



# INFLUENCE OF RESOURCE ALLOCATION ON PERFORMANCE OF ROAD INFRASTRUCTURE PROJECTS IN NORTH EASTERN KENYA

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## ABSTRACT

Road infrastructure remains a fundamental driver of economic development, regional integration, and access to essential public services. Despite substantial public investment in road infrastructure development, many projects in North Eastern Kenya continue to experience implementation challenges characterized by cost overruns, delayed completion, inefficient utilization of resources, and poor project outcomes. Although previous studies have examined various determinants of infrastructure performance, limited empirical attention has been devoted to the role of resource allocation in enhancing the performance of road infrastructure projects, particularly within geographically marginalized and resource-constrained regions. This study therefore examined the influence of resource allocation on the performance of road infrastructure projects in North Eastern Kenya. The study was anchored on Resource Dependency Theory and Resource-Based Theory and adopted a positivist research philosophy and an explanatory research design. The target population comprised 152 respondents drawn from project managers, contractors, government agencies, and other stakeholders involved in road infrastructure projects. Primary data were collected using structured questionnaires, yielding a response rate of 92.36 percent. Reliability and validity tests confirmed the adequacy of the research instrument, with the resource allocation construct demonstrating satisfactory psychometric properties. Descriptive statistics and binary logistic regression analysis were employed in data analysis. The findings revealed that resource identification, budgeting practices, and allocation strategies were generally perceived to support effective implementation of road infrastructure projects. Further, resource allocation exerted a positive and statistically significant influence on road infrastructure performance ( $B = 0.337$ ,  $p = 0.001$ ,  $OR = 1.401$ ), indicating that projects characterized by effective resource allocation practices were significantly more likely to achieve satisfactory performance outcomes than projects operating under weak resource allocation systems. The study concludes that resource allocation constitutes a critical strategic implementation capability that enhances road infrastructure performance through effective identification, planning, budgeting, and deployment of financial, human, and material resources. The study recommends that implementing agencies institutionalize comprehensive resource planning frameworks, strengthen budgeting processes, and adopt strategic resource allocation mechanisms to improve the implementation and performance of road infrastructure projects.

**KEYWORDS:** Resource Allocation; Road Infrastructure Performance; Resource Identification; Budgeting; Allocation Strategy; Strategy Implementation; North Eastern Kenya

## 1. INTRODUCTION

Road infrastructure remains one of the most important drivers of economic growth, regional integration, and sustainable socio-economic development. Efficient road networks facilitate the movement of people, goods, and services, reduce transportation costs, stimulate trade, improve access to education and healthcare, and enhance national competitiveness (Kim & Kang, 2021; Zhang & Li, 2024). Consequently, governments across the world continue to invest substantial financial resources in the construction, rehabilitation, and maintenance of road infrastructure as a means of promoting inclusive economic development and improving citizens' quality of life (World Bank, 2022; Elif, 2022). Well-developed transport systems also enhance investment opportunities by connecting production centres with domestic and international markets, thereby supporting industrialization, agricultural commercialization, and regional economic integration (Chilunjika, 2023; Ahmadabadi & Heravi, 2019). Road infrastructure has therefore increasingly been viewed not merely as a physical asset but as a strategic public investment capable of generating long-term economic and social returns (Singh & Gupta, 2023).

Despite the acknowledged importance of road infrastructure, project performance continues to present a significant challenge across both developed and developing economies. Large-scale road infrastructure projects frequently experience implementation problems manifested through delayed completion, cost overruns, inefficient utilization of available resources, quality deficiencies, and failure to achieve intended socio-economic outcomes (Kim & Kang, 2021; World Bank, 2022). These implementation challenges have



attracted increasing attention from governments, development agencies, and project management scholars because infrastructure projects consume substantial public resources while simultaneously serving as critical instruments for national development (Henry, 2021; Mehta, 2023). Poor project performance not only reduces the economic returns associated with infrastructure investment but also delays the realization of expected developmental benefits such as improved accessibility, reduced transportation costs, enhanced regional integration, and increased private sector investment (Nienaber, 2022; Grant, 2024).

Globally, infrastructure projects require enormous investments in financial, human, technological, and material resources whose effective planning and deployment largely determine project success. Contemporary project management literature recognizes that the availability of resources alone does not guarantee successful project implementation; rather, organizations must ensure that available resources are systematically identified, adequately budgeted, strategically allocated, and continuously monitored throughout the project life cycle (Hussein, 2021; Kanyanja & Al-Rubiae, 2023). Resource allocation has consequently emerged as one of the most critical strategic implementation capabilities because it directly influences project scheduling, operational efficiency, quality management, stakeholder coordination, and overall project performance (Zhang & Li, 2024; Singh & Gupta, 2023).

The growing complexity of infrastructure development has further elevated the importance of strategic resource allocation. Modern road infrastructure projects involve numerous stakeholders, multiple funding agencies, sophisticated construction technologies, diverse contractual arrangements, and extensive coordination among government institutions, contractors, consultants, financiers, development partners, and beneficiary communities (Liu, Clegg, & Pollack, 2024). Managing such complexity requires project managers to ensure that financial resources, construction materials, equipment, technical expertise, and human resources are available when required and deployed efficiently across competing project activities (Albalade & Bel-Piñana, 2021). Inadequate resource planning frequently results in interruptions during project implementation, duplication of effort, escalating project costs, inefficient resource utilization, and prolonged implementation schedules (Pedo & Makori, 2020). Conversely, effective resource allocation enhances operational efficiency, facilitates timely decision-making, minimizes implementation risks, and strengthens the likelihood of successful project delivery (Hussein, 2021).

Project management scholars increasingly argue that resource allocation should be viewed as a strategic management function rather than merely an operational budgeting exercise. Strategic resource allocation involves systematic resource identification, realistic budgeting, prioritization of project activities, and continuous adjustment of resource deployment in response to emerging implementation challenges (Hill & Jones, 2021; Thompson & Strickland, 2020). This strategic perspective enables organizations to maximize the productivity of limited financial, human, and technological resources while ensuring that critical project activities receive adequate support throughout implementation (Miller & Friesen, 2022). Consequently, resource allocation has become an indispensable component of successful strategy implementation within both public and private sector infrastructure projects.

Empirical evidence from developed economies consistently demonstrates that projects characterized by effective resource allocation achieve superior implementation outcomes compared to projects operating under weak resource management systems. Studies conducted in Europe, North America, and Asia report that systematic budgeting, effective resource identification, and strategic deployment of project resources significantly reduce implementation delays, minimize budget overruns, improve construction quality, and enhance stakeholder satisfaction (Kim & Kang, 2021; Zhang & Li, 2024). However, although these findings provide important insights into project performance, much of the existing evidence originates from relatively stable institutional environments characterized by advanced infrastructure systems, mature procurement frameworks, and stronger project governance structures. Consequently, the applicability of these findings to developing countries operating under resource constraints remains uncertain.

Within developing countries, resource allocation continues to present one of the greatest challenges affecting infrastructure performance. Governments frequently implement road infrastructure projects under conditions characterized by inadequate funding, competing development priorities, institutional capacity constraints, procurement inefficiencies, and unpredictable economic environments (Ahmed & Butt, 2021; Shah & Ali, 2020). These challenges often constrain the timely mobilization and efficient deployment of project resources, leading to implementation delays, cost escalations, compromised construction quality, and reduced value for public investment (Asamoah & Kumi, 2021; Chikoti & Simatele, 2021). Consequently, improving resource allocation practices has become an important policy priority for many developing countries seeking to maximize infrastructure investment while promoting sustainable socio-economic development.

Sub-Saharan Africa continues to experience significant infrastructure deficits despite increasing public investment in transport systems. Numerous road infrastructure projects across the region continue to encounter implementation challenges associated with inadequate financial resources, weak institutional coordination, procurement bottlenecks, shortages of skilled personnel, and inefficient resource utilization (Nwachukwu et al., 2022; Asamoah & Kumi, 2021). These constraints have significantly undermined project efficiency, delayed infrastructure delivery, and reduced the developmental impact of public investment. As governments continue to expand road networks to stimulate regional trade and economic integration, greater attention has increasingly been directed towards strengthening resource allocation mechanisms capable of improving project implementation under resource-constrained environments (Chikoti & Simatele, 2021).



Kenya has similarly prioritized road infrastructure development as a central pillar of national and regional economic transformation. Through substantial public investment and increased collaboration with development partners and the private sector, the government has sought to improve transport connectivity, facilitate trade, enhance regional integration, and stimulate socio-economic development (Gichohi et al., 2023; Ngugi, 2022). Nevertheless, numerous road infrastructure projects continue to experience implementation challenges associated with delayed funding, inadequate budgeting, inefficient procurement systems, poor coordination, and suboptimal utilization of available resources (Mwangi et al., 2021; Kanyanja & Al-Rubiae, 2023). These implementation challenges are particularly evident within North Eastern Kenya, where geographical remoteness, security concerns, harsh climatic conditions, logistical constraints, and infrastructural deficits further complicate effective mobilization and allocation of project resources (Madey & Chege, 2022; Greiner, Greven, & Klagge, 2021).

North Eastern Kenya therefore presents a unique context for examining the influence of resource allocation on infrastructure performance. Road infrastructure projects implemented within the region operate under exceptionally challenging environmental and institutional conditions requiring careful identification of project resource requirements, realistic budgeting, efficient allocation strategies, and continuous monitoring of resource utilization throughout project implementation (Greiner, Greven, & Klagge, 2021). Under such conditions, ineffective resource allocation may significantly compromise project performance through delayed implementation, escalating construction costs, inefficient utilization of scarce resources, and reduced infrastructure quality. Conversely, strategic allocation of financial, human, and material resources has the potential to enhance project efficiency, strengthen stakeholder coordination, improve construction quality, and facilitate timely project completion (Hussein, 2021; Zhang & Li, 2024).

Although previous studies have examined various determinants of road infrastructure performance, relatively limited empirical attention has been devoted to resource allocation as a multidimensional strategic implementation capability comprising resource identification, budgeting, and allocation strategy, particularly within geographically marginalized and resource-constrained regions such as North Eastern Kenya. Existing studies have largely emphasized general project management practices or broader organizational capabilities without explicitly examining how strategic resource allocation influences road infrastructure performance within this unique implementation context (Singh & Gupta, 2023; Liu, Clegg, & Pollack, 2024). Consequently, important empirical, methodological, and contextual knowledge gaps remain regarding the contribution of resource allocation to successful infrastructure delivery.

This study therefore examined the influence of resource allocation on the performance of road infrastructure projects in North Eastern Kenya. Specifically, the study investigated how resource identification, budgeting, and allocation strategy influence road infrastructure performance. The study contributes to the growing body of knowledge on strategic implementation by providing empirical evidence capable of informing policy formulation, resource planning, and infrastructure management practices aimed at improving the successful delivery of road infrastructure projects within resource-constrained environments.

## **2. THEORETICAL FOUNDATION**

### **2.1 Resource Dependency Theory**

Resource Dependency Theory (RDT) was developed by Jeffrey Pfeffer and Gerald Salancik in 1978 to explain how organizational performance is influenced by dependence on resources controlled by external actors. The theory argues that organizations cannot independently generate all the resources necessary for their operations and must therefore establish relationships with external stakeholders who possess critical financial, technological, informational, regulatory, and human resources required for organizational survival and success. Consequently, organizational effectiveness depends largely on the ability of managers to acquire, coordinate, and strategically utilize resources obtained from the external environment.

The central proposition of Resource Dependency Theory is that organizations operate within dynamic environments characterized by uncertainty, resource scarcity, and interdependence. Under such conditions, managers must continuously identify critical resources, establish collaborative relationships with external stakeholders, and develop mechanisms for allocating available resources efficiently to achieve organizational objectives (Pfeffer & Salancik, 1978; Gao & Lai, 2023). Effective resource allocation therefore becomes an important managerial capability because it enables organizations to maximize the utilization of limited resources while simultaneously minimizing operational uncertainty and implementation risks (Celtekligil, 2020).

The theory is particularly applicable to road infrastructure projects because infrastructure development requires extensive financial investment, technical expertise, construction materials, specialized equipment, regulatory approvals, and institutional coordination. Government agencies, contractors, consultants, development partners, financiers, and local communities collectively contribute resources that determine project implementation and performance. The successful delivery of road infrastructure projects therefore depends not only on the availability of these resources but also on the ability of project managers to identify resource requirements accurately, mobilize resources from multiple stakeholders, allocate them strategically across project activities, and continuously monitor their utilization throughout project implementation (McLeod, 2021; Kim & Hwang, 2020).



Within the context of North Eastern Kenya, where infrastructure development is frequently constrained by geographical remoteness, security concerns, logistical difficulties, and limited public resources, the importance of strategic resource allocation becomes even more pronounced. Efficient identification of project requirements, realistic budgeting, and appropriate allocation strategies enable implementing agencies to optimize scarce financial, human, and material resources while minimizing implementation delays and cost overruns. Resource Dependency Theory therefore provides a useful framework for explaining how strategic allocation of externally sourced resources contributes to improved road infrastructure performance.

Despite its extensive application in organizational research, Resource Dependency Theory has attracted several criticisms. Critics argue that the theory places excessive emphasis on external environmental influences while giving comparatively limited attention to internal organizational capabilities that may also determine performance (Bennett & Law, 2020). Others contend that organizations are not merely passive recipients of environmental pressures but possess internal competencies capable of reducing external dependence through innovation, organizational learning, and strategic capability development (Arman & Ahmed, 2021). Nevertheless, Resource Dependency Theory remains highly relevant because it demonstrates how effective identification, acquisition, coordination, and allocation of external resources enhance organizational performance under conditions of uncertainty and resource constraints.

## 2.2 Resource-Based Theory

Resource-Based Theory (RBT), developed by Birger Wernerfelt in 1984, explains organizational performance from the perspective of internal organizational resources and capabilities. The theory argues that organizations achieve sustainable competitive advantage when they possess and effectively utilize valuable, rare, inimitable, and non-substitutable (VRIN) resources. These resources include financial capital, human expertise, technological capabilities, organizational knowledge, management systems, and institutional experience, all of which collectively determine organizational effectiveness and long-term performance (Wernerfelt, 1984; Collins, 2022).

Resource-Based Theory assumes that organizations differ significantly in terms of their resource endowments and managerial capabilities. Consequently, superior organizational performance is achieved not merely through possessing resources but through deploying them strategically in ways that competitors cannot easily replicate (Dubey, Gunasekaran, & Papadopoulos, 2019). Effective resource allocation therefore represents a critical managerial capability because it ensures that available financial, human, technological, and material resources are directed towards activities that maximize organizational value creation and project performance (Freeman, Dmytriiev, & Phillips, 2021).

The theory is particularly relevant to infrastructure project management because successful implementation depends heavily on efficient deployment of organizational resources. Road infrastructure projects require substantial financial investment, skilled personnel, construction equipment, engineering expertise, and advanced project management systems. Efficient allocation of these resources enables project managers to improve operational efficiency, strengthen project coordination, minimize resource wastage, and enhance construction quality while ensuring timely completion of project activities (Ssenyange & Kudakwashe, 2023).

Within the context of road infrastructure projects in North Eastern Kenya, Resource-Based Theory suggests that organizations capable of effectively identifying project resource requirements, preparing realistic budgets, and implementing appropriate allocation strategies are more likely to achieve satisfactory project performance than organizations characterized by inefficient resource deployment. Strategic utilization of financial resources, qualified personnel, construction technologies, and institutional knowledge enhances organizational capacity to overcome logistical challenges associated with infrastructure development in geographically marginalized regions. Consequently, efficient resource allocation becomes a strategic organizational capability that directly contributes to successful implementation of road infrastructure projects.

Although Resource-Based Theory has significantly influenced strategic management literature, it has also attracted criticism. Some scholars argue that the theory focuses primarily on internal organizational resources while paying insufficient attention to changing environmental conditions that may alter the strategic value of organizational capabilities (Waris et al., 2022). Others contend that measuring intangible organizational resources remains difficult because many strategic capabilities cannot easily be quantified or compared across organizations (Jayasuriya, Zhang, & Yang, 2020). Nevertheless, Resource-Based Theory continues to provide an important explanation of how efficient deployment of organizational resources contributes to superior project performance and sustained organizational effectiveness.

## 2.3 Theoretical Synthesis and Study Proposition

Resource Dependency Theory and Resource-Based Theory collectively provide a comprehensive explanation of how resource allocation influences road infrastructure performance. Resource Dependency Theory emphasizes the importance of acquiring, coordinating, and allocating externally controlled resources to support project implementation, while Resource-Based Theory highlights the strategic deployment of internally available financial, human, technological, and organizational resources to achieve superior performance. Together, the two theories suggest that effective resource allocation enhances organizational efficiency by



ensuring that critical project resources are identified, budgeted, prioritized, and deployed where they generate the greatest implementation value.

Drawing from these complementary theoretical perspectives, the present study conceptualized **resource allocation** as a multidimensional construct comprising **resource identification, budgeting, and allocation strategy**. Resource identification ensures that project requirements are accurately determined before implementation commences; budgeting facilitates effective financial planning and prioritization of project activities; while allocation strategy promotes efficient deployment of financial, human, technological, and material resources throughout the project life cycle. Collectively, these dimensions were expected to strengthen project coordination, improve operational efficiency, minimize implementation delays, reduce cost overruns, and enhance the overall performance of road infrastructure projects.

The theoretical proposition underpinning this study was therefore that **effective resource allocation positively influences the performance of road infrastructure projects in North Eastern Kenya**. Organizations characterized by systematic resource identification, realistic budgeting practices, and strategic allocation mechanisms were expected to demonstrate higher levels of project efficiency, better construction quality, improved cost management, and more timely project completion than organizations operating under weak resource allocation systems.

### 3. EMPIRICAL REVIEW

Resource allocation has increasingly emerged as one of the most important determinants of project performance in contemporary project management literature. As infrastructure projects become more complex, resource-intensive, and stakeholder-driven, organizations are increasingly required to identify, budget for, and strategically deploy financial, human, technological, and material resources throughout the project life cycle. Effective resource allocation enhances operational efficiency, facilitates timely implementation, minimizes project risks, and improves the overall quality of project outcomes (Hussein, 2021; Zhang & Li, 2024). Consequently, scholars have increasingly examined the extent to which resource allocation contributes to successful implementation of infrastructure projects across different organizational and geographical contexts.

Existing empirical evidence generally supports the proposition that effective resource allocation enhances project performance. Studies undertaken across transport infrastructure, construction, public works, and engineering sectors consistently report positive associations between efficient resource management and indicators of project success, including timely completion, cost control, construction quality, stakeholder satisfaction, and operational efficiency (Kim & Kang, 2021; Singh & Gupta, 2023). These findings suggest that projects characterized by effective identification of resource requirements, realistic budgeting, and strategic deployment of available resources experience fewer implementation challenges than projects operating under weak resource management systems. However, despite broad agreement regarding the importance of resource allocation, considerable variation exists concerning which dimensions of resource allocation exert the greatest influence on project performance.

One stream of literature emphasizes the importance of resource identification during project planning. Proponents argue that early identification of financial requirements, technical expertise, construction materials, equipment, and human resource needs improves implementation efficiency by reducing uncertainty during project execution (Kanyanja & Al-Rubiae, 2023; Hussein, 2021). Projects characterized by comprehensive resource planning are generally associated with improved scheduling accuracy, better coordination among stakeholders, and reduced implementation delays. Nevertheless, most existing studies have examined resource identification as part of broader project planning frameworks without explicitly evaluating its independent contribution to infrastructure performance. Moreover, much of the available evidence originates from relatively stable institutional environments where resource availability is less constrained, limiting the applicability of such findings to resource-constrained regions.

A second body of literature focuses on budgeting as a critical determinant of project performance. Empirical studies generally indicate that realistic budgeting facilitates efficient financial planning, supports timely procurement of project inputs, minimizes resource shortages, and strengthens financial accountability during project implementation (Pedo & Makori, 2020; Liu, Clegg, & Pollack, 2024). Effective budgeting further enables project managers to prioritize expenditure according to implementation needs while maintaining greater control over project costs. However, findings regarding the magnitude of budgeting effects remain inconsistent. While several studies identify budgeting as one of the strongest predictors of successful project delivery, others report that budgeting alone cannot guarantee project success unless accompanied by effective monitoring, leadership, procurement systems, and stakeholder coordination (Hill & Jones, 2021; Miller & Friesen, 2022). These inconsistencies suggest that budgeting should be examined alongside other complementary dimensions of strategic resource allocation.

Another important stream of literature examines resource allocation strategy as a determinant of infrastructure performance. Existing evidence suggests that strategic allocation of financial, human, and technological resources enables organizations to optimize resource utilization, improve operational flexibility, and respond effectively to changing implementation conditions (Ssenyange & Kudakwashe, 2023; Freeman, Dmytriiev, & Phillips, 2021). Appropriate allocation strategies also facilitate prioritization of critical project activities, minimize resource wastage, and enhance coordination among project stakeholders. Nevertheless, previous studies have generally conceptualized allocation strategy from broad organizational perspectives without specifically examining how



allocation decisions influence road infrastructure performance within geographically dispersed and institutionally constrained project environments. Consequently, relatively limited evidence exists regarding allocation strategy within large-scale public infrastructure projects implemented under challenging operational conditions.

Within the African context, empirical studies similarly demonstrate that resource allocation positively influences infrastructure implementation and organizational performance. Studies conducted in Nigeria, Ghana, Zambia, and Tanzania report that inefficient allocation of financial resources, inadequate budgeting, shortages of skilled personnel, and weak procurement systems significantly contribute to project delays, escalating construction costs, and reduced infrastructure quality (Nwachukwu et al., 2022; Asamoah & Kumi, 2021; Chikoti & Simatele, 2021). Although these studies collectively underscore the importance of efficient resource management, they primarily examine infrastructure development at a general level without explicitly disaggregating resource allocation into resource identification, budgeting, and allocation strategy. Furthermore, many investigations focus on urban infrastructure projects operating within relatively accessible environments, limiting their contextual relevance to geographically marginalized regions.

Studies conducted in Kenya likewise report that resource allocation remains one of the major determinants of successful infrastructure delivery. Gichohi et al. (2023) observed that inefficient allocation of project resources significantly contributed to cost overruns and implementation delays within road construction projects. Similarly, Ngugi (2022) established that inadequate budgeting and poor coordination of financial resources adversely affected project completion schedules. Mwangi et al. (2021) further reported that shortages of construction materials, delayed procurement, and inadequate deployment of technical personnel compromised the quality and sustainability of completed road infrastructure projects. While these studies provide valuable insights into infrastructure implementation within Kenya, they exhibit notable limitations. First, most conceptualize resource allocation as a general project management function rather than a multidimensional strategic implementation capability. Second, they rarely examine the independent contributions of resource identification, budgeting, and allocation strategy to project performance. Third, existing evidence largely originates from relatively urbanized counties, leaving limited empirical knowledge regarding infrastructure projects implemented within geographically remote regions such as North Eastern Kenya.

The reviewed literature demonstrates broad consensus regarding the importance of resource allocation in enhancing infrastructure performance. Nevertheless, significant empirical, methodological, and contextual gaps remain. Empirically, relatively limited evidence exists regarding the influence of resource allocation on the performance of road infrastructure projects within North Eastern Kenya. Methodologically, previous studies have seldom conceptualized resource allocation as a multidimensional construct comprising resource identification, budgeting, and allocation strategy, instead treating resource management as a single, aggregated variable. Contextually, the unique implementation environment of North Eastern Kenya, characterized by geographical remoteness, infrastructural deficits, security challenges, logistical constraints, and resource limitations, remains substantially underrepresented within existing scholarship. The present study therefore sought to address these gaps by examining the influence of resource allocation on the performance of road infrastructure projects in North Eastern Kenya using resource identification, budgeting, and allocation strategy as the principal dimensions of resource allocation.

## **4. MATERIALS AND METHODS**

### **4.1 Research Philosophy**

The study was guided by the positivist research philosophy. Positivism assumes that social phenomena can be objectively observed, measured, and analyzed using scientific methods to establish causal relationships among variables (Saunders, Lewis, & Thornhill, 2023). The philosophy was considered appropriate because the study sought to examine the influence of resource allocation on the performance of road infrastructure projects using quantifiable data and statistical techniques. Positivism further emphasizes objectivity, hypothesis testing, empirical measurement, and generalization of findings, all of which were consistent with the objectives of the present study (Creswell & Creswell, 2023).

### **4.2 Research Design**

The study adopted an explanatory research design. Explanatory research is appropriate where the primary objective is to establish causal relationships between independent and dependent variables and to explain how variations in one variable influence variations in another (Saunders et al., 2023). The design was considered suitable because the study sought to determine the influence of resource allocation on the performance of road infrastructure projects in North Eastern Kenya. The explanatory design enabled the researcher to test the study hypothesis while determining both the magnitude and direction of the relationship between the study variables.

### **4.3 Study Area**

The study was conducted in North Eastern Kenya, comprising the counties of Garissa, Wajir, and Mandera. The region occupies a strategic position within Kenya because of its proximity to neighboring countries and its importance in promoting regional integration, cross-border trade, and socio-economic development. Despite recent investments in transport infrastructure, the region continues to experience considerable challenges associated with inadequate road connectivity, difficult terrain, security concerns,



logistical constraints, and limited supporting infrastructure. These characteristics make North Eastern Kenya an appropriate context for examining the influence of resource allocation on road infrastructure performance.

#### 4.4 Target Population

The target population comprised 152 respondents drawn from key stakeholders involved in road infrastructure projects in North Eastern Kenya. The respondents included project managers, resident engineers, contractors, consultants, county government officials, officials from road agencies, and representatives of beneficiary communities. These respondents were selected because they possessed direct knowledge and practical experience regarding the planning, implementation, management, and performance of road infrastructure projects within the study area.

#### 4.5 Data Collection

Primary data were collected using structured questionnaires administered to the selected respondents. The questionnaire was designed to capture respondents' perceptions regarding resource allocation and road infrastructure performance. Resource allocation was operationalized using three dimensions: resource identification, budgeting, and allocation strategy. Responses were measured using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

Prior to the main survey, the research instrument was subjected to pilot testing to assess clarity, relevance, validity, and reliability. Feedback obtained during the pilot study informed minor revisions to improve the quality and comprehensibility of the questionnaire before full-scale data collection.

#### 4.6 Reliability and Validity of the Research Instrument

The reliability of the research instrument was assessed using Cronbach's alpha coefficient. Cronbach's alpha values of 0.70 and above are generally considered acceptable for social science research (Hair et al., 2022). The resource allocation construct demonstrated satisfactory internal consistency, indicating that the measurement items reliably captured the underlying construct.

Construct validity was assessed using the Average Variance Extracted (AVE). According to Hair et al. (2022), AVE values exceeding 0.50 indicate satisfactory convergent validity because the measurement items adequately explain the variance of the intended construct. The validity assessment confirmed that the measurement items were appropriate for measuring resource allocation within the context of road infrastructure projects.

#### 4.7 Measurement of Study Variables

The independent variable was resource allocation, conceptualized through three dimensions: resource identification, budgeting, and allocation strategy. The dependent variable was road infrastructure performance.

Descriptive analysis of the resource allocation indicators was based on frequencies, percentages, and modal values. The mode was preferred to the mean because the measurement items were collected using five-point Likert-scale responses, which generate ordinal data. Unlike the arithmetic mean, which assumes equal intervals between response categories, the mode identifies the most frequently occurring response category and therefore provides a more appropriate measure of central tendency for ordinal data (Jamieson, 2004; Boone & Boone, 2012).

For inferential analysis, composite scores were computed for each construct and subsequently recoded into binary categories to facilitate binary logistic regression analysis. Composite scores ranging from 7 to 21 represented low resource allocation, whereas scores ranging from 22 to 35 represented high resource allocation. Similarly, road infrastructure performance was recoded into unsatisfactory and satisfactory performance categories before regression analysis.

#### 4.8 Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) Version 30. Descriptive statistics comprising frequencies, percentages, and modal values were used to summarize respondents' perceptions regarding resource allocation. Inferential analysis was conducted using binary logistic regression because the dependent variable was binary in nature.

The binary logistic regression model estimated the probability of satisfactory road infrastructure performance as a function of resource allocation and was specified as:

$$\ln \left( \frac{P_i}{1 - P_i} \right) = \beta_0 + \beta_1 RA$$

Where:

$P_i$  = Probability of satisfactory road infrastructure performance

RA = Resource Allocation

$\beta_0$  = Constant (Intercept)

$\beta_1$  = Logistic regression coefficient associated with Resource Allocation

Statistical significance was evaluated at the 5 percent significance level, while Odds Ratios (OR) were used to interpret the likelihood of achieving satisfactory road infrastructure performance associated with improvements in resource allocation.

#### 4.9 Ethical Considerations

The study adhered to established ethical principles governing social science research. Approval to conduct the study was obtained from the relevant institutional and regulatory authorities before commencement of data collection. Participation in the study was voluntary, and informed consent was obtained from all respondents before administration of the questionnaire. Confidentiality and anonymity of respondents were maintained throughout the study, and all information collected was used exclusively for academic purposes. Data were securely stored and accessed only by authorized members of the research team, thereby ensuring compliance with accepted ethical standards for scientific research (Creswell & Creswell, 2023).

## 5. RESULTS AND DISCUSSION

### 5.1 Introduction

This section presents and discusses the findings on the influence of resource allocation on the performance of road infrastructure projects in North Eastern Kenya. The analysis begins with a brief presentation of the response rate and the adequacy of the research instrument, followed by descriptive statistics for the dimensions of resource allocation. The section concludes with the results of binary logistic regression analysis and a discussion of the findings in relation to existing theoretical and empirical literature.

### 5.2 Response Rate, Reliability and Validity

A total of **140** completed questionnaires were returned from the **152** questionnaires administered, representing a response rate of **92.1%**. This response rate was considered adequate for statistical analysis because it exceeded the minimum response threshold generally recommended for social science research (Hair et al., 2022). The high response rate enhanced the representativeness of the study findings and reduced the likelihood of non-response bias.

The reliability analysis demonstrated satisfactory internal consistency for the study constructs, with Cronbach's alpha coefficients exceeding the recommended threshold of 0.70 (Hair et al., 2022). Similarly, construct validity assessment confirmed that the measurement items adequately represented the underlying study constructs, with acceptable Average Variance Extracted (AVE) values exceeding the recommended minimum of 0.50. These findings indicate that the research instrument was both reliable and valid for measuring resource allocation and road infrastructure performance.



### 5.3 Descriptive Statistics for Resource Allocation

Table 1  
Descriptive Statistics for Resource Allocation

| Dimension               | Mode | Interpretation                                                                                                        |
|-------------------------|------|-----------------------------------------------------------------------------------------------------------------------|
| Resource Identification | 4    | Respondents generally agreed that project resource requirements were systematically identified before implementation. |
| Budgeting               | 4    | Budgeting processes were perceived to support effective planning and utilization of project resources.                |
| Allocation Strategy     | 4    | Organizations generally adopted appropriate mechanisms for allocating resources to project activities.                |

The descriptive findings indicate that respondents generally held favourable perceptions regarding resource allocation practices within road infrastructure projects. The modal response of Agree across all three dimensions suggests that project managers and other stakeholders perceived resource identification, budgeting, and allocation strategies as being reasonably well implemented within the study area.

Resource identification recorded a modal response of Agree, indicating that organizations generally established project resource requirements before project implementation commenced. Proper identification of financial, human, technological, and material resource requirements enables project managers to anticipate implementation needs, minimize uncertainties, and facilitate timely mobilization of project inputs. These findings suggest that implementing agencies increasingly recognize the importance of comprehensive planning in improving project implementation.

Similarly, budgeting attracted a modal response of Agree, suggesting that respondents perceived budgeting processes as generally supporting effective project implementation. Appropriate budgeting enables organizations to estimate project costs accurately, prioritize expenditure, and allocate financial resources according to implementation requirements. Effective budgeting also facilitates financial accountability while reducing the likelihood of project interruptions arising from resource shortages.

Allocation strategy likewise recorded a modal response of Agree, implying that organizations generally adopted structured mechanisms for distributing available resources across competing project activities. Strategic allocation of financial, human, and material resources improves operational efficiency by ensuring that critical project components receive adequate support throughout implementation. Collectively, these findings suggest that effective resource allocation constituted an important strategic capability supporting successful implementation of road infrastructure projects within North Eastern Kenya.

### 5.4 Binary Logistic Regression Results

Table 2  
Binary Logistic Regression Results for Resource Allocation and Performance of Road Infrastructure

| Variable            | $\beta$ | S.E.  | Wald   | p-value | Odds Ratio |
|---------------------|---------|-------|--------|---------|------------|
| Constant            | —       | —     | —      | —       | —          |
| Resource Allocation | 0.337   | 0.102 | 10.921 | 0.001   | 1.401      |

#### Reference Category: Low Resource Allocation

The binary logistic regression analysis established that resource allocation exerted a positive and statistically significant influence on the performance of road infrastructure projects ( $\beta = 0.337$ ,  $p = 0.001$ ). The positive regression coefficient indicates that improvements in resource allocation increased the likelihood of achieving satisfactory road infrastructure performance.

The estimated Odds Ratio (OR = 1.401) indicates that projects characterized by strong resource allocation practices were approximately 1.4 times more likely to achieve satisfactory performance than projects operating under weak resource allocation systems. These findings support the proposition that effective resource identification, budgeting, and allocation strategies enhance project implementation by ensuring that financial, human, and material resources are available when required and deployed efficiently throughout the project life cycle. The null hypothesis stating that resource allocation has no statistically significant influence on road infrastructure performance was therefore rejected.

### 5.5 Discussion of Findings

The findings demonstrate that resource allocation constitutes a significant strategic implementation capability influencing the performance of road infrastructure projects in North Eastern Kenya. Organizations that effectively identify project resource requirements, prepare realistic budgets, and strategically allocate available resources are considerably more likely to achieve timely project completion, efficient resource utilization, improved construction quality, and overall project success. These findings reinforce the argument that project performance depends not merely on resource availability but on the efficiency with which available resources are planned, coordinated, and deployed throughout implementation.

The results are consistent with Resource Dependency Theory, which argues that organizational performance depends on managers' ability to acquire, coordinate, and allocate scarce external resources effectively (Pfeffer & Salancik, 1978). Road infrastructure



projects require substantial financial resources, specialized technical expertise, construction materials, equipment, and institutional support, all of which must be strategically mobilized and deployed to achieve successful implementation. The significant positive relationship observed in this study suggests that organizations capable of managing these external dependencies through effective resource allocation are more likely to deliver satisfactory infrastructure outcomes.

The findings also support the propositions of Resource-Based Theory, which emphasizes that sustainable organizational performance depends on the strategic deployment of valuable organizational resources (Wernerfelt, 1984). Effective budgeting, resource identification, and allocation strategies enable organizations to optimize the utilization of financial, human, technological, and material resources, thereby strengthening operational efficiency and improving project implementation outcomes. The results therefore suggest that resource allocation functions not merely as an operational activity but as a strategic organizational capability capable of enhancing infrastructure performance.

Empirically, the present findings corroborate previous studies by Hussein (2021), Zhang and Li (2024), Kanyanja and Al-Rubiae (2023), and Ssenyange and Kudakwashe (2023), who similarly reported that effective resource allocation significantly improves project implementation, operational efficiency, cost management, and overall infrastructure performance. The findings are also consistent with studies conducted within the African context by Nwachukwu et al. (2022), Asamoah and Kumi (2021), and Chikoti and Simatele (2021), which identified inefficient allocation of financial and human resources as major contributors to delays and cost overruns in infrastructure projects.

Unlike many previous studies that conceptualized resource allocation as a single project management function, the present study operationalized resource allocation through resource identification, budgeting, and allocation strategy, thereby providing a more comprehensive understanding of how different dimensions of resource allocation collectively influence road infrastructure performance. Furthermore, by focusing on North Eastern Kenya, the study extends existing knowledge to a geographically marginalized and operationally challenging environment where efficient resource allocation is particularly critical for successful infrastructure delivery. These contextual and methodological contributions strengthen the existing body of knowledge on strategic implementation and infrastructure project management while providing evidence-based guidance for improving road infrastructure performance in resource-constrained settings.

## 6. CONCLUSION

This study examined the influence of resource allocation on the performance of road infrastructure projects in North Eastern Kenya. The findings demonstrate that resource allocation is a significant determinant of infrastructure performance. Specifically, effective resource identification, realistic budgeting, and strategic allocation of financial, human, and material resources positively contribute to project implementation by improving operational efficiency, strengthening project coordination, and facilitating timely execution of project activities.

The binary logistic regression analysis established that resource allocation exerted a positive and statistically significant influence on road infrastructure performance. Projects characterized by effective resource allocation practices were significantly more likely to achieve satisfactory implementation outcomes than projects operating under weak resource allocation systems. These findings provide empirical evidence that resource allocation constitutes a strategic implementation capability rather than merely an administrative or financial function.

The study further demonstrates that successful road infrastructure development depends not only on the availability of resources but also on the effectiveness with which those resources are identified, budgeted, prioritized, and deployed throughout the project life cycle. Efficient resource allocation minimizes implementation delays, reduces resource wastage, strengthens financial accountability, and enhances construction quality, thereby improving the overall performance of road infrastructure projects.

The findings support the propositions of Resource Dependency Theory and Resource-Based Theory by demonstrating that organizations capable of effectively mobilizing, coordinating, and strategically utilizing available resources are better positioned to achieve superior project outcomes. Consequently, strengthening resource allocation practices should be regarded as a strategic priority for organizations involved in the planning and implementation of road infrastructure projects.

## 7. RECOMMENDATIONS

The findings of this study have important implications for policymakers and practitioners involved in road infrastructure development. National and county governments should strengthen policy frameworks governing resource planning and allocation by institutionalizing standardized procedures for resource identification, budgeting, allocation, and monitoring throughout the project life cycle. Such frameworks should promote timely mobilization of financial, human, technological, and material resources while ensuring that resource allocation decisions are aligned with project priorities and implementation schedules.

Road agencies and project implementing organizations should strengthen budgeting systems by adopting realistic and evidence-based financial planning practices that adequately reflect project requirements and potential implementation risks. Budget



allocations should be timely, predictable, and responsive to changing project needs in order to minimize implementation delays arising from resource shortages.

Project managers should establish integrated resource management systems that facilitate continuous monitoring of resource utilization and support timely decision-making during project implementation. Greater coordination among contractors, consultants, government agencies, financiers, and development partners should be encouraged to ensure efficient mobilization and deployment of project resources. Additionally, implementing agencies should invest in continuous capacity building for project managers in strategic resource planning, budgeting, procurement management, and resource optimization to enhance the efficiency and effectiveness of road infrastructure project implementation.

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