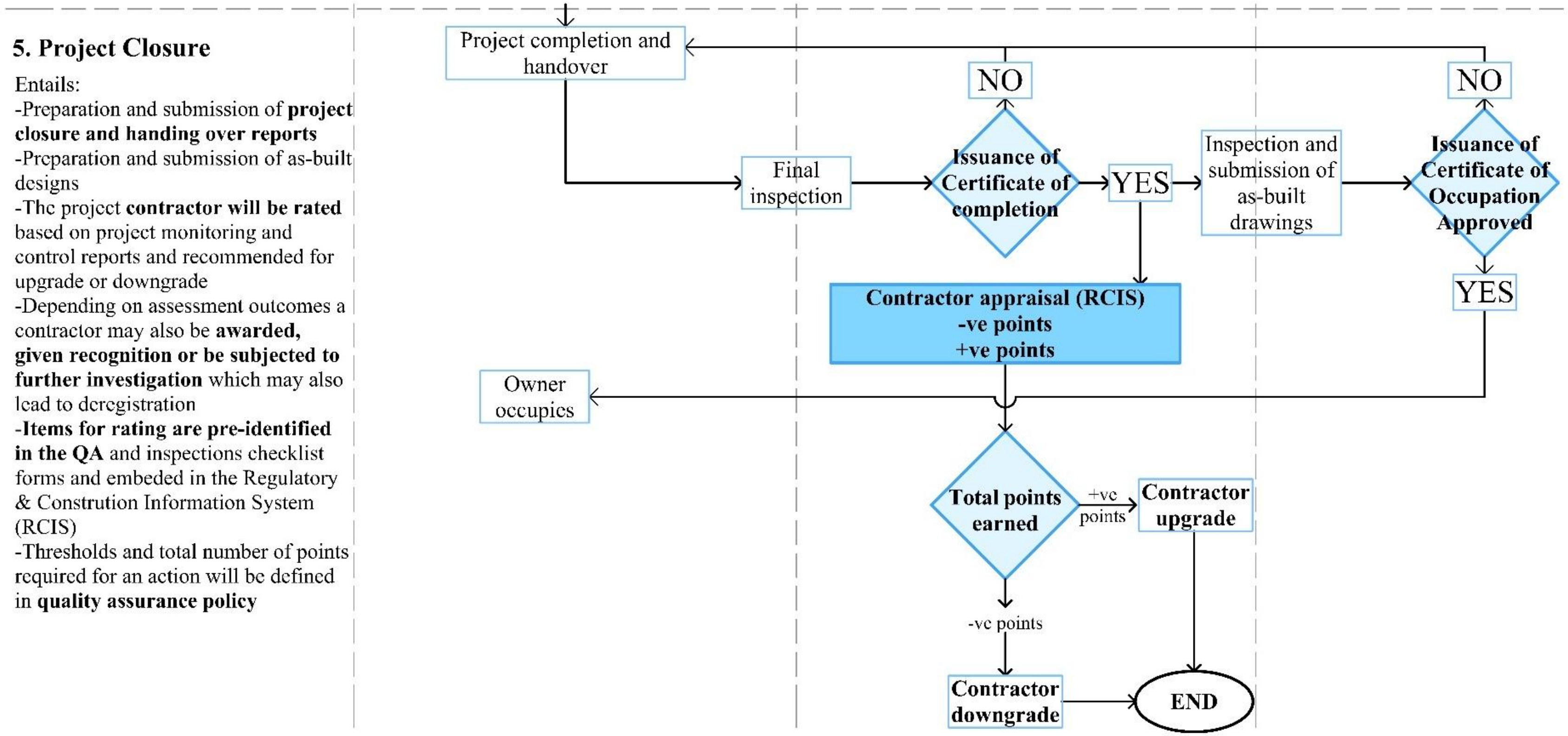

Figure 5.6: Regulatory System for Rewarding or Sanctioning

To objectively address issues of low regulatory compliance, this study proposes adopting a Robust Decision-Making (RDM) model. This model tests relevant parameters and facilitates the development of tools designed to continuously guide toward improved levels of regulatory compliance. The RDM model aims to identify the underlying reasons for widespread non-compliance and characterise the individuals or organisations involved. This shifts the focus from mere "enforcement" to "regulatory intervention", as proposed by OECD (2000) and Mangalam et al. (2020), by emphasising awareness, motivation, and capacity issues.

Compliance officers should apply this RDM tool to all non-compliant sites (referred to as subjects) to foster a continuous process of evaluation and the development of hierarchical assistive or enforcement interventions aimed at achieving compliance, as depicted in Figure 5.7.

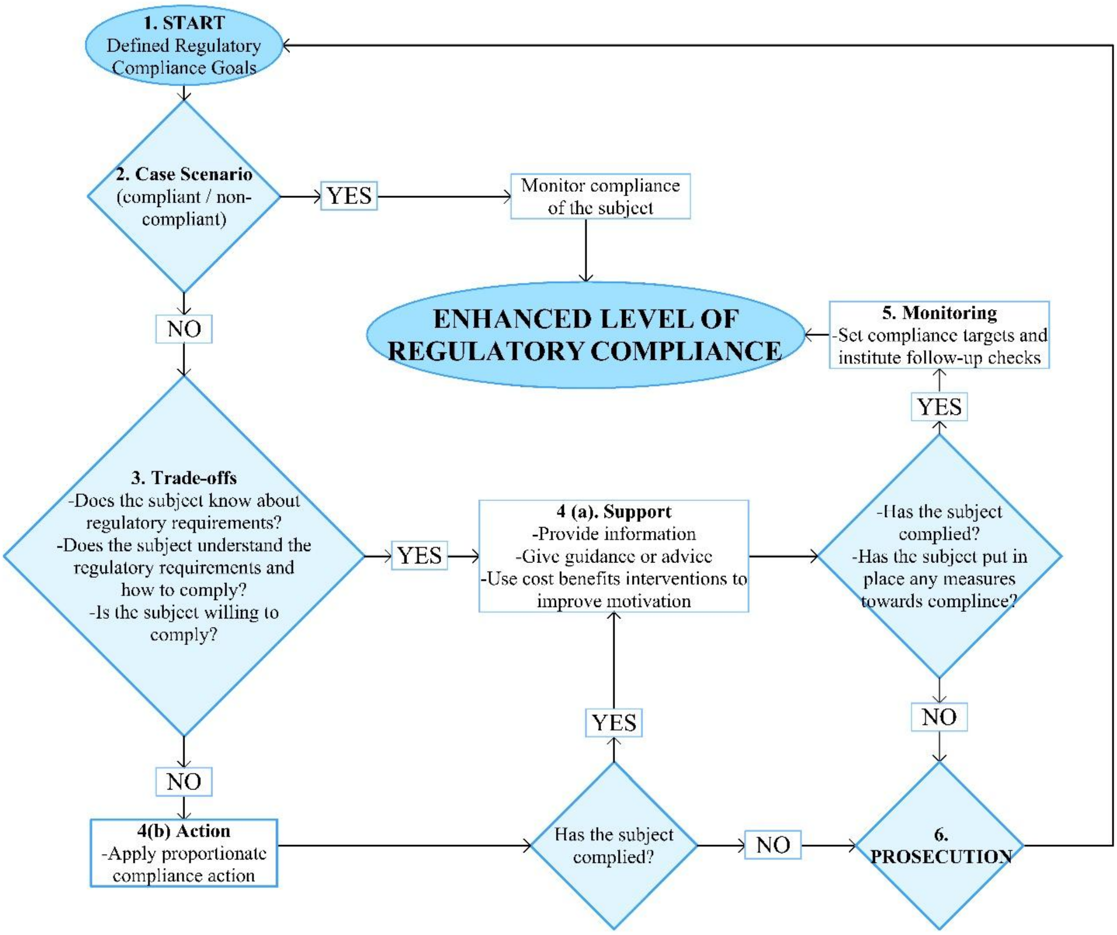

Figure 5.7: RDM Model for Continuous Compliance Improvement

Robust Decision-Making (RDM) facilitates the exploration of multiple plausible future scenarios. It also prioritises the development of robust, rather than optimal, strategies and supports the creation of adaptable strategies.

c) Technology Integration

The proposed framework centres on technology integration as its core engine, strategically leveraging "RegTech" to create an active ecosystem for preserving and improving regulatory gains. This digital transformation is structured around three primary pillars: surveillance and reporting, real-time compliance monitoring, and an expansive e-learning suite.

To enhance surveillance and reporting, the framework advocates for the continued use of rugged field devices for real-time data entry by inspectors, while introducing advanced tools like drones and site-based IoT sensors. These technologies are specifically targeted at high-density areas, such as the region East of the CBD, where traditional physical surveillance is currently overstretched. To complement these field tools, a Regulatory and Construction Information System (RCIS) Mobile App is proposed for development. This application will serve as a dedicated tool for compliance monitoring, allowing contractors to track their "compliance points" in real-time and receive automated SMS or push notifications regarding renewal dates, inspection milestones, and safety alerts.

Finally, the framework addresses the "awareness gap" through the proposed comprehensive digital e-learning suite. This resource should feature Massive Open Online Courses (MOOCs) offering free certification to help construction workers satisfy accreditation requirements. It should further provide instructional "Toolbox" videos—short, multilingual demonstrations of specific compliance tasks, such as the correct use of PPEs. To ensure these educational gains are applied on-site, the suite should also incorporate interactive, stage-specific digital checklists. These must be completed by supervisors and uploaded to the OPRS database as a mandatory component of the PEP, ensuring that regulatory standards are woven directly into the fabric of project execution.

d) Community Surveillance

To ensure the sustainability of this service-oriented approach, the framework proposes the utilisation of Compliance Field Assistants (CFAs)—local proxies recruited from the built environment sector, grassroots governance advocates, or residents' association representatives. Once trained, these assistants serve as vital intermediaries between the National Construction Authority (NCA) and local construction sites.

Their primary mandate will be to drive "assisted compliance" in regions with historically low compliance rates. While the NCA retains exclusive legal accountability for enforcement, these assistants will expand the regulator's reach into "invisible" or overlooked sites. To sustain this engagement, assistants will be trained and receive formal integration into the RCIS digital ecosystem and also get a monthly stipend for logistical support. This collaborative structure decentralises the compliance burden, fostering a proactive culture of safety and legality from the ground up.

5.3 Phased Roadmap for Framework Implementation

The implementation of the proposed framework is structured as a strategic roadmap designed to transition the Kenyan construction industry from its current low-compliance baseline toward the National Construction Authority’s (NCA) 90% compliance vision. This progression is grounded in the Theory of Regulatory Compliance (TRC), which warns that a sudden surge toward 100% compliance can paradoxically degrade construction quality due to the burdens of over-regulation. By prioritizing the six significant predictors identified in this study—Proactiveness of Regulatory Agencies (PRA), Competency of Project Leaders (CPL), Conduciveness of the Construction Task Environment (CTE), Goodness of Construction Labour (GCL), Suitability of the Project Legal Framework (SLF), and Characteristics of the Project Client (CPC)—the roadmap facilitates a sustainable climb toward the "sweet spot" of substantial compliance (70–99%).

The roadmap is proposed for execution across four distinct phases:

a) Phase I: Immediate Term (0–1 Year) – Foundations and Procedural Clarity

The primary objective of the immediate phase is to address the critically low compliance rate at the project registration stage, which currently stands at 26.22%. Priority should be given to the Suitability of the Project Legal Framework (SLF) and the Proactiveness of Regulatory Agencies (PRA) to eliminate bureaucratic barriers and corruption loopholes. Actions at this stage should centre on standardising construction laws, clarifying penalties to ensure cross-agency consistency, and recognising the roles of Compliance Field Assistants (CFAs).

In this phase, Robust Decision Making (RDM) should be incorporated as a diagnostic tool. Regulators should utilise RDM to analyse why clients fail to register projects, determining if the cause is a lack of resources, limited awareness, or procedural bottlenecks. This data-driven approach shifts the industry from a purely deterrence-based model to one of "assisted compliance," where agencies provide direct procedural guidance to bring “illegal” projects into the regulated system. Furthermore, capacity enhancement should be initiated through physical training, the deployment of a Digital E-Learning Suite to bridge identified awareness gaps, and the engagement of Compliance Field Assistants (CFAs) to drive "assisted compliance" initiatives.

b) Phase II: Short-Term (1–2 Years) – Leadership and Task Environment

Once the legal baseline is stabilised, focus shifts to the Competency of Project Leaders (CPL) and the Conduciveness of the Construction Task Environment (CTE). The goal is to solidify the 64.75% compliance level currently observed during project implementation, ensuring it is sustained through competent supervision rather than intermittent inspections.

A mandatory requirement for filing a Project Execution Plan (PEP) during registration should be introduced, necessitating the nomination of a "regulatory compliance champion" responsible for on-site monitoring. During this phase, RDM should be applied to non-compliant sites to facilitate behavioural assessments. By identifying whether non-compliance stems from a lack of capability (requiring coaching) or "self-seeking" intentions (requiring deterrence), regulators can tailor interventions that promote a "culture of compliance" without defaulting to immediate punitive measures. This phase should also see the introduction of RegTech to enhance surveillance and expanded EdTech training.

c) Phase III: Medium-Term (2–5 Years) – The Human Element and Reward Models

The medium-term phase should target Goodness of Construction Labour (GCL) and Characteristics of the Project Client (CPC) to entrench long-term behavioural change. This period marks the full operationalisation of the mathematical reward and sanction model within the Regulatory and Construction Information System (RCIS).

Under this model, contractors and consultants earn or lose points based on their compliance history, which directly influences annual license renewals, category upgrades, and professional recognition. Simultaneously, a formal compliance role should be established for the project client, ensuring they are no longer excluded from regulatory liability. By rewarding consistent adherence, the framework leverages Social Cognitive Theory (SCT), encouraging stakeholders to view compliance as a learned social force and a shared commitment to public safety.

d) Phase IV: Long-Term (5+ Years) – Automation and Deep Uncertainty

The final phase focuses on the full integration of Regulatory Technology (RegTech) and the continuous optimisation of the framework. The proposed roadmap envisions a fully automated approval system across national and county levels, utilising Building Information Modelling (BIM) and Artificial Intelligence (AI) for real-time monitoring.

During this stage, RDM serves as the engine for continuous improvement by "stress testing" the framework against deep uncertainty, such as economic shifts or emerging building technologies. This exploratory modelling allows regulators to identify policy-relevant scenarios and adjust "predictor rules" to maintain the industry at a high-compliance plateau. This ensures the 90% target is achieved in a manner that is robust, adaptive, and resilient to the diminishing returns of over-regulation. At this level, a compliance culture will have been replaced, and the Compliance Field Champions can be replaced by Safe Neighbourhood Partners.

As shown in Figure 5.8, transitioning to this proposed regulatory framework should be viewed as a strategic investment rather than an administrative burden, as it effectively replaces the prohibitive "cost of non-compliance" with long-term operational efficiency and systemic risk reduction. For developers and clients, onboarding requirements should be designed to be minimally invasive, primarily necessitating the formalisation of a PEP and the designation of a Compliance Champion to manage site-level adherence. These modest initial efforts are significantly offset by the elimination of bureaucratic bottlenecks that typically arise from navigating opaque, overlapping mandates and manual oversight processes. Furthermore, while contractors must commit to the mandatory training and accreditation of their workforce, these upfront investments are projected to be rapidly recouped by mitigating the substantial financial drain—currently estimated at 6% to 15% of total construction value—lost to the remediation of defective works.

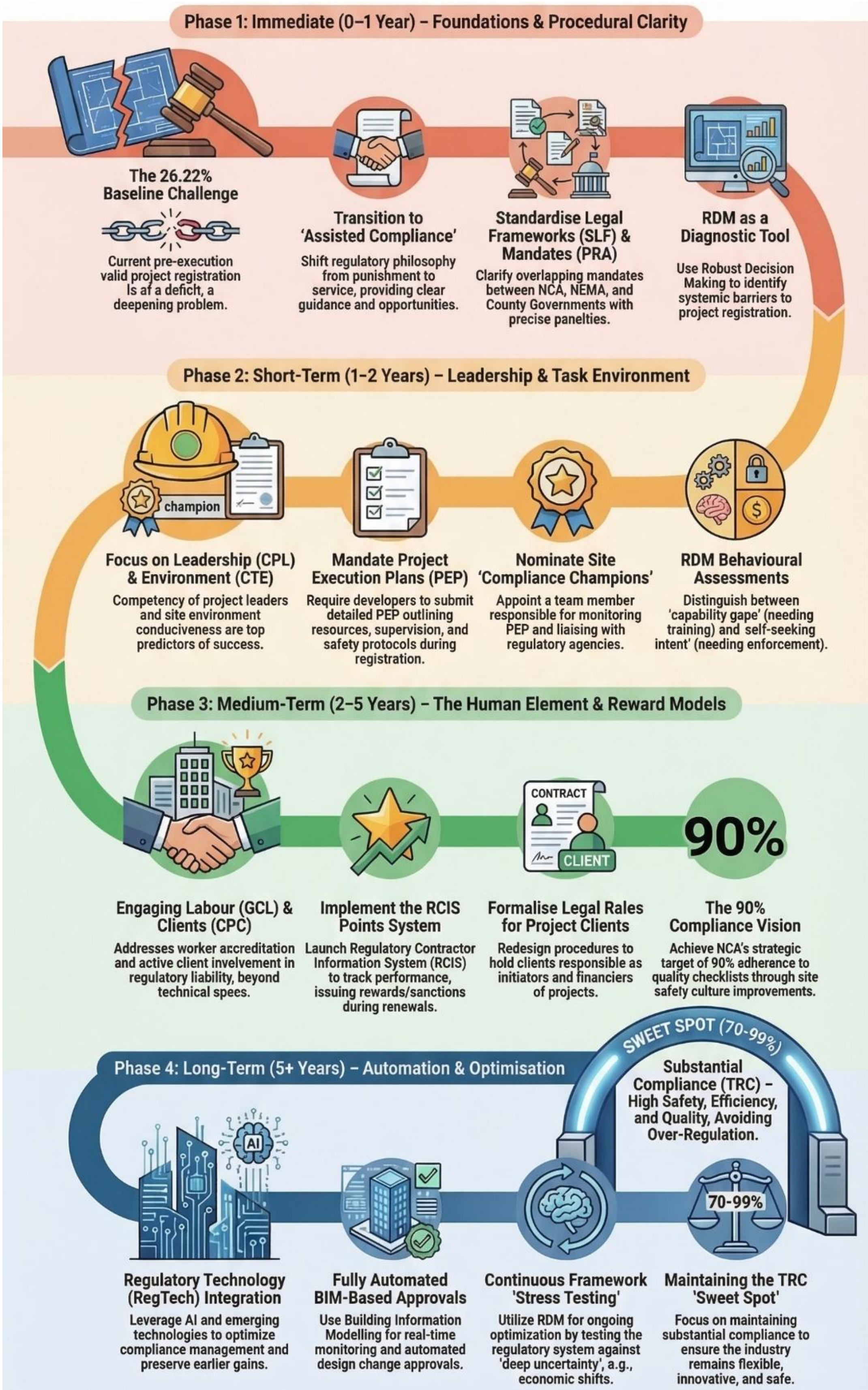

Figure 5.8: Phased framework for Compliance in Kenya

5.4 Guiding Principles of the Proposed Framework

The proposed regulatory framework is underpinned by several core guiding principles, collectively designed to transform the construction sector from an environment marked by non-compliance and structural failures into a realm defined by quality and safety. These principles, derived from comprehensive research findings, theoretical foundations, and global best practices, include:

i) Shift to a Mixed, Responsive, and Service-Oriented Approach: This principle advocates for moving beyond a purely deterrence-based regulatory model. Instead, it proposes a balanced approach that combines enforcement with responsive, service-oriented support. The goal is to maximise public interest by not only penalising non-compliance but also by actively facilitating adherence through guidance and resources.

ii) Fostering a Culture of Compliance through Learning and Cooperation: The framework seeks to cultivate an industry-wide culture where compliance is ingrained through continuous learning and cooperative efforts among all stakeholders. This involves promoting shared understanding, best practices, and collaborative problem-solving to proactively address compliance challenges.

iii) Integration of Technology and Automation: This principle emphasises the strategic adoption of advanced technologies and automation within regulatory processes. Leveraging technology aims to streamline operations, enhance oversight capabilities, improve data analysis for risk identification, and increase overall efficiency in compliance management.

iv) Enhanced Stakeholder Engagement and Collaboration: Effective regulation hinges on robust engagement and close collaboration with all relevant industry stakeholders, including developers, contractors, workers, professional bodies, and the public. This ensures that regulatory measures are practical, widely accepted, and effectively implemented.

v) Clarity of Procedures and Processes: The framework mandates that all regulatory procedures and processes are clearly defined, transparent, and easily accessible. This clarity helps minimise ambiguity, reduces compliance burdens, and ensures that all industry participants understand their obligations and the steps required to meet them.

vi) Inclusivity, Comprehensive Policies and Procedures: The development and implementation of exhaustive and robust policies and procedures are central to the framework. These provide clear, actionable guidelines that translate complex regulatory requirements into practical steps for all entities within the construction sector.

vii) Prompt Response and Corrective Action: This principle dictates that any instances of non-compliance must be met with timely, decisive, and effective responses. This includes swift investigations, immediate corrective actions to mitigate risks, and measures to prevent recurrence, thereby reinforcing accountability and maintaining safety standards.

viii) Continuous Improvement and Robust Decision-Making: The regulatory framework is designed as an adaptive system that undergoes continuous evaluation and refinement. It incorporates feedback, lessons learned from incidents, and evolving industry standards to ensure ongoing improvement and to support robust, evidence-based decision-making.

The overarching aim of these guiding principles is to ensure the seamless integration of technology, to cultivate a deep understanding among all industry players regarding the meaning and purpose of safe construction, to foster comprehensive knowledge of relevant laws and regulations, and to integrate stakeholders meaningfully into the regulatory processes. This holistic approach is crucial for ensuring the sustained growth and enhanced safety of the construction industry over time.

5.5 Benefits of the Framework

The proposed framework is conceptualised to yield a spectrum of strategic benefits, functioning primarily as a comprehensive informational tool that clarifies the complexities of the Kenyan construction regulatory landscape. By directly addressing the persistent challenges of low compliance—which have historically hindered the industry's contribution to national and global development—the framework introduces an enhanced oversight model designed to mitigate the severe economic and social impacts of structural failures.

A central pillar of this approach is the seamless integration of technology to foster inter-governmental synergy between national and devolved units. This digital collaboration promotes good governance by eliminating the coordination gaps often exploited by corrupt practices. Furthermore, the strategic application of technology facilitates real-time reporting and enforcement, thereby improving construction risk management and shielding stakeholders from legal and financial liabilities. To encourage a culture of voluntary adherence, the framework incorporates "assisted compliance" initiatives, specialised training, and reward mechanisms, drawing inspiration from proven international models such as Singapore’s CONQUAS.

For regulators, the framework drives unprecedented oversight efficiency. The automation of inspections and quality assurance protocols enhances institutional integrity by minimising discretionary face-to-face interactions, effectively sealing traditional corruption loopholes. Consultants also benefit from a more structured risk-mitigation environment; the mandatory PEPs ensure that design errors and constructability challenges are resolved before they manifest as site failures. This shift allows for professional appraisal based on verified project outcomes, rewarding consultants committed to high standards. Simultaneously, the initiative creates a vital professional pipeline by engaging young construction graduates as Compliance Field Assistants (CFAs), equipping the next generation with a deep-rooted "compliance-first" mindset through early exposure to regulatory site management.

At the macroeconomic level, the framework preserves national wealth and human life by preventing the catastrophic resource drain associated with building collapses. It further champions environmental stewardship by optimising resource consumption and preventing the premature demolition of non-compliant structures. Finally, for contractors, the framework provides a transparent pathway for growth via the RCIS. The proposed mathematical model allows firms to earn points through consistent compliance, leading to automatic license upgrades and public recognition for the "Exemplary Compliance". Together, these multifaceted advantages provide a robust economic and social rationale for the rapid adoption of the framework within the Kenyan construction sector.

5.6 Potential Challenges to the Proposed Framework

The proposed research framework faces several inherent challenges, primarily stemming from the intricate and multifaceted nature of the construction industry. Because the framework necessitates broad, industry-wide interventions or a comprehensive "all-of-government" approach, its success relies heavily on the synchronised cooperation of diverse stakeholders—a level of synergy that is often difficult to guarantee in practice.

This challenge is further compounded by the conceptual foundations of the study; by adopting the central tenet of Gestalt Psychology that "the whole is greater than the sum of its parts", the framework asserts that regulatory compliance must be perceived and executed as an integrated system rather than a series of isolated components. While theoretically robust, this holistic perspective complicates the feasibility of partial compliance and may create friction in environments accustomed to fragmented processes.

The sheer intricacy of building standards makes it difficult to ensure a flawless proposal; consequently, hidden regulatory gaps remain a significant risk. To address these vulnerabilities, the study emphasises that implementation must be supported by extensive stakeholder consultations, targeted capacity building, and a commitment to regular iterative reviews. Furthermore, the integration of robust technological solutions will be essential to bridge systemic gaps and ensure the framework remains resilient against the practical realities of the construction sector.

5.7 Chapter Summary

This chapter has presented a comprehensive framework for enhancing building regulatory compliance in Kenya, specifically designed to foster site safety and eliminate the persistent challenge of building failures. The framework is built on a rationale that contrasts the industry's current low compliance rates—26.22% at registration and 64.75% during execution (among registered projects)—with a strategic vision of attaining at least 90% compliance by 2025.

The proposed model signifies a paradigm shift from a strictly deterrence-based strategy to a mixed, responsive strategy that balances persuasion, opportunity, and punishment. It operationalises this shift by mapping the five stages of the building project lifecycle (Initiation, Planning, Execution, Monitoring/Control, and Closure) against critical regulatory milestones. Central to the framework is the direct addressing of the six significant predictors identified in the study: CTE, CPL, GCL, PRA, CPC, and SLF.

Innovative tools introduced in this framework include the mandatory filing of a PEP during registration, the issuance of legally sanctioned interim compliance tickets for project milestones, and the creation of an RCIS that utilises a points-based mathematical model for rewards and sanctions. Furthermore, the framework champions a service-oriented philosophy by adopting an RDM to facilitate "assisted compliance". By integrating technologies such as RegTech and EdTech and fostering collaboration between national and devolved units, the framework provides a robust mechanism to reduce the economic and social impacts of building failures and enhance stakeholder trust in the Kenyan construction sector.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This thesis focused on addressing the persistent issue of low regulatory compliance in construction projects, a problem whose underlying causes had not been adequately explored, and whose effects include persistent building failures and collapses. Chapter One introduced the research problem. Chapter Two provided a comprehensive literature review, culminating in the identification of a research gap and the articulation of a theoretical and conceptual framework. In these chapters, it was established that while low regulatory compliance continues to be a prevalent issue in construction projects, the fundamental reasons for this phenomenon have not been adequately addressed. This then necessitated an investigation into the relationship between regulatory compliance and its influencing factors. This foundational work informed the methodology presented in Chapter Three, which detailed the research approaches for data collection and analysis. Chapter Four presents the results of data analysis carried out as per the procedures outlined in Chapter Three, and discusses these findings in light of existing literature. Chapter Five addressed the primary objective of the study by proposing a framework for enhancing compliance of building projects with construction industry regulations, and also proposes its phased implementation roadmap. This framework aims to foster quality and safety on construction sites and mitigate building failures.

Chapter Six, which is the concluding chapter, offers a comprehensive overview of the entire research. It revisits the study's objectives, initially outlined in Chapter One, and assesses their attainment. It also summarises key findings of the study, which lead to the conclusions and recommendations drawn per objective. The Chapter also reflects on key issues associated with the effectiveness of building regulatory compliance, such as damage to property, social attitudes, and general affordability of compliance, including a self-introspection on the research journey. Finally, the chapter discusses the contributions of the study, its limitations and outlines areas for further research.

6.2 Conclusions of the Study

The primary aim of this research was to develop a framework for enhancing compliance with construction industry regulations in Kenya, with the ultimate goals of fostering on-site quality and safety and preventing building failures. While employing a quantitative approach with a cross-sectional design, the research primarily focused on construction projects located within Nairobi City County (NCC). The methodology involved collecting data through questionnaires administered to construction site supervisors from randomly selected sites, supplemented by a review of existing compliance records. Statistical analysis of the collected data utilised various tools, including descriptive statistics, correlation analysis, confirmatory factor analysis (CFA), and multiple regression analysis (MRA) to address the study's objectives. The ensuing conclusions and recommendations were formulated based on findings from the four distinct objectives.

6.2.1 Level of Regulatory Compliance in Construction Projects

The first objective of this study was to establish the levels of regulatory compliance in construction projects within NCC. This was achieved through the analysis of primary data gathered from sampled projects and secondary objective data obtained from the National Construction Authority's (NCA) Online Project Registration System (OPRS). Key findings indicate that regulatory compliance in Kenyan construction projects is assessed at two principal stages: project registration and during project execution.

Regarding compliance at the registration stage, analysis of secondary data from the NCA's OPRS database for projects documented in Nairobi City County in 2023 revealed a significant deficit in compliance. Only 26.22% of the listed projects were registered, signalling a deeper regulatory challenge. With regards to registered projects, compliance during the execution phase was assessed at a medium level of 64.75%, additionally underscoring the pressing need to enhance overall compliance within the industry. Further, it was observed that these compliance levels varied spatially, with areas located to the East of Nairobi's Central Business District (CBD) registering lower compliance levels compared to those to the West.

Primary data, collected from construction site supervisors across sampled projects, further explicated compliance levels by assessing three outcome variables: project registration status (RS), site conditions (SC), and workforce status (WS). Descriptive statistics for these variables, measured on a 7-point Likert scale, revealed relatively high mean scores exceeding 6.0. In summary, the study's findings based on the study's first objective reveal a nuanced picture: while a moderate level of compliance was observed during the execution phase for registered projects, and certain on-site conditions and workforce aspects were perceived to exhibit high compliance, a critically low level of compliance was evident at the crucial initial project registration stage. These significant disparities, coupled with the frequent occurrence of building failures in unregistered non-compliant projects, clearly highlight a pressing problem within the industry.

Given findings that a significant proportion of projects are initiated without proper registration and requisite initial approvals, there is an imperative need to bolster regulatory compliance through enhanced registration processes. Achieving this necessitates heightened awareness among developers regarding regulatory prerequisites, coupled with the implementation of robust regulatory surveillance by pertinent agencies to ensure all projects are registered before the commencement of any construction activities. This effort requires the industry to refine compliance protocols and conduct a comprehensive Regulatory Impact Assessment (RIA) for the instruments, to address the fundamental issue of projects commencing without the necessary legal foundation. Furthermore, the NCA should strategically leverage EdTech (Educational Technologies) and Regulatory Technology (RegTech), applying emerging technologies to optimise regulatory compliance surveillance and management, thereby ensuring compliance *ab initio* and preserving the regulatory gains secured during the registration phase to the end. Several Geographic Information System (GIS) technologies that can give unprecedented visibility into construction activities exist. These include Remote Sensing (Satellite and Aerial Imagery) for detecting live and new construction works, and several mobile apps.

6.2.2 Factors Affecting the Level of Regulatory Compliance in Construction Projects

The second objective of this study was to establish factors that affect the level of regulatory compliance in construction projects within NCC. The findings indicate that regulatory compliance is comprehensively explained by nine factors established from existing literature. These include: the suitability of the legal framework (SLF), the proactiveness of regulatory agencies (PRA), the efficiency of regulatory processes (ERP), the conduciveness of the construction task environment (CTE), the characteristics of the project client (CPC), the competency of project leaders (CPL), the quality of construction labour (QCL), the stability of the prevailing economic environment (SEE), and adherence to ethical factors (AEF). Each of these primary factors is further substantiated by several surrogates, underscoring their significance in determining compliance levels.

Regulatory compliance within Kenyan construction projects, particularly in Nairobi, is influenced by a multifaceted array of factors, including the efficacy of legal frameworks, the proactivity of regulatory bodies, the efficiency of procedural mechanisms, and the competence of personnel. A strategic review of regulatory measures, aligned with the attributes of the nine identified explanatory factors, presents an effective approach to enhancing compliance. Given the intricate interdependencies among these established factors, it is posited that additional unexamined variables may also exert influence. Consequently, further research is recommended to comprehensively identify any supplementary factors affecting the level of regulatory compliance.

6.2.3 Relationship between Regulatory Compliance in a Construction Project and its Influencing Factors

The third objective of this study was to establish the relationship between regulatory compliance in construction projects within NCC and its influencing factors. Although the research hypothesised that regulatory compliance is influenced by nine explanatory variables, analyses including correlations and multiple regressions revealed that six of the nine factors significantly account for the variability in regulatory compliance.

These six significant factors are: the suitability of the legal framework (SLF), the proactiveness of regulatory agencies (PRA), the conduciveness of the construction task environment (CTE), the characteristics of the project client (CPC), the competency of project leaders (CPL), and the quality of construction labour (GCL). Collectively, these factors explained 67.8% of the variability in regulatory compliance. Consequently, the Null Hypothesis (H_0) that explanatory variables do not affect the level of regulatory compliance (β_i =0) tested at the 0.05 level of significance, was rejected. However, a notable portion (32.2%) remained unexplained by the factors examined in this study, suggesting a need for further research to identify other potential influencing factors. It is implied by the findings that harmonising regulatory procedures with the key aspects of these six critical factors could yield substantial benefits in reducing the negative externalities associated with the industry.

6.2.4 A Framework for Enhancing Regulatory Compliance of a Construction Project

The fourth objective of this study focused on developing a framework for enhancing regulatory compliance in construction projects. This objective aimed to synthesise the study's findings with existing knowledge into a practical framework for the improvement of building regulatory compliance. The framework's formulation was based on: the levels of regulatory compliance established in Objective One, the factors identified as influencing regulatory compliance from Objective Two, the determined relationships between regulatory compliance and its influencing factors from Objective Three, and insights gleaned from literature reviews and desk studies.

The resulting framework aims to enhance regulatory compliance across the entire building construction project lifecycle, encompassing initiation, planning, implementation, and monitoring. It signifies a departure from the current deterrence-based strategy, which has proven ineffective due to its heavy reliance on sanctions and penalties. Instead, it proposes a more holistic, risk-informed, and service-oriented approach. The framework integrates strategic actions derived from the study's findings, including: reviewing and improving the suitability of the regulatory framework, increasing the proactiveness of regulatory agencies, improving the efficiency of regulatory processes, addressing factors related to the conduciveness of the construction task environment, improvement of the characteristics of the project client, enhancing the competency of project leaders, improving the quality of construction labour, increasing public awareness and sensitization, enhancing stakeholder education and training, leveraging technological integration and automation, and encouraging collaboration and coordination among stakeholders.

The study's primary recommendation advocates for the adoption of its proposed framework, designed to implement a mixed enforcement approach to regulatory compliance. This approach prioritises an initial phase of less punitive and restrictive measures, integrating both punishment and persuasion to foster adherence. Furthermore, it promotes compliance through a service-oriented strategy, exemplified by initiatives such as assisted compliance programs.

At the project planning stage, the framework stresses the importance of developing a robust project execution plan (PEP). This plan should not only detail how project proponents intend to meet diverse regulatory requirements but also define new roles, such as a project regulatory champion or a project manager, depending on the project's complexity and value. Additionally, it proposes conferring certain regulatory functions upon the client or developer. Implementing these recommendations would necessitate revisions to the construction industry's existing legal and institutional frameworks, leading to a review of current compliance checklists.

The framework proposes innovative mechanisms, including the issuance of interim compliance tickets to project participants such as contractors and developers. These tickets would serve to legally validate their performance, feeding into a mathematical model designed to determine rewards or sanctions based on their level of compliance. Participants would accrue or lose points contingent upon their adherence or non-compliance, thereby impacting their license renewal, upgrades, or risk assessments. Furthermore, the framework advocates for the adoption of a Robust Decision-Making (RDM) model to continuously assess instances of non-compliance and guide targeted regulatory interventions.

6.3 Recommendations of the Study

The study generates several key recommendations aimed at enhancing the compliance of construction projects with industry regulations in Kenya. Some of the broader practical recommendations of the study include:

1) Review of the construction regulatory framework: The study recommends conducting a Regulatory Impact Assessment (RIA) for the construction industry. This assessment is vital for refining regulatory compliance protocols across all building stages, especially given the current low project registration compliance rate of 26.22% and the medium compliance rate of 64.75% during project execution, both falling short of the industry's 90% target. Furthermore, the study advises assigning clear functions to all parties within the building regulatory framework to address existing overlaps and inefficiencies in regulatory processes. This necessitates the institutionalisation of quality assurance systems featuring fact-based processes, robust decision-making protocols, and unambiguous duty allocation. Such a review will facilitate the formal adoption of project execution plans (PEP), delineate the roles of regulatory compliance champions and project clients, and define the responsibilities of construction project managers. It will also enable the integration of service-oriented approaches, such as assisted compliance, and the utilisation of Geographic Information System (GIS) technologies for project management, offering visibility into ongoing and new construction activities.
2) Development of a reward system: The study recommends leveraging Regulatory Technology (RegTech) to optimise regulatory compliance management, thereby preserving regulatory gains secured during the registration phase. This includes developing a reward or sanctioning mathematical model for project parties (similar to Singapore's CONQUAS system) that encourages continuous compliance improvement. This model would allow project parties to gain or lose points based on adherence or non-compliance, thereby influencing licence renewal, upgrades or downgrades, and risk assessment. The reward system is intended to incentivise adherence to

regulations, encourage ethical conduct, and build a culture of integrity, ultimately safeguarding the industry's reputation. As such, the coordinating agency (in this case, the NCA) should strategically leverage RegTech not as a passive database but as an active monitoring ecosystem that uses mobile apps and automated reminders to preserve regulatory gains captured during the registration phase.

3) Redesign regulatory procedures to align with the aspects of the six significant factors, more specifically, conferring regulatory roles to the project client: Six factors (SLF, PRA, CTE, CPC, CPL, and GCL) were found to significantly influence regulatory compliance, explaining up to 67.8% of regulatory variability. The study, for instance, recommends a client-centric approach where regulators assist compliance. A paradigm shift is recommended away from the current scenario where project leaders fully indemnify project clients/developers to one where clients/developers equally bear responsibility as initiators, financiers, and apex decision-makers in a project. The study therefore recommends the conferment of regulatory duties upon the project client/developer.
4) Continual improvement: The study recommends adopting the study's proposed framework for enhancing regulatory compliance. Continuous monitoring and feedback into the system to address identified issues and improve compliance levels are required to ensure continued integration of strategic actions. Based on the recommendation for a service-oriented approach to regulatory compliance, the Robust Decision-Making (RDM) model for testing parameters to identify reasons for non-compliance and guide hierarchical assistive interventions has been proposed. This will ensure that practical challenges, including aspects of social attitudes and trust, inclusion, empathy with the government, affordability of compliance, the place of community policing, and other environmental issues, are addressed and do not become a hindrance to regulatory compliance. This requires continuous training and sensitisation of all stakeholders, including the construction workers, professionals, and the general public. Modelling and coaching should also be scaled through EdTech (Educational Technologies), such as video-based tutorials on proper site

hoarding or PPE usage, facilitating the retraining of players into the path of regulatory obedience.

5) Leveraging community policing: The study recommends empowering local communities to help in monitoring and reporting compliance through Compliance Field Assistants (CFAs). This will foster inclusivity, cultivate a culture of collective responsibility for public safety, and thus contribute to an orderly, well-coordinated, and prosperous built environment. Once the 90% target is achieved in a manner that is robust, adaptive, and resilient, the Compliance Field Assistants (CFAs) can be replaced by Safe Neighbourhood Partners.

The study's key findings, conclusions, and recommendations based on the four specific objectives are summarised in Table 6.1.

Table 6.1: Findings, Conclusions, and Recommendations of the Study

Objective	Findings	Conclusions	Recommendations
1. To establish the levels of regulatory compliance in construction projects within Nairobi City County.	-The level of project regulatory compliance is defined by both its registration status before execution and its adherence to regulatory measures during actualisation. The level of regulatory compliance during project registration was found to be 26.22%, while that of registered projects during project implementation was 64.75%. -Compliance levels in projects located in the more populous areas East of Nairobi's CBD register lower compliance compared to those to the West.	-The level of building regulatory compliance in Nairobi is low at registration, and medium among registered projects during execution. -Compliance levels in Nairobi vary spatially, with areas to the East of Nairobi's Central Business District (CBD) registering lower compliance rates compared to those to the West.	-The industry's vision, as attuned by NCA, is to attain at least 90% compliance by the year 2025. -Undertake regulatory impact assessment (RIA) on all proposed statutory instrument/ regulation for the industry to inform the refinement of regulatory compliance protocols. -Leverage regulatory technology (RegTech), which is the application of emerging technologies to monitor, assist, and improve the way businesses manage regulatory compliance. RegTech should not be a passive database but an active monitoring ecosystem that uses mobile apps and automated reminders to preserve regulatory gains captured during the registration phase. EdTech (Educational Technologies) should also be used to facilitate the retraining of players into the path of regulatory obedience.

Objective	Findings	Conclusions	Recommendations
2. To establish factors that affect the level of regulatory compliance in construction projects within Nairobi City County.	-The level of regulatory compliance can be explained by the nine factors established in literature namely: the suitability of legal framework (SLF), the proactiveness of regulatory agencies (PRA), the efficiency in regulatory processes (ERP), the conduciveness of the construction task environment (CTE), the characteristics of the project client (CPC), the competency of project leaders (CPL), the goodness of construction labour (GCL), the stability of prevailing economic environment (SEE), and the adherence to ethical factors (AEF)	-There could be other explanatory variables to the study not covered and that can be explored through other studies.	-Review regulatory measures in line with the attributes of the nine explanatory factors as an effective strategy for mitigating regulatory non-compliance. -Update current compliance checklists. -Undertake a further study to establish more factors that affect the level of regulatory compliance.
3. To establish the relationship between regulatory compliance in construction projects within Nairobi City County and its influencing factors.	-67.8% of regulatory compliance variability is explained by the suitability of legal framework (SLF), the proactiveness of regulatory agencies (PRA), the conduciveness of the construction task environment (CTE), the characteristics of the project client (CPC), the competency of project leaders (CPL), and the goodness of construction labour (GCL).	-While six of the nine explanatory factors tested were found to contribute significantly to variability in regulatory compliance, a significant portion (32.2%) remains unexplained. -The Null Hypothesis (H_0) that explanatory variables do not affect the level of regulatory compliance (β_i =0) was rejected.	-There is a need to redesign regulatory procedures to conform to the aspects of the six significant factors, e.g., CPC, which is currently excluded. -Assign legally sanctioned responsibilities to the project client or developer, given their role as initiators, financiers, and apex decision-makers in a project. -A further study to establish factors that contribute to the other 32.2% of the regulatory compliance is needed.
4. To formulate a framework for enhancing the regulatory compliance of construction projects in Kenya.	-The current regulatory system is more of a deterrence-based strategy that focuses on sanctions, punishments, and penalties to promote regulatory compliance. -The system has not been successful in facilitating the improvement of regulatory compliance to the desired levels.	-Compliance can be improved by enhancing the internal and external project environment, specifically establishing a more suitable legal framework, ensuring proactive regulatory agencies, ensuring conduciveness of the construction environment, engaging competent	-The study recommends the adoption of a mixed strategy that advocates for a responsive approach to enforcement and community involvement through CFAs or the safe neighbourhood partners. -This begins with less punitive and less restrictive strategies and establishes a synergy between punishment and persuasion in pursuit of regulatory compliance.

Objective	Findings	Conclusions	Recommendations
		project leaders, engaging better construction labour, and ensuring positive client characteristics e.g. by incorporating aspects of CPC into the regulatory system, and leveraging RegTech and EdTech.	-Confer regulatory responsibilities to the project client. -Introduce a requirement to develop project execution plans (PEP) at the project planning stages and the appointment of project regulatory champions. -A robust decision-making (RDM) model is recommended to further promote regulatory compliance in the industry through a service-oriented approach. -The recommended framework should be adopted to foster the realisation of regulatory goals through, among other things, incentivisation of compliance.

6.4 A Reflection on the Effectiveness of Building Regulatory Compliance in Kenya

Building regulation in Kenya face significant obstacles, mainly due to persistent structural failures caused by non-compliance that lead to fatalities and substantial property damage. A major practical challenge arises from complex, uncoordinated, and often overlapping regulatory requirements, which are further worsened by prevailing negative societal attitudes, leading to confusion and inefficiencies. Current social perceptions show scepticism, where adherence to regulations is viewed as optional or easily bypassed, rather than as a collective responsibility for public safety. Despite ongoing efforts to raise public awareness and promote inclusion, these attitudes continue to deeply affect regulatory functions.

The affordability of compliance also presents a potential impediment, with perceived high approval costs hindering adherence. Corruption and bureaucratic delays further distort established processes, leading to a perception that regulatory mandates prioritise revenue generation over safety. Consequently, a more empathetic governmental approach is required, which necessitates the redesign of regulatory compliance frameworks to be more facilitative, rather than being seen to impede legitimate, safe, and economically viable construction.

Enhancing regulatory compliance within the construction industry is anticipated to yield numerous benefits, including the establishment of order, safeguarding public safety, promoting the sustainable utilisation of resources, and fostering stakeholder trust. While regulatory agencies must adopt a more proactive stance in fulfilling their mandates, a comprehensive review of project client characteristics, project leader competency, and construction labour quality is necessary. The current deterrence-based model, which primarily relies on sanctions, punishments, and penalties to enforce regulatory compliance, is demonstrating limited effectiveness. This highlights the need for a more coordinated, responsive, and service-oriented framework that promotes collaboration, enhances awareness, and addresses resource limitations to encourage voluntary adherence.

The untapped potential of community surveillance/policing, particularly in ensuring conducive construction environments and adherence to building statutes, remains considerable. Empowering local communities to monitor and report non-compliant construction could foster inclusivity, cultivate collective responsibility for public safety, and contribute to an orderly built environment. Overall, compliance can be improved through enhanced coordination within both the internal and external building project environments.

6.5 Recapitulation of the Study and Self-Reflection

Reflecting on the doctoral journey, the researcher acknowledges that while the study effectively realised its objectives, certain alternative approaches could have offered different dimensions of insight. The research was firmly anchored on a positivist paradigm, assuming reality to be objective and quantifiable. This allowed for the rigorous testing of nine hypothesised determinants and the rejection of the null hypothesis through statistical evidence. However, were this research to be undertaken again, a pragmatist stance involving a mixed-methods design might be adopted. This would facilitate a deeper exploration of the "human element"—specifically the cognitive processes and personal values of developers—using qualitative narratives to supplement the quantitative data on Characteristics of the Project Client (CPC).

Furthermore, the study utilised a cross-sectional research design, which was appropriate for establishing patterns of association at a single point in time. In hindsight, a longitudinal approach would have been beneficial to analyse the transformation of regulatory compliance over an extended period, particularly to observe the sustainability of compliance gains beyond the "heightened surveillance" of the rainy season. Additionally, while the focus on building projects was justified by the high incidence of structural failures, expanding the scope to include infrastructure sub-sectors (such as roads and water) would have allowed for a cross-sectoral comparison of regulatory efficiency.

Finally, the study concentrated on five primary regulatory agencies. While these represent the most critical touchpoints for site compliance, incorporating a broader array of utility-based regulators would have captured a more complete range of regulatory influences on the project lifecycle. These reflections do not denigrate the current findings, which explain 67.8% of compliance variability, but rather serve to encourage future researchers to build upon this foundation using more diverse methodological lenses.

6.6 Contributions of the Research

6.6.1 Contribution to Knowledge

This study advances the existing body of knowledge, particularly in the area of building regulatory compliance within Kenya's construction industry. Through the progression of ideas from specific observations and empirical data to the formulation of a comprehensive framework for enhancing regulatory compliance, the study dynamically contributes to the ongoing discussion surrounding regulatory compliance, building failures, and collapses, eventually making recommendations aimed at enhancing quality and safety on construction sites.

The study observed persistent issues of building failures and collapses in Kenya's construction industry, linked to regulatory non-compliance. Through empirical investigation, including the analysis of project registration data and on-site compliance levels in Nairobi City County, the study identified specific patterns of low compliance (e.g., only 26.22% of projects are registered, and 64.75% compliance noted during execution for registered projects). Subsequently, the research identified key determinants that significantly influence regulatory compliance (such as the suitability of the legal framework, proactiveness of regulatory agencies, conduciveness of the construction task environment, characteristics of the project client, competency of project leaders, and goodness of construction labour), which collectively explained 67.8% of the regulatory variability. It also uncovered common barriers to compliance (e.g., bureaucratic hurdles, corruption, financial constraints, and resistance to change) and proposed strategies for enhancement (e.g., public awareness, education, technology integration, and collaboration) based on qualitative data.

Based on these specific observations and identified patterns, the study deductively synthesised a broader theoretical and practical framework for enhancing regulatory compliance in Kenya's construction industry. This framework advocates for a shift from a deterrence-based approach to a more mixed, responsive, and service-oriented model that involves all stakeholders, aiming to foster quality and safety and ultimately reduce building collapses. Subsequently, this study builds upon the foundations of prior research, including the 1996 report by the Commission of Inquiry that examined existing building laws, bylaws, and regulations (Commissions of Inquiry, 1996). It also draws upon the 2020 study by the National Construction Authority (NCA) on building failures and collapses in Kenya (NCA, 2020), and the 2021 study by the National Crimes Research Centre (NCRC) on crimes related to housing permit forgeries (National Crimes Research Centre [NCRC], 2021), among other relevant works.

Further to the foregoing, the study contributes to the development and refinement of the theories that underpinned the research by providing empirical evidence and nuanced perspectives that either support, extend, or challenge existing theoretical assumptions. These are: The Theory of Regulatory Compliance (TRC), Deterrence

Theory (DT), Capture Theory (CT), Public Interest Theory of Regulation (PITR), and Social Cognitive Theory (SCT).

TRC postulates a diminishing relationship between regulatory effort and compliance, suggesting an "optimal balance of rules" rather than striving for 100% compliance, as excessive regulation can lead to a drop in aspects of quality. The study's finding that only 26.22% of listed projects were registered and 64.75% of registered projects achieved compliance during implementation, against an industry vision of at least 90%, empirically demonstrates that projects in Kenya are far from achieving optimal compliance. This data enhances TRC by indicating that current efforts are not optimally balanced or focused on the "predictor" or "right rules" necessary to significantly move compliance levels. The finding that only 67.8% of regulatory compliance variability is explained by the identified factors also implicitly supports TRC's view that not all rules are created equally and bear differential influence, thus emphasising the need to identify the most impactful regulatory elements.

PITR assumes that governments intervene through regulation to maximise public interests and correct market failures. The study's consistent finding of persistent high incidences of building failures, leading to loss of lives and property, with nearly all cases involving non-compliance, strongly supports PITR's central premise that government intervention through robust regulation is obligatory to safeguard public interest. The proposed framework's vision for "near 100% compliance with building regulations and zero incidences of failure and collapse of buildings, as well as zero fatalities" directly aligns with PITR's core goal of enhancing social welfare and correcting market malfunctions. This empirical validation strengthens the relevance of PITR in addressing severe market failures, particularly against criticisms that challenge the notion of "public interest" motives.

CT argues that regulated industries can influence regulators to make decisions in their favour, potentially leading to regulatory failure. The study's identification of "corruption and mismanagement" as a significant barrier to compliance, specifically mentioning "corruption by regulatory bodies/agencies officials" and "unqualified and corrupt agency agents", directly enhances CT. This provides empirical evidence of how regulatory capture manifests within the Kenyan construction industry, supporting the theory's view that entities, including regulators and regulated parties, can be "greedy" and "self-seeking". The proposed framework's innovative approach to "confer regulatory functions upon the project client" is a practical measure designed to mitigate this risk, by shifting responsibility to a party whose direct interests align with project quality and safety, thereby potentially bypassing traditional points of regulatory capture.

DT suggests that compliance is driven by the certainty, severity, and celerity of penalties. However, the study found that the current "deterrence-based strategy" in Kenya, which relies heavily on sanctions and penalties, has been "ineffective" in achieving desired compliance levels. This challenges the classical DT, as the high incidence of non-compliance despite existing penalties indicates that a purely punitive approach is insufficient. The findings enhance DT by suggesting that human behaviour is not always purely rational, and that excessive force may reduce willingness to comply. The proposed framework, therefore, advocates for a mixed, responsive, service-oriented approach, where regulators assist compliance and balance punishment with persuasion. This shifts the focus from merely punishing violations to understanding why rules are broken, creates awareness, motivates compliance, and builds capacity, while still acknowledging that flagrant violators need to be controlled. The Robust Decision Making (RDM) model proposed in the framework embodies this refined, evidence-based approach to deterrence, moving beyond a narrow, punitive focus.

SCT suggests that learning occurs in a social context through dynamic interactions of person, environment, and behaviour, emphasising observational learning, self-efficacy, and reinforcement. The study's findings on the importance of factors like the "conduciveness of the construction task environment" (CTE), "competency of project leaders" (CPL), and "goodness of construction labour" (GCL), all of which explained significant variability in compliance, strongly enhance SCT. These factors encompass environmental aspects (CTE), the natural person (CPL), and behavioural (GCL) aspects, aligning with SCT's core tenets. The study highlights that continuous training and awareness or sensitisation among the construction workers, the professionals, and the general public are crucial for enhancing compliance. These practical recommendations directly align with SCT's constructs, emphasising that compliance is a learned behaviour fostered through education, modelling (e.g., by project leaders), and reciprocal interaction within the construction environment. The proposed framework's focus on "assisted compliance initiatives" and "reward mechanisms" further supports SCT's concept of positive reinforcement to cultivate a culture of obedience. The empirical identification of specific factors (CTE, CPL, GCL) that influence compliance provides concrete examples of how the person, the environment, and behaviour interact to shape compliance outcomes, strengthening SCT's applicability in the construction context.

Generally, this study's philosophical contribution resides in its advocacy for a participatory, supportive, and service-oriented paradigm of regulation. This approach prioritises the active engagement of all pertinent stakeholders, wherein regulatory bodies endeavour to facilitate the attainment of compliance objectives. The concept of shared responsibility represents a notable departure from traditional models in which the burden of compliance rested exclusively with regulatory entities. Instead, it suggests a framework predicated on the active involvement of all stakeholders in ensuring adherence to stipulated standards. Consequently, the study champions a transition towards a more preventive, supportive, and collaborative regulatory model, shifting the emphasis from punitive measures for breaches to proactive assistance for entities in meeting compliance requirements. This inherently necessitates symbiotic collaboration with regulated entities to ensure the successful fulfilment of regulatory obligations.

6.6.2 Practical Implications

This study offers several practical implications for the Kenyan construction industry, primarily aimed at strengthening regulatory compliance, refining building practices, and ensuring ownership of regulatory processes. It identifies nine key determinants of regulatory compliance in Kenya as: the suitability of the legal framework (SLF), the proactiveness of regulatory agencies (PRA), the efficiency of regulatory processes (ERP), the conduciveness of the construction task environment (CTE), the characteristics of the project client (CPC), the competency of project leaders (CPL), the goodness of construction labour (GCL), the stability of the prevailing economic environment (SEE), and adherence to ethical factors (AEF). It then puts forth a practical framework based on these factors that regulators can use to foster quality and safety in construction.

By pinpointing the key factors that influence regulatory compliance, this research first highlights specific areas where practical interventions can be targeted. These include the recommendation to assign regulatory responsibilities to the project client or developer, as outlined under the CPC variable, considering their role as initiators, financiers, and primary decision-makers in a project. The study also emphasises that project leaders should not indemnify project clients or developers, even for decisions they make solely.

Secondly, the study takes note of the current low project compliance levels and recommends a framework that, among other things, advocates for the redesign of construction regulatory procedures to guide the improvement of compliance levels, and by extension, ensure better project performance. A notable discovery was a significant compliance disparity between registered and unregistered projects. Based on these findings, the study proposes a holistic framework designed to enhance regulatory compliance across the entire project lifecycle, encompassing initiation, planning, implementation, and monitoring. Through the framework, the study ensures that clear functions are assigned to each party in the building regulatory space and addresses overlaps that create inefficiencies in the regulatory processes. This framework integrates strategic approaches, including reviewing the regulatory framework, increasing public awareness and involvement, enhancing stakeholder education and training, integrating technology, developing comprehensive regulations, and fostering collaboration.

Given the study's finding that 35.25% of regulatory compliance gains are lost during project execution, the recommended framework rides on the platform of Regulatory Technology (RegTech) and EdTech (Educational Technology) that ensures optimisation of regulatory compliance management, through close monitoring and incentivisation of compliance, thus expected to ensure the preservation of regulatory gains secured during the project registration phase. To support this, the study recommends the modification of the current Regulatory and Construction Information System (RCIS) developed by NCA to include a reward or sanctioning model for contractors, and allow for field reporting by Compliance Field Assistants. This will not only ensure that contractors gain or lose points based on compliance or non-compliance levels, but also expected to influence licence renewal, inform regulators on contractors' category upgrades or downgrades, and risk assessment.

Thirdly, beyond bridging the surveillance gap, this framework serves as a strategic professional development pipeline. By engaging young construction graduates as Compliance Field Assistants, the initiative provides essential entry-level exposure to regulatory standards and site management, equipping the next generation of professionals with a deep-rooted "compliance-first" mindset.

Fourthly, this study advocates for a shift from a purely deterrence-based regulatory approach, which focuses on sanctions and penalties, toward a more collaborative and service-oriented framework. This marks a practical change in how regulators engage parties in construction projects, emphasising support and guidance rather than just punishment in the pursuit of regulatory compliance. The study champions the adoption of a robust decision-making (RDM) model to promote compliance.

Since systems alone can't effectively create change, people need to play a central role in advancing regulatory goals, driving change, and cultivating a new culture. Through this, the study underscores the importance of assisted compliance, where regulators strive to help projects achieve compliance rather than simply penalising non-compliance. This highlights a practical shift toward preventative measures and collaboration with stakeholders, rather than a focus on post-violation action. As such, this study advocates for the recruitment and facilitation of Compliance Field Assistants to serve as vital intermediaries between the National Construction Authority (NCA) and local construction sites by expanding the regulator's reach into "invisible" or overlooked sites. Their primary mandate will be to drive "assisted compliance" while the NCA retains exclusive legal accountability for enforcement. RDM will also serve to ensure inclusivity and promote the cultivation of a culture of collective responsibility, where communities will feel a part of the processes that shape their built environments.

Finally, the study's findings, conclusions, and recommendations can also be used to develop content and/or curriculum for training construction industry stakeholders, especially given that the study has identified valuable practical material.

6.7 Limitations of the Study

Limitations of the Study discussed in this section refer to aspects that could have potentially affected the study’s outcomes, interpretation, and generalizability of the findings. The study, for instance, employs a cross-sectional research design, which, while appropriate given the time and resource constraints of the researcher, has inherent limitations such as the inability to analyse the transformation of regulatory compliance over an extended period. Data collection for this study, for example, was undertaken during a time of heightened regulatory compliance checks normally undertaken during the rainy season due to many collapses tending to occur during this time. This could have affected the typical operations of the construction projects under study. The information collected at one point in time could, therefore, be potentially non-representative. The approach also could not lead to the establishment of definite cause-and-effect relationships, meaning that potentially critical factors influencing regulatory compliance may have been overlooked.

Further, the study observes building regulatory compliance through the lens of only five main regulatory agencies: The County government, the National Construction Authority (NCA), the National Environment Management Authority (NEMA), the Department of Occupational Safety and Health Services (DOSHS), and the Water Resources Authority (WRA). These represent a few of the many regulatory agencies in the industry, and hence, the findings may not capture the full range of regulatory influences on construction projects. In conclusion, the study focuses on the regulatory compliance aspects of buildings under construction, thus excluding other areas such as roads, water, electrical, telecommunications, and even the decommissioning of built structures. These limitations highlight areas where future research could further refine the understanding of regulatory compliance in the construction industry.

6.8 Areas for Further Research

Regulatory compliance within the construction industry represents a vast field of study. While the industry broadly incorporates elements such as road and railway construction, electric and telecommunication infrastructure development, and the construction of dams and waterways, as well as the demolition of built structures, this investigation specifically addressed regulatory compliance for buildings under construction. This focused approach leaves ample scope for future research, including:

1) Evaluating factors that promote non-compliance among unregistered projects: This study primarily focused on registered projects, but a significant portion of projects remain unregistered, indicating a need to understand the underlying reasons for this non-compliance from the initial stage.
2) Assessment of human factors in the compliance of construction projects: While the study touched upon factors like the goodness of construction labour, characteristics of the project client, and the competency of project leaders, a deeper understanding of broader human factors influencing compliance could yield further insights.
3) Leveraging technology and innovation to promote compliance, specifically the development of a mathematical model for rewarding or sanctioning compliance through the RCIS platform: The proposed framework recommends the adoption of a mathematical model for rewards, sanctions, and other assessments based on compliance adherence, to be embedded in the Regulatory and Construction Information System (RCIS). Further research could focus on developing, refining, and validating this model.
4) Compliance in other sub-sectors: This study specifically focused on the buildings sub-sector, leaving the evaluation of the level of regulatory compliance in other significant areas of construction, such as roads, water, electrical, and telecommunication infrastructure development, unexamined.

5) Validation of proposed framework: This study introduced a framework designed to enhance regulatory compliance within construction projects. Further research is necessary to establish and detail the framework's validation process.
6) An account of the economic losses associated with structural collapses and failures in Kenya: While the current work explores the why and how of compliance, this study would quantify the consequences of failure, transitioning the focus from regulatory compliance to a rigorous financial and socioeconomic impact assessment.
7) The role of building legislation as a moderating variable between project-level factors and final quality outcomes: While six significant factors in this study explain 67.8% of the variability, the remaining 32.2% suggests the presence of complex moderating or mitigating interactions that should be unveiled.

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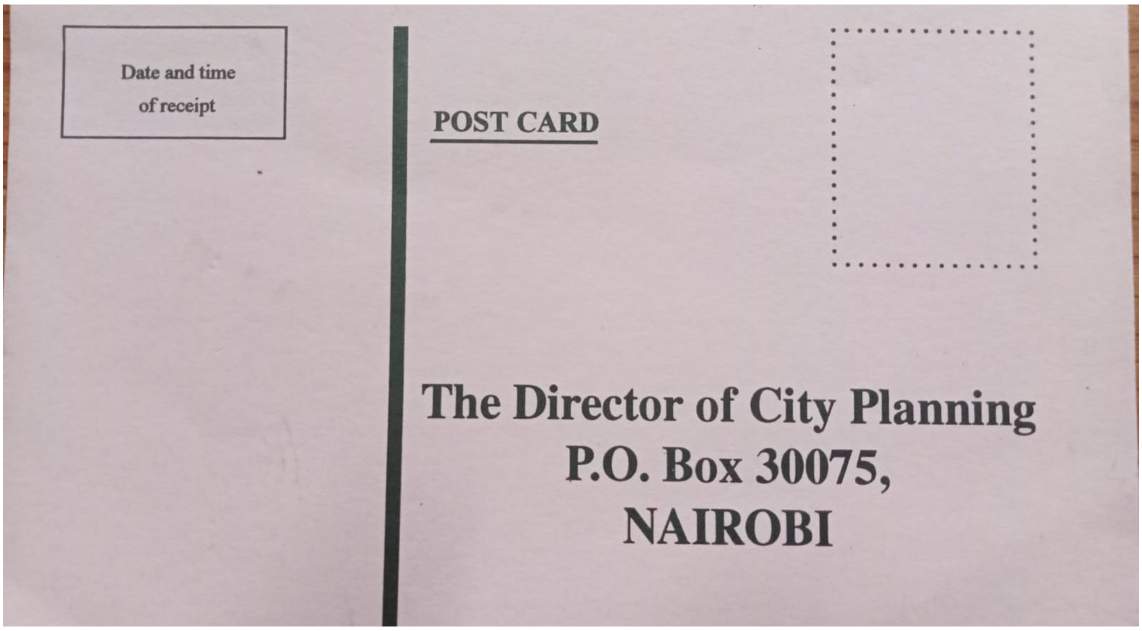
APPENDICES

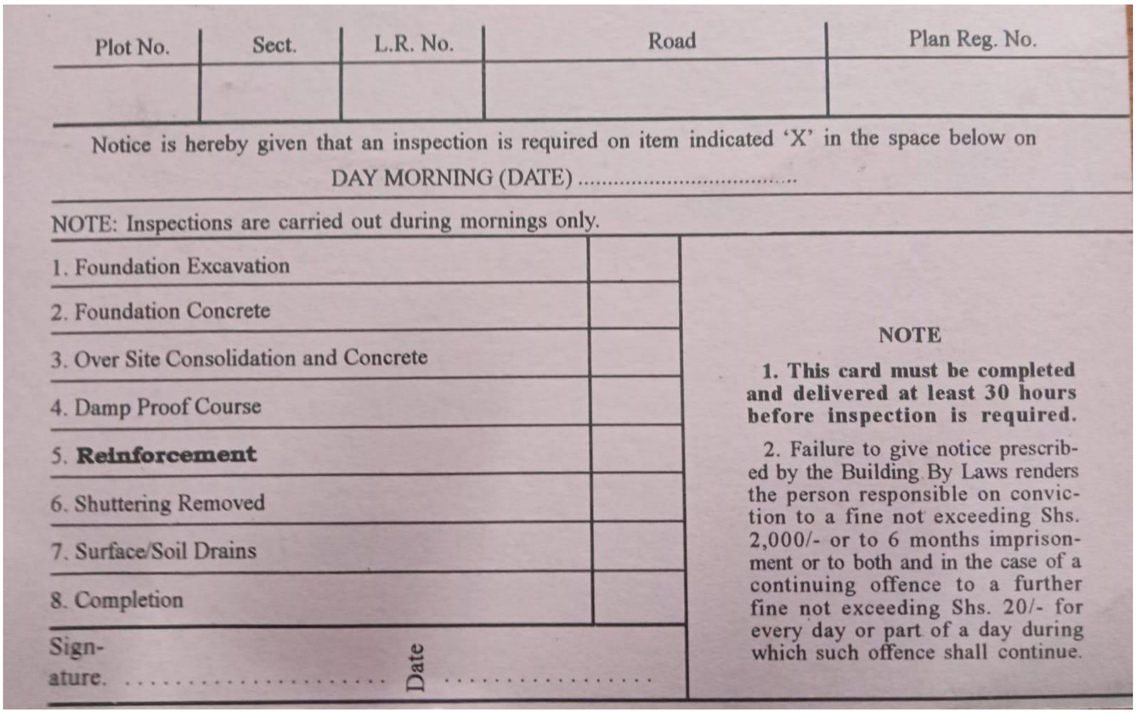
Appendix I: Nairobi County Quality Assurance Tool (Post-Card)



Date and time of receipt

POST CARD

The Director of City Planning
P.O. Box 30075,
NAIROBI



Plot No.	Sect.	L.R. No.	Road	Plan Reg. No.

Notice is hereby given that an inspection is required on item indicated 'X' in the space below on DAY MORNING (DATE) ....

NOTE: Inspections are carried out during mornings only.

1. Foundation Excavation	
2. Foundation Concrete	
3. Over Site Consolidation and Concrete	
4. Damp Proof Course	
5. **Reinforcement**	
6. Shuttering Removed	
7. Surface/Soil Drains	
8. Completion	

Sign-ature. .... Date ....

NOTE

1. This card must be completed and delivered at least 30 hours before inspection is required.

2. Failure to give notice prescribed by the Building By Laws renders the person responsible on conviction to a fine not exceeding Shs. 2,000/- or to 6 months imprisonment or to both and in the case of a continuing offence to a further fine not exceeding Shs. 20/- for every day or part of a day during which such offence shall continue.

Appendix II: NEMAs Quality Assurance Tools

a) EIA Site Inspection Form

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

COUNTY DIRECTOR OF ENVIRONMENT, MACHAKOS

E-mail: machakos@nema.go.ke
Website: www.nema.go.ke

P.O. Box 2- 90100
Machakos, Kenya

EIA SITE INSPECTION REPORT

PROJECT NAME		
REF. NO.		
PHYSICAL LOCATION		
DESCRIPTION OF THE PROJECT		
a.	Current land use	
b.	Access roads	
c.	Topography of the site	
d.	Is the site served with water supply	
e.	Is the site served with sewer line	
f.	Is the site served with power supply	
g.	Does it neighbor a water resource	
h.	Does it have a unique feature	
i.	Is the site ideal for the proposed project	

Our Environment, Our Life

DESCRIPTION OF THE NEIGHBOURHOOD	
DOES THE REPORT ADEQUATELY IDENTIFY THE NEGATIVE IMPACTS	
IS THE EMP COMPREHENSIVE	
FINDINGS OF THE INSPECTION	
RECOMMENDATIONS	
OFFICER'S NAME	
SIGNATURE	
DATE	

Our Environment, Our Life

b) EMPs Monitoring Tool

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

MONITORING OF ENVIRONMENTAL MANAGEMENT PLANS (EMPs) OF ENVIRONMENTAL AUDIT (EA) REPORTS (No. of EMPs MONITORED)

TEMPLATE

1. **Project Description**

NEMA Audit File Reference No.	
Name of Facility	
Certificate of Incorporation	
Year of Incorporation	
Activity/Sector	

2. **Hazard Category**

A. High Risk	
B. High Risk	
C. High Risk	

3. **Location**

Physical Address	
Ward/Sub-County/County	
GPS Coordinates	
Landline	

Mobile	
E-mail	

4. **Environmental Management Plans (EMP) Extract from EA Report**

SL No.	Potential Impact (Priority 6)	Proposed Mitigation (Priority 6)

5. Audit Action Plan

Date of Audit: ……………………………………

To: Facility Manager

From: Name of Inspector
County Name:
Physical Address:
Phone & e-mail Contact:

Facility: Type of Facility
Location/County/Sub-county
Physical Address
Phone & e-mail Contact:

Key Observations and Agreed Action Plan

Sl No.	Observations/Non-Compliance	Mitigation Action Plans Agreed with Facility	By When

Appendix III: NCAs Suspension of Works Order

S/No: NCA

NATIONAL CONSTRUCTION AUTHORITY
ISO 9001:2015 Certified

9th Floor, KCB Towers
Kenya Road, Upper Hill Area
Nairobi, Kenya

+254 709 126 102/172/173
P.O.Box 21046-00100
info@nca.go.ke

Ref: .... **Date:** ....

To Developer:..

Contractor :..

Project :..

....

Title/ LR Number :..**Street/ Road** ....

County :..**Town**: ....

SUSPENSION OF WORKS ORDER

In exercise of powers granted under Section 23(2) of the National Construction Authority Act no. 41 of 2011 and following the inspection carried out on the works at your construction site by the undersigned, the works have been found to be **NON-COMPLIANT** on the following item(s) marked (X) and are hereby **SUSPENDED** with **IMMEDIATE** effect. Take note that you will be required to ensure compliance and obtain a lifting of the suspension of works order before proceeding with the works, failure to which action shall be taken against you in line with the provisions of section 23(3a)* and (5) of the National Construction Authority Act.

- [ ] 1. NCA Compliance Certificate
- [ ] 2. NCA registered contractor with valid licence
- [ ] 3. NCA Accredited Skilled workers and Site Supervisors
- [ ] 4. Site board showing all approvals and the professionals engaged
- [ ] 5. Personal Protective Equipment
- [ ] 6. Hoarding, fencing and netting
- [ ] 7. Safety signs

Additional Comments

....

....

....(Name and Signature of investigating Officer)

FOR: EXECUTIVE DIRECTOR/ REGISTRAR OF CONTRACTORS

Received by.. I.D.No........................ Sign.....................................

Date.. Time:..................................

Copy to:

Officer Incharge of (...) Police Station

Project Supervising Team..

**section 23 (3a) a person who wilfully fails to comply with an order of an investigating officer under subsection (3) commits an offence and shall be liable, on conviction, to a fine not exceeding one million shillings or imprisonment for a term not exceeding three years or to both.*

Appendix IV: DOSH Quality Assurance Tools

a) Notification Form

MLSSS/DOSH/BCR 25A (Revised 2014)
(fill in duplicate)
OFFICIAL USE ONLY
Reg. Fee/OSH Levy: KSh……………………
MR No……………………………………
Signature…………………………………
Date………………………………………

REPUBLIC OF KENYA

MINISTRY OF LABOUR,
SOCIAL SECURITY AND SERVICES

OFFICIAL USE ONLY
Recommended for Registration on ……………/20…..
Name of County OSH Officer ……………………………
Signature ……………………………………………

OCCUPATIONAL SAFETY AND HEALTH ACT, 2007

(Acts No. 15 of 2007)

NOTIFICATION AND APPLICATION FOR REGISTRATION OF BUILDING OPERATIONS OR WORKS OF ENGINEERING CONSTRUCTION

1. Name of Contractor (person, firm, or company undertaking the operations or works)	……………………………………………
2. State whether main contractor or sub-contractor.	……………………………………………
3. Trade of person, firm or company undertaking the operations or works.	……………………………………………
4. Address of registered office or of principal place of business	P. O. Box ……………………… Email: ………………
5. Address to which communications should be sent (if different from above).	P. O. Box……………………… Email:………………
6. Place where the operations or works are carried on **(Plot No., Street, Town, County)**	……………………………………………
7. Telephone No. of the site.	Tel: ………………………………………
8. How many workers are you likely to employ on the site?	……………………………………………
9. Approximate date of commencement.	……………………………………………
10. Probable duration of work.	……………………………………………
11. Is mechanical power being, or to be, used? If so, what is its nature (e.g. electric, steam, gas or oil)?	……………………………………………
12. Nature of operations or works carried on:	

(a) Building operations (tick items which apply)

Construction……………………………	of	Industrial building……………………………
Maintenance……………………………		Commercial or public building……………………
Demolition……………………………		Dwellings over 3 storey…………………………
		Dwellings of 3 storey or less……………………
		Others……………………………………………

(b) Work of engineering construction *(specify type)*……………………………………………

13. Name of Director/Partner/Proprietor ……………………………………………

I hereby give notice that I am undertaking the building operations or works of engineering construction specified above.

Signature…………………………………… Date……………………………………

NOTE:

1. This form should be accompanied by DOSH 23 (Self-assessment form), DOSH 30 (Appointment of Safety Supervisor) together with OSH Levy and registration fee payment (KShs. 5000) banking slip in the name of the contractor.

2. Any person undertaking any building operations or work of engineering construction to which the Act applies is required, not later than seven days after the beginning of any such operations or works, to serve on the area Occupational Safety and Health Officer a written notice giving the particulars specified in rule (3) of the Factories (Building Operations and Works of Engineering Construction) Rules, 1984 unless they are operations or works which the person undertaking them has reasonable grounds for believing will be completed in less than six weeks.

b) Self-Assessment Form (Form DOSH 23)

MLSSS/DOSH BCR 34

Fill in duplicate

THE OCCUPATIONAL SAFETY AND HEALTH ACT, 2007

BUILDING OPERATIONS OR WORKS OF ENGINEERING CONSTRUCTION SELF-ASSESSMENT REPORT

1. NAME OF CONTRACTOR……………………………………………………………………………………

2. PERSONNEL

	Permanent		*Casuals*		*Sub - Total*
	Male	*Female*	*Male*	*Female*	
Management/Supervisors					
General workers					
Sub - Total					
Grand Total					

3. NUMBER OF SANITARY AND WASHING FACILITIES

MALE				*FEMALES*		
Toilets	*Urinals*	*Showers/ bathrooms*	*Hand Washing*	*Toilets*	*Showers/ bathrooms*	*Hand Washing*

4. WELFARE FACILITIES

a) First Aid Box/First aid rooms ……………………………………………………………………

b) Drinking Water………………………………………………………………………………

5. SHARED FACILITIES

If facilities mentioned in paragraphs 3. and 4. are shared or are provided by client or main contractor or any other person please indicate the Name of person/Company providing the facilities

……………………………………………………………………

6. GIVE A BRIEF SUMMARY OF NATURE OF WORK BEING DONE IN THE SITE

……………………………………………………………………………………………………

……………………………………………………………………………………………………

7. MACHINERY, EQUIPMENT AND PLANT IN USE (machines, Lifting equipment, pressure vessels etc) …………………

……………………………………………………………………………………………………

8 . LIST THE EXPECTED HAZARDS…………………………………………………………………

……………………………………………………………………………………………………

9. WHAT PRECAUTIONS HAVE YOU TAKEN OR INTEND TO TAKE TO CONTROL THE HAZARDS?

……………………………………………………………………………………………………

10. LIST THE PROTECTIVE APPLIANCES AND CLOTHING PROVIDED TO WORKERS

……………………………………………………………………………………………………

11. VENTILLATION

a) Mechanical (e.g. Type) ……………………………………………………………………

b) Local exhaust ventilation (if any*)*: ……………………………………………………………

12. FIRE PRECAUTION

a) Appliances (Indicate types, number and distribution of fire extinguishers): ……………………………

……………………………………………………………………………………………………

b) Means of escape from workplace in case of fire: (specify)……………………………………………

13. DECLARATION.

I declare that the information given herein is true to the best of my knowledge and belief.

Signature: …………………………………… **Designation** ……………………………………

Assessment Report Date ……………………… **Name of Person filling Assessment Report**: ……………………

c) Notice of Appointment of Safety Supervisor/Officer (Form DOSH 30)

ML/DOSH./FORM 30
(To be filled in duplicate)

REPUBLIC OF KENYA

MINISTRY LABOUR, SOCIAL SECURITY AND SERVICES

OCCUPATIONAL SAFETY AND HEALTH (BUILDING OPERATIONS AND WORKS OF ENGINEERING CONSTRUCTION) RULES, 1984

Rule 7.

NOTICE OF APPOINTMENT OF SAFETY SUPERVISORS/OFFICERS

The Director,
Directorate of Occupational
Safety and Health Services,
P.O. Box 34120 - 00100,
Nairobi.

Please Take Notice That:

Mr./Mrs./Miss ....

has been appointed the Safety Supervisor / Officer for the ....

.... site with effect from ....

day of .... 20 ....

The person has been found competent to carry out the duties as required by Rule 7 of the Building operations and works of Engineering Construction Rules, and his name has been entered in the abstract of the rules posted on the site.

Name of the safety supervisor's employer making the appointment ....

....

Address of the above said employer ....

Signature and seal of the said employer ....

....

....

....

NOTE:
This form should be copied to the Occupational Safety and Health Officer in-charge of the area in which this site is situated.

Appendix V: Sample Size Determination Formula for Registered Projects

Other Formula

Using Yamane's sample size determination formula below.

$$n_1 = \frac{N}{1 + N(e)^2}$$

where;

n_1 = is the sample size being sought

N = the population of the study

e = the margin error in the calculation (the confidence level is usually set at 0.05)

Therefore, the sample size will be

$$n_1 = \frac{816}{1 + 816(0.05)^2}$$

n_1 = 268.4

n_1=268

Appendix VI: Random Selection Output for Registered Projects from R Programming

[1]	729	431	786	118	454	51	583	807	262	517	103	604	799	216	330	14	546	415	340	25
[21]	92	724	233	108	800	97	313	199	722	694	493	514	242	211	328	26	548	773	347	364
[41]	157	19	595	363	751	194	693	815	558	62	418	489	476	260	483	20	67	341	277	524
[61]	385	709	466	502	48	810	446	563	180	7	207	499	368	181	80	361	106	204	12	417
[81]	227	567	675	453	513	537	121	439	127	182	82	320	477	254	284	90	135	712	273	428
[101]	83	206	301	521	577	186	255	407	405	623	776	816	674	76	265	781	475	766	27	547
[121]	50	671	745	581	13	640	619	270	813	743	225	528	432	761	134	510	522	695	285	647
[141]	98	283	503	52	221	572	482	470	275	229	683	739	438	655	785	397	757	252	652	349
[161]	192	166	144	179	318	535	303	292	187	77	772	70	717	369	447	289	673	319	210	777
[181]	367	516	584	31	34	609	737	391	305	728	703	145	691	243	434	351	357	465	384	472
[201]	607	276	433	389	667	63	5	209	498	406	375	246	280	425	629	657	711	747	530	630
[221]	423	608	753	700	464	542	624	720	57	348	311	672	403	557	648	731	234	650	158	339
[241]	531	217	129	295	606	638	412	448	687	162	137	331	171	593	613	386	735	109	746	445
[261]	39																			

Source: Author generated

Appendix VII: Survey Introductory Letter

JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY
SCHOOL OF ARCHITECTURE AND BUILDING SCIENCES
P.O. Box 62000-00200, NAIROBI, KENYA. Tel.: 067-5870000, Ext. 2429/2430/

March 2024

TO WHOM IT MAY CONCERN

RE: REQUEST TO ADMINISTER QUESTIONNAIRE TO THE SITE SUPERVISOR

Dear respondent,

I am a postgraduate student from JKUAT pursuing a doctoral degree in Construction Project Management. I am currently undertaking my research titled ***"Developing a Framework for Enhancing Compliance of Construction Projects to Construction Industry Regulations in Kenya"*** as a course requirement. The purpose of this letter is to kindly request you to share the requested information that will facilitate this research work.

The aim of the research is to investigate the determinants of compliance of construction sites to construction regulations in Kenya. The specific objectives are:

1) To find out the levels of regulatory compliance in construction projects;
2) To find out factors that affect level of regulatory compliance in a construction project;
3) To establish the relationship between compliance in a construction project and its explanatory variables; and
4) To formulate a framework for enhancing regulatory compliance of a construction project.

The information collected from the questionnaire will be **CONFIDENTIAL** and used **ONLY** for the purposes mentioned above. Your contribution towards this will be of great assistance in formulating measures that can make the construction industry more compliant, safer and productive. I have attached a research license from the National Commission of Science, Technology and Innovation (NACOSTI) for your ease of reference.

Yours faithfully,

LAGAT, DAVID KIPCHIRCHIR

Candidate, PhD in Construction Project Management.

Mobile: 0721787135 Email: david.lagat@students.jkuat.ac.ke

Appendix VIII: Questionnaire

QUESTIONNAIRE NO.: ……………………………………

DATE OF DATA COLLECTION: ……………………………………

NOTE: Please tick [√] or fill where appropriate

SECTION A: BACKGROUND INFORMATION

1. Gender

○ Male ○ Female

2. Highest level of education

○ None ○ Trade test ○ Certificate ○ Diploma ○ HND

○ Bachelor's degree ○ Postgraduate ○ Other (specify): ……..........................

3. Age Bracket

○ 15-19 ○ 20-24 ○ 25-29 ○ 30-34 ○ 35-39 ○ 40-44

○ 45-49 ○ 50-54 ○ 55-59 ○ 60-64 ○ 65-69 ○ 70+

4. What is your position in this construction project?

○ Site Foreman ○ Site Supervisor/agent ○ Clerk of works

○ Other (Specify): ………………………

5. How many years of work experience do you have in building construction sector?

○ Below 3 yrs ○ 4-7 yrs ○ 8-11 yrs ○ 12-15 yrs ○ 16-19 yrs ○ 20+ yrs

6. What NCA class and category of works is the Main Contractor in this project registered?

Category / Class	NCA 1	NCA 2	NCA 3	NCA 4	NCA 5	NCA 6	NCA 7	NCA 8
1. Building works								
2. Water works								
3. Roads works								
4. Mechanical works								
5. Electrical works								

7. What stage of construction is this construction project?

◯ Site preparations ◯ Foundation ◯ Ground Floor ◯ Slabbing ◯ Framing

◯ Roofing ◯ Finishes ◯ Other (specify): ……..........................

8. What is the estimated cost (KSh. in millions) of this construction project?

◯ Below 5M ◯ 5-10M ◯ 11-20M ◯ 21-50M ◯ 51-100M

◯ 101-200M ◯ 201-300M ◯ 301-500M ◯ Above 500M

9. a) Since inception, has this project undergone any regulatory inspection e.g. by NCA, County Government, NEMA, WRA?

◯ Yes ◯ No

b) If your answer to 9(a) above is **Yes,** has this project ever been suspended by any regulatory agency (e.g. NCAs X)?

◯ Yes ◯ No

c) If your answer to 9(b) is **Yes,** which agency gave the suspension and what were the reasons?

Regulatory Agency	*Reason*
◯ County Government	…………………………………….. ……………………………………..

Regulatory Agency	*Reason*
◯ National Environment Management Authority (NEMA)	…………………………………….. ……………………………………..
◯ National Construction Authority (NCA)	…………………………………….. ……………………………………..
◯ Directorate of Occupational Safety and Health Services (DOSHS)	…………………………………….. ……………………………………..
◯ Water Resources Authority (WRA)	…………………………………….. ……………………………………..
◯ Other: …………………………………………	…………………………………….. ……………………………………..

10. a) Have there been any serious construction related injuries in this project where there was hospitalization?

◯ Yes ◯ No

11. **On a scale of 1-10,** please rate the level of compliance of this construction project to construction industry regulations in Kenya?

	1	2	3	4	5	6	7	8	9	10	
Very low	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	Very high

SECTION B: REGULATORY COMPLIANCE OF THE SITE

12. By selecting either **YES** or **NO** please indicate whether this construction site is compliant in respect of the following.

Item	YES	NO
Project registration status (RS)		
a) This project has a building permit from the Nairobi City County Government		
b) This project has a valid NEMA license (EIA/ESIA)		
c) This project has a valid NCA compliance certificate		
d) This project is validly registered with DOSHS as a work-place		
Project site conditions (SC)		
a) There is a site board showing details of all project implementers in this project		
b) There is an environment management plan (EMP) for this project		

Item		YES	NO
c)	A geotechnical survey was undertaken for this project		
d)	Hoarding/netting/fencing has been done on this project site		
e)	There is a dedicated fire assembly point in this project site		
f)	There is a fully kitted first aid kit available on site		
g)	The OSHA abstract declaring this project site as a work place is displayed		
Project workforce status (WS)			
a)	The main contractor undertaking the works on site has a valid NCA license		
b)	I have a valid accreditation as a site supervisor		
c)	Construction workers adorn personal protective equipment (PPE)		
d)	There is an appointed safety officer on site		

13. **On a scale of 1 to 7**, where **1 = Fully disagree**, and **7 = Fully agree**, please indicate your level of agreement to the following statements in relation to this project.

		Fully disagree ← → Fully agree						
Item		**1**	**2**	**3**	**4**	**5**	**6**	**7**
Project registration status (RS)								
a)	Space e.g. way leaves and road reserves for public utilities have been adequately provided							
b)	County government inspectors undertake regular site inspections							
c)	NEMA conducts regular compliance monitoring on this site							
d)	We implement the projects environment management plan (EMP) fully							
e)	NCA inspectors undertake regular site compliance checks							
Project site conditions (SC)								
a)	All debris and excavated materials are dumped on sites approved by the county							
b)	General environmental protection is ensured at all times							
c)	Hoarding/netting/fencing has been adequately provided on site							
d)	Safety signs are adequately displayed in this construction site							
e)	Materials are always inspected for quality before admission to site							

	Fully disagree ← → Fully agree						
Item	**1**	**2**	**3**	**4**	**5**	**6**	**7**
f) Material tests are conducted at all relevant stages of this project							
g) A record of all material test results is kept							
h) Poor quality materials are not stored in this construction site							
i) All construction materials are handled appropriately to maintain quality							
j) Changes project specifications are handled procedurally							
Project workforce status (WS)							
a) Consultants e.g. engineers, architects regularly visit the site for inspections							
b) A validly registered NEMA expert helps in the implementation of EMP							
c) The skilled construction workers on site are accredited							
d) Construction workers adorn adequate personal protective equipment (PPE)							
e) There is always a trained first aider on site							

SECTION C: FACTORS INFLUENCING THE LEVEL OF REGULATORY COMPLIANCE IN CONSTRUCTION SITES

14. **Suitability of the project legal framework (SLF)**

On a scale of 1 to 7, where **1 = Fully disagree**, and **7 = Fully agree**, please indicate your extent of agreement with the following statements on the suitability of the **legal framework** that influence the level of regulatory compliance in this construction project site.

	Fully disagree ← → Fully agree						
Suitability of the legal framework (SLF)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
a) I am aware of construction regulations applicable to this project							
b) The laws applicable to this project are very clear to me							
c) The interpretation of applicable laws is consistent across regulatory agencies							
d) Penalties for project non-compliance are clear							
e) Penalties for project non-compliance are specific to an issue							

	Fully disagree ← → Fully agree						
Suitability of the legal framework (SLF)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
f) In my view the existing laws are adaptable for all projects e.g. public and private (residential and commercial)							
g) Existing laws support quality implementation of works in this project							

15. **Proactiveness of the regulatory agencies (PRA)**

On a scale of 1 to 7, where **1 = Fully disagree**, and **7 = Fully agree**, please indicate your extent of agreement with the following statements on the **proactiveness of the regulatory agencies** that influence the level of regulatory compliance in this construction project site.

	Fully disagree ← → Fully agree						
Proactiveness of the regulatory agencies (PRA)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
a) I am aware of the different building regulatory agencies							
b) The mandates of the different regulatory agencies are clear to me							
c) Good coordination amongst regulators is ensured at every stage of the project							
d) There is a general acceptance of regulatory agencies role in project delivery							
e) The regulators guided us procedurally leading to compliance							
f) The regulators gave us adequate opportunities to comply							
g) The regulators have put in place clear project monitoring and evaluation measures							
h) Regulatory agencies are proactive							
i) This project is frequently inspected by the regulatory inspectors							
j) Safety is a priority for regulators in this construction site							
k) Quality is a priority for regulators in this construction site							
l) Clear communication by regulators is ensured at all times							
m) Regulatory agencies carry out sensitization programs frequently							
n) Regulatory agencies are always available for consultation							
o) The regulators ensure a clear administrative procedure for all parties involved in the project e.g. signing of binding contracts							
p) In my view regulatory agencies apply building laws strictly							
q) In my view all regulatory agencies are necessary							

16. **Efficiency in regulatory processes (ERP)**

On a scale of 1 to 7, where **1 = Fully disagree**, and **7 = Fully agree**, please indicate your extent of agreement with the following statements on the **efficiency in regulatory processes** that influence the level of regulatory compliance in this construction project site.

	Fully disagree ← → Fully agree						
Efficiency in regulatory processes (ERP)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
a) The regulatory processes are simple							
b) The regulatory processes are integrated across agencies							
c) The regulatory processes are predictable							
d) The regulatory approvals are issued in a timely manner							
e) Information on regulatory processes is readily available							
f) The regulatory processes require good project documentation to comply							
g) The regulatory processes helped to identify constructability challenges in this project							
h) Regulatory processes helped to resolve constructability challenges in this project							
i) The regulatory processes helped to avoid design errors							

17. **Conduciveness of the construction task environment (CTE)**

On a scale of 1 to 7, where **1 = Fully disagree**, and **7 = Fully agree**, please indicate your extent of agreement with the following statements on construction **task environment factors** that influence the level of regulatory compliance in this construction project site.

	Fully disagree ← → Fully agree						
Conduciveness of the construction task environment (CTE)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
a) We make sure every new assignment is clear before executing							
b) We set realistic project objectives							
c) We keep a copy of all site instructions							
d) Teamwork is always demonstrated by the project team							
e) Site safety briefings are conducted regularly							

	Fully disagree ← → Fully agree						
Conduciveness of the construction task environment (CTE)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
f) Team leaders work side by side with the workers							
g) Workers are always given reasonable work targets							
h) Workers are assigned work based on their skills							
i) Workers are encouraged to collaborate when implementing works							
j) Workers are encouraged to contribute ideas on how to best carry out the works							
k) There are clear decision-making procedures for tasks in the project							
l) There are clear communication channels for matters related to the project							
m) The building technology we use does not affect quality of the works							
n) There are clear contractual obligations for each party involved in the project							
o) We use technologies like BIM and MS Project to ensure quality							
p) Defective work is always reworked							
q) We normally invite regulatory agencies for staged inspections and approvals							
r) Design changes during project implementation are communicated to regulators							
s) Dangers identified in the project are communicated to supervisors							
t) Force majeure (unforeseen natural occurrences) measures are factored to project							

18. **Characteristics of the project client (CPC)**

On a scale of 1 to 7, where **1 = Fully disagree**, and **7 = Fully agree**, please indicate your extent of agreement with the following statements on the **characteristics of the project client** that influence the level of regulatory compliance in this construction project site.

	Fully disagree ← → Fully agree						
Characteristics of the project client (CPC)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
a) The client is closely involved at every aspect of this project							
b) The client is aware of all construction-related regulatory requirements							
c) The client has always been willing to comply with all regulatory requirements							

d) The client always seeks advise from the project team							
e) Quality of planning of the work depends on the client							
f) The client does not influence construction process unduly							
g) The client often shares opinion on the project with the project team							
h) The client appreciates the consequences associated with non-compliance of projects							

19. **Competency of project leaders (CPL)**

On a scale of 1 to 7, where **1 = Fully disagree**, and **7 = Fully agree**, please indicate your extent of agreement with the following statements on the **competency of project leaders** that influence the level of regulatory compliance in this construction project site.

	Fully disagree ← → Fully agree						
Competency of project leaders (CPL)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
a) All the selected project team leaders are professionally trained							
b) The consultants involved are committed to quality delivery of work							
c) Project team leaders always believe in collective responsibility over the works							
d) Project consultants are always available for consultation							
e) Project consultants always offer good supervision							
f) Changes in project consultants are handled procedurally							
g) Project team leaders have ensured a clear implementation strategy for regulatory requirements							
h) The client has engaged a dedicated project manager for the project							

20. **Goodness of construction labour (GCL)**

On a scale of 1 to 7, where **1 = Fully disagree**, and **7 = Fully agree**, please indicate your extent of agreement with the following statements on **construction labour** that influence the level of regulatory compliance in this construction project site.

	Fully disagree ← → Fully agree						
Construction labour factor (GCL)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
a) Capacity of a worker is assessed before assigning of duties							

	Fully disagree agree						Fully
Construction labour factor (GCL)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
b) Construction workers are given reasonable work targets							
c) Construction workers involved in this project are competent							
d) Workloads are fairly distributed among construction workers with the same expertise							
e) Workers are remunerated based on their expertise							
f) There is a clear plan of payment for construction workers							
g) Workers are often rewarded for excellent work							
h) Continuous training of workers is ensured							
i) Workers generally satisfied with the work they do							
j) This site does not experience high worker rate of replacement							
k) There exist mechanisms for resolving disputes among workers							
l) There is a mechanism to address welfare issues of workers							
m) Cases of negligence among workers are subjected to disciplinary action							
n) There is a positive view of regulatory compliance among construction workers							

21. **Stability of prevailing economic environment (SEE)**

On a scale of 1 to 7, where **1 = Fully disagree**, and **7 = Fully agree**, please indicate your extent of agreement with the following statements on the **stability of prevailing economic environment** that influence the level of regulatory compliance in this construction project site.

	Fully disagree agree						Fully
Stability of prevailing economic environment (SEE)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
a) The costs associated with regulatory compliance are realistic							
b) The permitting costs are predictable							
c) Taxes do not affect costs of project delivery							
d) The cost of construction labour is reasonable							
e) The costs associated with material testing are reasonable							

	Fully disagree ← → Fully agree						
Stability of prevailing economic environment (SEE)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
f) Profit margins don't determine how work is done							
g) The main contractor has adequate cash-flow for this project							
h) The client has adequate financial capacity for this project							

22. **Adherence to ethical factors (AEF)**

On a scale of 1 to 7, where **1 = Fully disagree**, and **7 = Fully agree**, please indicate your extent of agreement with the following statements on the **adherence to ethics** that influence the level of regulatory compliance in this construction project site.

	Fully disagree ← → Fully agree						
Adherence to ethics (AEF)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
a) The regulatory permitting processes are carried out transparently							
b) Staff of regulatory agencies have never asked for bribes							
c) I have never encountered incidences of corruption in this construction site							
d) I have never encountered collusion between regulatory officers and project team							
e) Regulatory agencies do not approve poor drawings							
f) I have not seen cases of falsifications of project documents							
g) The building plans being implemented are as approved							
h) Construction workers do not hide poor works							
i) The client has never ignored consultants advise							
j) The client complied to regulations because she or he believed the project is visible to regulators							
k) The expected profit margins do not affect adherence to regulatory processes							
l) There has not been any political interference with work on this project							

SECTION D: GENERAL COMMENTS

23. In your **opinion**, what are the barriers to compliance of construction projects to construction regulations?

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24. In your **opinion**, what should be done to enhance the level of compliance of construction projects to construction regulations?

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25. **Any other** comments?

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THANK YOU

Appendix IX: NACOSTI Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **167491**

Date of Issue: **18/January/2024**

RESEARCH LICENSE

This is to Certify that Mr.. David Kipchirchir Lagat of Jomo Kenyatta University of Agriculture and Technology, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: A FRAMEWORK FOR ENHANCING COMPLIANCE OF CONSTRUCTION SITES TO CONSTRUCTION INDUSTRY REGULATIONS IN KENYA for the period ending : 18/January/2025.

License No: **NACOSTI/P/24/32522**

167491

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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See overleaf for conditions

Appendix X: Qualitative Responses

Q23. What are the barriers to compliance of construction projects to construction regulations?

- State of the economy affecting money flow; Payments not done in a timely manner; Rise in material prices
- Lack of fixed periods on approvals hence can take weeks or months; Increase in material prices, taxes and labour rates
- Economic crisis, taxation and corruption especially in government offices; Congestion in Nairobi, clogging up offices creating delays
- Lack of title deeds hampering approvals in the county; Approvals take too long even when clients have taken construction loans hence projects proceed without approvals
- Lots of processes and rules to be followed especially in the CBD; Delays in acquiring all needed processes
- Cost of regulators is high
- Delays in obtaining permit & approvals
- Lack of enough funds
- Inadequate time & Lack of resources
- Corruption & Lack of Inspection
- Corruption& Ignorance
- Avoid harassing construction workers in order to create loopholes for bribery and corruption like denying certification
- Absence of accountability mechanisms for regulatory bodies and construction workers causing laxity in enforcement
- Lack of adequate awareness among construction workers on regulatory non-compliance
- Corruption within the construction industry can lead to non-compliance as builders may bribe officials to overlook violations of regulations
- Process of obtaining permits and approvals for building is lengthy and discourages builders therefore leading to corruption
- Corruption within the construction industry especially with building (small) that are somehow punished immediately for late payments hence corruption

- Limited access to information and education on regulation hinders compliance efforts especially among the trade tested workers
- Combining all the rules and regulations into one docket from simple to complex making it hard to comprehend
- There is limited access to information pertaining to compliance
- Corruption as a result of the lengthy bureaucratic process of getting a licence and requesting inspections
- Inadequate monitoring and supervision of construction activities by regulatory agencies
- Bribes and corruption between rich clients and the inspector from the regulatory body
- Weak monitoring and supervision of construction activities by regulatory agencies can allow non-compliant practices to go on unchecked
- Not so many people understand or comprehend the exact regulations dictating construction projects. There is insufficient understanding especially among the workers
- There is a lack of knowledge that exists as a deficit in awareness among numerous construction firms and labourers in Kenya regarding the specific regulations
- Lack of awareness or familiarity between construction companies and workers in Kenya where there is a lack of familiarity with the specific regulations that govern construction projects
- Awareness where many construction workers in Kenya especially Nairobi are not fully aware of the specific regulations for different projects
- There are so many rules involved, some which are difficult to comprehend or understand better therefore leading to unintended non-compliance
- Corruption within regulatory bodies and among construction workers can undermine compliance efforts
- Loopholes in construction regulations may lead to exploitation by all the parties involved to circumvent compliance
- There is no clear transparency in the regulatory process such as the issuing of the permits, also inspection procedures can be one-sided at times
- Sometimes stakeholders involved in construction projects may not be fully aware of the regulations applicable to their projects. this can include subcontractors, contractors, designers and even clients

- Weak enforcement of regulations by regulatory authorities can undermine compliance efforts. If there is a perception that non-compliance is common and rarely penalized, some stakeholders may be less motivated to adhere to regulations
- A lack of training and education regarding construction regulations among workers and supervisors and construction managers can lead to inadvertent non-compliance
- Excessive bureaucracy in the permitting and inspection process can frustrate stakeholders and lead to non-compliance and especially if the process is believed to be slow
- Complex building codes where some rules for constructing buildings are very complicated. Most construction professionals find them hard to understand and follow
- Lack of awareness because many people involved in construction don't know about specific rules. This lack of knowledge can lead to accidental violations
- Ambiguity in regulations or legal interpretations can create uncertainty regarding compliance requirements
- Maintaining accurate records and documentation to demonstrate compliance can be burdensome
- Corruption because of the constraints of accessing the permits forced to use back channels to access them
- Complex projects that is large-scale projects involving multiple stakeholders can pose challenges in ensuring compliance at every stage
- When there is limited training on the regulations and compliance, it can become an hindrance
- Regular updates and modifications on necessitating ongoing diligence to ensure adherence may be a constraint limiting adaptation
- In multilingual work environments, understanding and adhering to regulations can be challenging that is language and communication barriers
- Compliance with regulations may involve navigating through complex and unclear regulations on safety guidelines that may hinder compliance eventually
- Construction projects are subject to so many regulations from safety codes and environmental directives making it more complex for comprehension of the measures
- Sometimes time constraints following project schedules may not allow adequate time for compliance related activities such as inspections and paperwork

- Inadequate training on regulatory requirements can at times hinder compliance efforts due to insufficient awareness. Make the regulations clear and precise to understand by clearly defining compliance obligations including penalties for non-compliance
- Sometimes technological barriers may interfere through outdated technology use that slow down certain processes
- Ethnic or cultural factors especially in a country such as Kenya that may at times prioritize cultural factors over the expediency of compliance related issues
- Resistance to change traditional construction practices that may not comply with regulations
- Weak penalties for non-compliance, reducing incentives to adhere to regulations
- Cost considerations leading to prioritization of savings over compliance
- Ineffective enforcement by regulatory bodies that stems from corruption and resource unavailability
- Some aspects of politics at times can interfere with the regulatory process affecting compliance
- Corruption and bribery undermining regulatory compliance efforts
- Political interference in regulatory process affecting enforcement
- Cost considerations leading to prioritization of savings over compliance
- Regulations too difficult to comprehend
- Public participation is very low
- Corruption with officers (NCA)
- Time consumption in government offices
- Corruption
- Poor enforcement because of corruption
- Corruption
- Time
- Long approval process
- Corruption
- High costs of compliance
- Transparency
- Poor communication

- Poor communication between regulatory bodies and construction professionals can lead to misunderstandings or unawareness of code changes
- Corruption through bribery or unethical practises can compromise compliance efforts. Transparent processes and accountability are vital
- Technology can be a problem where lack of access to digital tools for compliance tracking and hinder efficient communication and reporting between construction sites
- cumbersome administrative processes and documentation requirements can discourage compliance. simplifying procedures can enhance adherence
- High compliance costs
- Corruption by the government
- Limited access to information
- Approval takes too much time
- Time consuming
- Train construction workers
- Lack of awareness about regulations
- Corruption from poor enforcement
- Corruption
- High compliance cost
- Insufficient training programs for construction practitioners can result in misunderstandings or misrepresentations of regulations. Proper education is crucial for ensuring compliance
- Enforcement levels can vary significantly across different counties hence this inconsistency can lead to failure in penalties affecting compliance
- Sometimes political influence can impact enforcement decisions especially during the election time some bigger buildings get their permits faster from deep connections
- Issues of inadequate finances
- low cash-flow from client at times
- There may not be enough resources especially in small construction firms to implement the necessary regulations
- In term of costs some amongst construction community say meeting the regulatory standards is sometimes costly

- The requirement to meet regulatory standards in construction sometimes imposes financial burdens leading to corruption
- Corruption that comes from financial burdens because of trying to adhere to higher strict regulatory standards
- Favouring cash and profits over proper safety guidelines and regulations
- Overlapping and generating conflicting regulations
- Inadequate resources and corruption hinder regulatory bodies from effectively carrying out enforcement measures
- Insufficient monitoring and inspection mechanisms to ensure compliance
- Lack of formal employment opportunities in the construction sector
- Resource limitations and corruption within regulatory bodies impede their ability to enforce regulations adequately
- Informal construction trends that come up disregarding regulations
- When profit takes place over safety and legality leading to unsafe buildings
- Compliance issues always arise within the construction industry due to lack of knowledge amongst the workers
- Corruption & long approval period
- Lack of awareness
- High approval costs
- Corruption & Ignorance
- High costs, Ignorance & Corruption
- Use of unskilled Professionals who are cheap
- Time Consideration
- Deadlines to close on a project; you just find that some workers omit some safety regulations
- Natural disasters
- Poor communication between leaders; corrupt officers
- Lack of resources e.g. equipment and technology
- Corruption by county council
- Time
- Corruption by leaders
- Cost consideration

- Corruption from county council
- Enforcement challenges in the construction industry
- Corruption from Authorities with a lot of money being asked for
- Long application process
- Lack of enough time may lead to shortcuts and negligence
- Lengthy and complex bureaucratic process for obtaining permits and approvals
- Mostly its corruption and bribery
- Limited access to information and guidance on regulatory requirements
- NCC MCAs misusing powers to grab public land; employment of unqualified staff
- Regulatory agencies hampered by limited resources or compromised by corruption struggle to enforce standards effectively
- Lack of awareness on regulations due to limited exposure and evolvement
- Construction stakeholders often lack awareness of existing regulations leading to potential compliance issues
- Lack of coordination among regulatory agencies at different levels
- Regulatory agencies are impacted by limited resources leading to corruption and cutting corners
- There is a common issue among construction workers in the lack of regard to existing regulations, posing compliance risks
- Failure of construction stakeholders to be aware of existing regulations can result in non-compliance and legal repercussions
- Some regulations are very complex or can be complex and may vary across different areas therefore understanding and interpreting these regulations can be challenging especially for smaller construction sites
- Construction firms may resist adopting new practices or technologies required for compliance especially if these new trends disrupt established workflows
- Limited financial and human resources can hinder compliance efforts. Adequate funding and fulfilled personnel are essential for implementing and monitoring adherence to regulations
- There is an insufficient understanding of relevant regulations amongst construction professionals

- Lack of incentives or recognition for compliance efforts may dampen motivation to adhere to regulations
- Fragmented regulations and compliance laws like different zones may have conflicting or overlapping regulations complicating compliance efforts
- Risk perception where some stakeholders may underestimate the risks associated with non-compliance, leading to lax attitudes
- Construction professionals may lack the relevant information on all regulations or the main ones that govern safety in the building
- There is always the resistance to change challenge where those in the construction industry may resist adopting new practices aimed at improving compliance
- In certain instances, construction professionals may lack full awareness of petinent regulations governing their projects potentially resulting in violations
- Regulatory bodies face challenges in enforcement due to resource constraints and corruption
- Corruption stemming from non-compliance
- Sometimes time constraints in tight project schedules may lead to shortcuts or compromises in compliance, leading to unsafe conditions
- No barriers experienced so far
- Material cause of change in market value; small wages cause of competition
- Existing regulations are often overlooked by construction stakeholders, highlighting a crucial gap in awareness
- Limited public awareness of the importance of compliance for safety and sustainability
- Frequently ignoring regulations as a result of rapid urbanization
- Socio-economic factors influencing compliance decisions such as poverty and inequality
- Insufficient training and education programs for construction professionals on regulatory compliance
- Fragmented regulatory framework unnecessarily generating ambiguity
- The prevalent problem is the lack of knowledge about any current regulations
- Time Constraints
- Lack of enough time & management
- corruption by the county council

- Corruption
- Corruption
- Complexity of Regulation
- Corruption & lack of enough time
- Regulatory ambiguity/inconsistency and uncertainties
- Corrupt officers; poor communication
- Corrupt officers
- Corrupt *Kanjo*
- Disagreements in cost of construction
- Lack of enough time
- Strict rules to casuals who can't afford things like reflector and safety boots
- Arrogancy by the casuals
- Disobedience among workers
- Low payment and high cost of building materials
- Corruption; a lot of documents needed
- Lack of accountability for regulatory violations by construction firms
- Regulatory ignorance among construction stakeholders that is the regulators and workers raising a pressing concern that demands attention to mitigate legal and safety risks
- Land registry is delaying the process; construction happening on illegally owned land
- Digitization of systems; Proper registry of authorities and professionals; Rewards to the ones who comply (points, bonus, rewards in approval rates)
- Rapid urbanization and informal settlements exacerbating compliance challenges
- Enforcement challenges
- Costly; Lack of information
- Informal construction techniques proliferate commonly disregarding regulations amidst a booming real estate market

Q24. What should be done to enhance the level of compliance of construction projects to construction regulations?

- Digitization; Enhancement of number of officers undertaking approvals; Strict application of rules; Enhancement of enforcement
- Proper planning and funding
- Reduce the process required for small projects (10M and below); Weed out corrupt officers
- Registration of site foremen should be done regularly
- Time management
- Adequate time should be given
- Regular Inspection
- Regular Inspections
- Make approval to a shorter time
- Offer recognition awards for construction projects that demonstrate exemplary compliance with violations
- Enforce strict consequences for contractors who violate regulations, holding them accountable including the main contractor
- Teach/train and educate everyone involved in building (workers and inspectors) about rules and regulations
- Make permits easier for example by simplifying the process of getting them so that builders can follow the rules without interfering with the project timelines avoiding delays
- Update the rules and regulations from time to time by improving them and making sure they still work and are usable to the new developments
- Involve technology and the internet to make it easy to obtain permits and licences without long waits and lengthy processes
- Explain clearly by making sure that everyone in construction sites regularly knows the rules and can easily find information about them
- Foster partnerships with industry associations to promote compliance through peer networks and knowledge sharing
- Increase awareness and training programs or opportunities to make it known all the relevant information to all in the construction projects

- Provide tax breaks or other financial incentives for construction companies that invest in compliance measures
- The regulatory body can implement random spot-checks to ensure ongoing compliance throughout the duration of a construction project
- Improve transparency in the construction process by making regulatory requirements easily accessible to the stakeholders
- Encourage collaboration between regulatory agencies, industry stakeholders and communities to enforce compliance
- There is need to be some familiarity between all the stakeholders on the specific regulations governing construction projects
- Offer and refine more training efforts for construction workers and contractors focusing on importing knowledge about regulatory requirements
- Tailor and improve educational training for construction workers and all contractors regarding regulatory obligations
- Offer more insights and sponsor more and more adverts and campaigns to educate all the stakeholders especially the construction workers in the informal sector
- Make the main rules and regulations simple for most even the uneducated basic labourer to understand how they lead to compliance
- They should establish gifts or rewards especially for the high maintenance like residential construction firms that show persistence to demonstrate they are following the rules and regulations
- Conduct regular risk assessments to identify potential areas of non-compliance and address them proactively
- Use technology to establish a database with all the information for tracking construction projects and their compliance status
- Integrate risk management practices into construction practices into construction processes to identify and mitigate compliance risk
- Align construction regulations with international standards to enhance the effectiveness and facilitate cross-border collaborations
- Build the capacity of the regulatory bodies to enforce construction regulations effectively

- There should be avenues for dispute resolution mechanism by establishing effective dispute resolution mechanism to address conflicts related to compliance with regulations swiftly
- There should be community engagement with local communities to address their concern and ensure that they put into consideration
- Foster a culture of continual improvement within the construction industry to drive better compliance with regulations over time
- Establish standardized processes for obtaining permits, conducting inspections and enforcing regulations
- Implement quality control measures to ensure that construction materials and techniques meet regulatory standards
- Collaboration where the government should foster collaboration between industry associations and professional bodies like NCA
- Offer promotions and rewards in terms of incentives and tax breaks for construction firms that are consistent with adhering to compliance
- Conduct regular inspections by qualified inspectors to ensure compliance with regulations at various stages of constructions
- The government can foster a public reporting mechanism that will establish for the public to report non-compliance issues anonymously
- Regularly educate project teams on relevant regulations, codes and standards. Conduct training sessions to raise awareness about compliance requirements
- Establish open channels of communication between stakeholders; clearly communicate compliance expectations to all team members
- Ethical leadership by avoiding corruption and intimidation setting an example of compliance at the leadership level
- Regular training refreshers by conducting refresher courses on compliance therefore keeping teams informed about updates
- Utilize technology such as BIM and drones for monitoring and enforcing compliance
- Establish public reporting mechanisms through complaints made by the public anonymously
- Show all details during the inspections so that everyone knows what’s happening and can trust the results

- By ensuring safety first communities can be empowered through construction compliance
- Building better by joining the movement for safe construction practices
- Regularly review and update construction regulations to address emerging challenges
- Simplify regulations
- Increase awareness
- Collaborate well with the agency
- Use technology to speed up the process
- Reduce corruption
- Reduce corruption
- Reduce Corruption
- Speed up the approval process
- Speed up the approval process
- Use of technology
- Offer subsidized costs
- Collaborations
- Increase collaborations
- Involve relevant stakeholders including construction companies, architects, engineers and regulators in the development and review of regulations
- Clear regulations. Ensure that construction regulations are clearly defined, accessible and understandable to all stakeholders
- Increase education and training awareness through comprehensive programs to make known the most basic regulations
- Embrace technology solutions such as BIM and construction management softwares to facilitate compliance to regulations
- Affordable compliance costs
- Catch the corrupt officials
- Improve access to information
- Use technology (online for approval)
- Online approval
- Simplify construction regulations
- Conduct public awareness campaigns

- Tax relief and incentive for compliance
- Gifts for compliance e.g. incentives
- Public awareness
- Encourage peer reviews among construction professionals to assess compliance with regulations and share best practices
- There has to be transparency in reporting mechanisms for construction companies to report their compliance with regulations
- Regulatory bodies should make their availability and information easily accessible in their online portals even through workshops and seminars
- Mechanical assistance and technology; materials
- Smooth cashflow of project
- Offer incentives and tax breaks for small construction firms
- The regulating body should offer rewards to construction firms that demonstrate consistent adherence to regulations as an encouragement to others
- Create incentives for construction companies that maintain a track record of regulatory compliance
- The government should ease up on some of the fines and penalties offering waivers once in a while to motivate adherence
- Invest in local capacity development to empower communities to monitor and enforce compliance at the grassroots level
- Require ongoing training and education for construction professionals to keep them updated on regulatory changes and best practices
- Regularly update and diligently enforce construction regulations to encompass best practices and evolving standards
- Reduce corruption &Speed up the approval process
- To create awareness on compliance
- Reduce approval costs
- Reduce corruption
- Reduce the cost, Reduce corruption & Have officers readily available to help with the approval
- Regular Inspections
- Enough time should be given

- A good communication on when the scope should be closed; Government agencies to be available all time and should be online
- Planting of trees to control soil erosion
- Inspections should be done regularly
- Enough resources should be provided
- Government should be strict by county council officers
- More time should be provided
- Regular inspections
- People should be considerate with cost changes
- County council should employ honest and loyal workers
- Penalties and proper inspections should be applied; Adequate training should be undertaken
- Regulate corruption; Reduce charges needed; Educate people on arising matters
- Application procedures should be quick and should not take long to get approvals
- Enhance regulations with enough funds to follow-up on works
- Enough time should be provided to avoid pressure to meet deadlines
- Incorporate risk management principles into construction regulations to mitigate likelihood of accidents and failures
- Streamline the permitting process
- Encourage the adoption of sustainable construction practices that comply with environmental regulations
- Registering all building professionals under 1 body
- All regulators should be under one roof; All construction workers should be insured; Permits should be paid for under one roof
- Boost regulatory oversight by adapting new regulations and enforcement by integrating cutting edge practices and evolving standards
- Regularly revise and rigorously enforce construction regulations to align with the best practices and advancing standards
- Foster collaboration among government agencies industry associations, civil society organizations to promote compliance
- Consistently upgrade and robustly implement construction regulations to mirror optimal practices and emerging standards

- Continuosly adjust and rigorously enforce construction regulations to encompass best practices and evolving standards
- Increase awareness amongst construction workers by offering more information on regulations through trainings and education seminars for all stakeholders
- Regulatory bodies should adopt a zero tolerance to corruption through fair policies in the construction industry which can undermine compliance
- The permitting board should invest in research and development to develop initiatives and innovative solutions to improve compliance with regulations
- Conduct regular audits and reviews of construction projects to access compliance with regulations and identify areas of improvements
- conduct risk assessment and identify potential risks associated with compliance very early in the project and develop mitigation strategies
- Prioritize health and safety especially worker safety by complying with occupational health and safety administration standards
- The general population should be educated on the importance of construction regulations and their role in ensuring safety
- Everything is in place and works as it should
- Putting up high levels of buildings by developers and high government officials instead of one-story buildings
- Persistently refine and effectively apply construction regulations to embody cutting edge practices and evolving standards
- Develop programs to help construction folks understand and meet regulations
- Simplify the permitting so that there is less temptation to avoid the rules
- Keep the inspection process clear and open so that people trust it is fair and accountable
- Promote accountability by holding everyone involved accountable to their actions
- Consistently review and firmly implement construction regulations to incorporate leading practices and advancing standards
- Enough time for planning & execution
- Time and regular Inspection
- Government should be aware of the County Council and be strict on them
- Regular Inspection
- Anticorruption Rules

- Regulations should be simple and clear
- Regular Inspections
- Anticorruption rules should be applied; hold regular inspections
- Anticorruption rules should be applied
- They should consider the current economy
- Money should be realized over time
- Enough time should be provided by the project
- Safety boots and reflectors should be provided to those who can't afford them
- Proper care should be taken
- Rules and regulations should be followed
- Rules and regulations should be followed and strictly enforced
- Cost of construction to be lowered and bring balance by government
- The documents needed should be revised and reduced by the relevant authorities
- Provide training and capacity building for architects, engineers, contractors and all stakeholders to ensure they understood and adhere to regulations
- Updating and effectively advancing the regulatory framework consistently to embody the best practices and standards
- Fast moving systems in Nairobi; Lowering approval rates and processes
- Offer incentives such as tax breaks or expedited permitting for projects that demonstrate exceptional compliance with regulations
- Regular inspections
- Reduce the regulatory costs