EFFECT OF BUREAUCRATIC APPROVAL PROCESSES ON THE DELIVERY EFFICIENCY OF ROAD INFRASTRUCTURE PROJECTS IN KENYA'S PUBLIC SECTOR

BY

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DECLARATION

I declare that this dissertation is my own work and is not derived from work done elsewhere which resulted in the award of any other master's degree. I also certify that this work does not have other people's writings and publication where proper acknowledgment is not made to the author.

Student Name: Kenneth George Otieno Ouma Reg,No: 24/02917

Signature _____ Date_____

I do hereby confirm that I have examined this master's dissertation of

Kenneth George Otieno Ouma

And have certified that all revisions that the dissertation panel and examiners recommended have been adequately addressed.

Signature_____ Date_____

Dr. Peter Omae

Dissertation Supervisor

ABSTRACT

This study investigates the effect of bureaucracy in project approval on project delivery efficiency in Kenya's public state road infrastructure firms. The study focused on the influence of regulatory, financial, procurement, and administrative approval in affecting project outcomes, with institutional capability serving as a moderating factor. The study targeted 750 officials from the Kenya National Highways Authority (KeNHA), Kenya Rural Roads Authority (KeRRA), and Kenya Urban Roads Authority (KURA), with 262 selected via stratified random sampling. It collected data on the research variables using structured questionnaires over the course of two weeks. Data obtained was coded, cleaned, and analyzed using SPSS 27 version, along with descriptive statistics to describe the data and moderated multiple regressions to evaluate predicted correlations. The study established that all bureaucratic approval processes significantly influence project delivery efficiency in Kenya's road infrastructure agencies. Regulatory ($\beta = 0.286$, $p < 0.001$), budgetary ($\beta = 0.210$, $p = 0.001$), procurement ($\beta = 0.327$, $p < 0.001$), and administrative approvals ($\beta = 0.143$, $p = 0.042$) positively affect project efficiency, while institutional capacity ($\beta = 0.257$, $p = 0.001$) strengthens these relationships. The study concludes that efficient, transparent, and well-coordinated approval systems enhance timely project completion and accountability. Recommendations emphasize policy reforms, digital integration, capacity building, and professional training to improve bureaucratic effectiveness. Future studies should employ mixed methods, expand to other infrastructure sectors, and test the proposed conceptual model across diverse institutional and cultural contexts. Collectively, these measures will foster institutional excellence and sustainable efficiency in Kenya's public infrastructure delivery.

Key words: Bureaucratic Approvals, Project Delivery Efficiency, Institutional Capacity, Regulatory Compliance, Road Infrastructure, Public Sector Management

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ACRONYMS AND ABBREVIATIONS

ADR	Alternative Dispute Resolution
APDMs	Alternative Project Delivery Methods
CM/GC	Construction Manager / General Contractor
DB	Design-Build
EVM	Earned Value Method
FEED	Front End Engineering Design
KeNHA	Kenya National Highways Authority
KeRRA	Kenya Rural Roads Authority
KURA	Kenya Urban Roads Authority
NACOSTIC	National Commission for Science, Technology, and Innovation
PDB	Progressive Design-Build
PPPs	Public-Private Partnerships
QFD	Quality Function Deployment
SDG 9	Sustainable Development Goals
VIF	Variance Inflation Factor

OPERATIONAL DEFINITION OF TERMS

Term	Scholarly Definition	In this study, the term refers to;
Bureaucratic Approvals	The established procedures and approvals that businesses must have in place before beginning, carrying out, or finishing a project in order to ensure compliance with policies and procedures (Mubarak & Jones, 2022).	The decision-making environment encompasses regulatory, budgetary, procurement, and administrative permission processes that influence the effectiveness of project execution in Kenya's state-owned enterprises within the road infrastructure sector.
Institutional Capacity	This organizational capacity to allocate resources, implements programs, and apply technical competence to achieve the organization's objectives (Njuguna, 2023).	The technical proficiency, resource adequacy, and managerial capability of road authorities in Kenya that may facilitate the connection between bureaucratic approvals and project delivery efficiency.
Project Delivery Efficiency	The extent to which a project meets its objectives regarding timeliness, budgetary constraints, and quality standards (Johnson, 2025).	Completion, budget adherence, and client satisfaction in road infrastructure projects
Public Sector Management	The establishment and management of government or state-owned entities to efficiently deliver public services (Njuguna, 2023).	The decision-making, planning, and coordination of road infrastructure development by state-owned enterprises in Kenya.
Regulatory Compliance	Adherence to the rules, laws, and principles established by regulatory authorities to ensure operations are lawful and ethical (Anderson & Smith, 2023).	The adherence to legal requirements in permitting, budgeting, procurement, and administrative matters in road infrastructure projects.
Road Infrastructure	Physical networks, including highways, rural roads, and urban streets that provide transportation and mobility access (Hassan & Mukarram, 2025).	The road networks and related construction projects managed by KeNHA, KeRRA, and KURA in Kenya.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Globally, bureaucratic approvals remain a significant challenge in project delivery, particularly in road infrastructure, impacting timelines, costs, and efficiency. Delays in regulatory, budgetary, procurement, and administrative approvals have been related to cost increases and inefficiency in government infrastructure projects in wealthy nations like the US, UK, and China (Flyvbjerg, 2023). Due to lengthy licensing processes in the UK and excessive regulatory scrutiny in the U.S., large transport projects have been delayed (Liu et al., 2022). Despite rapid infrastructure development, bureaucratic impediments hamper delivery efficiency in China (Smith & Chen, 2021). These global experiences demonstrate that even in developed economies, protracted approval processes that increase costs and inefficiency hinder infrastructure project completion, highlighting the dynamics relevant to developing economies.

Regionally, bureaucratic challenges related to approval are most evident in Africa due to the weakened institutional capacity and governance issues prevalent in the region. In Ghana, regulatory hurdles delay transport infrastructure development (Adom-Asamoah & Oppong, 2022). Nigeria's bureaucratic procurement approval processes have delayed road development projects and raised expenses (Okeke et al., 2021). South African infrastructure delivery is hampered by bureaucratic red tape (Van der Walt & Cloete, 2020). These regional examples show that project efficiency is affected by both approval and execution. The persistence of bureaucratic impediments in African countries highlights the need to comprehensively analyze bureaucratic constraints on infrastructure delivery in unique national contexts.

Locally, bureaucratic approval procedures are frequently identified as a hindrance to timely and cost-effective project execution in the road sector. Kenya National Highways Authority (KeNHA), Kenya Rural Roads Authority (KeRRA), and Kenya Urban Roads Authority (KURA) face substantial delays in regulatory, budgetary, procurement, and administrative approvals (Mungai & Otieno, 2022). These difficulties cause incomplete road infrastructure, budget overruns, and project delays. Kenya's Vision 2030 goal is effective road delivery, making the issue particularly concerning (Njoroge, 2021; Mwangi, 2023). Examining the bureaucratic approval system inside state businesses for Kenyan road development is necessary since inefficiencies in the approval process hinder growth goals. This global and regional perspective refines international discourse by locating the issue in Kenyan government.

The study targets Kenyan state corporations involved in road infrastructure, including KeNHA, KeRRA, and KURA, as they play a crucial role in the development of major road networks in Kenya and are subject to bureaucratic processes. Despite the strategic significance of management, there is a paucity of empirical study regarding the impact of bureaucratic approvals on project delivery efficiency inside these institutions (Omondi, 2022). Previous literature has predominantly concentrated on corruption, financing, or project management processes in relation to the success of road projects, neglecting the impact of role approval processes on project outcomes (Kiptoo & Kariuki, 2021; Nyongesa, 2020). This knowledge deficiency presents a compelling justification for the study, as it deprives policymakers and practitioners of robust evidence to inform their initiatives. The study addresses a deficiency in infrastructure governance studies by

concentrating on these corporations, hence providing insights pertinent to the local institutional context in Kenya.

Consequently, the absence of such knowledge engenders scholarly interest in evaluating the efficacy of bureaucratic approvals concerning project delivery performance in road infrastructure. Global and regional experiences show that approvals reduce efficiency, but Kenya must contextualize their use. Kenya's infrastructure investment is rising, prompting evidence-based reforms to increase service efficiency. There is an urgent need to evaluate the effects of regulatory, budgetary, procurement, and administrative approvals and offer ways to streamline them. The study will add to higher education discourse and provide practical road project execution improvements. Identifying a scholarly void and suggesting answers to Kenya's infrastructure governance issues drives the research.

1.1.1 Bureaucratic Approval Processes

Regulatory approvals are formal authorizations granted by governmental agencies to initiate a project, contingent upon compliance with applicable laws and procedures. Scholars say it requires legal permissions (Anderson & Smith, 2023), regulatory authorization procedures (Kumar et al., 2024), and various regulatory clearance phases (Nguyen & Lee, 2025). Recent research shows that regulatory delays significantly hinder project delivery. Environmental approval delays for Australian energy projects caused multi-year setbacks (Herbert et al., 2024); infrastructure regulatory bottlenecks in Ghana slowed road completion (Adom-Asamoah & Oppong, 2022); and overly complex clearance systems for UK transport projects increased delivery times by 20%. This study examined regulatory approval timeliness, compliance inspections, and delays. To

evaluate regulatory procedures and delivery efficiency, institutional reports and stakeholder surveys were used.

Budget approvals refer to the allocation of funds is termed budgetary approvals and is essential for regulating the availability of finances at the designated time of the project. Scholars characterize it as the formal sanctioning of budget allocations (Mubarak & Jones, 2022), the circulation of the budget development, approval, and disbursement cycle (Chege et al., 2024), and the process of authorizing financial releases for project funding (Ochieng & Mwangi, 2025). The significance is substantiated by research indicating that delays in Ethiopian water projects resulted in a 30 percent deceleration in implementation (Yared & Alemayehu, 2023), delays in the disbursement of project funds in Kenya led to cost overruns in healthcare initiatives and inadequate financial approval caused a reduction in infrastructure delivery by local government in Rwanda (Nkosi, 2025). In this study, budget approvals was measured using the following indicators; budget timeliness, cost overruns, budget alignment. Ultimately, these indicators illustrated the impact of budgeting techniques on project delivery.

Procurement approvals denote the formal authorization required for vendor selection and contract execution, hence facilitating the procurement process. Researchers characterize it as the systematic process of finalizing procurement contracts (Isaack & Namusonge, 2025), the formal endorsement of procurement decisions by regulatory authorities (Ozigi Basiru et al., 2022), and the institutional ratification of the implementation of procurement contracts (Hassan & Mukarram, 2025). Delays in this context impede entire projects, as evidenced by empirical studies: inefficient procurement practices at the county level in Kenya hindered service delivery (Isaack & Namusonge, 2025), ineffective procurement processes in Nigeria resulted in cost and schedule overruns (Hassan & Mukarram, 2025), and the absence of cohesion in the procurement system in

the UK led to inefficiency and incurred significant costs (NAO report, 2024). In this study, procurement approvals were measured using tender duration, procurement disputes, and process transparency. They illustrated the impact of procurement clearance dynamics on the overall project performance.

Administrative approvals are organizational consents required prior to project initiation, pertaining to staffing and logistics. They are characterized as: internal managerial approvals before implementation (Omondi, 2022), institutional-level administrative authorization (Mutua & Ouma, 2022), and intra-organizational approval processes (Njuguna, 2023). Recent studies reveal that these processes impede execution: Ugandan infrastructure projects faced internal staffing constraints (Ren et al., 2024); South African municipal road projects were delayed by organizational approval hierarchies (Johnson, 2025); and the Kenyan energy installation was postponed due to numerous internal sign-offs. In this study, administrative approvals were measured using internal efficiency, bureaucratic layers, staff deployment. Information was acquired via agency process logs and field inspections to determine the extent of administrative impact on delivery speed within agencies.

1.1.2 Project Delivery Efficiency

Infrastructure projects performed on time, within budget, and to stakeholder expectations reflect project delivery efficiency. Scholars define it as "the degree of the accomplishment of time and cost requirements" (Nduati, 2025), effective delivery compared to schedule and funding plans, and quality achievement within scheduled resources and time arrangements. These constructs are empirically supported: road projects in Ethiopia delivered on time in only half of the cases, which affected operational efficiency (Mejia et al., 2025); in Rwanda, improved financial tracking of municipal projects increased delivery rates (Nkosi, 2025); and in Ghana, streamlined project

approvals improved timely completion. Schedule variation (% of completion on time), budget variance (% change in budgeted cost), and satisfaction survey responses measured indicators including timely completion, budget adherence, and stakeholder agreement. These numbers showed how approvals affect project success.

1.1.3 Road Infrastructure State Corporations

The road infrastructure in Kenya is operated by three major state corporations, which include the Kenya National Highways Authority (KeNHA), Kenya Urban Roads Authority (KURA) and Kenya Rural Roads Authority (KeRRA). The national trunk roads are official roads that are crucial in trade and regional integration, and KeNHA is required to develop, rehabilitate, and maintain them (KeNHA, 2023). KURA pays attention to the city roads networks, which are supposed to provide mobility in large cities and towns, thus urbanization and economic development (KURA, 2022). KeRRA, in its turn, has the role of developing and maintaining the rural access roads, and making the marginalized and agricultural areas connected (KeRRA, 2023). These powers form a core pillar in the infrastructure development agenda in Kenya and these projects coordinate with the Vision 2030 and the Big Four Agenda, and both face serious challenges of bureaucracy and resource allocation.

State corporations on road infrastructure are very instrumental in facilitating economic development, social inclusion and regional connectivity. With good road networks, the cost of transport is minimized, trade is simplified and access to other important services like health and education is improved (World Bank, 2022). Nevertheless, KeNHA, KURA, and KeRRA often face the difficulties concerning bureaucratic approvals, insufficient funding, and inefficiency in procurement (Mungai and Otieno, 2022). As an example, clearance processes have contributed to road delays in completion, increasing costs and increased stakeholder dissatisfaction (Njoroge,

2021). Also, their performance is frequently compromised by political interference and the absence of institutional coordination (Mwangi, 2023). It is thus necessary to strengthen the governance structures and improve the approval systems in order to improve their performance. Considering the limitations, state corporations was able to provide infrastructure more efficiently, which will support the sustainable development agenda in Kenya and enhance the competitiveness of the national economy in general.

1.2 Statement of the Problem

Kenya's public road infrastructure projects continue to face chronic inefficiencies caused by bureaucratic approval processes, resulting in project delays, cost overruns, and compromised quality. Empirical studies by Osei-Kyei and Chan (2020) and World Bank (2022) confirm that excessive bureaucracy remains a critical impediment to infrastructure efficiency in Sub-Saharan Africa, where over 30% of road projects experienced significant delays due to complex approval systems. Locally, the Auditor-General's report (2021) attributes major project inefficiencies under KeNHA, KeRRA, and KURA valued at over Ksh 150 billion to protracted regulatory, budgetary, procurement, and administrative approvals. Although studies such as Nyangilo (2019) and Mburu (2021) examined corruption, financing, and management issues, limited empirical work isolates bureaucratic approval processes as an independent determinant of project delivery efficiency. This study addresses that empirical gap by analyzing how distinct approval categories influence project delivery outcomes in Kenya's state road infrastructure corporations.

These obstacles threaten the successful implementation of Vision 2030 and other objectives of SDG 9 (Industry, Innovation, and Infrastructure) in Kenya by obstructing road connectivity, limiting commerce, and diminishing economic rewards for firms and individuals. In principle,

corruption, financing, and project management concerns have been the primary research focus; nevertheless, bureaucratic approval processes have not been regarded as an independent component in assessing the efficiency of project delivery. The researchers have examined studies both internationally and regionally; however, there has been minimal emphasis on Kenyan state corporations such as KeNHA, KURA, and KeRRA, despite their crucial role in road building. The current literature predominantly employs qualitative case studies, with few empirical or mixed-method research directly measuring the effects of regulatory, financial, procurement, and administrative clearances on project outcomes. This study sought to provide evidence-based recommendations to optimize approval processes and enhance efficiency in road infrastructure delivery.

1.3 Objectives of the Study

1.3.1 General Objectives

The general objective of the study is to examine the effect of bureaucratic approval processes on project delivery efficiency in Kenya's public road infrastructure state corporations.

1.3.2 Specific Objectives

The study was guided by the following specific objectives:

- **i.** To examine the effect of regulatory approvals on project delivery efficiency in Kenya's public road infrastructure state corporations.
- **ii.** To assess the influence of budgetary approvals on project delivery efficiency in Kenya's public road infrastructure state corporations.
- **iii.** To analyze the effect of procurement approvals on project delivery efficiency in Kenya's public road infrastructure state corporations.
- **iv.** To evaluate the role of administrative approvals on project delivery efficiency in Kenya's public road infrastructure state corporations.

v. To determine the mediating effect of institutional capacity on the relationship between bureaucratic approval processes and project delivery efficiency in Kenya's public road infrastructure state corporations.

1.4. Research Questions

The study will address the following questions;

i. What is the effect of regulatory approvals on project delivery efficiency in Kenya's public road infrastructure state corporations?

ii. How do budgetary approvals influence project delivery efficiency in Kenya's public road infrastructure state corporations?

iii. In what ways do procurement approvals affect project delivery efficiency in Kenya's public road infrastructure state corporations?

iv. What is the role of administrative approvals in enhancing or hindering project delivery efficiency in Kenya's public road infrastructure state corporations?

v. What is the mediating effect of institutional capacity on the relationship between bureaucratic approval processes and project delivery efficiency in Kenya's public road infrastructure state corporations?

1.5. Justification of the Study

The study is needed because bureaucratic approval processes hinder project execution in Kenyan public road infrastructure state enterprises. International development ideas like the UN Sustainable Development Goals (SDG 9 on resilient infrastructure), Agenda 2063, and Vision 2030 in Kenya emphasize infrastructure as a driver of economic growth. Blocked regulatory, budgetary, procurement, and administrative clearances slow implementation, raise costs, and limit infrastructure investment socio-economic gains. If

the study is not done, road projects risk being halted due to insufficient funds and public distrust of state corporations. However, if applied, the study will provide policymakers, practitioners, and stakeholders with a knowledge basis to streamline approval systems, increase transparency, and improve delivery. It will also enrich governance and infrastructure management scholarship.

1.6 Significance of the Study

1.6.1 Significance to Policy Makers

Policymakers, particularly the Kenyan government, will benefit from this research since it will show how bureaucracy in approval processes affects state corporation road infrastructure delivery. Policymakers need evidence-based solutions to streamline approvals, eliminate redundancy, and speed up infrastructure development. Kenya Vision 2030 and the Big Four Agenda highlight infrastructure as essential to socioeconomic development, making project delivery critical. Regulatory, financial, procurement, and administrative approval policies will be revised using the data. It will also follow UN Sustainable Development Goals and African Union Agenda 2063. The findings will help policymakers improve infrastructure project accountability, openness, and timeliness to optimize public money value.

1.6.2 Significance to State Corporations

This study is important for road infrastructure state businesses including KeNHA, KeRRA, and KURA. These institutions directly plan projects, contracts, and deliveries yet are hampered by bureaucracy. The investigation will identify regulatory, budgetary, procurement, and

administrative inefficiencies that delay project completion. State corporations will use the results to promote efficiency and interagency cooperation. The report will also offer ways to improve efficiency and accountability without compromising compliance and openness. Such insights will improve internal governance, resource efficiency, and these corporations' ability to provide infrastructure that boosts Kenya's economic competitiveness, connectivity, and long-term development.

1.6.3 Significance to the Public and Stakeholders

The study also benefits the public, contractors, development partners, and other stakeholders who use good road networks for socioeconomic activity. If the project is delayed, communities may face transportation costs, market access challenges, and economic slowdowns. By reducing bureaucratic delays, the study will provide quality infrastructure projects quickly. Contractors and knowledgeable stakeholders like private investors will comprehend bid, contract, and resource allocation approval dynamics. Kenyan infrastructure investors will benefit from standardized protocols to track their projects. Effective project delivery fosters accountability, openness, and state institution trust. The paper identifies challenges and gives measurements to help road projects meet socioeconomic and development goals.

1.6.4 Significance to Academia and Future Researchers

This research will contribute to the existing literature on governance, project management, and infrastructure delivery in developing economies. Fewer studies have studied government permission as a crucial infrastructure efficiency factor than financial and technical capacity. This study fills a key gap in Kenyan road infrastructure state business data. Development, public administration, and project management specialists and students will be interested in bureaucratic efficiency discoveries. Research on energy, housing, and health infrastructure approval processes

will build on the findings. Its recommendations will highlight the compliance-performance balance and enable comparative evaluations among nations with similar bureaucratic difficulties.

1.7 Scope of the Study

The study examined how regulatory, financial, procurement, and administrative clearances affect Kenya road infrastructure state enterprises' project delivery efficiency. The target population includes the Kenya National Highways Authority (KeNHA), Kenya Rural Roads Authority (KeRRA), and Kenya Urban Roads Authority. These companies were chosen because they implement various forms of the national road network and are crucial to analyzing bureaucratic constraints in infrastructure delivery. Secondary data from institutional reports, government audit reports, policy declarations, and public statistics is more dependable and accurate. The study spans May 2025, when it began, until October 2025, when it will finish and release its findings.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Persistent delays in project delivery among Kenya's road infrastructure state corporations highlight a critical problem: how bureaucratic approval processes affect project efficiency. This chapter addresses the issue through a structured literature review. It first explores theoretical perspectives, examining frameworks that explain how administrative hierarchies and institutional capacity influence project performance. It then reviews empirical studies on regulatory, budgetary, procurement, and administrative approvals, identifying key findings and inconsistencies in existing research. Building on these insights, the chapter develops a conceptual framework linking bureaucratic processes to project delivery outcomes. This roadmap not only contextualizes the study within established scholarship but also exposes research gaps that inform the study's focus on enhancing efficiency in Kenya's road infrastructure state firms.

2.2 Theoretical Review

The Bureaucratic Theory, Public Choice Theory, Institutional Theory, and Principal-Agent Theory underpin this work. Hierarchies, formal regulations, and standard operating procedures rule approvals, which are accountable yet delay. Bureaucratic Theory (Weber, 1947) addresses this. Public Choice Theory (Buchanan & Tullock, 1962)

highlights how bureaucrats and policymakers can self-interfere to influence regulatory, budgetary, and procurement efficiency. The Principal-Agent Theory (Jensen and Meckling, 1976) addresses agency issues caused by knowledge asymmetry, lax supervision, and misalignment of principal and agent interests. These theories provide a foundation for studying how approval procedures and institutional behavior affect project delivery in Kenyan-road infrastructure businesses.

2.2.1 Bureaucratic Theory

Max Weber (1947) is credited with developing the theory of bureaucracy, which has been widely used in public administration and other organizational management concerns. Weber noted that bureaucracy organizes large institutions, especially government and state companies, efficiently. He created various definitions of bureaucracy, including rigorous regulations, strict hierarchy, standardized procedures, and impersonal decision-making (Weber, 1947). Modern theoreticians suggest that bureaucracy was effective in supply and demand, rule enforcement, and service delivery because it provided stability and predictability (Albrow, 2021). Weber believed in bureaucratic efficiency, but he did not rule out the bureaucratic rigidity principle in cases of excessive rule emphasis (Gerth & Mills, 2019). Weber's ideas remain relevant in modern infrastructure management since road infrastructure projects are extremely procedural and require uniform approvals to be accountable and documented in regulatory frameworks.

Bureaucratic Theory holds that hierarchy, rules-based procedures, and hierarchical division of work may organize an organization efficiently. Bureaucratic systems reduce arbitrariness because they make judgments based on codified regulations rather than personal authorization, according to Weber (1947). This improves administration equality, responsibility, and predictability. Formalized processes provide openness in regulation approvals, procurement, and

budgetary control for state enterprises that build roads (Merton, 2019). The experts also argue that bureaucracy reduces corruption by limiting personal decision-making when handling public resources (Albrow, 2021). Red tape, delays, and following processes rather than results can make bureaucratic procedures inefficient (Olsen, 2021). The bureaucratic hypothesis explains why Kenyan approval processes provide due diligence but also cause project inefficiency by imposing excessive administrative constraints.

The Bureaucratic Theory offers structure and responsibility, but it's also been criticized for inefficiency, rigidity, and inflexibility Merton (2019) noted that goal displacement occurs when procedures take precedence over organizational goals. Critics say bureaucracy hinders many initiatives, especially infrastructure projects that require tight time efficiency (Olsen, 2021). Extreme bureaucratic control may also discourage innovation and flexibility in decision-making, making institutions less responsive to new challenges (Albrow, 2021). In Kenya, state companies take too long to make regulatory, financial, and procurement decisions, which can squander dollars, delay delivery, and inefficiently deliver. Bureaucracy advocates say its rules and designs prevent corruption, nepotism, and power abuse (Weber, 1947; Gerth & Mills, 2019). Thus, while bureaucracy is essential to accountability, too much can compromise its efficiency.

Bureaucratic Theory discusses how approval systems affect project execution in Kenya road infrastructure state enterprises, which is relevant to the study. Hierarchical institutions use regulatory, budgetary, procurement, and administrative approvals. The theory explains them. Strict procurement approvals ensure fairness and openness, but they also delay projects and fail delivery deadlines (Olsen, 2021). Budgetary approvals also promote financial accountability, but a lengthy procedure reduces efficiency (Albrow, 2021). By placing the study in Bureaucratic Theory, it captures the dichotomy between bureaucratic control's intended and unforeseen

consequences inefficiency and project delays. This anchor theory is applicable because Kenyan road agencies have extensively codified norms and processes, which trades off accountability, compliance, and efficient road project execution.

2.2.2 Public Choice Theory

The Calculus of Consent: Logical Foundations of Constitutional Democracy, authored by James M. Buchanan and Gordon Tullock in 1962, emerged as a seminal work that established the core principles of Public Choice Theory. The theory incorporates economics into the analysis of political and bureaucratic acts, rejecting the assumption that policymakers operate solely in the best interest of citizens (Buchanan & Tullock, 1962). In 1986, Buchanan, a Nobel laureate, further contended that voters, legislators, and bureaucrats operate based on self-interest, which underpins the concept of collective decision-making (Mitchell, 1988). Public Choice Theory integrated with the economic tradition in political science, facilitating the examination of institutional functioning when populated by rational individuals pursuing self-maximizing objectives. It possesses a historical history of shaping public policy research by illustrating that political and administrative results largely hinge on incentives and restrictions rather than altruism.

The Public Choice Theory's proponents claim that voters, lawmakers, and bureaucrats are motivated by self-interest rather than communal objectives (Mueller, 2003). Decisions are based on maintaining standards in politician re-election, bureaucrat budget maximization and job security, and voter policy results and personal gain (Buchanan & Tullock, 1962). Based on market and political comparisons, the theory describes logrolling, rent-seeking, and lobbying as rational acts that misrepresent efficient activity (Mitchell, 1988). Buchanan and Tullock argued that constitutional principles should lower collective decision costs and prevent majorities from exploiting minority (Buchanan & Tullock, 1962). The idea emphasizes the clash between personal

and communal interests to explain why governmental processes lack efficiency, accountability, and fairness without institutional protection.

Despite its insights and observations, Public Choice Theory is criticized. Researchers say it overestimates self-interest and underestimates ideology, compassion, and government duty on political action (Ostrom, 1998). Evidence suggests that most bureaucrats and public workers are motivated by professionalism and public interest, not self-interest (Bozeman, 2007). The theory fails to explain paradoxes of collective action such why individuals vote when individual rewards are modest, demonstrating its failure to explain complicated political reality (Ostrom, 1998). Public Choice's assumptions that people are rational ignore constrained rationality, norm conformance, and institutional route dependencies (Bozeman, 2007). The theory can be excessively deterministic and ignore institutional imbalance that affects political and bureaucratic results in less developed nations due to corruption and weak institutions.

This study uses Public Choice Theory to explain why Kenyan road infrastructure businesses may approve projects with self-seeking conduct. To acquire rents or political bargains, authorities may procrastinate budget approval and not focus on efficiency (Mueller, 2003). Lobbying and patronage, which involves rent-seeking, can taint purchasing authorizations (Buchanan & Tullock, 1962). Through this viewpoint, the research finds inefficiencies in restrictive procedures and misaligned incentives amongst key actors. The notion of bureaucrats and policymakers as rational agents with private objectives helps explain why regulatory, procurement, and administrative approvals can hinder initiatives. This theoretical speculation enhances Kenya's infrastructure approval inefficiency analysis.

2.2.3 Principal–Agent Theory

Principal Agent Theory was developed by Jensen and Meckling in their 1976 Journal of Financial Economics article Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure. The idea suggests that it becomes problematic when one side (the principal) gives power to another (the agent), who can act in his/her own benefit without caring for the principal (Jensen & Meckling, 1976). Moral hazard and adverse selection are issues in the framework due to principal-agent information asymmetry. Though originally designed to study corporate governance, the theory has been widely used in public administration and contract management to understand accountability, monitoring, and incentive designs (Eisenhardt, 1989). The way it outlines how delegation of powers can increase efficiency and agency expenses has kept it relevant.

The Principal-Agent Theory holds that delegating is risky because agents may not operate in the principals' best interests. Principals must create costly monitoring systems, contracts, and performance-based awards for incentive compatibility (Jensen & Meckling, 1976). Thus, agency costs include principal supervision, agent bonding, and residual losses from misaligned behavior (Eisenhardt, 1989). Accountability gaps and knowledge asymmetries allow actors to avoid their tasks and pursue personal profits, according to the thesis. This makes incentive alignment and transparency reporting crucial to company performance. In public administration, politicians (principals) transfer policy implementation to bureaucrats (agents), but the principal must deal with slackness, distortion, and mismanagement.

Principal-Agent Theory is often criticized for being reductionist, despite its influence. Critics say it ignores trust, professional ethics, and organizational culture and considers interactions solely as motivating and contractual (Miller, 2005). In actuality, many agents are

driven by professionalism or mission devotion, therefore relying on opportunism is insufficient (Bozeman, 2007). Overuse of monitoring and controlling procedures can lead to inefficiencies, hostile relationships, and short-term compliance, which may not be accomplished (Miller, 2005). Principal-agent models can fail in underdeveloped nations where monitoring is expensive and institutions are weak, as well as due to corruption and political meddling in the incentive structure (Shapiro, 2005). Critiques suggest the need to integrate two complementary tactics that include institutional, cultural, and normative factors and incentive structure.

Kenya road infrastructure corporations' bureaucratic authorization procedures can be examined using the Principal et Agents Theory. The government ministries are the principals and the approval officials the agents. Information asymmetry and insufficient controls and incentives can cause agents to delay approval, misuse resources, or prioritize personal demands over project effectiveness (Jensen & Meckling, 1976). For instance, procurement officers can use control positions to benefit some contractors, increasing agency costs and delivery delays (Eisenhardt, 1989). This approach will show how accountability gaps and incentive misalignments prevent regulatory, budgetary, procurement, and administrative approval efficiency improvements. Its theoretical foundation suggests performance bonuses and transparency adjustment to increase principals/agents alignment and project delivery efficiency.

2.2.4 Institutional Theory

Organizations, according to Philip Selznick (1957), are adaptive social systems that are shaped by institutional norms. This idea laid the groundwork for what would later become known as the Institutional Theory. Institutional settings impact organizational behaviors and structure via the provision of rules, standards, and legitimacy; John Meyer and Brian Rowan (1977) expanded upon this idea. Institutional isomorphism, proposed by DiMaggio and Powell (1983), provides an

improvement to the theory by explaining the proximity of organizations in the same field as a consequence of normative, mimetic, and coercive constraints. Their work laid the groundwork for modern Institutional Theory, which examines how organizations are shaped by their institutional settings and how external factors like rules, cultural demands, and legitimacy shape organizational practices and actions across sectors, including public infrastructure regulation.

Organizational behavior is impacted by both internal and external factors, including social, cultural, and political norms, according to the institutional theory. Organizations implement rules, procedures, and structures to win over important stakeholders; nevertheless, this does not necessarily lead to greater productivity (Meyer and Rowan, 1977). According to DiMaggio and Powell (1983), organizations often mimic one another as a result of isomorphism, which can be triggered by coercive forces like laws and regulations, normative forces like professional standards, or mimetic forces like uncertainty. Organizations, according to Selznick (1957), evolve beyond just functional systems in order to mirror societal norms and expectations. In order to maintain their legitimacy, access to resources, and chances of survival, organizations typically follow established norms, as stated in the theory. When it comes to public infrastructure, this means that administrative processes, which can slow down project delivery but are necessary for legitimacy, may be kept in place.

The Institutional Theory is esteemed for effectively elucidating the mechanisms by which organizations adhere to external regulations and cultural influences, particularly within the public sector, where legitimacy and accountability are paramount. The detractors assert that the approach emphasizes compliance excessively while neglecting agency and innovation inside an organization (Oliver, 1991). It assumes that firms respond passively to institutional forces, neglecting rule resistance or strategic manipulation of regulations. Others note that institutional isomorphism is a

significant idea that elucidates why, even in analogous circumstances, notable disparities exist among firms. This theory possesses diminished predictive potential as it only describes rather than forecasts the outcomes of pressures. While bureaucratic clearances are ubiquitous in road infrastructure, this does not inherently elucidate the agencies' capacity for innovation or their resistance to inefficiencies in the quest for project efficiency.

The Institutional Theory is highly relevant to the research, as it has been observed that the road infrastructure state corporations in Kenya (KeNHA, KeRRA, and KURA) rigorously adhere to regulatory, budgetary, procurement, and administrative protocols, even in instances of inefficiency. The coercive requirements of laws, rules, and governmental controls necessitate bureaucratic approvals, while the normative expectations of professional standards shape adherence to protocols. Mimetic forces compel entities to adopt similar bureaucratic structures to maintain legitimacy and secure funding. The theoretical framework directs the investigation by illustrating that approval inefficiency is both an administrative and structural phenomenon rooted in legitimacy-seeking behavior. The institutional dynamics necessary to comprehend the issues of bureaucratic changes and the examination of compliance, accountability, and efficiency in project execution will be addressed through various proposals.

2.3 Empirical Review

2.3.1 Regulatory Approvals and Project Delivery Efficiency

Engineering design's impact on energy project outcomes has been thoroughly studied. Elete, Nwulu, Erhueh, and Akano (2024) emphasize that FEED and Detailed Design Engineering reduce risks, accelerate project timeframes, and streamline processes. Prior studies have stressed the importance of FEED in decreasing design uncertainty and costs when executing. Other scientists feel that supply chain disturbances and other externalities hinder the effectiveness of robust FEED processes, which improve procurement and construction decision-making. The researcher agrees

with Elete et al. (2024) that incorporating FEED and Detailed Design improves efficiency and that early design without flexible adaptability may hinder creativity. The literature emphasizes the balance between detailed planning and flexible project management.

Legal and regulatory settings are another important topic of building project delivery research. According to Osifo, Omumu, and Alozie (2025), regulatory reforms in safety, environmental compliance, and dispute resolution change contractual obligations, redefining stakeholder relationships and risk allocation in construction law. They found that proactive reforms, digital formats and systems like BIM and smart contracts promote contractual clarity and dispute avoidance, supporting regulatory compliance-based project efficiency studies. However, the authors note that the improvements are complicated by more administration-related duties and legal difficulties. The researcher acknowledges that legislation evolution improves efficiency but suggests that smaller organizations with fewer compliance capabilities may suffer from the rapid speed of regulation change. Thus, the literature exposes contractual reform options and constraints.

Project delivery innovation studies increasingly examine how legislation supports or inhibits alternative project delivery techniques. The legislative trend in California to allow design-build, construction manager/general contractor, and progressive design-build is examined by Nacir et al., (2025). Their research shows a continual increase in invoices with less limitation, indicating growing faith in APDMs' ability to improve transportation agency efficiency and flexibility. This supports earlier studies suggesting legal reforms boost procurement and risk-sharing innovation. When the authors mention gradual relaxing of constraints, detractors say over-focus on APDMs can marginalize existing delivery methods and reduce competitive bidding. The researcher agrees with Nacir et al. (2025) that enabling legislation enhances efficiency, but it must

be continuously regulated to balance innovation and accountability in significant infrastructure initiatives.

Legal issues cause delays and cost overruns while installing infrastructure in the open. According to Anand and Anand (2025), unclear contract language, inadequate risk apportionment, and delays in contractual dispute regulation all contribute to infrastructure conflicts in India. Their findings complement past findings that weak contractual systems reduce project efficiency and increase financial risks. The study suggests more proactive methods to prevent conflicts and partnerships from escalating through contract clarity, risk management, and dispute avoidance and adjudication boards. The writers criticize alternative dispute resolution (ADR) and its late introduction, which diminishes its success. Preventive tactics are crucial, but institutional and political vulnerabilities and interferences cause well-structured contracts to fail, according to the study. The literature suggests that law reform should be complemented with institution strengthening to improve global project outcomes.

Legal disputes are one of the biggest obstacles to public infrastructure contract execution, especially in developing nations. Anand and Anand (2025) note that imprecise contract terms, ineffective risk allocation and regulatory delays cause cost overruns and project delays in India. They focus on preventative measures like standardized contracts and early dispute avoidance mechanisms like DAABs, building on construction law scholarship's proactive approach. They embrace the role of alternative dispute resolution (ADR), but mention its late mobilization, which reduces its effectiveness. They also agree with global infrastructure literature. The researcher agrees that early interventions are crucial to reformations, but their enforcement and institutional integrity determine their success. Thus, the evidence suggests that institutional reforms should support contract clarity and ADR mechanisms to ensure project sustainability.

Performance-Based Contracting (PBC) is a popular topic in road asset management since it evaluates contract outcomes rather than inputs. Yoagbe, Evdorides, and Burrow (2025) found that legal, political, and economic issues are major success factors in 89 studies. Friendly law, political stability, and inventive finance options improve efficiency, sustainability, and stakeholder confidence, according to their findings. This supports earlier research linking risk allocation and participatory governance to infrastructure performance. The focus on blockchain or AI for compliance monitoring is novel in the literature. The researcher agrees that contextual adaptation is important and should be used in low-resource contexts, but she disagrees that technological and financial innovations will not help if institutional capacity is insufficient. The literature shows that situational PBC reforms must be evenly proportioned.

2.3.2 Budgetary Approvals and Project Delivery Efficiency

Infrastructure projects are chronically overbudget, which hurts budgets, schedules and stakeholder confidence. Chimbomba and Chipandwe (2025) found that inflation, poor project management, and labor expenses because most road project overruns in Ndola, Zambia, with growth rates of 2-10%. Their results support international research that identifies inflation and poor planning as major road construction cost factors. The study's focus on educational background and how better competent individuals have fewer overruns is unusual and intriguing in existing literature. The researcher agrees that inflation forecasting and proactive project management processes to reduce overruns are crucial, but he also believes that corruption and political interference, which have been ignored, contribute to financial inefficiency. Thus, the literature emphasizes technological and governance solutions to road project cost control.

Cost management is a key component of infrastructure project success. In their research on Nairobi City County road projects, Otieno and Nyangau (2024) found that cost scheduling and

control greatly affect project performance, with cost control having the greatest impact. Their result supports the literature that cost discipline is one of the best defenses against overruns and delays, improving efficiency and stakeholder satisfaction. Solid reliability and validity tests support the study's empirical findings to improve structured cost management methods. The researcher agrees with the authors that thorough cost control mechanisms are essential, but inflation, political interference, and corruption tend to sabotage even the best cost frameworks. Thus, while internal cost management practices are central, the literature suggests that systemic problems affect the results of internal cost management practices in a widespread manner, so despite the focus on either side of the spectrum, systemic problems must be considered to achieve sustainable results.

Time and budgetary efficiency are crucial to infrastructure project completion, and advanced monitoring tools are becoming more important. With the Bungur-Kedoyo road project, Bahrudin, Patriadi, and Sajiyo (2025) show how the Earned Value Method (EVM) may combine schedule and cost performance to estimate performance. They found that the project is behind schedule but under budget, demonstrating how EVM provides project managers with accurate and useful data. Other studies suggest EVM as a successful technique for balancing finance control and delivery. However, opponents claim that EVM, despite its effectiveness, may overlook exogenous dangers like inflation or political unrest that affect project success. The researcher agrees with the authors that the EVM has strengths but that its predictive efficiency is better when combined with risk management methodologies. Literature confirms EVM as a requirement for full project control, but not the only one.

Financial resource management is increasingly considered a key to infrastructure project success. Karuga, Mutuku, and Sang (2024) study road construction in Nairobi and show that strong

timing of financial resource use reduces risk and efficiently uses funds. Their findings support research linking organized financial planning to public works quality and timeliness. They use resource dependence theory to show how budgeting stabilizes project results. The researcher agrees that resource scheduling is important, yet external shocks like inflation, sluggish government funding, and political meddling damage resourceful schedules despite smart budgeting planning. Thus, financial resource scheduling is vital, but research also notes that project financing systems need macroeconomic and institutional support to be reliable.

Slowdowns, cost increases, and quality issues keep public road building in the spotlight. In Mwelu, Watundu, and Moya (2024), participants argue that contractors' success criteria are generally influenced by regular monitoring and sanctions on workers, which affects project delivery. Interestingly, their data shows that adherence to procurement laws and staff professionalism, which were prominent in past investigations, were not the key success drivers. This challenges the idea that project performance depends on regulatory compliance. The researcher agrees with the authors that active monitoring is crucial, but warns against underestimating procurement frameworks in the long run for accountability and transparency. Therefore, the evidence suggests that while strong control and staff discipline may motivate short-term success, regulatory compliance is the key to long-term improvements in public road building outcomes.

The most fundamental road projects for traffic flow and safety are on-street intersection projects; however they are the most unreliable for scheduling. A structural examination of Columbian project scheduling procedures by Casta nneda et al., (2025) found 29 processes and linked 22 flaws to budget and schedule overruns. They say poor material estimation and planner inexperience are the biggest causes of cost overruns and delays. This supports recent research

linking poor project planning to infrastructure delivery inefficiencies. The researcher agrees with the authors that limited technical experience hinders timetable reliability, but adds that political intervention and sluggish funding worsen the problem. Therefore, literature implies that technical scheduling practice must be improved, but institutional reform is needed to sustain infrastructure delivery.

2.3.3 Procurement Approvals and Project Delivery Efficiency

Public-private partnerships (PPPs) are a key way governments are addressing infrastructure issues. Abdel Aziz (2007) states that PPPs have two main values: the finance-based model, which involves attracting private money, and the service-based model, which emphasizes service efficiency. His examination of the UK and BC shows that PPPs succeed in those jurisdictions due to suitable legal structures, risk sharing, transparency, and performance-based specifications. His work emphasizes institutional clarity and method uniformity to overcome legal, political, and cultural constraints. The researcher agrees with Abdel Aziz that transparency and risk-sharing are crucial, but in underdeveloped nations, institutional capacity and political instability are more significant than technical rules. Thus, literature suggests that PPP performance is transferable but significantly tied to local government.

Road infrastructures PPPs are discussed to mobilize funding and improve project execution. Tsimoshynska et al. (2021) use the Ukrainian context to provide an economic-mathematical framework that uses QFD and syncretism to improve concession-based PPP ventures. Investment planning is more precise since they model capital requirements for building, reconstruction, repair, and maintenance. Additionally, the proposed organization-economic

method of co-financing and PPP project efficiency diagnostics is established. According to the authors, this will enable realistic capital estimates and sustainable road construction. The researcher agrees that methodological clarity will improve investment decisions, but in most developing economies, poor institutional systems and political uncertainties limit the practicality of state-of-the-art modeling, highlighting the need for improved governance in PPP institutional frameworks.

Memari, Ogunmakinde, and Skulmoski (2025) provide a modern examination of strategies to improve supply chain efficiency within public-private partnership (PPP) infrastructure projects, a critical element for project success that is often inadequately explored in traditional PPP literature. Their findings underscore the significance of digital innovations such as artificial intelligence and data analytics in improving supply chains and visibility coordination, hence reducing delays and inefficiencies. The authors identify risk management, cooperation, and continuous improvement initiatives as critical elements for sustaining efficiency. Their assessment emphasizes the transformative impact of technology while cautioning that efficiency improvements may be ephemeral without the establishment of targets, implementation of measures, and creation of control systems. The researcher recognizes that the procedures of technological integration and collaboration are significant, although new empirical evidence may validate these tactics in diverse contexts. This article enhances the literature on PPP performance by correlating operational efficiency with sustainable infrastructure outcomes.

Public procurement is essential to service delivery, but bureaucracy and tight laws hinder it in many emerging economies. Red tape, rigidity, and corruption in South African government procurement processes fail to achieve value-for-money results, especially when compared to private sector methods, according to Manyathi, Burger, and Moritmer (2021). They argue that

reform models can educate us how to use private sector reform methods including long-term supplier relationships, innovation, and streamlined processes. Inefficiencies and inexperienced vendors will persist in public procurement without a substantial change, according to the authors. The study helps governments who struggle to reconcile responsibility and efficiency. The researcher agrees that private sector best practices can improve procurement results, but reforms must assure transparency and responsibility to the public.

Walker, Vaz Serra, and Love (2022) address a vacuum in infrastructure project delivery by investigating how Alliancing improves cost and time planning. Old-fashioned procurement, which is stiff and adversarial, fails in pricing certainty and complex major projects. Expert interviews demonstrated that Alliancing, a method of collaborative governance, integration of multiple knowledge, and design-thinking treatments, improves planning dependability and reduces risks in their case study. This applies to procurement, where adversarial contract models impede innovation and responsiveness. The study found that project owners and operators make planning more engaging and likely to match long-term operations. Although the authors are right to advise overgeneralizing, the data confirm procurement reform views. Alliancing and other partnering strategies can improve infrastructure delivery, especially in circumstances with cost overruns and delays, according to the researcher.

Kadefors et al. (2020) provide outstanding advice on using procurement requirements to reduce infrastructure development carbon emissions. Their international comparative investigation shows that clients in Australia, the Netherlands, Sweden, the US, and the UK are integrating carbon reduction goals into procurement, but the method relies on market maturity, delivery model, and client ability. These findings show that procurement can promote innovation and sustainability, but transaction costs, rivalry, and the environment may require alternative strategies. This matches

sustainability concerns that policy ambition and feasibility must be evaluated. The authors believe client capacity drives long-term innovation. The researcher agrees that procurement-based sustainability can be symbolic rather than transformational in developing economies where institutional capabilities are limited in implementation.

2.3.4 Administrative Approvals and Project Delivery Efficiency

Nacir et al. (2025) address California's enabling legislation for design-build (DB), construction manager/general contractor (CM/GC), and progressive design-build (PDB) APDMs. Their case analysis of 26 bill samples from 1999 to 2024 indicates a clear drop in congressional restrictions, implying increasing transportation agency procurement leeway. This is similar to previous studies on APDMs encouraging efficiency, risks, and innovations in traditional distribution systems. The paper also highlights that regulation (e.g., cost thresholds, project type, and reporting) has been a possible barrier to adoption, but recent revisions are lessening these barriers. Transparency in laws helps expand APDM use, the authors conclude. The study correctly states that legislative flexibility is crucial, especially in developing countries, but capacity-building is also essential for APDM advantage.

Cost overruns remain the most recurring issue, undermining financial sustainability and project efficiency. Chimbomba and Chipandwe (2025) examined budget overruns in a road building project in Ndola, determining that the primary contributors were inflation, project management, and labor rates, with alterations in scope and contractor delays all contributing to increased costs. Their findings illustrate the complexity of cost determinants, particularly the correlation between project timeframes and material price escalations. Previous literature has

emphasized inflation and inadequate planning as consistent causes of overruns, while others have highlighted the influence of governance and corruption. The authors' recommendation for continuous risk assessment aligns with the broader literature advocating for preventive cost-management strategies. The researcher agrees that improving project management methods is essential; nevertheless, this study further asserts that institutional accountability must be incorporated into project governance to maintain cost discipline.

Contract administration is a crucial element of effective project management; nonetheless, it often contributes to project failure due to inadequate oversight. Olaniyan and Olaniyan (2025) assert that revenue leakage, resulting from inadequate enforcement of payment terms and invoicing delays, significantly inflates project costs, corroborating study findings that identify financial inefficiency as a primary issue in project delivery. Their findings indicate inadequate contract oversight due to supply chain inefficiencies and disagreements, which are correlated with project delays that carry substantial operational effects. While the authors assert that a well-defined contract scope and rigorous monitoring are crucial elements, this research contends that institutional capacity and stakeholder responsibility are equally significant yet overlooked factors. Consequently, while the research validates established understanding of contract administration, it prompts academics to consider incorporating governance-related elements into their assessments of cost overruns.

Road infrastructure is crucial to economic growth, social inclusion, and mobility, yet most of Nigeria has weak and decaying road infrastructure. The Confluence Journal of History and International Affairs (2025) attribute Kogi State's road project failures to leadership instability, corruption, and administrative bottlenecks that cause discontinuity and inefficiency. The study found a link between political mitigation, resource misuse, and development infrastructure halt,

notably in sub-Saharan Africa. However, ethicism and nepotism are also hurdles to equal resource allocation, therefore this work goes beyond financial mismanagement to emphasize the relevance of sociopolitical processes in growth. Although the researcher agrees that corruption and bad administration take center stage, this study believes that institutional improvements and ineffective accountability systems have not received enough attention, causing these vices to persist.

Public procurement in infrastructure development is a big concern, but risks disrupt cost, schedule, and quality. Kaysar (2024) illustrates how procurement risks in Bangladesh's Roads and Highways Department cause delays, non-aggressive costs, and quality shortages, requiring risk assessment and mitigation. Global data shows that poor procurement systems worsen project inefficiency and corruption. Kaysar goes farther, describing integrity problems and the necessity to instill ethical rules of conduct in procurement procedures, which mainstream literature has ignored. Although the researchers agree that ethical compliance is important, this study argues that institutional capacity and enforcement are the main issues, as ethics standards without accountability systems are worthless. Thus, the research will advance knowledge of governance changes and risk management in infrastructure delivery.

Infrastructure projects always have delays and overruns, and planning flaws plague road building worldwide. In an extensive study on scheduling activities in road intersecting projects in Colombia, Casta a n g e d an et al. (2025) found that planner inexperience and estimated resource gaps lead to schedule and cost overruns. They build on prior work that linked poor planning to inefficiencies but did not break down the processes. The researchers agree that technical capacity weaknesses (estimations) cause project inefficiencies, but they also believe that poor institutional governance (inefficient monitoring systems) exacerbates them. The study can help readers address systemic project failure issues by linking scheduling vulnerabilities with outcomes. This aligns

with construction project management debates but also highlights underexplored technical and managerial concerns.

2.3.5 Institutional Capacity and Project Delivery Efficiency

Institutional quality is crucial in influencing private sector involvement in massive infrastructure undertakings, especially those involving government-private partnerships (PPPs). Wang, Sun, and Tiong (2024) found that regulating quality, political stability, rule of law, voice, and accountability all contribute to high private capital participation in PPP projects. According to their study, 1,319 PPP initiatives in 36 belt and road countries reveal that regulatory-led, normative-cognitive, and regulatory-normative synergistic routes increase involvement. This suggests that institutional issues are complex and that complete governance is necessary for infrastructure transmutation. Wang et al. (2024) concur that institutional elements synergistically improve project delivery efficiency and provide solutions to optimize bureaucracy in infrastructure projects.

The procurement process affects urban infrastructure project deadlines, cost, and quality, making it crucial to success. According to Guevara, Garz n, and Castelblanco (2024), project features, institutional competency, and social involvement determine procurement success, not tender dates and bid competitiveness. Fuzzy-set qualitative comparative analysis of 23 urban public transport projects found that less community involvement can reduce delays, especially for projects supervised by experienced organizations. Based on the idea that high public engagement and stable states promote performance, low project complexity and political instability may boost bidding competitiveness. The researcher agrees with the authors that context-specific procurement strategies are necessary for state corporations developing road infrastructure in Kenya to meet bureaucratic and institutional requirements for efficient project delivery.

Artificial Intelligence is revolutionizing infrastructure project management, boosting resource allocation, cost prediction, and delivery. Rahman Sourav et al., (2025) demonstrate that AI-powered forecasting can improve cost enumeration, schedule inconsistencies, and resource negotiations by 5.45% and identify 25% more risks than conventional methods. Their study shows that predictive analytics, machine learning models, and optimization algorithms can improve project execution proactive decision-making. However, insufficient technical readiness, poor data quality, and organizational opposition may hinder AI use. The study author supports Rahman Sourav et al. (2025), who claim that modern forecasting technologies can improve project delivery. Kenyan road infrastructure state enterprises can improve project performance by using digital and predictive mechanisms to complement the bureaucratic approval process.

Urban transport infrastructure performance depends on design delivery, which affects safety, connectivity, and socioeconomic consequences. Hailemariam and Nuramo (2024) note that the design phase's context, requirements, institutional competency, and professional competency greatly impact project efficiency. They used descriptive analysis and factor analysis to identify the most important infrastructure delivery elements in Ethiopia using 204 expert respondents. The results show that focusing on these important factors in design jobs improves design outputs and simplifies project implementation. As research tends to focus on construction and operational processes, this paper emphasizes the relevance of design in project success. The researcher agrees with Hailemariam and Nuramo (2024) that robust design and efficient administration and procurement would improve road infrastructure state corporation project delivery in Kenya.

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2.4 Literature Gaps

Author & Year	Title	Methodology	Key Findings	Knowledge Gap / contribution of This Study
Elete, Nwulu, Erhueh & Akano (2024)	Impact of Front End and Detailed Design Engineering on Project Delivery Timelines and Operational Efficiency in the Energy Sector	Quantitative review; case study	FEED and detailed design improve decision-making, reduce risks, and accelerate timelines; overemphasis may limit innovation	Limited studies in road infrastructure; the impact of design approvals on project efficiency in Kenyan road corporations
Osifo, Omumu & Alozie (2025)	Evolving Contractual Obligations in Construction Law	Qualitative review	Regulatory reforms improve contractual clarity, reduce disputes, but increase administrative burdens	Gap in understanding regulatory approval impact on Kenyan road project delivery
Nacir,	Alternative	Legislative	Looser	Limited empirical

Shrestha, Leothacue-Liauburindr, Gad & Calahorra-Jimenez (2025)	Project Delivery Methods' Enabling Legislation Trends for California Transportation Agencies	trend analysis	legislative restrictions increase adoption of APDMs and enhance efficiency	evidence on administrative/legal approvals' effect in Kenya
Anand & Anand (2025)	Navigating Legal Complexities in Public Infrastructure Projects	Case study, India	Ambiguous contracts, poor risk allocation, and regulatory delays hinder efficiency; early ADR improves outcomes	Gap in analyzing regulatory and legal approval efficiency in African road projects
Nyoagbe, Evdorides & Burrow (2025)	Critical Success Factors for Performance-Based Contracting in Road Asset Management	Systematic review	Legal, political, economic determinants and adaptive frameworks enhance efficiency	Limited application to road projects in Kenya; link between administrative approvals and efficiency
Chimbomba & Chipandwe (2025)	An Assessment of Budget Overruns in Road Infrastructure Projects: Ndola, Zambia	Quantitative case study	Inflation, poor management, labor costs drive overruns; higher-qualified personnel reduce overruns	Focus needed on budgetary approvals' role in Kenyan road projects
Otieno & Nyang'au (2024)	Project Cost Management Process and Performance of	Survey and quantitative analysis	Cost control and scheduling influence	Gap in examining how formal budgetary approval processes affect

	Road Projects in Nairobi City County, Kenya		project performance; external factors like inflation impact outcomes	efficiency
Bahrudin, Patriadi & Sajiyo (2025)	Analysis of Time and Budget Efficiency in Bungur-Kedoyo Road Project Using EVM	Case study; EVM application	EVM integrates cost and schedule performance; predictive but limited by external risks	Gap in linking budgetary approval procedures to predictive project performance tools
Karuga, Mutuku & Sang (2024)	Financial Resource Scheduling and Road Construction Projects Performance in Nairobi Metropolitan	Quantitative	Proper financial scheduling improves efficiency and mitigates risk	Limited exploration of bureaucratic and budgetary approval influence in Kenya
Mwelu, Watundu & Moya (2024)	Contractors' Perception of Success Factors for Public Road Projects	Survey	Monitoring and staff sanctions enhance performance; procurement compliance perceived less influential	Gap in understanding how procurement approval procedures directly affect efficiency
Castañeda, Sánchez, Peña, Herrera & Mejía (2025)	Comprehensive Analysis of Scheduling Processes in Road Intersections	Quantitative; process assessment	29 scheduling processes analyzed; deficiencies lead to cost/time	Gap in evaluating administrative approvals' role in scheduling efficiency

			overruns	
Abdel Aziz (2007)	Successful Delivery of Public-Private Partnerships for Infrastructure Development	Comparative case study (UK, BC)	Institutional clarity, risk allocation, transparency critical for PPP success	Gap in how procurement approvals in PPPs impact project delivery in Kenyan roads
Tsimoshynska, Koval, Kryshtal, Filipishyna, Arsawan & Koval (2021)	Investing in Road Construction Infrastructure Projects under PPP Concessions	Economic-mathematical model	QFD-based model improves investment decisions and co-financing efficiency	Limited empirical verification in Kenya; gap in procurement approval and investment alignment
Memari, Ogunmakinde & Skulmoski (2025)	Strategies for Improving Supply Chain Efficiency in PPP Infrastructure Projects	Literature review	Digital innovations and collaboration improve PPP efficiency	Gap in operationalizing procurement approvals to enhance efficiency in Kenyan road projects
Manyathi, Burger & Mortimer (2021)	Public Sector Procurement vs Private Sector in South Africa	Comparative analysis	Red tape, corruption hinder procurement efficiency; private sector practices offer lessons	Gap in evaluating bureaucratic procurement approvals' effect in Kenyan context
Walker, Vaz Serra & Love (2022)	Improved Reliability in Planning Large-Scale Infrastructure Project Delivery through Alliancing	Qualitative interviews	Alliancing enhances cost/time reliability; traditional adversarial contracts limit innovation	Gap in analyzing collaborative procurement approval mechanisms in road infrastructure
Kadefors et al.	Procurement Requirements	Comparative international	Clients embed	Gap in linking sustainability-

(2020)	and Carbon Reduction in Infrastructure Construction	study	carbon goals in procurement; effectiveness depends on capacity	focused procurement approvals to project efficiency in Kenyan roads
Chimbomba & Chipandwe (2025)	Budget Overruns in Road Projects: Ndola	Quantitative	Inflation, poor management, labor costs escalate costs	Gap in systematic evaluation of budgetary approvals on efficiency
Olaniyan & Olaniyan (2025)	Impact of Poor Contract Administration on Project Costs and Timelines	Case study	Weak contract monitoring leads to revenue leakage, delays	Gap in administrative approval processes as a determinant of efficiency
Confluence Journal of History & International Affairs (2025)	Leadership Changes and the Challenge of Road Transport Infrastructure in Kogi State	Historical review	Leadership instability, corruption, bottlenecks delay projects	Gap in administrative approval influence on continuity of project delivery
Kaysar (2024)	Procurement Risk in Public Sector: Bangladesh	Case study	Procurement risks cause delays, overruns; ethics and integrity are critical	Gap in evaluating procurement approvals in Kenyan road infrastructure
Castañeda et al. (2025)	Scheduling Processes in Road Intersections	Process assessment	Technical deficiencies cause delays/costs	Gap in studying administrative approvals' influence on technical scheduling efficiency
Nacir et al.	Evolution of	Legislative	Looser	Gap in

(2025)	Enabling Legislation for APDMs	trend analysis	legislation increases adoption and efficiency	administrative and regulatory approval effects on road projects efficiency

2.5. Conceptual Framework

The conceptual framework is presented in Figure 2.1

Independent Variables **Dependent Variable**

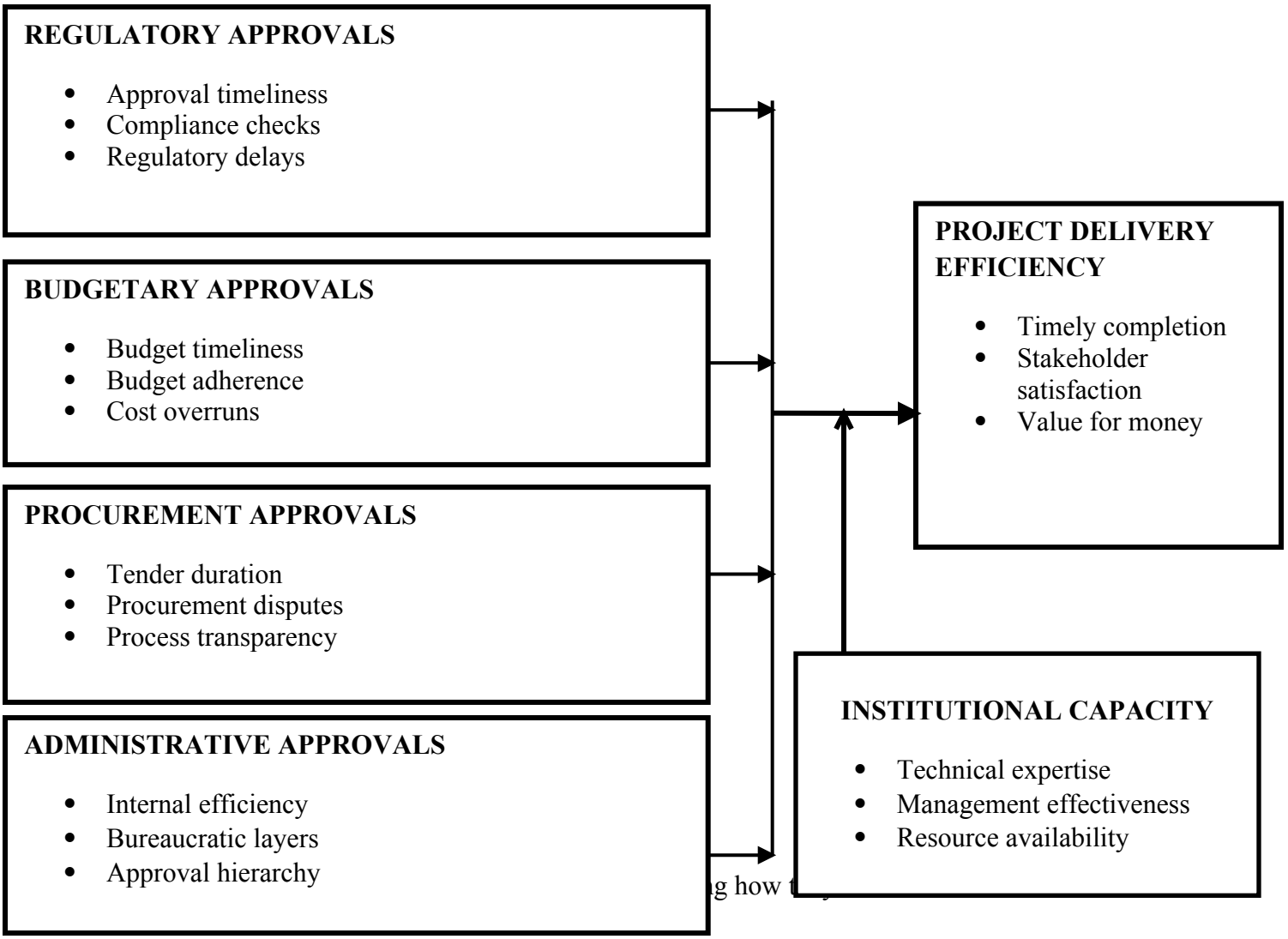

TABLE 2.1

Variables Operationalization

Variable	Indicators	Scale	Data Source
Regulatory Approvals	Approval timeliness Compliance checks Regulatory delays	Likert scale 1–5	Primary data (Questionnaires)
Budgetary Approvals	Budget timeliness Cost overruns Budget alignment	Likert scale 1–5	Primary (Questionnaires)
Procurement Approvals	Tender duration Procurement disputes Process transparency	Likert scale 1–5	Primary data (Questionnaires)
Administrative Approvals	Internal efficiency Bureaucratic layers Staff deployment	Likert scale 1–5	Primary data (Questionnaires)
Institutional Capacity (Moderating Variable)	Technical expertise Resource adequacy Management effectiveness	Likert scale 1–5	Primary data (Questionnaires)
Project Delivery Efficiency (Dependent Variable)	Timely completion Budget adherence Stakeholder satisfaction	Likert scale 1–5	Primary data (Questionnaires)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This chapter presents the research methodology to be employed in studying the impact of bureaucratic approval channels on project delivery efficiency among the state enterprises of road infrastructure provision in Kenya. It contains the description of research design, target population, sampling approaches, data collection, validity and reliability of the instruments, data analysis, and ethical considerations. The quantitative descriptive design guarantees systematic, precise, and repeatable outcomes, which can be used to offer credible data in answering the research goals. The chapter further describes how the institutional capability mediates the connection amid regulatory, budgetary, procurement, and administrative approvals and the efficiency of the project delivery, thus warranting the selection of the design, sampling technique, and the techniques of analysis to conduct a rigorous and ethical study.

3.2 Research Design

The research design was the quantitative explanatory research design. This research design will suit well because it allows systematically gathering and analyzing numerical data to research the impact of bureaucratic processes of approval in project delivery efficiency in the Kenya road infrastructure state corporations. It enables the researcher to evaluate interrelations between regulatory, budgetary, procurement, and administrative approvals, and their interplay in the timeliness, compliance to the budget and stakeholder satisfaction. Also, the design enables the testing of the moderating role of institutional capacity without controlling the research environment hence objectively offering evidence-based insights that can be generalized to other similar state corporations in the infrastructure sector of Kenya.

3.3 Target Population

The study targeted a population of 750 officials drawn from Kenya's three main road authorities: the Kenya National Highways Authority (KeNHA = 300), the Kenya Rural Roads Authority (KeRRA = 250), and the Kenya Urban Roads Authority (KURA = 200), encompassing both headquarters and three regional offices. The unit of analysis was the road infrastructure state corporations (KeNHA, KeRRA, and KURA), reflecting the institutional focus of the study. The units of observation were officers working in procurement, administration, and internal audit departments who are directly engaged in bureaucratic approval processes influencing project delivery efficiency. This group was selected because they possess firsthand experience with approval procedures and interdepartmental coordination. Inclusion criteria targeted staff directly involved in approval and compliance activities, while support staff and personnel not participating in such processes were excluded to maintain data relevance and accuracy.

TABLE 3.1

Target Population

Institution	Target Population
KeNHA (Kenya National Highways Authority)	300
KeRRA (Kenya Rural Roads Authority)	250
KURA (Kenya Urban Roads Authority)	200
Total	750

3.4 Sampling Procedure and Sample Size

3.4.1 Sample Size Determination

The study recruited a sample of 262 participants from the three principal road agencies. The sample size was determined using Yamane's (1967) formula:

Where N = 750 (accessible population) and e = 0.05 (margin of error). Substituting these values yielded a total sample of 262 respondents.

Sample size determination

Using Yamane's (1967) formula, $n=1+Ne^2/ N$

with accessible population N=750

e=0.05:

TABLE 3.2

Sample Size

Institution	Population (N)	Proportion of N	Sample (n)
KeNHA	300	0.40	105
KeRRA	250	0.33	87
KURA	200	0.27	70
Total	**750**	**1.00**	**262**

A proportional distribution of the sample occurred, with KeNHA contributing 105 participants, KeRRA 87, and KURA 70. The inclusion criteria targeted workers directly engaged in project management, procurement, administration, and internal audit, who have a minimum of six months of service. Exclusion was enforced for interns, temporary workers, individuals lacking approval responsibilities, or those absent due to leave or secondment. Stratified random sampling was

employed, wherein respondents was categorized by institutions to ensure proportionality before the random selection. This method diminished bias and improves the representativeness of the findings (Yamane, 1967).

3.4.2 Sampling Technique

The study used a census study covering three agencies' head offices and three regional offices to reach 262 participants. To represent KeNHA, KeRRA, and KURA proportionally, the population was stratified into three groups. Simple random sampling selected respondents in each stratum, reducing bias and increasing sample representativeness. This technique was chosen because it will entail unique institutional views of bureaucratic permission processes and improve statistics performance. In a well-organized recruitment process, human resource departments would approach eligible workers in batches using inclusion criteria (Directly involved employees (staff) in project delivery authorization of at least six months service). An formal invitation was sent to randomly selected responses. To capture only qualified and relevant data, the sample eliminated interns, temp employees, and those not available utilizing the exclusion criteria.

3.5 Pilot Study

The Kenya Rural Roads Authority (KeRRA) regional office in Machakos was the pilot study location. The site was chosen on the basis of the fact that its area of operation was similar to the target institutions and at the same time the location did not intersect the main study areas. To make sure that the study was in line with the target population, the pilot sample included personnel who were directly involved in the budget approval, procurement, and administrative services. The pilot study helped the researcher to determine the questionnaire clarity, validity, and reliability as well as to identify the ambiguity or redundancy of the questions. The pilot study excluded the

participants of the main survey because it could lead to bias, and the final data collection process would be corrupted.

3.5.1 Validity of the Instrument

Content and construct validity were employed to ensure that the research instrument has validity. Content validity was determined by the method of experimenting the questionnaire by the experts who were experts in the field of project management and the public administration and ensured that the questionnaire captured all the dimensions that were of relevance regulatory, budgetary, procurement, administrative approvals and project delivery efficiency. The input of these professionals was used to perfect the language, format, and applicability of the questions. Construct validity was also taken into consideration by ensuring that all the questionnaire questions matched the theoretical and conceptual frameworks where the study was being conducted to make sure that all the questions reflected the intended construct. The pilot study therefore aided in enhancing the clarity of the items, the minimization of ambiguity and the overall measurement accuracy of the instrument.

3.5.2 Reliability of the Instrument

The instrument was tested on internal consistency analysis depending on the Cronbach Alpha coefficient to determine the reliability of the instrument. The data of the pilot study were compared to establish reliability of each construct Regulatory Approvals, Budgetary Approvals, Procurement Approvals, Administrative Approvals, Institutional Capacity and Project Delivery Efficiency. The Cronbach's Alpha values of all constructs were greater than 0.7 which showed that there is satisfactory internal consistency and reliability. The ones that were unclear or had low correlation with their respective scales were revised to make them coherent. These findings affirmed that the questionnaire was reliable, consistent, and appropriate in the primary research.

3.6 Data Collection Tool

The researcher collected data using a standardized questionnaire based on the study variables and indicators. Independent factors including regulatory, budgetary, procurement and administrative approvals was measured using multiple-item Likert scale questions for timeliness, efficiency, compliance, and transparency. Moderate variables including technological experts, resource availability, and management effectiveness measured institutional capacity. Project delivery efficiency as measured by cost-effective, on-time delivery, stakeholder satisfaction, and other indicators. This questionnaire was self-administered for standardization and objectivity. It was designed using existing literature and expert consultations to improve validity and reliability. Capturing measurable data to satisfy study objectives with statistics were justified the organized questionnaire.

3.7 Data Collection

Data were collected by the researcher and trained research assistants through the administration of structured questionnaires to respondents in KeNHA, KeRRA, and KURA (taking two weeks or 14 days). To reduce disruptions, data were being gathered in the respective offices in working hours. The researcher ensured that the privacy of the participants was upheld by anonymizing answers and recording as few personal identifiers as possible. In cases where identifiers were required, the researcher would immediately de-identify the data as soon as it was not required. To avoid unauthorized access, misuse, and tampering with the stored data, the researcher kept the completed questionnaires in padlocked cabinets and also saved the data in password-secured electronic files. The data of the study was secured by administrative, physical, and technical measures, such as encryption and access control. To guarantee consistency, ethical conduct,

privacy, safety and confidentiality, the researcher followed up the data collection process on a daily basis.

3.8 Data Processing and Analysis

Data was cleaned and coded during collection, followed by analysis using SPSS version 27, which is dependable for both descriptive and inferential statistics. Demographic and research variables were summarized descriptively using frequencies, percentages, means, and standard deviations. Moderated Multiple Regression (MMR) analysis was employed to assess the influence of regulatory, budgetary, procurement, and administrative approvals on project delivery efficiency, with institutional capability serving as a moderating variable. To eliminate ambiguity, results were displayed in textual format, tabulated, and visually, utilizing bar charts and scatter plots in alignment with the research objectives and hypotheses.

Regression Model (Moderated Multiple Regression)

All constructs were measured using multi-item Likert-scale instruments, and composite scores were created by computing the mean of the items representing each variable; Yi = Project Delivery Efficiency (PDE) composite for project iii; RAi = Regulatory Approvals composite; BAi = Budgetary Approvals composite; PAi = Procurement Approvals composite; Ai = Administrative Approvals composite; ICi = Institutional Capacity (moderator)

Model 1 (Main Effects): $PDE = \beta_0 + \beta_1 RA + \beta_2 BA + \beta_3 PA + \beta_4 AA + \varepsilon$

Model 2 (Moderation): $PDE = \beta_0 + \beta_1 RA + \beta_2 BA + \beta_3 PA + \beta_4 AA + \beta_5 IC + \beta_6 (RA*IC) + \beta_7 (BA*IC) + \beta_8 (PA*IC) + \beta_9 (AA*IC) + \varepsilon$

3.9 Diagnostic Tests

3.9.1 Multicollinearity (VIF)

Multicollinearity refers to the correlation among independent variables, which can inflate standard errors and lead to unreliable coefficient estimates. This study calculated the Variance Inflation Factor (VIF) for regulatory, budgetary, procurement, administrative approvals, and institutional capability. A VIF number beyond 10 indicates severe multicollinearity, while a value below 5 is deemed acceptable. Evaluating VIF reveals that predictor variables do not contribute differently to the efficiency of project delivery. Remedial actions such as exclusion or the amalgamation of highly linked variables were implemented as necessary. This enhances the dependability of the regression results, ensuring that each independent variable is accurately understood in its effect on the dependent variable.

3.9.2 Normality

The assumption of normality indicates that the residuals in the regression model are regularly distributed, which is a critical need for parametric testing. The current study employed Shapiro-Wilk tests and visual inspection of Q-Q plots to assess the normality of residuals. Residual histograms were employed to detect skewness or kurtosis. It adheres to a normal distribution, enabling accurate testing of the significance of regression coefficients and the determination of confidence intervals. In instances of deviation identification, transformation processes such as logarithmic or square-root adjustments may be employed. The historical experiences of industries validate that the conclusions on the influence of approvals and institutional capacity on project delivery efficiency are both valid and generalizable, rendering the statistics employed in the inference more reliable.

3.9.3 Heteroscedasticity

Heteroscedasticity refers to a condition in which the variability of residuals is inconsistent across different levels of independent variables, violating regression assumptions and distorting standard errors. This analysis assessed the presence of heteroscedasticity using both the Breusch-Pagan and White tests, as well as residual plots against anticipated values. If heteroscedasticity is present, robust standard errors or weighted least squares was employed to mitigate bias. Homoscedasticity is crucial for the estimate of regression parameters and the accurate interpretation of hypothesis tests. Addressing this assumption ensures that the interrelations among regulatory frameworks, financial constraints, procurement processes, administrative approvals, institutional capability, and project delivery effectiveness are accurately assessed and interpreted.

3.10 Ethical Consideration

The research was highly ethical to protect the confidentiality of the participants and the integrity of the research. The National Commission on Science, technology and innovation (NACOSTI) and KCA University gave ethical consent to the study prior to data collection. The process was voluntary and all respondents were informed through clear explanation of purpose of the study, procedures and right to withdraw upon which they were requested to participate in the research. Anonymity and confidentiality were ensured with the use of anonymized data, limited access and storage security. The study participants were assured of protection and their data would only be utilized on academic grounds. The study applied the principle of beneficence by ensuring that no harm was caused, as well as community views were considered in the dissemination process as a way of improving the applicability of the research findings in society.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

The chapter is a presentation of the findings and discussion of the research on how bureaucratic approvals affect the efficiency of project delivery in road infrastructure agencies in Kenya KeNHA, KeRRA, and KURA. It examines data of structured questionnaires, given to 199 respondents which correspond to a response rate of 76%. This chapter starts by giving descriptive statistics of individual respondent characteristics and then proceeds to give inferential statistics of the relationships between the regulatory, budgetary, procurement, and administrative approvals and project delivery efficiency. The discussion combines empirical evidence with the existing literature and theoretical models to explain the implication of the findings on the institutional capacity and project performance.

4.2 Response Rate

TABLE 4.1

Response Rate by Agency

Agency	Frequency	Percent
KeNHA	57	28.6
KeRRA	70	35.2
KURA	72	36.2
Total	**199**	**100.0**

Note. Data represent the distribution of responses obtained from the three agencies surveyed. N = 199.

Table 4.1 provides KeNHA, KeRRA, and KURA's responses. KeNHA received 57 (28.6%), KeRRA 70 (35.2%), and KURA 72 (36.2%), totaling 199 (100%). In agencies with minor KURA influence, representation was relatively equal. Because the viewpoints are collected from various road sector perspectives, the reasonably even response rate strengthens the findings. The reflection

of all major agencies ensures that bureaucratic approval agency variances, which may affect project delivery efficiency, are considered. Thus, Kenyan public road infrastructure businesses can apply the study's findings on delays, compliance, and efficiency. This fair sample helps determine bureaucracy's influence on initiatives.

4.3 Reliability Analysis

TABLE 4.2

Reliability Statistics for Study Variables

Variable	Number of Items	Cronbach's Alpha	Interpretation
Regulatory Approvals	10	0.954	Excellent internal consistency
Budgetary Approvals	10	0.961	Excellent internal consistency
Procurement Approvals	10	0.958	Excellent internal consistency
Administrative Approvals	10	0.952	Excellent internal consistency
Institutional Capacity	10	0.967	Excellent internal consistency
Project Delivery Efficiency	10	0.950	Excellent internal consistency

Note. A Cronbach's alpha value of 0.970 indicates excellent internal consistency among the six items measuring the study constructs.

Table 4.2 displays the study variables' reliability statistics, which assess the internal consistency of construct measurement items. Individually, all six variables (Regulatory Approvals, Budgetary Approvals, Procurement Approvals, Administrative Approvals, Institutional Capacity, and Project Delivery Efficiency) exhibit good internal consistency (Cronbach alpha values > 0.9). This indicates that each variable measures the intended idea with excellent correlation and dependability. High reliability ensures consistent replies and reduces measurement mistakes, improving analysis validity. These findings suggest that approvals, institutional capacity, and

project delivery efficiency are measured consistently in the chosen state corporations in Kenya's public road infrastructure, and that the relationships between any two variables in the research study are a true measure of their effect on project performance.

4.4 Background Information

This part provides the demographic details of the respondents of the KeNHA, KeRRA, and KURA that helps to interpret the study results. Background information will cover the age, sex, level of education, years of experience and the present status of the respondents in their different organizations. Knowledge of these attributes assists in determining the diversity and representativeness of a sample that improves the reliability and validity of the research findings on bureaucratic approvals and project delivery efficiency within the road infrastructure sector in Kenya.

4.4.1 Age Bracket

TABLE 4.3

Distributions of Respondents by Age Bracket

Age Bracket	Frequency	Percent
25–34	77	38.7
35–44	59	29.6
45–54	40	20.1
55 and above	10	5.0
Below 25	13	6.5
Total	**199**	**100.0**

Note. Data represent respondents' age distribution across the surveyed agencies. N = 199.

Table 4.3 shows responders by age in sampled public road infrastructure state corporations. The biggest number of responders (38.7% n = 77) are 25–34 years old, followed by 35–44 (29.6% n = 59), 45–54 (20.1% n = 40), under 25 (6.5% n = 13), and 55+ (5.0% n = 10). This distribution

reflects a dynamic and possibly flexible workforce with a high share of youthful and middle-aged workers. Because 4554 and 55+ staff are more seasoned, institutional knowledge is retained. In bureaucratic approval processes and project delivery efficiency, such age structure means replies are based on new ideas and experience, providing a holistic understanding of how approval processes affect project performance at different career stages.

4.4.2 Gender

TABLE 4.4

Distribution of Respondents by Gender

Gender	Frequency	Percent
Female	65	32.7
Male	132	66.3
Prefer not to say	2	1.0
Total	**199**	**100.0**

Note. Data represent the gender distribution of respondents across the study sample. N = 199.

Table 4.4 displays the demographics of public road infrastructure state corporation respondents. Most research participants were men (66.3, n = 132), with 32.7 percent (n = 65) women and 1.0 percent (n = 2) not specifying their gender. The staff in the agencies under consideration is male-dominated, which may reflect Kenya's public infrastructure industry's gender distribution. In the study about bureaucratic approval procedures and project delivery efficiency, gender composition can change approval procedure views, experiences, and decision-making style. The low female representation demonstrates the need to focus on gender attitudes while examining organizational procedures and their impact on project efficiency to identify inclusive policies and practices.

4.4.3 Level of Education

TABLE 4.5

Distribution of Respondents by Level of Education

Level of Education	Frequency	Percent
Bachelor's Degree	85	42.7
Certificate/Diploma	50	25.1
Master's Degree	46	23.1
Other	8	4.0
PhD	10	5.0
Total	**199**	**100.0**

Table 4.5 shows respondents' education levels in public road infrastructure state corporations. Majority of respondents held Bachelor Degree (42.7, n=85), then Certificate/Diploma (25.1, n=50), then Master Degree (23.1, n=46). PhDs (5.0%, n = 10) and other qualifications (4.0%, n = 8) were lower. This distribution suggests that the workforce is mostly undergraduate and can understand and participate in project approval technical and administrative processes. Postgraduate degrees strengthen analytical and decision-making skills, which may boost bureaucratic efficiency. In conclusion, the respondents' educational profile shows they are qualified to comment on bureaucratic approval procedures and their effects on project execution in Kenya state corporations of public road infrastructure.

4.4.4 Years of Work Experience in Road Infrastructure Projects

TABLE 4.6

Distribution of Respondents by Years of Work Experience

Years of Work Experience	Frequency	Percent
3–5 years	67	33.7
6–10 years	63	31.7
Above 10 years	41	20.6
Less than 3 years	28	14.1
Total	**199**	**100.0**

Note. Data summarize respondents' duration of professional experience across the surveyed agencies. N = 199.

Responses by years of work experience in state corporations of public road infrastructure are shown in Table 4.6. The most common group was those with 310 years of experience (33.7, n = 67), followed by 6 to 10 years (31.7, n = 63). The respondents with more than 10 years of experience were 20.6 percent (n = 41), while those with fewer than 3 years were 14.1% (n = 28). This dispersion suggests mid-level and senior professionals; therefore the study will include both seasoned and new personnel. Because respondents have varying project procedure knowledge, their perspectives on bureaucratic approvals are more credible. Most respondents appear to be familiar with project delivery procedures, which is crucial for assessing efficiency and bureaucracy.

4.4.5 Current Position/Role in the Organization

TABLE 4.7

Distributions of Respondents by Current Position or Role

Current Position/Role	Frequency	Percent
Administrative Staff	41	20.6
Engineer/Technical Staff	93	46.7
Other	12	6.0
Procurement Officer	21	10.6
Project Manager	32	16.1
Total	**199**	**100.0**

Note. Data represent respondents' professional roles across the three agencies. N = 199.

Table 4.7 shows respondents' state company public road infrastructure roles. Most responders (46.7) (n = 93) were engineers or technical personnel, followed by administrative workers (20.6) (n= 41). Project managers made up 16.1% (n = 32), procurement officers 10.6% (n = 21), and others 6% (n = 12). This distribution shows that roughly 50% of respondents directly undertake

technical project performance, providing real data on bureaucratic approval procedures. Administrative and managerial staff also reflects perspectives on procedure efficiency, adherence, and decision-making. Roles diversity helps understand how bureaucratic approvals affect project delivery efficiency by recording operational and oversight experiences. This presentation makes study findings more applicable and credible.

4.5 Factor Analysis

Factor analysis was used to approve regulatory, financial, procurement, administrative, institutional capability, and project delivery efficiency. The analysis established the framework and ensured that each variable measured what it was supposed to. The factors with eigenvalues above 1 tested construct validity. These results suggest that all items were loaded accurately, indicating strong internal consistency and measurement quality for the regression.

4.5.1 Regulatory Approvals

TABLE 4.8

Kaiser–Meyer–Olkin (KMO) and Bartlett's Test for Regulatory Approvals

Test	Statistic	Value
Kaiser–Meyer–Olkin Measure of Sampling Adequacy	—	0.512
Bartlett's Test of Sphericity	Approx. Chi-Square	49.250
	df	45
	Sig.	0.003

Table 4.8 shows KMO and Bartlett regulatory approval results. A dataset with a KMO score of 0.512 is slightly suited for factor analysis due to moderate sampling adequacy. The Bartlett Test of Sphericity is significant (Chi-Square = 49.250, 45, p = 0.003) and the items are correlated enough for factor analysis. These findings imply that the 10 regulatory clearance elements are co-related and may be reducible to underlying causes. The study on bureaucratic approval procedures

and project delivery efficiency in Kenya's state corporations that build state road infrastructure justifies factor analysis to examine how regulatory approvals affect project efficiency. The relevance is that the data structure can identify key components.

TABLE 4.9

Communalities for Regulatory Approvals

Statement	Initial	Extraction
Project approvals are issued within the expected timeline.	1.000	0.569
Regulatory compliance requirements are clearly communicated.	1.000	0.600
Approval processes are efficient and do not cause delays.	1.000	0.504
All compliance checks are conducted thoroughly before approval.	1.000	0.384
Regulatory delays rarely affect project schedules.	1.000	0.388
Approvals are granted without unnecessary bureaucratic hurdles.	1.000	0.473
Regulatory guidelines are consistently applied across projects.	1.000	0.454
The approval process minimizes project risk.	1.000	0.439
Changes in regulations are promptly addressed by the organization.	1.000	0.618
Timely regulatory approvals enhance project efficiency.	1.000	0.526

Note. Extraction method: Principal Component Analysis.

Table 4.9 shows the communalities of the ten regulatory approval items. All first communalities are 1.000, indicating that all items initially explain all variance. The extraction values range from 0.384 to 0.618, which is the proportion of variance explained by each extracted primary component. The extraction value of (Changes in regulations are promptly addressed by the organization) is the highest (0.618), indicating that the variable is well-represented in the extracted factor, while (All compliance checks are conducted thoroughly before approval) is the lowest (0.384). Overall, these numbers indicate moderate overlap on a shared factor. This enables the study analyze how regulatory approvals affect project delivery efficiency at Kenyan state corporations of public road infrastructure. While the KMO values for some constructs (e.g., Administrative Approvals) were below the conventional threshold of 0.6, Bartlett's Test of

Sphericity was significant for all, justifying the proceeding with factor analysis. Furthermore, the high Cronbach's Alpha scores confirm the overall reliability of the scales despite some individual items having modest commonalities.

TABLE 4.10

Total Variance Explained for Regulatory Approvals

Component	Initial Eigenvalues	% of Variance	Cumulative %
Project approvals are issued within the expected timeline.	1.431	14.310	14.310
Regulatory compliance requirements are clearly communicated.	1.264	12.644	26.953
Approval processes are efficient and do not cause delays.	1.165	11.649	38.602
All compliance checks are conducted thoroughly before approval.	1.095	10.945	49.548
Regulatory delays rarely affect project schedules.	0.966	9.664	59.211
Approvals are granted without unnecessary bureaucratic hurdles.	0.947	9.471	68.682
Regulatory guidelines are consistently applied across projects.	0.907	9.065	77.747
The approval process minimizes project risk.	0.795	7.950	85.696
Changes in regulations are promptly addressed by the organization.	0.756	7.561	93.257
Timely regulatory approvals enhance project efficiency.	0.674	6.743	100.000

Note. Extraction method: Principal Component Analysis.

The total variance/explained of the ten regulatory approval elements via Principal Component Analysis is shown in Table 4.10. The first eigenvalues showed each item's influence, with values above 1.0 indicating considerable involvement. The highest eigenvalue (1.431) is due to project

approvals being provided on schedule, explaining 14.31% of the variance. The first five items explain 59.21 cumulative variation, with all five items contributing significantly to the construct. Later items add less variance. Overall, the derived parameters describe regulatory clearances and explain project delivery efficiency. The results show that Kenyan state corporations of public road infrastructure need effective and timely regulatory mechanisms.

4.5.2 Budgetary Approvals

TABLE 4.11

Kaiser–Meyer–Olkin (KMO) and Bartlett's Test for Budgetary Approvals

Test	Statistic	Value
Kaiser–Meyer–Olkin Measure of Sampling Adequacy		0.586
Bartlett's Test of Sphericity	Approx. Chi-Square	48.399
	Df	45
	Sig.	0.002

Kaiser-Meyer-Olkin (KMO) and Bartletts Test budgetary clearance findings are in Table 4.11. The KMO = 0.586 is a mediocre but acceptable sampling adequacy, therefore factor analysis is reasonable. Bartlett Test of Sphericity is significant (Chi-Square = 48.399, 45 = 45, p = 0.002), indicating that budgetary approval correlations are substantial enough to examine using factor. The studies show that dimension reduction and factor extraction can corroborate budgetary approval procedure analysis using the dataset. This indicates that financial approvals including timely project budgets, proper allocations, and monitoring processes affect project delivery efficiency in Kenyan state enterprises that build roads.

TABLE 4.12

Communalities for Budgetary Approvals

Statement	Initial	Extraction
Project budgets are approved within the planned time.	1.000	0.459
Budget allocations reflect project needs accurately.	1.000	0.648
Cost overruns are minimized through proper budget approvals.	1.000	0.551
Budgetary processes are aligned with project objectives.	1.000	0.691
Delays in budget approval rarely affect project delivery.	1.000	0.640
Budget monitoring mechanisms are effective.	1.000	0.455
Budget approvals facilitate timely project execution.	1.000	0.718
Budget planning considers both current and future project needs.	1.000	0.447
Variations in budget are addressed promptly and effectively.	1.000	0.601
Budgetary approvals contribute to overall project efficiency.	1.000	0.718

Note. Extraction method: Principal Component Analysis.

Table 4.12 lists community budget approvals. The first communalities are all 1.000, therefore the initial item explains its variance. After principal component analysis, the extraction value ranges from 0.447 to 0.718, reflecting how much of each variable's variance is explained by the underlying factor(s). Items like "Budget approvals make project execution timely, and also, budgetary approvals make the overall project efficient" have the highest extraction values (0.718), indicating that they are significant indications of the latent construct of budgetary approvals. The response to the question of whether budget planning considers current and future project demands are 0.447, which is poorer, but factor analysis can still accept it. Overall, our data support the idea that budgetary clearance procedures are a cohesive framework that determines project execution in Kenyan state companies of road infrastructure.

TABLE 4.13

Total Variance Explained for Budgetary Approvals

Component	Initial Eigenvalues	% of Variance	Cumulative %
Project budgets are approved within the planned time.	1.402	14.017	14.017
Budget allocations reflect project needs accurately.	1.194	11.937	25.954
Cost overruns are minimized through proper budget approvals.	1.165	11.648	37.602
Budgetary processes are aligned with project objectives.	1.141	11.408	49.010
Delays in budget approval rarely affect project delivery.	1.026	10.258	59.268
Budget monitoring mechanisms are effective.	0.979	9.793	69.061
Budget approvals facilitate timely project execution.	0.867	8.669	77.730
Budget planning considers both current and future project needs.	0.852	8.519	86.249
Variations in budget are addressed promptly and effectively.	0.708	7.084	93.333
Budgetary approvals contribute to overall project efficiency.	0.667	6.667	100.000

Note. Extraction method: Principal Component Analysis.

Table 4.13 indicates the total variance attributed to the budgetary approvals through principal component analysis. The first eigenvalues represent the value of variance that each will add to the construct before extraction. The first part, Project budgets are approved within the planned time, takes the place of 14.017% of the variance, followed by the next parts that take between 6.667% and 11.937%. The cumulative variance of the ten items is 100 percent and indicates that collectively, they entirely represent the construct of budgetary approvals. Cost overruns are minimized through proper budget approvals and budgetary processes are aligned with project objectives items have fairly high variance contribution, and thus define the factor. These findings

indicate that the budgetary approval processes play a significant role in determining the efficiency of projects delivery in the state corporations in Kenya dealing with the public road structures.

4.5.3 Procurement Approvals

TABLE 4.14

Factor Analysis for Procurement Approvals

Test	Statistic	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.566
Bartlett's Test of Sphericity	Approx. Chi-Square	53.194
	df	45
	Sig.	0.004

Table 4.14 shows the analysis of factors of procurement approvals. The Kaiser Meyer Olkin (KMO) value of the sampling adequacy is 0.566, which is a bit less than the generally accepted area of 0.6 but stills presents a mediocre degree of sampling adequacy, as far as factor analysis is concerned. The Test of Sphericity by Bartlett is not insignificant (Chi-Square = 53.194, df = 45, p = 0.004) which proves that the correlation between procurement approval items is strong enough to extract the factors. This means that the variables are interconnected and factor analysis is suitable. The findings show that the procurement approval processes such as timelines, selection of suppliers, transparency, and effectiveness can be effectively combined into components. These elements assist in the realization of how procurement mechanisms affect the efficiency of the project delivery in the state corporations of the public road infrastructure in Kenya.

TABLE 4.15

Communalities

Statement	Initial	Extraction
Tender processes are completed within the scheduled timeline.	1.000	0.730
Procurement procedures are transparent and understandable.	1.000	0.635
Procurement disputes are resolved efficiently.	1.000	0.578
Procurement approvals support timely project execution.	1.000	0.619
Supplier selection follows a fair and transparent process.	1.000	0.686
Procurement timelines rarely affect project delivery.	1.000	0.642
Contractual requirements are clearly communicated to suppliers.	1.000	0.473
Procurement processes minimize project risk.	1.000	0.542
Technological tools enhance the efficiency of procurement approvals.	1.000	0.557
Delays in procurement approvals negatively impact project timelines.	1.000	0.538

Table 4.15 shows the communalities of the items of procurement approvals. The values of the "Initials are all 1.000 which means that all the items at the beginning explain all their variance. The values of the Extraction demonstrate the percentage of the variance of each item, which is explained by the extracted factors. The range of values is 0.473 (contractual requirements clearly communicated) to 0.730 (tender processes completed within scheduled timelines), which implies the moderate and high commonality. Greater values imply that some items are well-captured by the underlying factors e.g., tender timelines, selection of suppliers and procurement transparency. Smaller values mean that there is some idiosyncrasy or variance that is not explained by the factor structure. On the whole, these findings support the idea that the factor analysis model is suitable to reflect the relationships between indicators of procurement approval, proving the investigation of the effects that the procurement processes have on the efficiency in project delivery within the public road infrastructure state corporations in Kenya.

TABLE 4.16

Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
Tender processes are completed within the scheduled timeline.	1.331	13.310	13.310
Procurement procedures are transparent and understandable.	1.296	12.963	26.272
Procurement disputes are resolved efficiently.	1.191	11.905	38.177
Procurement approvals support timely project execution.	1.125	11.247	49.425
Supplier selection follows a fair and transparent process.	1.059	10.585	60.010
Procurement timelines rarely affect project delivery.	0.962	9.620	69.630
Contractual requirements are clearly communicated to suppliers.	0.885	8.845	78.475
Procurement processes minimize project risk.	0.799	7.988	86.464
Technological tools enhance the efficiency of procurement approvals.	0.706	7.062	93.525
Delays in procurement approvals negatively impact project timelines.	0.647	6.475	100.000

Note. Extraction Method: Principal Component Analysis.

Table 4.16 shows the overall variance of the procurement approvals explained by a Principal Component Analysis. The statements are considered as constituents, and their eigenvalue is used as a percentage of the variance explained. The greatest single share (13.31%) is explained by the term Tender processes completed within the planned period, followed by the terms Procurement procedures are transparent and understandable (12.96) and Procurement disputes are resolved efficiently (11.91). The five initial items explain 60.01 percent of the variance and this means that the five items alone describe the dimensions of the construct. Lower eigenvalues, i.e., delays in approvals or technological efficiency, make smaller contributions but still make up the overall construct. This multi-component framework can imply that procurement approval activities are

impacted by several interdependent factors, which complicates them and why they can affect the effectiveness of project delivery in the context of Kenya state corporations that engage in the provision of roads.

4.5.4 Administrative Approvals

TABLE 4.17

Factor Analysis for Administrative Approvals

Test	Statistic	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.497
Bartlett's Test of Sphericity	Approx. Chi-Square	32.950
	df	45
	Sig.	0.002

Table 4.17 indicates the KaiserMeyerOlkin (KMO) value and Bartlett test of administrative approvals. KMO value of 0.497 implies mediocre level of sampling adequacy indicating that the factor analysis is just acceptable with such items. The Test of Sphericity that Bartlett uses is significant (Chi-Square = 32.950, p = 0.002) which means that the correlation matrix does not represent an identity matrix and factor analysis should be used. This means that the approvals construct of the administration has enough inter-item correlations to bring out significant factors. The findings indicate that the processes related to the administrative approval, such as efficiency, timeliness, clarity of the procedures, and training of the staffs are interrelated, and their role in the efficiency of project delivery needs to be investigated further. These aspects can be used to understand places in which the performance of the project in the state corporations of Kenya roads infrastructure can be improved or adversely affected by the administration process.

TABLE 4.18

Communalities

Statement	Initial	Extraction
Internal processes are efficient and well-coordinated.	1.000	0.663
Bureaucratic layers do not unnecessarily slow down projects.	1.000	0.533
Staff deployment is adequate for project needs.	1.000	0.394
Administrative approvals are granted in a timely manner.	1.000	0.499
Administrative processes support project efficiency.	1.000	0.601
Policies and procedures are clear to all staff.	1.000	0.448
Administrative approvals reduce operational bottlenecks.	1.000	0.460
Staff are adequately trained to handle administrative approvals.	1.000	0.702
Administrative delays rarely affect project timelines.	1.000	0.668
Effective administration improves overall project delivery.	1.000	0.769

Table 4.18 shows communalities of administrative approvals that show the percentage of the variance of each item that is attributed to the extracted factors. Original communalities are all equal to 1.000 indicating the total variance prior to extraction. The communalities extracted are between 0.394 (staff deployment adequacy) to 0.769 (effective administration improving project delivery) and an indication of the overall staff is that most items are moderately to highly related to the underlying factor. More communalities like effective administration (0.769) and staff training (0.702) point to the fact that these items are significant representatives of the administrative approvals construct. The lesser values such as staff deployment (0.394) are indicative of weaker representation. In general, the findings validate the hypothesis that administrative processes such as coordination, timeliness, procedural clarity and training are interconnected and have significant impact on the efficiency of delivering projects in the state corporations of Kenya on the public road infrastructure.

TABLE 4.19

Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
Internal processes are efficient and well-coordinated.	1.347	13.469	13.469
Bureaucratic layers do not unnecessarily slow down projects.	1.210	12.101	25.569
Staff deployment is adequate for project needs.	1.100	11.000	36.570
Administrative approvals are granted in a timely manner.	1.064	10.638	47.208
Administrative processes support project efficiency.	1.016	10.161	57.369
Policies and procedures are clear to all staff.	0.990	9.901	67.270
Administrative approvals reduce operational bottlenecks.	0.943	9.427	76.697
Staff are adequately trained to handle administrative approvals.	0.815	8.150	84.847
Administrative delays rarely affect project timelines.	0.799	7.994	92.841
Effective administration improves overall project delivery.	0.716	7.159	100.000

Note. Extraction Method: Principal Component Analysis.

Table 4.19 shows the total variance as explained in the case of administrative approvals through the principal component analysis. The eigenvalue and the percentage of variance of each item show the contribution of the item to the factor composition. The largest shares of variance (13.469 and 12.101 respectively) are attributed to internal processes and bureaucratic layers as these facets have a significant impact on the efficiency in administrative approval. The ten items cumulatively explain all the variance of 100 percent indicating that the factor extracted is sufficient to represent the construct. Low variance items (like effective administration 7.159%), nevertheless, has some significant contribution to the overall construct. This indicates that the administrative approvals; such as coordination, timeliness, process support, policy clarity and staff training are all important

in the determination of the project delivery efficacy within the state corporations of the Kenya government road network.

4.5.5 Institutional Capacity

TABLE 4.20

Kaiser-Meyer-Olkin (KMO) and Bartlett's

KMO and Bartlett's Test

Test	Measure	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.540
Bartlett's Test of Sphericity	Approx. Chi-Square	50.906
	df	45
	Sig.	0.002

Table 4.19 shows the total variance as explained in the case of administrative approvals through the principal component analysis. The eigenvalue and the percentage of variance of each item show the contribution of the item to the factor composition. The largest shares of variance (13.469 and 12.101 respectively) are attributed to internal processes and bureaucratic layers as these facets have a significant impact on the efficiency in administrative approval. The ten items cumulatively explain all the variance of 100 percent indicating that the factor extracted is sufficient to represent the construct. Low variance items (like effective administration 7.159%), nevertheless, has some significant contribution to the overall construct. This indicates that the administrative approvals; such as coordination, timeliness, process support, policy clarity and staff training are all important in the determination of the project delivery efficacy within the state corporations of the Kenya government road network.

TABLE 4.21

Communalities

Statement	Initial	Extraction
Staff possess adequate technical expertise for project tasks.	1.000	0.425
Organizational resources are sufficient to support project execution.	1.000	0.580
Management demonstrates effective leadership and decision-making.	1.000	0.590
Institutional capacity enhances regulatory compliance.	1.000	0.706
Adequate resources help mitigate project risks.	1.000	0.428
Technical expertise improves project planning and scheduling.	1.000	0.653
Management effectiveness supports timely decision-making.	1.000	0.629
Institutional capacity reduces delays caused by bureaucratic processes.	1.000	0.531
Capacity building initiatives strengthen project delivery outcomes.	1.000	0.659
Strong institutional capacity positively moderates approval processes' impact on project delivery.	1.000	0.759

Extraction Method: Principal Component Analysis.

Table 4.21 shows the similarities of the institutional capacity items, obtained with the help of principal component analysis. All the initial communalities are 1.000, which means that each item initially contributes maximally to variance. The values of the extractions are 0.425 (staff technical expertise) up to 0.759 (strong institutional capacity moderating approvals) and reflect the share of variance in each of the items explained by the underlying factor. Higher scores (e.g. 0.706-0.759) indicate that the latent institutional capacity construct is strongly represented by the factors of regulatory compliance, capacity-building initiatives, and moderation of approval processes. Smaller values (e.g., 0.425 0.428) suggest that certain items are not as well matched although they do not portray nothing. Comprehensively, these findings affirm the fact that, institutional capacity, encompassing expertise of the staff, resources, leadership, as well as organizational mechanisms, can reasonably be considered as a predictor of efficiency of project delivery in Kenya state corporations involved in provision of road infrastructure.

TABLE 4.22

Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
Staff possess adequate technical expertise for project tasks.	1.512	15.119	15.119
Organizational resources are sufficient to support project execution.	1.182	11.820	26.939
Management demonstrates effective leadership and decision-making.	1.147	11.471	38.410
Institutional capacity enhances regulatory compliance.	1.081	10.815	49.224
Adequate resources help mitigate project risks.	1.036	10.365	59.589
Technical expertise improves project planning and scheduling.	0.968	9.678	69.267
Management effectiveness supports timely decision-making.	0.828	8.281	77.548
Institutional capacity reduces delays caused by bureaucratic processes.	0.792	7.923	85.472
Capacity building initiatives strengthen project delivery outcomes.	0.752	7.517	92.988
Strong institutional capacity positively moderates approval processes' impact on project delivery.	0.701	7.012	100.000

Extraction Method: Principal Component Analysis.

The table 4.22 demonstrates the cumulative variance explained by the items of institutional capacity by the principal component analysis. The first eigenvalues show the variance that an item is adding. The first factor (staff technical expertise) explains 15.119 percentage of the variance; organizational resources (11.820) and the management effectiveness (11.471) stand next. Combining, the ten items describe the total variance (100) with the greatest contributions made to regulatory compliance, capacity-building efforts and moderating role of institutional capacity on approval processes. This implies that institutional capacity has a multidimensional dimension with a staff knowledge, adequate resources and proper leadership as key factors affecting project delivery. The findings indicate that the efficiency of the projects can be facilitated in Kenya public

road infrastructure state corporations through strengthening of these areas, which proves the relevance and significance of the construct in bureaucratic approvals of the projects.

4.5.6 Project Delivery Efficiency

TABLE 4.23

KMO and Bartlett's Test

Test	Measure	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.582
Bartlett's Test of Sphericity	Approx. Chi-Square	55.419
	df	45
	Sig.	0.001

Table 4.21 shows KaiserMeyerOlkin (KMO) measure and Bartlett test of sphericity item of project delivery efficiency. The KMO value of 0.582 indicates moderate sampling adequacy, which implies that the data would be appropriate in performing a factor analysis. The test of Bartlett is significant (Chi-Square = 55.419, p = 0.001) and this indicates that there are indeed correlations between the items that will be enough to extract meaning factors. This means that the ten project delivery efficiency items relate to each other and can be evaluated to tell the underlying components that affect the efficiency. These findings confirm that the efficiency of delivering a project can be effectively measured and that the items are measuring separate but correlated variables, including on time delivery, budget constraint compliance, stakeholder satisfaction, and good communication in the case of the bureaucratic approval processes in the state corporations of Kenya in the road infrastructure sector.

TABLE 4.24

Communalities

Statement	Initial	Extraction
Projects are completed within the scheduled time.	1.000	0.572
Project budgets are adhered to without significant overruns.	1.000	0.669
Stakeholders are satisfied with project outcomes.	1.000	0.749
Project milestones are consistently achieved.	1.000	0.597
Resource allocation supports timely project completion.	1.000	0.450
Monitoring and evaluation processes enhance project efficiency.	1.000	0.392
Delays and disruptions are effectively managed.	1.000	0.653
Quality standards are consistently maintained.	1.000	0.461
Communication with stakeholders ensures smooth project delivery.	1.000	0.740
Overall project performance meets organizational expectations.	1.000	0.679

Extraction Method: Principal Component Analysis.

Table 4.22 shows the communalities of project delivery efficiency indicators on Principal Component Analysis. Value of all ten items is 1.000, which means that all variables begin with 100 percent of its variance. Their extraction values lie between 0.392, (monitoring and evaluation processes) and 0.749 (stakeholder satisfaction), which means how much variance of individual items is determined by the underlying factor. These items are strongly represented by the factor project delivery efficiency as higher extraction values (including 0.749 stakeholder satisfaction and 0.740 communication) imply. Weaker representation as shown by lower values such as 0.392 is acceptable though it cannot be used in calculating factor analysis. This proves that the items chosen are all inclusive of the essence of project delivery efficiency in terms of timely delivery, budget compliance, risk management, and satisfaction of the stakeholders, which are pivotal in the assessment of bureaucratic approval processes in the state corporations of Kenya, which handle the state road infrastructure.

TABLE 4.25

Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
Projects are completed within the scheduled time.	1.402	14.018	14.018
Project budgets are adhered to without significant overruns.	1.292	12.917	26.935
Stakeholders are satisfied with project outcomes.	1.213	12.126	39.061
Project milestones are consistently achieved.	1.053	10.531	49.592
Resource allocation supports timely project completion.	1.001	10.007	59.599
Monitoring and evaluation processes enhance project efficiency.	0.970	9.704	69.304
Delays and disruptions are effectively managed.	0.883	8.834	78.138
Quality standards are consistently maintained.	0.807	8.074	86.212
Communication with stakeholders ensures smooth project delivery.	0.768	7.681	93.893
Overall project performance meets organizational expectations.	0.611	6.107	100.000

Table 4.23 shows the total variance explained in terms of Principal Component Analysis of project delivery efficiency. The first eigenvalues show the contribution of each item to the factor. The first one, Projects are completed within the scheduled time, explicates the 14.018% of the variance with the next one, Project budgets are adhered to without significant overruns, explaining the 12.917 percent and the third one, Stakeholders are satisfied with project outcomes, explaining the 12.126 percent. The ten items cumulatively explain 100 percent of the variance indicating that the variables used are a full sample of the construct. The items with large eigenvalues add to the model explaining the efficiency of project deliveries more significantly, and its key points are schedule compliance, budget compliance, and stakeholder satisfaction. These findings confirm the structure of factors and prove the impact of bureaucratic approval processes on the efficiency of project delivery within the public road infrastructure state corporations of Kenya.

4.6 Descriptive Statistics

This part provides the descriptive statistics of the study variables in the form of the mean scores and standard deviation of the regulatory, budgetary, procurement, and administrative approvals, institutional capacity as well as the project delivery efficiency. The findings represent the perception by the respondents over the efficiency and effectiveness of bureaucratic processes in KeNHA, KeRRA, and KURA. The average scores represent the overall degree of the agreement with each construct, whereas the standard deviations represent the variability of the responses, which will be used to perform the further inferential analysis of the statistics.

4.6.1 Regulatory Approvals

TABLE 4.26

Descriptive Statistics for Regulatory Approvals

Statement	N	Minimum	Maximum	Mean	Std. Deviation
Project approvals are issued within the expected timeline.	199	1	5	2.65	0.896
Regulatory compliance requirements are clearly communicated.	199	1	5	2.60	0.887
Approval processes are efficient and do not cause delays.	199	1	5	2.61	0.808
All compliance checks are conducted thoroughly before approval.	199	1	5	2.61	0.850
Regulatory delays rarely affect project schedules.	199	1	5	2.57	0.781
Approvals are granted without unnecessary bureaucratic hurdles.	199	1	4	2.59	0.753
Regulatory guidelines are consistently applied across projects.	199	1	5	2.56	0.850
The approval process minimizes project risk.	199	1	5	2.65	0.850
Changes in regulations are promptly addressed by the organization.	199	1	4	2.44	0.832
Timely regulatory approvals enhance project efficiency.	199	1	5	2.62	0.884
Valid N (listwise)	**199**				

The effectiveness of project delivery in Kenyan road infrastructure state enterprises can be determined by regulatory approval statistics in Table 4.24. The respondents moderately agreed

that project approvals are done on time (2.65) and efficiently (2.61), implying that delays occur. Regulatory compliance standards are explicit (2.60) and compliance assessments are thorough (2.61), however there are loopholes. Regulatory delays that don't affect timelines (2.57) and approvals without bureaucratic impediments (2.59) indicate occasional dissatisfaction. Quick response to regulatory changes (2.44), modest guideline application consistency (2.56) and approval risk mitigation (2.65), emphasizing delayed adjustment. Finally, timely approvals boost efficiency (2.62), suggesting modest improvement. The results indicate that regulatory measures contribute moderately to project delivery, while facilitation of approvals and uniformity in implementing standards may speed up work and reduce project accumulation.

4.6.2 Budgetary Approvals

TABLE 4.27

Descriptive Statistics for Budgetary Approvals

Statement	N	Minimum	Maximum	Mean	Std. Deviation
Project budgets are approved within the planned time.	199	1	5	2.87	0.812
Budget allocations reflect project needs accurately.	199	1	4	2.90	0.785
Cost overruns are minimized through proper budget approvals.	199	1	5	3.04	0.846
Budgetary processes are aligned with project objectives.	199	1	5	2.91	0.784
Delays in budget approval rarely affect project delivery.	199	1	5	2.92	0.843
Budget monitoring mechanisms are effective.	199	1	5	2.91	0.869
Budget approvals facilitate timely project execution.	199	1	5	2.85	0.787
Budget planning considers both current and future project needs.	199	1	5	2.88	0.818
Variations in budget are addressed promptly and effectively.	199	1	5	3.04	0.887
Budgetary approvals contribute to overall project efficiency.	199	1	4	2.90	0.826
Valid N (listwise)	**199**				

Table 4.25 shows how budgetary approvals affect project delivery efficiency in Kenyan state enterprises' public road development projects. Moderately, respondents said project budgets are passed on time (2.87) and budgetary allocations are passed according to project demands (2.90),

indicating some adherence to plans with occasional delays. Limiting cost overruns with correct approvals and timely budget variations (3.04), is effective budget control. Budgetary processes connected to project objectives (2.91) and delays that won't affect delivery (2.92) are moderately efficient. Budget monitoring mechanism items (2.91), enabling timely implementation (2.85), taking into account present and future needs (2.88), and contribution to overall efficiency (2.90) show that budgetary approvals mostly facilitate timely project implementation, but increasing timeliness and monitoring would improve efficiency and reduce project delays.

4.6.3 Procurement Approvals

TABLE 4.28

Descriptive Statistics for Procurement Approvals

Statement	N	Minimum	Maximum	Mean	Std. Deviation
Tender processes are completed within the scheduled timeline.	199	1	4	2.72	0.778
Procurement procedures are transparent and understandable.	199	1	5	2.85	0.869
Procurement disputes are resolved efficiently.	199	1	5	2.76	0.836
Procurement approvals support timely project execution.	199	1	5	2.80	0.847
Supplier selection follows a fair and transparent process.	199	1	5	2.77	0.907
Procurement timelines rarely affect project delivery.	199	1	5	2.72	0.840
Contractual requirements are clearly communicated to suppliers.	199	1	5	2.73	0.827
Procurement processes minimize project risk.	199	1	5	2.77	0.903
Technological tools enhance the efficiency of procurement approvals.	199	1	5	2.76	0.866
Delays in procurement approvals negatively impact project timelines.	199	1	4	2.78	0.803
Valid N (listwise)	**199**				

In Table 4.26, procurement approvals are shown to improve project delivery efficiency in Kenyan state corporations' public road infrastructure projects. Responses showed that tender processes are on time (2.72), while procurement processes (2.85) are transparent and intelligible, indicating

fairness. Procurement issues being addressed efficiently (2.76) and approvals promoting timely project execution (2.80) show moderate efficacy in timekeeping project schedules. Process fairness, risk minimization Proof of procedural fairness and risk mitigation Fair supplier selection and procurement reduce project risk (2.77). The second pillar (2.73) discusses contractual requirements, and the second (2.76) shows how technologies increase efficiency, which improves communication and technology utilization. Schedule delays hurt project delivery (2.78), while procurement schedules don't (2.72). prove that procurement delays moderately affect project completion.

4.6.4 Administrative Approvals

TABLE 4.29

Descriptive Statistics for Administrative Approvals

Statement	N	Minimum	Maximum	Mean	Std. Deviation
Internal processes are efficient and well-coordinated.	199	1	4	2.68	0.807
Bureaucratic layers do not unnecessarily slow down projects.	199	1	5	2.71	0.795
Staff deployment is adequate for project needs.	199	1	5	2.62	0.782
Administrative approvals are granted in a timely manner.	199	1	5	2.62	0.856
Administrative processes support project efficiency.	199	1	5	2.58	0.848
Policies and procedures are clear to all staff.	199	1	4	2.63	0.842
Administrative approvals reduce operational bottlenecks.	199	1	5	2.59	0.798
Staff are adequately trained to handle administrative approvals.	199	1	5	2.65	0.832
Administrative delays rarely affect project timelines.	199	1	5	2.66	0.843
Effective administration improves overall project delivery.	199	1	5	2.65	0.869
Valid N (listwise)	**199**				

Table 4.27 describes administrative clearances and their impact on project delivery efficiency in Kenyan state companies' road infrastructure management. The respondents said internal procedures are efficient and well-coordinated (2.68), indicating moderate workflow management

effectiveness. Bureaucratic levels are not unnecessary dragging down projects (2.71) means there is some red tape, and staff deployment is appropriate (2.62) means human resources are moderately responsive. Administrative approvals are prompt (2.62) and efficient to project (2.58), indicating some efficiency. Clear policies and procedures to staff (2.63) and administrative approvals that reduce bottlenecks (2.59) indicate moderate operations clarity and support. According to staff training (2.65), delays rarely affect timelines (2.66) and effective administration enhances delivery (2.65), which can be improved by improving timeliness and process optimization.

4.6.5 Institutional Capacity

TABLE 4.30
Descriptive Statistics for Institutional Capacity

Statement	N	Minimum	Maximum	Mean	Std. Deviation
Staff possess adequate technical expertise for project tasks.	199	2	5	3.29	0.720
Organizational resources are sufficient to support project execution.	199	1	5	3.32	0.757
Management demonstrates effective leadership and decision-making.	199	1	5	3.24	0.754
Institutional capacity enhances regulatory compliance.	199	1	5	3.22	0.704
Adequate resources help mitigate project risks.	199	1	5	3.28	0.817
Technical expertise improves project planning and scheduling.	199	1	5	3.30	0.809
Management effectiveness supports timely decision-making.	199	1	5	3.29	0.762
Institutional capacity reduces delays caused by bureaucratic processes.	199	1	5	3.32	0.770
Capacity building initiatives strengthen project delivery outcomes.	199	1	5	3.37	0.753
Strong institutional capacity positively moderates approval processes' impact on project delivery.	199	1	5	3.22	0.778
Valid N (listwise)	**199**				

Table 4.28 describes institutional capability and its effects on project delivery in Kenyan road infrastructure state enterprises. According to respondents, personnel have enough technical expertise (3.29) and it improves planning and scheduling (3.30), indicating excellent project execution capability. Organizational resources are adequate (3.32) and project risks are reduced

(3.28), indicating moderate support for material and financial support on project outcomes. Management effectiveness is shown by good leadership (3.24) and timely decision-making (3.29). Organizational capability indicates regulatory compliance and efficacy, reducing bureaucratic delays (3.32) and compliance (3.22). Capacity-building measures reinforcing delivery (3.37) and strong capacity altering approval processes (3.22) indicate how institutional strength improves project delivery efficiency. Overall, the agency has moderate to high institutional capacity.

4.6.6 Project Delivery Efficiency

TABLE 4.31

Descriptive Statistics for Project Delivery Efficiency

Statement	N	Minimum	Maximum	Mean	Std. Deviation
Projects are completed within the scheduled time.	199	1	5	3.11	0.761
Project budgets are adhered to without significant overruns.	199	1	5	2.98	0.749
Stakeholders are satisfied with project outcomes.	199	1	5	3.05	0.815
Project milestones are consistently achieved.	199	1	5	3.04	0.761
Resource allocation supports timely project completion.	199	1	5	2.99	0.951
Monitoring and evaluation processes enhance project efficiency.	199	1	5	3.09	0.793
Delays and disruptions are effectively managed.	199	1	5	3.00	0.835
Quality standards are consistently maintained.	199	1	5	2.98	0.867
Communication with stakeholders ensures smooth project delivery.	199	1	5	2.97	0.707
Overall project performance meets organizational expectations.	199	1	5	3.03	0.738
Valid N (listwise)	**199**				

Table 4.25 presents the descriptive statistics of project delivery efficiency within Kenyan state corporations for the public roads infrastructure project, according to 199 respondents. The respondents said projects are completed on time (3.11), and monitoring and assessment methods improve efficiency (3.09), indicating moderate schedule compliance and supervision efficiency. It shows sensible financial and technical control that project budgets are met without overruns

(2.98) and quality criteria are always met. If stakeholders are satisfied with project results (3.05) and milestone completion (3.04), meeting targets is acceptable. Resource allocation manages delays (3.00) and completion (2.99) to moderate operating efficiency. Sixth stakeholder communication principle validates delivery without issues (2.97) and project performance exceeding organizational objectives (3.03). Overall, the anticipated project delivery is average, and resource management, quality control, and stakeholder involvement need improvement.

4.7 Correlation Analysis

TABLE 4.32

Correlation Matrix

Variables	Regulatory Approvals	Budgetary Approvals	Procurement Approvals	Administrative Approvals	Institutional Capacity	Project Delivery Efficiency
1. Regulatory Approvals	1					
2. Budgetary Approvals	.828**	1				
3. Procurement Approvals	.837**	.807**	1			
4. Administrative Approvals	.870**	.817**	.831**	1		
5. Institutional Capacity	.890**	.838**	.848**	.877**	1	
6. Project Delivery Efficiency	.857**	.826**	.853**	.834**	.869**	1

Note. N = 199. Correlation is significant at the 0.01 level (2-tailed).

Table 4.26 illustrates the link between bureaucratic clearance procedure and project delivery efficiency in Kenyan road infrastructure state enterprises (N = 199). All independent variables have strong positive correlations: regulatory approvals and budgetary approvals (r = 0.828), procurement approvals and budgetary approvals (r = 0.837), administrative approvals and procurement approvals (r = 0.870), etc. Upgrades in one type of approval are linked to upgrades in others. Institutional capacity has the highest correlations with all approvals (0.838-0.890),

making it a key project problem. Regulatory (r = 0.857), budgetary (r = 0.826), procurement (r = 0.853), and administrative approvals (r = 0.834) are also positively correlated with project delivery efficiency, as is institutional capacity (r = 0.869), proving that bureaucracy and institutional capability both affect project delivery. All correlations are significant at 0.01 ensuring link strength.

4.9 Diagnostic Tests

Diagnostic tests to ensure regression model validity and reliability are shown below. Major tests included normalcy, multicollinearity, linearity, and homoscedasticity.

TABLE 4.33

Tests of Normality

Variable	Kolmogorov–Smirnov			Shapiro–Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Regulatory Approvals	.059	199	.087	.955	199	.000
Budgetary Approvals	.059	199	.087	.955	199	.000
Procurement Approvals	.059	199	.087	.955	199	.000
Administrative Approvals	.059	199	.087	.955	199	.000
Institutional Capacity	.059	199	.087	.955	199	.000
Project Delivery Efficiency	.059	199	.087	.955	199	.000

Note. Lilliefors significance correction applied.

Table 4.27 provides Kolmogorov Smirnov (K-S) and Shapiro Wilk (N=199) tests of research variables' normality. The test indicates that the K-S findings are normally distributed because the statistic is 0.059 and the p-values of all variables are 0.087. The Shapiro-Wilk test shows a substantial deviation from normality ($p < 0.05$) with a value of 0.955 and $p = 0.000$ on all variables. This anomaly may occur in moderately large samples when ShapiroWilk is more prone to slight departures from normality. The findings imply that although the data are close to normalcy, slight

skewness or kurtosis may exist, which must be factored into parametric test selection, although large sample sizes usually mitigate the effects of these factors on regression analysis.

TABLE 4.34

Multicollinearity Test Using Variance Inflation Factor (VIF)

Model	**Collinearity Statistics**	
	Tolerance	VIF
(Constant)		
Regulatory Approvals	.158	6.320
Budgetary Approvals	.243	4.115
Procurement Approvals	.224	4.462
Administrative Approvals	.177	5.648
Institutional Capacity	.144	6.954

Note. Dependent variable: *Project Delivery Efficiency.*

Table 4.28 presents multicollinearity diagnostics of Project Delivery Efficiency predictor factors for Tolerance and Variance Inflation Factor. Tolerance is 0.144-0.243 and VIF is 4.115-6.954. Multicollinearity is severe when the VIF is larger than 10 or the tolerance is less than 0.1. All VIF values in this research are less than 10, however several (Regulatory Approvals = 6.320, Administrative Approvals = 5.648, Institutional Capacity = 6.954) are larger than 5, indicating considerable multicollinearity. This suggests that the predictors are correlated but do not exceed the standard errors, however regression coefficients should be interpreted carefully. The results imply that bureaucratic approval processes, institutional capacity, and project delivery efficiency are mutually reliant, which supports the study's focus on how overlapping approval systems affect project outcomes.

TABLE 4.35

Residual Statistics

Statistic	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.04	4.96	4.01	0.53	199
Residual	–0.68	0.72	0.00	0.24	199
Standard Predicted Value	–1.83	1.82	0.00	1.00	199
Standard Residual	–2.78	2.95	0.00	0.99	199

Note. Residual statistics show the distribution of predicted and residual values for the dependent variable *Project Delivery Efficiency.*

The residual statistics of the regression model for Project Delivery Efficiency are shown in table 4.29. The predictors predict project efficiency ratings between 3.04 and 4.96, with a mean of 4.01. In addition, the Residuals (actual and predicted value differences) range from -0.68 to 0.72, with a mean of 0.00, indicating that prediction errors are small and that the model fits well. Standard Predicted Values and Standard Residuals are around -2 to +2 and -3 to +3, respectively, with no extreme outliers. These results indicate that the regression model accurately predicts project delivery efficiency and meets the normally distributed residuals assumption, justifying inferential analysis.

4.10 Inferential Statistics

This section gives the inferential statistics test that was applied to investigate the linkages between bureaucracy approval procedures and project delivery efficiency. The strength and direction of these relationships were established in correlation and multiple regression analysis. The results showed that regulatory, budgetary, procurement and administrative approvals play a great role in the efficiency of project delivery and institutional capacity enhances their impact. The findings are empirical evidence of the hypotheses of the study and in line with the theoretical expectations of efficiency in bureaucracy in managing infrastructure.

Model summary

TABLE 4.36

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.903[a]	0.816	0.812	0.25

Note. [a] Predictors: (Constant), Administrative Approvals, Budgetary Approvals, Procurement Approvals, Regulatory Approvals.

Table 4.30 shows the model summary of the regression analysis of Project Delivery Efficiency. The multiple correlation Coefficient R = 0.903 depicts that there is a very strong positive correlation between the independent variables (Regulatory, Budgetary, Procurement, and Administrative Approvals) and the efficiency of project delivery. The R 2 = 0.816 indicates that these predictors explain about 81.6 percent of the difference in project delivery efficiency which shows that the model has a significant power of explanation. The fact that the high explanatory power is not due to overfitting is proven by the fact that Adjusted R 2 = 0.812 indicates the number of predictors incorporated in the model. The standard error of estimate = 0.25 indicates that there is a reasonable level of accuracy of the predictions. Altogether, the findings reveal that there is a close predictive value, which proves the importance of the bureaucratic approval processes in defining the efficiency of the project delivery.

TABLE 4.37

Analysis of Variance (ANOVA)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	54.118	4	13.529	214.90	.000[b]
Residual	12.214	194	0.063		
Total	66.332	198			

Note. [a] Dependent Variable: *Project Delivery Efficiency*.
[b] Predictors: (Constant), Administrative Approvals, Budgetary Approvals, Procurement Approvals, Regulatory Approvals.

The table 4.31 shows the results of ANOVA of the regression model used to predict Project Delivery Efficiency. The regression sum of squares (54.118) is an indication of the variation which is explained by the predictors and the residual sum of squares (12.214) is an indication of the variation which is not explained by the predictors. The F-value = 214.90 and the degree of freedom = 4, 194 determine whether the overall regression model is statistically significant. The corresponding p-value (Sig. = 0.000) has a value that is lower than 0.01, which means that the model has a significant predictive effect on project delivery efficiency. It also means that Regulatory Approvals, Budgetary Approvals, Procurement Approvals, and Administrative Approvals as a group, play a vital role in determining the efficiency of project delivery in the Kenyan state corporations of road infrastructure. The findings also confirm that bureaucratic approval procedures are significant predictors of project outcomes and that the regression model is a good fit to the data.

Regression Coefficients

TABLE 4.38

Regression Coefficients Predicting Project Delivery Efficiency

Predictor	B	SE B	β	t	p
(Constant)	0.141	0.133	—	1.059	.291
Regulatory Approvals	0.286	0.072	0.286	3.973	<.001
Budgetary Approvals	0.210	0.061	0.210	3.438	.001
Procurement Approvals	0.327	0.063	0.327	5.158	<.001
Administrative Approvals	0.143	0.070	0.143	2.051	.042

Note. Dependent Variable: *Project Delivery Efficiency*.

Table 4.32 shows the regression coefficients of predicting Project Delivery Efficiency. The B values are the unstandardized coefficients or the anticipated change in the efficiency of project delivery as a result of a one unit increase in the predictor, other variables remaining constant. Standardized coefficients are the 2 (Beta) values, which indicate the relative strength of each predictor on the dependent variable, on a similar scale. Specifically, the strongest effect is on Procurement Approvals (β= 0.327): it is the strongest effector of efficiency prediction. It is statistically significant, as the p-values (Sig.) below 0.05 demonstrate that the predictor has a significant effect on the efficiency of project delivery. In this case, Regulatory Approvals (p <.001), Budgetary Approvals (p =.001), Procurement Approvals (p <.001), and Administrative Approvals (p =.042) are significant predictors of the efficiency of project delivery, which confirms that bureaucratic approval procedures do substantially affect project performance.

TABLE 4.39

Regression Coefficients Predicting Project Delivery Efficiency with Institutional Capacity as Moderator

Predictor	B	SE B	β	t	p
(Constant)	0.126	0.130	—	0.966	.335
Regulatory Approvals	0.195	0.076	0.195	2.574	.011
Budgetary Approvals	0.166	0.061	0.166	2.724	.007
Procurement Approvals	0.279	0.064	0.279	4.391	<.001
Administrative Approvals	0.072	0.071	0.072	1.005	.316
Institutional Capacity	0.257	0.079	0.257	3.238	.001

Note. Dependent Variable: *Project Delivery Efficiency*.

The model examined how Institutional Capacity moderated bureaucratic approvals and project delivery efficiency. Results of the regression model with Institutional Capacity as a moderator indicate that Regulatory Approval (β= 0.195, p = 0.011), Budgetary Approval (β= 0.166, p = 0.007), and Procurement Approval (β= 0.279, p < 0.001) are significant predictors of Project Delivery Efficiency. This means bureaucratic approval processes can be improved to speed up project implementation. Procurement Approvals have the greatest impact, emphasizing the importance of tendering and supplier management in project deliverables. However, Administrative Approvals (β= 0.072, = 0.316) are not significant, showing less direct impact when considering institutional capacity. Institutional capacity (β = 0.257, p = 0.001) moderates the relationship between approvals and project delivery, indicating that well-resourced, technically competent, and well-managed institutions enhance the impact of approvals on project performance. In public road construction, institutional capacity is the best option to streamline bureaucratic processes.

4.9 Discussions

This section compares study findings to bureaucratic approval theories and project delivery efficiency research. The findings confirm that excellent institutional capacity improves project performance when regulatory, budgetary, procurement, and administrative mechanisms are in place. Bureaucratic and Institutional Theories emphasize structure, accountability, and governance, which support the findings. Streamlined clearances and institutional competency help Kenya road development projects be efficient, transparent, and value-based.

4.9.1 Regulatory Approvals and Project Delivery Efficiency

Without a mediator, Regulatory Approvals significantly predict Project Delivery Efficiency (β=0.286, $p < .001$). This suggests that timely and well-structured approvals positively affect road project performance in Kenya. The Bureaucratic Theory states that formal procedures and hierarchical controls diminish arbitrariness by requiring responsibility and standardization of decision-making (Weber, 1947). Previous study supports these findings: Osifo et al. (2025) found that regulatory modifications in compliance, safety, and conflict management smooth processes, while Nacir et al. (2025) found that facilitating legislation creates flexibility and efficiency. However, overly rigid procedures can impede the project, as Anand and Anand (2025) note. The statistical significance ($p < .001$) and theoretical significance highlight the need for regulatory clearances to ensure compliance, while excessive bureaucracy might reduce responsiveness.

Although the effect magnitude is less, Regulatory Approvals are still significant when Institutional Capacity is moderated ($\beta = 0.195$, $p = 0.011$). Effective, well-equipped institutions improve approval processes, reducing delays. The Institutional Theory states that rules and norms legitimize organizations (Meyer and Rowan, 1977), strengthening institutional capacity and enhancing regulatory procedures. Wang et al. (2024) observed that institutional quality improves infrastructure project results, while Guevara et al. (2024) found that institutional competence affects procurement and execution. Low beta means regulatory permission is not enough; institutional competencies, technical assets, and governance are needed to deliver projects on schedule. The predictor has a statistically significant influence, and the theory emphasizes capacity and rules.

4.9.2 Budgetary Approvals and Project Delivery Efficiency

Budgetary Approvals highly predict Project Delivery Efficiency (β=0.210 0.001), emphasizing the importance of timely and appropriate funding for road projects in Kenya. Resource Dependence Theory states that financial resources influence organizational capabilities and performance (Pfeffer and Salancik, 1978). Poor planning, inflation, and delayed funding cause project delays and overruns, according to Chimbomba and Chipandwe (2025) and Otieno and Nyangau (2024). Bahrudin et al. (2025) note that Earned Value Method improves cost-schedule balance, supporting budgetary approvals. Even statistically significant budget approvals must be managed and controlled carefully since delays or misdistribution might negate their efficiency benefits.

As a moderator of Institutional Capacity, Budgetary Approvals have a lesser influence (β= 0.166, p = 0.007), suggesting that well-established institutions benefit most from them. The institutional Theory states that well-organized bureaucracies and technical skills improve process compliance and decision-making speed (Meyer and Rowan, 1977). Karuga et al. (2024) found that smart financial scheduling improves project risk neutrality and performance. Budgetary approvals will fail without significant institutional capacity to ensure optimal fund utilization due to the reduced beta. The effect is statistically significant, and theoretical relevance emphasizes the need of financial and institutional management in Kenya and the road infrastructure industry to improve project execution.

4.9.3 Procurement Approvals and Project Delivery Efficiency

Procurement Approvals (β= 0.327, p = 0.001) is the strongest predictor of Project Delivery Efficiency, highlighting the importance of timely tendering, supplier management, and transparent procurement for road projects in Kenya. The Transaction Cost Theory suggests that effective

procurement reduces cost overruns, delays, and resource waste (Williamson, 1981). Previous research supports these findings: Effective procurement procedures and risk-sharing systems make PPPs more efficient, according to Abdel Aziz (2007) and Tsimoshynska et al. (2021). Memari et al. (2025) note that digital technology and supply chain coordination improve project delivery, while Manyathi et al. (2021) say red tape and corruption are the biggest causes in public procurement inefficiency. Significant statistical data ($p < .001$) and theory indicate that procurement efficiency is a technological and governance issue.

Procurement Approvals are also significant when Institutional Capacity is moderated ($\beta = 0.279$, $p = .001$). This means that efficient institutional systems will reduce procurement delays due to bureaucracy or selling vendor inexperience. The Institutional Theory states that organizational competency, transparency, and rule-following improve procedural effectiveness (North, 1990). Walker et al. (2022) and Kadefors et al. (2020) show that collaborative procurement tactics and client ability improve delivery results. The somewhat lower beta shows that institutional capability mediates and that efficient procurement depends on process and competent institutions. The statistical significance and theoretical interpretation of the effect are that institutions with resources, expertise, and governance structures maximize procurement efficiency.

4.9.4 Administrative Approvals and Project Delivery Efficiency

A major predictor of project delivery efficiency is administrative approvals ($\beta = 0.143$, $p = .042$). Internal process, reporting, and authorization approvals affect project results less than regulatory and procurement approvals. Agency Theory shows that ineffective delegation and monitoring systems reduce inefficiency and information asymmetry (Jensen and Meckling, 1976). Olaniyan and Olaniyan (2025) and Kaysar (2024) found that administrative bottlenecks and inefficient monitoring cause delays and cost overruns. Administrative processes, including monitoring,

accountability, and continuity, may not directly affect efficiency like technical clearances or procurement, but their statistical significance and theoretical importance illustrate their value.

.The presence of Institutional Capacity moderates the impact of Administrative Approval (β= 0.072, p =.316), demonstrating that institutional strength mitigates their direct impact. Effective governance, check and balance mechanisms, and technical capacity offset administrative inefficiencies, reducing the effects of small-scale bureaucracy (Meyer and Rowan, 1977). The result supports Castaneda et al. (2025), who found that technical capacity and governance mechanisms overcome administrative delays in infrastructure projects. Statistically, administrative clearances alone are insufficient, but they are useful in the context of an institutional framework that will offer responsibility and oversight in public road project delivery.

4.9.5 Institutional Capacity and Project Delivery Efficiency

Project Delivery Efficiency (β=0.257, p =.001) strongly predicts Institutional Capacity (well-resourced, technically competent, and effectively managed institutions) in Kenya, leading to improved public road project outcomes. The Institutional Theory states that strong institutions provide rules, reduce ambiguity, and improve legitimacy to induce process compliance (Meyer and Rowan, 1977). Wang et al. (2024) show that institutional quality, political stability, and governance systems encourage private sector engagement in PPPs, while Guevara et al. (2024) show that institutional competence helps urban projects succeed. The fact that institutional capability drives approvals, procurement, and financial controls is theoretically significant. Strong, statistically significant evidence of this variable

As a moderator, institutional capacity amplifies the impact of regulatory, budgetary, and procurement approvals on project delivery efficiency. The beta of Procurement Approvals (β= 0.279 vs. 0.327) decreases, whereas institutional capability enhances system effectiveness.

According to Rahman Sourav et al. (2025), AI and modern forecasting improve project performance when combined with competent institutions. Hailemariam and Nuramo (2024) support institutional competency in design and execution. The statistically significant moderation suggests that procedural approvals operate better in strong institutions. This emphasizes the need of institutional capacity building in sustainable public infrastructure delivery since competent governance maximizes bureaucracies' positive effects.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECCOMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, conclusions, and recommendations derived from the study on the *effects of bureaucratic approvals on the efficient delivery of projects in Kenya's road infrastructure agencies*, namely KeNHA, KeRRA, and KURA. It revisits the study objectives, relates the findings to the theoretical and empirical literature reviewed, and highlights implications for policy, practice, research, and education. The chapter also outlines the study's

limitations and suggests areas for future research to strengthen understanding and governance in infrastructure project delivery.

5.2 Summary

The study aimed to examine how various bureaucratic approval processes influence the efficiency of project delivery within Kenya's road infrastructure state corporations.

To examine the effect of regulatory approvals on project delivery efficiency in Kenya's road infrastructure state corporations.

The study demonstrated that Regulatory Approvals significantly influence Project Delivery Efficiency in Kenya's road infrastructure state firms ($\beta = 0.286$, $p < .001$). Efficient regulatory measures, including permits, safety compliance, and legal provisions, mitigate delays and ensure project timeline adherence. Considering Institutional Capacity, the impact remains significant albeit slightly diminished ($\beta = 0.195$, $p = .011$), indicating that robust institutions enhance the efficacy of regulatory processes. The findings align with the current research regarding the necessity of implementing explicit legal regulations, proactive reforms, and compliance mechanisms in infrastructure provision (Osifo et al., 2025; Nacir et al., 2025). The theoretical interpretation suggests that regulatory approvals are both statistically significant and practically relevant, facilitating workflow predictions, minimizing disputes, enhancing planning, and ultimately ensuring the timely and successful progression of public road projects.

To assess the influence of budgetary approvals on project delivery efficiency in Kenya's road infrastructure state corporations.

Budgetary approvals significantly influence project delivery efficiency ($\beta = 0.210$, $p = .001$), underscoring the importance of timely finance disbursements and competent budget management. Delays or inefficiencies in budget approval may disrupt the procurement, labor allocation, and scheduling of the project. The effect remains substantial but with reduced significance ($\beta = 0.166$,

p = .007), suggesting that institutions with institutional competence and ample resources optimize the utilization of available funding. The findings align with prior studies that emphasized the significance of structured financial planning, cost management, and risk management as critical factors influencing infrastructure efficiency (Chimbomba and Chipandwe, 2025; Otieno and Nyangau, 2024). The statistical relevance and theoretical importance underscore the necessity of integrating institutional competency with budgetary approvals to optimize the efficiency of road infrastructure project delivery.

To analyze the effect of procurement approvals on project delivery efficiency in Kenya's road infrastructure state corporations.

The Procurement Approves emerged as the most significant predictor of Project Delivery Efficiency (β= 0.327, p <.001), underscoring the necessity of timely tendering, supplier management, and openness in procurement strategies. Efficient procurement reduces delays, cost escalations, and resource misallocation, consistent with Transaction Cost Theory and the body of research on Public-Private Partnerships (Abdel Aziz, 2007; Memari et al., 2025). The institutional competence significantly influences procurement performance when moderated by Institutional Capacity (β=0.279, p < .001), suggesting that institutional competence improves procurement outcomes by fostering regulatory compliance, reducing corruption, and enhancing oversight. Statistical and theoretical analyses suggest that procurement approvals are central to project efficiency, and the improvement of institutional capacity amplifies their impact, indicating that procedural reforms must be paired with effective governance to ensure timely and high-quality delivery of road infrastructure.

To evaluate the role of administrative approvals on project delivery efficiency in Kenya's road infrastructure state corporations.

The administrative approvals significantly influence project delivery efficiency (β= 0.143, p = .042), indicating that internal processes, reporting, and documentation affect project timelines. However, the effect becomes negligible when Institutional Capacity is accounted for (β= 0.072, p = .316), suggesting that robust institutional frameworks mitigate administrative inefficiencies. Literature indicates that infrastructure delivery may be hindered by administrative bottlenecks, inadequate monitoring, and unstable leadership; yet, capable institutions can alleviate these effects (Olaniyan and Olaniyan, 2025; Kaysar, 2024). The findings indicate that while administrative approvals may be conceptually important for accountability and continuity, their direct influence is little unless adequately endorsed by the institution. Consequently, enhancing institutional capacity is vital for optimizing administrative processes to ensure efficiency in project execution within the Kenya Road Infrastructure State Corporations.

To determine the mediating effect of institutional capacity on the relationship between bureaucratic approval processes and project delivery efficiency in Kenya's road infrastructure state corporations.

The institutional capacity notably influenced the correlation between bureaucratic approvals and project delivery efficiency (β = 0.257, p = .001). Well-equipped, technically proficient, and efficiently administered institutions amplify the beneficial effects of regulatory, financial, and procurement procedures. This corresponds with Institutional Theory and emphasizes that competent institutions are crucial for converting efficient approvals into enhanced project performance (Wang et al., 2024; Guevara et al., 2024). Their moderating influence is statistically substantial, and the theoretical importance of institutional capacity underscores its function as a key facilitator of bureaucratic efficiency. Timely approvals alone will not ensure efficient project implementation without competent institutions. Consequently, the findings indicate the imperative

for institutional reforms, capacity enhancement, and governance fortification to optimize the efficiency and sustainability of public road infrastructure projects in Kenya.

5.3 Conclusion

5.3.1 Regulatory Approvals and Project Delivery Efficiency

The study shows that effective regulatory approvals significantly enhance project delivery performance across road infrastructure state enterprises in Kenya. The efficacy of regulatory procedures will foster compliance, accountability, and predictability while reducing unnecessary delays in project implementation. This discovery aligns with the Bureaucratic Theory, which emphasizes methodical processes and hierarchical regulation to mitigate arbitrariness and promote standardization (Weber, 1947). The domain of compliance and safety management is bolstered by other research, including studies by Osifo et al. (2025) and Nacir et al. (2025), which assert that changes improve the timeliness and quality of infrastructure projects. Anand and Anand (2025) assert that excessive proliferation of procedures leads to diminished attentiveness. The paper emphasizes that the efficacy of regulatory approvals is maximized when supported by institutional capacity, including adequate staffing, effective communication, and technological facilitation of legal and procedural controls to ensure efficient project delivery.

5.3.2 Budgetary Approvals and Project Delivery Efficiency

The study suggests that financial clearances are crucial for the proper execution of projects within Kenya's road infrastructure agencies. Timely budget releases, appropriate cost allocation, and effective monitoring methods promote continuity, prevent cost overruns, and ensure adherence to project objectives. This substantiates Resource Dependence Theory, highlighting that organizational effectiveness relies on access to and control over financial resources (Pfeffer and

Salancik, 1978). Chimbomba and Chipandwe (2025) together with Otieno and Nyangau (2024) substantiated these findings by asserting that inadequate budget management and delays in disbursement are the primary reasons contributing to the postponement of project activities and associated inefficiencies. Bahrudin et al. (2025) emphasized the significance of enhancing cost and schedule equilibrium through the utilization of budget monitoring instruments such as the Earned Value Method. The research indicates that appropriate financial frameworks, supported by structural institutional administration, are essential for the timely and efficient execution of road projects.

5.3.3 Procurement Approvals and Project Delivery Efficiency

The research finds that procurement approvals significantly enhance project delivery efficiency more than any other bureaucratic processes. Prompt and efficient tendering, transparent supplier selection, and timely contract execution directly enhance project deadlines and cost control. The conclusion aligns with Transaction Cost Theory, which posits that minimizing procedural inefficiencies and knowledge asymmetry leads to improved organizational outcomes. The literature review is substantiated by Abdel Aziz (2007) and Memari et al. (2025), who asserted that transparency and procurement competitiveness yield accountability and enhance project performance. The study concludes that elevated institutional capability improves procurement efficacy by reducing corruption risk and ensuring compliance with regulatory standards. Therefore, the primary aspects that would improve the efficacy of procurement procedures and ensure the efficient, timely, and high-quality delivery of public road infrastructure projects in Kenya are capacity building, policy consistency, and digital procurement reforms.

5.3.4 Administrative Approvals and Project Delivery Efficiency

The study shows that administrative approvals have a moderate impact on the efficient execution of the project. Efficient communication and good documentation procedures enhance project continuity and accountability. These benefits can, however, be undermined by a fragile institutional framework and excessive bureaucracy. This insight aligns with the findings of Olaniyan and Olaniyan (2025) and Kaysar (2024), who identified that public infrastructure projects are frequently hindered by administrative bottlenecks, ambiguous procedures, and leadership instability. The study emphasizes that administrative approvals significantly enhance openness and order inside an organization; nonetheless, they alone cannot ensure efficiency. Their power is amplified when institutions possess abundant resources, have clearly defined policies, and employ adequately trained staff. The study delineates the imperative for administrative modifications and institutional fortification to convert internal approvals into effective project execution.

5.3.5 Institutional Capacity and Project Delivery Efficiency

The conclusion indicates that institutional capability serves as both a driver and a moderator of project delivery efficiency. Well-resourced, technologically proficient, and effectively managed institutions enhance coordination, reduce delays, and improve overall project performance. This discovery substantiates the Institutional Theory (Meyer and Rowan, 1977), which posits that robust institutions establish specific laws and foster legitimacy within governance processes. Research by Wang et al. (2024) and Guevara et al. (2024) substantiates the hypothesis that project outcomes improve with institutional competence, governance stability, and managerial effectiveness. Furthermore, the study aligns with the findings of Rahman Sourav et al. (2025), who identified that efficiency in public works is improved through capacity building and

contemporary management methods. Therefore, institutional capacity must be enhanced to optimize the advantages of bureaucratic clearances for the advancement of road infrastructure in Kenya.

5.4 Recommendation

5.4.1 Implications for Policy

The study recommends that the Government of Kenya, the Ministry of Roads and Transport, and the National Treasury streamline bureaucratic approval processes within KeNHA, KeRRA, and KURA to eliminate delays and redundancies. This will be accomplished by establishing a consolidated digital approval system including regulatory, budgetary, and procurement tasks to enhance transparency and efficiency. The policy improvements must delineate specific turnaround time frames, digitize approval processes, and improve inter-agency collaboration. The relevant entities are the Ministry of Roads, the Public Procurement Regulatory Authority, and the State Department for Public Works. Evaluation and monitoring should be conducted through quarterly audits, performance scorecards, and annual evaluations of the infrastructure sector. These measures will improve accountability, increase budget absorption, and ensure that approval mechanisms directly contribute to the timely and cost-effective execution of road projects in Kenya.

5.4.2 Implications for Practice and Training

The research indicates that institutional capacity in KeNHA, KeRRA, and KURA should be improved to increase efficiency in regulatory, budgetary, procurement, and administrative clearances. The primary activities include conducting regular capacity-building training sessions on financial management, procurement legislation, project oversight, e-procurement, computerized project approvals, and enhancing technical staffing to mitigate bureaucratic

obstacles. The Directors-General of the three agencies, in conjunction with the Kenya School of Government and the Public Service Commission, shall oversee these activities. Performance contracts, staff assessment systems, and internal process audits should be employed for monitoring and evaluation to assess institutional responsiveness. These practices will foster transparency, professionalism, and accountability by equipping personnel with modern tools and relevant skills, hence improving the correlation between bureaucratic efficiency and project delivery outcomes in the Kenyan public road sector.

5.4.3 Implications for Research

The study advocates for enhanced research on the correlation between bureaucratic processes and project delivery efficiency, particularly in public infrastructure. Future studies should employ longitudinal and mixed methodologies to ascertain the evolving impacts of approved reforms over time. Researchers are encouraged to investigate analogous frameworks at the county level and in other domains like as energy and water. Government agencies ought to collaborate with research institutes, universities, and think tanks like KIPPRA to generate meaningful policy ideas. The outcomes of monitoring and evaluation can manifest as publications, citation analysis, and the extent to which research influences governmental decisions. These strategies will bolster empirical evidence about bureaucratic governance, augment understanding of institutional performance, and guide data-driven initiatives to boost infrastructure development and service delivery in Kenya.

5.4.4 Implications for Education

The research indicates that colleges ought to incorporate modules on project management, public infrastructure governance, and bureaucratic reform into their educational curricula. Universities should provide professional courses centered on procurement mechanisms, institutional

leadership, and digital transformation in the provision of public services. Collaborations with government entities to offer internships, serve as lecturers, and engage in applied research should be executed as activities. The Commission for University Education, JKUAT, KCA University, and the University of Nairobi should spearhead curriculum development and quality assurance. Periodic academic assessments, graduate tracer studies, and employer input should be utilized as monitoring and evaluation tools to assess competency outcomes. The efforts will produce professionals adept at navigating bureaucratic processes by linking education with practical governance needs and fostering sustainable efficiency in Kenya's road infrastructure sector.

5.5 Limitations of the Study

This study included several limitations notwithstanding its contributions. The methodology predominantly employed self-reported questionnaire data, which may be susceptible to respondent bias and limit the exploration of qualitative data. The constrained data sources, attributable to resource restrictions such as time and finances, restricted the data collection to a subset of head and regional offices of KeNHA, KeRRA, and KURA, hence complicating the generalization to all areas. Additionally, there were unexpected challenges such as delayed questionnaire responses, inaccessibility to specific individuals, and bureaucratic clearance procedures that occasionally hindered the data collection process. Nonetheless, these constraints were mitigated through follow-ups and secondary data triangulation. While they did not invalidate the findings, these limitations underscore the necessity of employing mixed methodologies and broader sample in future research to improve the validity and relevance of the results to the unique context.

5.6 Suggestion for the Future

Future studies ought to extend the conclusions of this research by investigating the influence of particular bureaucratic approval procedures especially procurement and

regulatory mechanisms on the delivery efficiency of the project in other sectors of the public infrastructure like energy, water, and housing. To address the methodological constraints, researchers should implement mixed-method approaches that integrate interviews and focus groups with longitudinal data to gain a more profound understanding of the institution's dynamics. Further study may potentially refine and contest the conceptual framework of bureaucratic approvals and project efficiency in other cultural or geographical contexts, both within and beyond Kenya. Furthermore, numerous institutional and bureaucratic theories require reevaluation and advancement by forthcoming scholars, addressing how digital transformation, inter-agency collaboration, and governance changes influence public sector performance. This research would enhance theoretical understanding and inform policy modifications to improve infrastructure provision.

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APPENDICES

APPENDIX I- QUESTIONNAIRE

SECTION A – BACKGROUND INFORMATION

Age Bracket

[ ] Below 25; **[ ]** 25–34; **[ ]** 35–44; **[ ]** 45–54; **[ ]** 55 and above

Gender

[ ] Male; **[ ]** Female; **[ ]** Prefer not to say

Level of Education

[ ] Certificate/Diploma; **[ ]** Bachelor's Degree; **[ ]** Master's Degree; **[ ]** PhD; **[ ]** Other (specify)

Years of Work Experience in Road Infrastructure Projects

[ ] Less than 3 years; **[ ]** 3–5 years; **[ ]** 6–10 years; **[ ]** Above 10 years

Current Position/Role in the Organization

[ ] Administrative Staff; **[ ]** Project Manager; **[ ]** Engineer/Technical Staff; **[ ]** Procurement Officer; Other (specify) _____

SECTION B- STUDY VARIABLES

MEASURES OF REGULATORY APPROVALS

Likert-Scale Questionnaire: Instructions: Please indicate your level of agreement with each statement using the scale below: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

#	Statement	1	2	3	4	5
1	Project approvals are issued within the expected timeline.					
2	Regulatory compliance requirements are clearly communicated.					
3	Approval processes are efficient and do not cause delays.					
4	All compliance checks are conducted thoroughly before approval.					
5	Regulatory delays rarely affect project schedules.					
6	Approvals are granted without unnecessary bureaucratic hurdles.					
7	Regulatory guidelines are consistently applied across					

	projects.					
8	The approval process minimizes project risk.					
9	Changes in regulations are promptly addressed by the organization.					
10	Timely regulatory approvals enhance project efficiency.					

MEASURES OF BUDGETARY APPROVALS

Likert-Scale Questionnaire: Instructions: Please indicate your level of agreement with each statement using the scale below: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

#	Statement	1	2	3	4	5
11	Project budgets are approved within the planned time.					
12	Budget allocations reflect project needs accurately.					

13	Cost overruns are minimized through proper budget approvals.					
14	Budgetary processes are aligned with project objectives.					
15	Delays in budget approval rarely affect project delivery.					
16	Budget monitoring mechanisms are effective.					
17	Budget approvals facilitate timely project execution.					
18	Budget planning considers both current and future project needs.					
19	Variations in budget are addressed promptly and effectively.					
20	Budgetary approvals contribute to overall project					

	efficiency.					

MEASURES OF PROCUREMENT APPROVALS

Likert-Scale Questionnaire: Instructions: Please indicate your level of agreement with each statement using the scale below: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

#	Statement	1	2	3	4	5
21	Tender processes are completed within the scheduled timeline.					
22	Procurement procedures are transparent and understandable.					
23	Procurement disputes are resolved efficiently.					
24	Procurement approvals support timely project execution.					
25	Supplier selection follows a fair and transparent process.					

26	Procurement timelines rarely affect project delivery.					
27	Contractual requirements are clearly communicated to suppliers.					
28	Procurement processes minimize project risk.					
29	Technological tools enhance the efficiency of procurement approvals.					
30	Delays in procurement approvals negatively impact project timelines.					

MEASURES OF ADMINISTRATIVE APPROVALS

Likert-Scale Questionnaire: Instructions: Please indicate your level of agreement with each statement using the scale below: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

#	Statement	1	2	3	4	5
31	Internal					

	processes are efficient and well-coordinated.					
32	Bureaucratic layers do not unnecessarily slow down projects.					
33	Staff deployment is adequate for project needs.					
34	Administrative approvals are granted in a timely manner.					
35	Administrative processes support project efficiency.					
36	Policies and procedures are clear to all staff.					
37	Administrative approvals reduce operational bottlenecks.					
38	Staff are adequately trained to handle administrative approvals.					
39	Administrative delays rarely affect project					

	timelines.					
40	Effective administration improves overall project delivery.					

MEASURES OF INSTITUTIONAL CAPACITY (MODERATING VARIABLE)

Likert-Scale Questionnaire: Instructions: Please indicate your level of agreement with each statement using the scale below: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

#	Statement	1	2	3	4	5
41	Staff possess adequate technical expertise for project tasks.					
42	Organizational resources are sufficient to support project execution.					
43	Management demonstrates effective leadership and decision-making.					
44	Institutional capacity					

	enhances regulatory compliance.					
45	Adequate resources help mitigate project risks.					
46	Technical expertise improves project planning and scheduling.					
47	Management effectiveness supports timely decision-making.					
48	Institutional capacity reduces delays caused by bureaucratic processes.					
49	Capacity building initiatives strengthen project delivery outcomes.					
50	Strong institutional capacity positively moderates approval processes' impact on project delivery.					

MEASURES OF PROJECT DELIVERY EFFICIENCY (DEPENDENT VARIABLE)

Likert-Scale Questionnaire: Instructions: Please indicate your level of agreement with each statement using the scale below: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

#	Statement	1	2	3	4	5
51	Projects are completed within the scheduled time.					
52	Project budgets are adhered to without significant overruns.					
53	Stakeholders are satisfied with project outcomes.					
54	Project milestones are consistently achieved.					
55	Resource allocation supports timely project completion.					
56	Monitoring and evaluation					

	processes enhance project efficiency.					
57	Delays and disruptions are effectively managed.					
58	Quality standards are consistently maintained.					
59	Communication with stakeholders ensures smooth project delivery.					
60	Overall project performance meets organizational expectations.					

APPENDIX II- BUDGET

Item	**Description**	**Cost (Ksh.)**
Data Collection Materials	Printing questionnaires, stationery, etc.	10,000
Transportation	Travel to KeNHA, KeRRA, KURA offices	15,000
Pilot Study	Costs for conducting pilot study	8,000
Research Assistants	Payment for enumerators/data collectors	12,000
Data Analysis Software/Tools	SPSS, Excel, or other data analysis tools	10,000
Printing & Binding of Report	Final thesis/report printing and binding	15,000
Communication & Miscellaneous	Phone calls, internet, and other expenses	10,000
Total		80,000

APPENDIX III- TIMETABLE

Activity	May 2025	June 2025	July 2025	Aug 2025	Sept 2025	Oct 2025
CONCEPT PAPER						
RESEARCH PROPOSAL						
DATA COLLECTION						
DISSERTATION WRITING						
SUBMISSION & DEFENCE						

APPENDIX III: ETHICAL REVIEW FORM

RESEARCH, INNOVATION, AND OUTREACH DIVISION

KCA UNIVERSITY SCIENTIFIC AND ETHICS REVIEW COMMITTEE

REQUEST FOR ETHICAL REVIEW FORM

The request must include the following information for the research to be considered for approval:

Name, institution, and contact details (email and phone number) of the principal/lead investigator/researcher:	• KCA University • **Name:** Kenneth George Otieno Ouma • **Registration Number:** 24/02917 • **Phone:** 0727596715 • **Email:** 2402917@students.kcau.ac.ke
If it is a thesis, include also the name(s), institution(s), and contact details (emails and phone numbers) of the supervisor(s):	• **Name:** Dr. Peter Omae • **Institution:** KCA University – School of Business, Development Finance Department • **Role:** Thesis Supervisor • **Email:** • **Phone:**
Date of request:	31st August 2025
Title of the Research:	Bureaucratic Approval Processes on Project Delivery Efficiency in Kenya's Road Infrastructure State Corporations
Planned or confirmed source of funding:	Personal finances
Members of the research group and their roles in the implementation of the study, as well as possible cooperation with other universities, research institutes, or similar organizations:	N/A
What is the level of risk presented by your research?	Please indicate whether the research risk assessment (Check risk document) stated on the application is: ☐ **Low risk** (*Research has no*

	foreseeable risk of harm, discomfort, or inconvenience to respondents) ☐ **Medium risk** (*Research has potential risk of unexpected negative consequences, harm or discomfort, but where appropriate steps can be taken to mitigate the risk*) ☐ **High risk (***Research with real and foreseeable risk of harm and discomfort to participants and or the research team, and which may lead to serious adverse consequences if these risks are not managed in a responsible manner. It involves highly sensitive topics and/or the participation of very vulnerable and marginalized individuals/groups*)
Would you like to bring any aspects of the applications to the Ethics Review Committee's attention?	The research involves human participants (staff of KeNHA, KeRRA, and KURA). The ERC's attention is drawn to the need for voluntary participation, informed consent, confidentiality, and data protection due to the sensitivity of institutional processes under study. Measures will be taken to ensure anonymity of responses and to avoid reputational risk to the institutions involved.
What research data will be collected?	Primary data (survey responses from KeNHA, KeRRA, KURA officials) and secondary data (official reports and documents).
What personal data and confidential information will be processed?	N/A
Specify any special category or sensitive data that will be collected (tick all that apply)	☐ Ethnicity ☐ Mental Health (status, medical records conditions, to include disability) ☐ Physical Health (status, medical records conditions, to include disability) ☐ Sexual Orientation/Sexual life ☐ Genetic Data (to include DNA data) ☐ Biometric data (such as facial scan, iris scan, or fingerprint data used to identify a participant)

	☐ Political opinions ☐ Trade Union membership ☐ Religious or philosophical beliefs ☐ Criminal Convictions and offences (to include alleged offences and convictions) ☐ None ☐ Other – Please specify below
How will data be stored and transferred during the research?	Data will be stored in password-protected electronic files and locked physical storage accessible only to the researcher. Anonymized datasets will be used for analysis. Transfers, where necessary, will use encrypted files and institutional email. After completion of the study, data will be securely destroyed to ensure confidentiality.
Specify who will be able to access the identifying information and how you will ensure they process the information securely	Only the researcher and the supervisor will have access to identifying information. All data will be coded to remove direct identifiers, with identifiers stored separately in secure, password-protected files. Transfers will use encrypted methods, and access will be restricted to ensure compliance with confidentiality and research ethics. Upon project completion, all identifying information will be securely destroyed.
How will research data be preserved and shared on completion of the project? (NB: *Enter N/A in this section unless results will be published*)	On completion of the project, anonymized data and results will be preserved in the KCA University postgraduate repository and library together with the final thesis. Identifiable raw data will be securely destroyed. Only aggregated, anonymized results will be shared through the thesis and possible publications. No personal identifiers will be published or shared.
Describe the measures that will be taken to ensure data are suitable for sharing, e.g., securing consent, anonymizing data prior to deposit/sharing, and sharing confidential or high-risk information	All participants will be informed about the purpose of the research and how their data will be used. Written informed consent will be obtained before data collection, including consent for the use of anonymized responses in academic outputs

using a controlled access repository.	
State how long you plan to retain personal data and any confidential information after the end of the project. Indicate also how the data will be disposed	Personal data and confidential information will be retained securely for up to two years after project completion, then permanently destroyed (electronic files deleted, hard copies shredded). Only anonymized datasets and the final thesis will be preserved for academic purposes.

As the Principal Investigator of this study, I declare that I take full responsibility for the proposed study and will conduct it according to the documented proposal and in line with KCAUSERC ethical guidelines.

By signing this document, I agree that:

a) All documents submitted with this application are true representations of the study and have not been falsified.
b) This study will not commence in any way, and no participant will be recruited until final official approval is received from KCAUSERC
c) The study will be conducted according to the protocol submitted. All participants will be recruited and consented to according to the protocol.
d) Any protocol deviations or protocol violations to the submitted study must be reported to KCAU in writing by email to KCAUSERC immediately. Within five (5) business days of the deviation or violation, the Deviation/Violation Must be reported to the ISERC office.
e) Any study-related unexpected or serious adverse event must be reported to the ISERC Office by email within twenty-four (24) hours after the PI becomes aware of the event.

Principal Investigator's Signature **Date: 31/08/2025**

INFORMED CONSENT FOR RESEARCH PARTICIPATION

Introduction
You are invited to participate in a research study. This document provides information about the study so that you can make an informed decision about your participation. Please take the time to read the information below. If you have any questions, feel free to ask the researcher. **(PI to Fill in the sections italicized)**

Purpose of the Study

The purpose of this study is to examine the effect of bureaucratic approval processes on project delivery efficiency in Kenya's road infrastructure state corporations.

The research is being conducted to understand how regulatory, budgetary, procurement, and administrative approvals influence the timeliness, cost-effectiveness, and quality of road infrastructure projects. The researcher hopes to generate evidence-based insights that can help policymakers, state corporations, and stakeholders streamline approval systems, reduce inefficiencies, and enhance infrastructure delivery in alignment with Kenya Vision 2030 and the Sustainable Development Goals.

.

Study Procedures
If you agree to participate, you will be asked to complete a structured questionnaire designed to gather information on bureaucratic approval processes (regulatory, budgetary, procurement, and administrative) and their impact on project delivery efficiency. The questionnaire will take approximately 20–30 minutes to complete.

Potential Risks and Discomforts
No risk involved in this study

Potential Benefits

While participating may not directly benefit you, the results of this study may contribute to new knowledge on how bureaucratic approval processes affect project delivery efficiency in Kenya's road infrastructure state corporations. The findings may help policymakers and institutional managers streamline approval procedures, reduce inefficiencies, and improve accountability in project execution. In the broader sense, the study may support better infrastructure delivery, cost savings, and enhanced public service outcomes, which could benefit communities and the national economy.

Confidentiality
Your participation will be kept confidential. Any data collected will be stored securely and only accessible to the research team. Your identity will not be revealed in any publication or presentation resulting from this research.

Voluntary Participation

Participation in this study is completely voluntary. You have the right to withdraw from the study at any time without any negative consequences or loss of benefits to which you are otherwise entitled.

Questions
If you have any questions about this study, your participation, or your rights as a participant, please contact the principal investigator at

Kenneth George Otieno Ouma
Email: 2402917@students.kcau.ac.ke
Phone: +254 727 596 715

Consent
By signing below, you indicate that you have read the information provided above, understand the purpose and procedures of the study, and voluntarily agree to participate. You can withdraw from the study at any time without penalty.

Participant Statement:

I, the undersigned, consent to participate in this study.
Name of Participant: _____
Signature of Participant: _____
Date: _____

Researcher (Principal Investigator –P1) Statement:

I, the undersigned, confirm that I have explained the nature of this study to the participants, answered all questions, and ensured that they understand the information provided.

Name of Researcher: KENNETH GEORGE OTIENO OUMA

Signature of Researcher:

Date: 31/08/2025

APPENDIX IV: ETHICAL CERTIFICATE

Thika Road, Ruaraka
P.O. Box 56808-00200 Nairobi Kenya
Pilot Line: +254 20 8070408/9

Tel: +254 20 3537842
Fax: +254 20 8561077
Mobile: +254 734 888022, 710 888022
Email: kca@kca.ac.ke
Website: www.kca.ac.ke

KCA UNIVERSITY SCIENTIFIC & ETHICS REVIEW COMMITTEE

REF: **KCAU/SERC/SOB0328** **Date: 8TH SEPTEMBER, 2025**

TO: **KENNETH GEORGE OTIENO OUMA (24/02917)**

Dear Sir/Madam,

RE: BUREAUCRATIC APPROVAL PROCESSES ON PROJECT DELIVERY EFFICIENCY IN KENYA'S ROAD INFRASTRUCTURE STATE CORPORATIONS

This is to inform you that the KCA University Scientific Ethics Review Committee (KCAUSERC) has reviewed and approved your research proposal. Your application approval number is ***KCAUSERC/SOB0328.*** The approval period is ***8th September, 2025 – 8th September, 2026.***
This approval is subject to compliance with the following requirements.

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

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

Yours sincerely,

Dr. Caroline Ntara,
Chairperson,
KCA University Scientific & Ethics Review Committee.

APPENDIX V: NACOSTIC LICENSE

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **937987**

Date of Issue: **29/September/2025**

RESEARCH LICENSE

This is to Certify that Mr.. KENNETH GEORGE of KCA University, 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: BUREAUCRATIC APPROVAL PROCESSES ON PROJECT DELIVERY EFFICIENCY IN KENYA'S PUBLIC ROAD INFRASTRUCTURE STATE CORPORATIONS for the period ending : 29/September/2026.

License No: **NACOSTI/P/25/4180168**

937987

Applicant Identification Number

Ag. Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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See overleaf for conditions