

**PROJECT PLANNING, COMMUNITY PARTICIPATION, GOVERNMENT
REGULATIONS AND PERFORMANCE OF ROAD PROJECTS IN ARID AND SEMI-
ARID COUNTIES IN KENYA**

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DECLARATION

Declaration by the student

This thesis is my original work and has not previously in its entirety or in part been presented for a degree or other academic work.

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DEDICATION

Special dedication goes to my family especially my husband Faiz Awadh, Parents Mohamed Abdi and Fatuma Kule, my children Ahmedmulla, Aslam, Ayman, and Awadh for your moral support, patience, and understanding, even when I've been away from home to learn, write and present. God bless you all. Thank you for your unwavering love, support and inspiration.

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ACRONYMS AND ABBREVIATIONS

ASAL	Arid and Semi-Arid Lands
CI	Confidence interval
CDF	Constituency Development Funds
CFA	Confirmatory Factor Analysis
CLRM	Classical linear regression model
CP	Community Participation
FY	Financial Year
G.O.K	Government of Kenya
GR	Government Regulation
HRMP	Human Resource Management Practices
KeNHA	Kenya National Highways Authority
KeRRA	Kenya Rural Roads Authority
KFW	Kreditanstalt für Wiederaufbau
KMO	Kaiser–Meyer–Olkin
KPI	Key Performance Indicators
KURA	Kenya Urban Roads Authority
LLCI	Lower confidence level
M & E	Monitoring and evaluation
NGOs	Non-governmental Organizations
Perf	Project performance
PMBOK	The Project Management Body of Knowledge
PMS	Performance Measurement Systems
PP	Project Planning
Q-Q	Quantile Quantile
SIDA	The Swedish International Development Cooperation Agency
SPSS	Statistical Package for the Social Sciences
UAE	United Arab Emirates
UK	United Kingdom

UN	United Nations
UNEP	United Nations Environment Programme
USA	United States of America
WBS	work-breakdown structure

OPERATIONAL DEFINITION OF TERMS

- Community participation:** The involvement of group of people who live in or near a project and participate in decision-making because they are directly or indirectly impacted by how the project and/ or organization's operations
- Government regulations:** Refers to the numerous policies, methods, and guidelines pertaining to Kenya's business regulation.
- Project:** Is a meticulously planned and created solo or group endeavor with a specific goal in mind.
- Project Performance:** The measurement of whether a project has met the requirements of scope, schedule, costs and the objectives.
- Project planning:** Is the process by which timetables, workforce, equipment, milestones, as well as budget estimates are specified otherwise estimating the time, money, effort, and staff resources required in the execution of the project.

ABSTRACT

The road construction industry is inherently complex due to the involvement of numerous parties, including the government, contractors, consultants, stakeholders, and regulators. In Kenya, road projects have been facing challenges, resulting in delays, increased costs, and subpar quality. This study objectives are to assess the effect of project planning on performance of road projects in arid and semi-arid counties in Kenya, to determining the mediation effect of community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya, To evaluate how government regulations influence the relationship between project planning and the performance of road projects in arid and semi-arid counties in Kenya, as well as to determine the moderated mediation effect of government regulations and community participation on this relationship. The study was anchored on theory of constraints and supported by Stakeholder Theory, Resource Based View Theory and Regulation Theory. The study adopted positivism philosophy. The study applied a cross sectional survey design and used census sample method. The study population were the 88 completed road projects in 22 Arid and Semi-arid counties in Kenya. The study adopted convenience sampling technique where primary data was collected using a questionnaire from 198 respondents. The study respondents were the contracted company's project managers, county public works officers and the local community leaders who are most advantageously placed and in the best position to provide the information required. Quantitative data was analyzed using descriptive and inferential statistics which included correlation and multiple regressions. The study results revealed that strong positive correlation ($R=0.648$) between project planning and performance of road projects; strong positive and statistically significant correlation ($R=0.718$) between project planning, community participation and performance of road projects; and that 51% ($R^2=0.510$) of variation in and performance of road projects is explained by the project planning, community participation. Further, community participation partially mediates the relationship between project planning and performance of road projects. Moreover, a significant effect of government regulations on the relationship between the project planning and performance of road projects was observed besides a strong, positive and statistically significant correlation ($R=0.738$) between government regulations, project planning and performance of road projects. In addition, 53.6% ($R^2=0.536$) of variation in performance is explained by the interaction between project planning and government regulations. There was a significant moderated mediated effect of government regulations and community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya. The study recommends the development of comprehensive and workable project designs that take into account the one-of-a-kind conditions that are typical of arid and semi-arid regions. There is a need for greater investment in training and development efforts that target project planners and engineers, with the purpose of expanding their knowledge and understanding of the design and execution of road projects within arid and semi-arid regions. Establishment of project planning frameworks that are especially adapted to the contextual needs of arid and semi-arid settings is an absolute necessity if one wants to successfully handle the one-of-a-kind difficulties that are offered by arid and semi-arid environments.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter discusses the research study with global, regional, local perspectives and insights. It elaborates and examines on the concepts of the influence of project planning, government regulations, and community participation on the performance of completed road projects in arid and semi-arid counties in Kenya. It also outlines the background of the study, statement of the problem, purpose of the study, objective of the study, scope of the study, significance of the study, limitation and delimitations of the study. Finally chapter one discussions will be highlighted in a chapter summary.

1.1 Background of the Study

Roads are a fundamental component of transportation infrastructure that provides support for human society. They establish crucial connections between target markets, manufacturing facilities, and production hubs. They promote economic progress, which is evident in the form of increased employment opportunities as well as improvements in the social, health, and education sectors. These factors are crucial in combating poverty (Wandiri & James, 2020). Research conducted in the USA has found that project owners worldwide are reducing or canceling capital construction projects due to financial constraints, uncertainty regarding costs, inadequate management, and concerns about potential delays that could affect the project's feasibility (Gitonga, Muchelule & Nyang'au, 2022). According to Lu Shan (2018), Chinese construction firms successfully completed their projects on time and within budget by utilizing effective planning and control techniques, ensuring proper coordination between designers and contractors, and leveraging their technical and professional expertise. According to Boddy (2015), the effective implementation of infrastructure projects relies on management commitment, proper information and communication channels, and qualified workers.

Worldwide, the achievement and manageability of the task is intently attached to its planning exercise (Miringiro & Dushimimana, 2023). Projects flop because of lack of deficient planning,

ordinarily on the grounds, they don't spell out the issues well or think about significant factors, for example, the necessities and perspectives on everybody associated with and influenced by the task. Successful planning gives subtleties and structure to project work plan and sets up an approach to proceed with the task after the close of financing, which means it is feasible (Flyvbjerg, 2013). Bhattacharya et al. (2021) study on schedule performance in Indian construction projects found out that factors like project stakeholder commitment, owner competence, and a variety of stakeholder perspectives in planning were thought to be critical elements in the performance of the project schedule. In addition, proactive scheduling practices, motivational initiatives, and efficient communication strategies are crucial for schedule performance (Bhattacharya et al., 2021).

Studies in the Gulf region revealed that time and cost overruns had an impact on a number of construction projects (Gunduz & Elsherbeny, 2020). Due to issues including poor design and inaccurate schedule and cost predictions, over 85% of construction projects in Qatar ran over budget and into other problems (Gunduz & Elsherbeny, 2020). The construction industry in Bahrain has had similar issues, with projects being delayed as a result of crucial variables like poor scheduling and planning. Additionally, it was discovered that some construction projects in Oman faced scheduling delays of more than 40% above the initial plans (Yap et al., 2021). These studies in the Gulf region showed that among the most important factors causing schedule deviations and cost overruns are inadequate planning and poor scheduling of project activities, ineffective design phases, ineffective project stakeholder collaboration and ignorance of project requirements (Yap et al., 2021). According to Mishmish and El-Sayegh (2018), the primary factors behind project delays included poor scope definition, an unrealistic beginning or baseline plan, and changes in the requirements of project stakeholders, particularly owners. As a result, it is important to concentrate on project planning issues because they have a negative effect on the project's performance.

In Africa, delays in the operation of government-funded projects are a typical occurrence. In Nigeria seven out of ten projects surveyed had implementation delays (Ogbeide et al., 2022). Further, 5–10% of the pre-contract cost for government projects in Nigeria is based on contingency

(Ogbeide et al., 2022). This has been determined to be insufficient, which occasionally results in additional financial obligations beyond the owner's capacity. Sometimes, clients are not ready for this, thus money in the form of loans is sought to cover these extra expenses. According to Ogungbile et al. (2018), construction delays are now commonplace in Nigeria. Mohamed and Adam (2020) note that despite a large number of reported cases, cost overruns are becoming more frequent in Sudanese construction projects, ranging from straightforward to highly complicated project platforms. This is according to a study that looked at the performance of construction projects in Sudan. Amoatey and Ankrah (2017) note that studies show an increase in cost overruns, delayed completion and unsatisfactory and missed project objectives in the majority of construction projects in Ghana, where this issue is also seen there. Pienaar (2021), research on the issue of project delays in South Africa, notes that this phenomenon can be ascribed to the project teams and the client's/his representative's incapacity to have a complete understanding of the construction project from origin to completion. They thus emphasize the necessity to raise public understanding of how much delays can harm project delivery.

Studies conducted by Tekka and Msangi (2020), in Tanzania, Uganda, and Mozambique on the causes and effects of risks, procedures, delays, and disruptions in construction projects as well as managerial and environmental impacts leading to project time and cost overruns to project completion. Muhwezi et al. (2020), discovered that design modifications, payment delays to contractors, information delays, and failure to deliver timely updates are the main reasons of delays and disruptions. The main impacts of delays and interruptions, on the other hand, are time overrun, cost overrun, adverse social impact, idleness of resources, and disagreements. According to the study, there are still a variety of reasons why building projects can be delayed or disrupted, and these factors pose a serious risk to their success (Muhwezi et al., 2020). The studies suggested that the major priorities of the parties in the project procurement process should be a sufficient construction budget, prompt information release, completion of the design, and project management expertise.

Nikkhah and Redzuan (2019) argue that community development is difficult to attain without the active participation of community members. According to Ika, Diallo, and Thuillier (2018), projects are effective tools for enhancing welfare and achieving development. Participation guarantees that the local community has a sense of ownership over the project. Chess and Purcell (2015) pointed out that successful community initiative in Western Canada show that demand should be the driving force behind sustainable community development. The implementation of community development initiatives aims to provide a conducive atmosphere for the community to take legal authority, ownership, and responsibility for the finished projects. They also observed that when young people actively participate in community initiatives, it empowers them to have autonomy over choices that directly impact their lives. Their conclusion was that community engagement in the execution of community development initiatives would result in community empowerment.

The Kenyan Constitution of 2010 included community involvement and decentralized government in Kenya. This was done to safeguard the interests and rights of minority groups who have historically faced marginalization, together with their respective communities. This also includes the providing of information for the creation and enforcement of rules, laws, and policies. This includes the endorsement of development proposals, allocation of funds, and implementation of projects as stipulated in the County Government Act of 2012. The involvement of local community organizations in development activities will progressively enhance project ownership and sustainable accomplishments (Ali, 2017). Armitage (2010) defines community participation as the intentional engagement of community members and the general public in the process of making decisions and carrying out planned undertakings. Extension agents and policy makers must urgently comprehend the significance of community involvement in executing community development programs. It is crucial to acknowledge the need of fully understanding the advantages and possibilities that can be attained by including the community in the execution of community development initiatives (Ali, 2017). According to Barasa and Jelagat (2016), participation in a project involves the engagement of stakeholders in guiding and implementing the project in order to achieve the specified objectives. Various scholars have formulated distinct conceptualizations

of community participation, which vary based on the specific project being carried out. Afande (2016) found that community involvement should include both the selection and implementation phases of the project.

Government policies and investments are a pervasive, important, and often positive influence on the business environment and economic development of any industrialized nation. (U.S.A Department of Transportation, 2016.) According to Maedo et al. (2018), Kenya, like many other nations, overhauled its system of county government to improve urban governance and increase the capacity of county authorities to carry out their duties. This included improving urban planning, management, and service delivery. Local authorities have not yet conducted sufficient investigations into or published the causes of project delays, cost overruns, and failure to fulfill specifications in public or government projects. According to the new constitution, the County Development Fund (CDF) in Kenya was established in 2013 following the general election (Maedo et al., 2018). The Commission for Revenue Allocation has assisted in allocating cash to counties under the new constitution's devolved form of governance. The Commission is required by Article 216 to submit recommendations for a fair method of revenue distribution among county governments. The County Government Act gives County authorities important duties but also grants them decentralized authority-based legal, administrative, and regulatory authorities. The number of construction projects in various Kenyan counties has significantly increased with the implementation of devolution in the nation. According to Kordi et al. (2021), there is increasing worry about the reasons why the required objectives are not met in accordance with the expectations of the projects' clients. There is currently no conclusive evidence that project completion delay issue is a significant result of a lack of comprehension or a misinterpretation of project planning and scheduling in actual practice. The current study examined the influence of project planning, government regulations, community participation and performance of completed road projects in arid and semi-arid counties in Kenya.

1.1.1 Project Planning

Project planning is the process by which timetables, workforce, equipment, milestones, as well as budget estimates are specified as otherwise estimating the time, money, effort, and staff resources required in the execution of the project (Mwakajo & Kidombo, 2017). The methodical allocation of project resources is the most effective strategy for achieving the project's goal (Pellerin & Perrier, 2019). It might also be said to be one of the crucial tools used by stakeholders to guarantee the success of projects (Urbaski et al., 2019). In this study, project planning refers to the process through which project goals are established, the project framework is chosen, and then methods, tactics, targets, strategies, and deadlines are established in order to achieve the goals while informing the pertinent stakeholders of the same. This is due to the fact that project planning must be started, finished, and budgeted to suit the needs of all stakeholders.

Nowadays, Human Resource Management Practices (HRMPs) are now being updated within organizations and are constantly reaffirming their strategic relevance. The HRMP is one area that influences employee retention intentions, work satisfaction levels, and organizational commitment, which in turn influences project performance (Pellerin & Perrier, 2019). The procedures used to manage a project's human resources help it perform better, which helps it develop and establish a lasting competitive edge.

Practices for project time planning comprise all planning steps required for a timely project completion. The activities definition, activity sequencing, schedule development, activity length estimation, and resource estimation of the activity are the planning processes in the time knowledge domain, according to PMBOK (2004). The time plan is one of the project's most crucial plans. Time schedules are created using a work-breakdown structure (WBS) that has already been defined. To create realistic and doable plans, tasks must be precisely scheduled, according to Antvik & Sjöholm (2007). The process of activity resource estimation includes calculating the projected amount of each resource to be consumed as well as the resources that are required. Materials planning procedures result from the need for equipment, manpower, and other resources. The procedure also includes scheduling the availability of each resource, particularly the material needed in the project (PMBOK, 2004). There are typically two resource estimation techniques:

top-down and bottom-up. The top-down technique is typically used when there is limited information. It is run by the project's top management and is based on lessons learned from previous initiatives of a similar nature. The bottom-up approach is also known as qualitative-based estimations since it includes each distinct work classification in the process.

Cost budgeting and cost estimation are both included in the project's financial planning stage, the goal of cost planning is to complete the project within the allocated spending limit. (PMBOK, 2004). Project budgets are crucial because they have an impact on every aspect of planning and execution. The tracking of all expenditures, including those for the numerous work packages that make up a project, is essential (Abdi, 2021). The construction of a sound and efficient cash flow is facilitated by the professional budget development for a project, which helps to control project expenses. According to Herrera et al. (2020), insufficient cash flow caused by bad budgeting causes completion delays and significant additional expenditures, which increases the danger of a temporary halt to the entire project. The project scope, the WBS, and the project plan should all be taken into consideration when estimating costs. According to Mardiani (2018), a reserve cost may be applied to activities with a low work package level or thorough information with potential high financial risks because there are many unpredictable aspects present in a project.

It is impossible to avoid planning when the complexity of the project is high (Gituro & Mwawasi, 2017), which is why planning is beneficial to the performance of the project. When a project is well-designed, it often has a control mechanism built into it to make certain that all of the essential actions are followed to enhance the success of the project in accordance with the plan that was developed. According to Michugu (2020), control mechanisms guarantee that the expected actions that will be carried out in order to put the set plan to action into action are consistent with the objectives that have been defined and are able to put the plan into action. Finding proof of budget overruns or time and expenditure overruns is not always easy for a project manager to do. These are documented with the use of the approach for project control. The current study assessed the effect of project planning on performance of completed road projects in arid and semi-arid counties in Kenya.

1.1.2 Government Regulations

Government policies and investments have a widespread and significant impact on the business environment and economic progress of any country. (U.S. Department of Transportation, 2016)

Government rules are statutory tools used to ensure the implementation of the construction policies outlined in the applicable legislation (Siddiqui, 2019). The health, safety, and welfare of the workers must be taken into account both during the actual construction phase and while planning construction operations, and regulations are statutory instruments that outline the minimum legal standards for construction works (Zwalf, 2020). Government regulations on road projects are laws, policies, and rules that have been approved by the government or one of its agencies and may have a good or negative impact on how well road projects work. As a result, the effectiveness of government regulations will be evaluated in relation to their criteria for compliance, disclosure, alignment with policy objectives, and code of conduct.

For the majority of road construction projects in any given nation, regulations approval is necessary. Regulation in the field of road building includes the registration of contractors, projects, skilled laborers, site managers, training facilities, and rules governing the collection and payment of the construction levy (G.O.K, 2012). Construction regulation authorities are typically established in every nation to harmonize construction laws found in statutes that may conflict with one another, prohibit the entry and penetration of unqualified contractors by controlling and enforcing the Building Code's implementation in the construction sector, and enhance bureaucratic requirements and procedures. Additionally, construction regulation authorities eradicate corruption in the building sector, prioritize contractor performance and material quality, and update the Building Codes to guarantee their applicability (Wamugu & Ogollah, 2017).

Regulations established by the government serve as a roadmap for the construction of new roads. They detail the limitations and conditions that must be met in order for road infrastructure projects to be completed in a manner that is both long-term and sustainable. Because of the laws, projects will have as minimal of an impact on the surrounding environment as is legally permissible. According to Steghofer (2018), a language in construction rules is necessary to specify that any

contractor who plans to conduct construction must inform the proper authorities for construction planning in writing prior to commencing the project. Steghofer argues that this phrase is essential because it ensures compliance with the requirements. Government regulations establish the standards and guidelines that must be followed during project planning and execution. These regulations can dictate the quality of materials used, construction methods, and safety protocols. When project planning aligns with these regulations, it can lead to improved performance outcomes. Conversely, if regulations are stringent and not adequately considered during planning, they may hinder project execution and performance. Regulations can affect how resources are allocated to road projects. For instance, compliance with environmental regulations may require additional resources for assessments and mitigation measures. This can impact the overall budget and timeline of the project. If project planners do not adequately account for these regulatory requirements, it may lead to delays and increased costs, ultimately affecting project performance.

The current study examined the moderating effect of government regulations on the relationship between project planning and performance of completed road projects

1.1.3 Community Participation

Community participation is process by which an organization involves individuals (community stakeholders) who may be impacted by the decisions it makes or who may have an impact on how those decisions are implemented. Community participation, according to Michungu (2020), is the method utilized by an organization to involve pertinent stakeholders in order to accomplish desired objectives (Michugu, 2020). The community stakeholders are people or organizations that actively participate in a project, whom interests may be impacted by how well the project is carried out or completed, and who may also have an impact on the project's goal and results. Community stakeholders include neighborhoods, community development groups, environmental organizations, development organizations, citizen associations and non-governmental organizations (NGOs). In this study, the term "Community Participation" is the same as

"Community participation/participation" which refers to the procedure an organization uses to involve pertinent stakeholders in order to achieve predetermined goals.

The DFID (2016) report on water and sanitation program delivery in London highlights the significant role played by the community in these programs. This surpasses mere execution and integrates the notion of sustainability into these programs. The report states that project engineers are responsible for ensuring the success of larger programs. The community has the authority to determine which projects within these programs should be prioritized and implemented first. Additionally, the community consumes the outcomes of these projects, meaning that the implementation must align with the community's consumption patterns. In their report, which was financed by the World Bank, Jody and Ray (2016) have shown that the road infrastructure in London, England, is of the highest quality in the world. Its longevity is on par with just two G7 nations, namely the United States and Germany. The researchers in this paper have highlighted that the country's culture, which guarantees the involvement of all community members in the execution and maintenance of development projects (including roads), has contributed to the success of these projects. Brown and Hyer (2014) contend that in London, community members contribute the necessary labor for road construction. Additionally, the community plays a role in determining which roads should be prioritized through public participation in development. Furthermore, the community provides other capital resources for projects, such as land and materials.

In addition, Klijn et al. (2016) state that successful involvement helps turn the requirements of stakeholders into the objectives of the corporation and sets the framework for the efficient development of strategy. Karlsen et al. (2015) state that include project stakeholders in the planning and execution of projects is becoming more standard practice in order to achieve superior project outcomes. A community involvement approach that is correctly managed allows the project's stakeholders to work together to boost the economic sustainability of the project, improve the comfort and quality of life of project participants, and limit adverse impacts on the surrounding environment. The evaluation of community engagement in this research takes place via the lens of interaction with participants as well as the processing of complaints.

The term "community empowerment" refers to the process of endowing stakeholders with greater authority and confidence as a means of allowing them to exercise decision-making capacities and capitalize on possibilities relevant to the project's influence on their lives. This effort is referred to as the "systematic endeavor." According to Axelsson and Granath (2018), increased accessibility to data, resources, skills, or institutional reforms may help assist the fulfillment of this purpose. According to Chilala (2019), the definition of stakeholder management is the active participation of the project team in supporting the ability of stakeholders to identify, negotiate, and accomplish their goals, including social, environmental, and economic elements, via active engagement in the progression of the project. Chilala defines this as "active involvement of the project team in facilitating the capacity of stakeholders to identify, negotiate, and achieve their objectives." It is vital to empower the stakeholders in some capacity if one wants to see an increase in the level of involvement from the stakeholders.

The degree to which the project's numerous communications are delivered to the necessary stakeholders at the appropriate moments during the course of the project will determine whether or not the project is successful. Effective communication, as defined by Matu et al. 2020, ensures that clients get information that is relevant to their needs and provides favorable perceptions about your organization or project. Butt et al. (2016) state that the project team and the mode of communication that is being used are both factors that have an effect on the planned communication strategy. In order to ensure the successful completion of projects, it is necessary to identify the projects' stakeholders, to manage those stakeholders in an effective way, and to keep those stakeholders informed.

It is essential to have an effective grievance management approach as a tool for social management while working on projects where there is a high probability of ongoing risks and adverse impacts. Proportional to Husted (2014), one of the reasons why a grievance system has to be scaled proportional to the risks and impacts of a project is because of the previous reason. According to Gomathi (2014), grievance management should include the multiple engagement tactics that were

discussed in the prior sections, in addition to the organization's more comprehensive process of community involvement. As a result, it is possible to argue that complaint mechanisms need to be developed so as to conform to the prerequisites of a particular project and the environment in which it will be carried out.

Any project's success in every organization depends on Community participation. These stakeholders are frequently many and their levels of influence can vary greatly in a project context. Power, legitimacy, and urgency, according to Akali (2018), are important stakeholder attributes. Since the quantity and kind of stakeholders will change throughout the course of the project, it seems sense to check identification periodically (Mayienda, 2020). Their involvement serves as both a means and an end in itself, emphasizing the dual role that stakeholder participation plays in the success of rural road projects. It serves as a method by which individuals and groups work together to build the project. Community participation ensures that the needs and priorities of local populations are integrated into project planning. When communities are involved, the projects are more likely to address their specific challenges, leading to higher acceptance and support for the initiatives. Participation fosters a sense of ownership among community members, which can motivate them to contribute to the project's success. When communities feel invested in the project, they are more likely to support its implementation and maintenance, leading to improved performance. The current study evaluated the mediating effect of community participation on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya.

1.1.4 Performance of Road Project

Evaluating project deliverables against key performance indicators (KPI) allows for the determination of road construction project performance. These key performance indicators (KPIs) assess the timeliness, cost-effectiveness, quality, efficiency, accuracy, safety, and profitability of project delivery (Vandevoorde & Vanhoucke, 2016). According to Pheng and Chuan (2006), the performance of a project may be evaluated from two perspectives: the stakeholders' viewpoint and the developer's viewpoint. Project time refers to the period starting at the beginning of a project and ending at its conclusion. According to Ngacho (2013), there are two primary time factors to

consider: the project time and the actual completion time. Project time failures occur when there are excessive delays or overruns in the execution process (Lensinko, 2015).

A project is deemed successful if it is executed within the allocated budget, finished within the predetermined timescales, and adheres to the functional and technical standards. The use of Performance Measurement Systems (PMS) has received little attention in the construction sector, especially in developing nations, despite being one of the most crucial elements for determining project success. As a result, it seems like there is always a discrepancy between the actual outcomes of the implementation of significant projects and stakeholder expectations. Three fundamental criteria; time, money, and quality have typically been used in the construction industry when applying performance assessment systems to gauge the degree of project success (Cruz et al., 2018). Systems for measuring success at the organizational level are frequently dependent on financial indicators, which are nearly invariably lagging indications. The UK construction sector created particular Key Performance Indicators (KPIs) in response to the Egan Report, including the duration and cost of construction, the capacity to anticipate expenses and completion dates, flaws, customer satisfaction with products and services, safety, profitability, and productivity (Cruz et al., 2018).

Akali (2018) expresses concern over the government's ongoing efforts to construct roads in Kenya's arid and semi-arid counties. It is observed that approximately 75% of these road projects face various obstacles, resulting in delays, exceeding the budget, or failing to meet the desired quality standards. In addition, as stated by Abdi (2020), a mere 10% of the development projects undertaken in the area by Kenyan construction companies using Constituency Development Funds (CDF) were completed effectively. 30% of the balance was unfinished, while 60% were never completed. According to the World Bank report of 2018, analysis of the public works records from the counties under investigation indicated that around 40% of the road infrastructure projects executed by local enterprises saw delays of 1-2 years, while 60% of the road projects suffered delays of 2-4 years.

By comparing project deliveries to key performance indicators (KPI), road construction project performance can be determined. These KPIs demonstrate if projects are completed on schedule, within budget, without defects, effectively, correctly the first time, safely, and profitably (Densford et al., 2018). If a project is finished on schedule, within budget, and meets all functional and technical requirements, it is considered to have done well. Indicators of performance for the road construction project were taken into consideration for this study, including quality, timing, and cost. Time as an indicator considered how long it took to complete a project, from its commencement to its end. While quality looked at how well the project complied with requirements and was suitable for use in achieving its intended purpose, the cost indicator was interested in the evaluation of the amount of cash and resources utilized in a project (Densford et al., 2018).

1.1.5 Arid and Semi-Arid Counties

Arid and semi-arid lands (ASAL), which make up over 89% of Kenya's counties, are often the nation's poorest and least developed regions. These counties' possibilities for socioeconomic development are severely hampered by a lack of road infrastructure, which also lowers the investment potential. Due to its susceptibility to both drought and flooding, this ASAL may have trouble accessing markets and other services, such as humanitarian aid. The road infrastructure must be able to survive extreme weather conditions in order to lessen these vulnerabilities, which calls for specialized materials and building know-how. The arid counties include Baringo, Garissa, Isiolo, Mandera, Marsabit, Samburu, Tana River, Turkana, and Wajir. The semi-arid ones are Embu, Kajiado, Kilifi, Kitui, Kwale, Laikipia, Lamu, Makueni, Meru, Narok, Nyeri, Taita Taveta, Tharaka Nithi, and West Pokot.

According to the data from the Kenya Red Cross, Kenya saw a significant amount of rainfall in the year 2023, which was identified as El Niño. The rainfall occurred with the predicted intensity, as the Kenyan meteorological department had anticipated. This resulted in the unfortunate loss of 142 lives and widespread destruction across 19 counties in both the Arid and Semi-Arid Lands (ASAL) and non-ASAL regions. The floodwaters displaced 30,000 households, leading to the loss of lives and livelihoods and the obstruction of roads. The inhabitants most impacted are those

living in the dry and semi-arid regions of Tana River, Turkana, Samburu, Wajir, Garissa, Makueni, Isiolo, Kilifi, Kwale, Meru, Marsabit, and Mandera counties. In these places, the roads have become impassable.

The formulation and implementation of rural access and minor road programs in Kenya are carried out by the county government. The arid and semi-arid areas have many underdeveloped roads, and the present state of road infrastructure projects in this region is unsatisfactory (County Public Works, 2021). For instance, in Baringo County, 60% of the roads built by regional contractors have been repaired (Baringo County Government, 2021). In contrast, 55% of the roads in Laikipia County were renovated. The percentages were 47 percent, 36 percent, and 44 percent, respectively, in the counties of Laikipia, Lamu, and Makueni (County Public works, 2021). Additionally, the contractors spent roughly twice as much as originally planned, and building took two to three years longer than expected. However, in order to bring about equitable development, the Kenyan government has started many roads in the area (County Public Works, 2021). According to Abdi (2020), there has to be more participation from the private sector in the design and oversight of road projects. For instance, with the assistance of the local populations, private groups SIDA and KFW built road projects in Nyanza and the Rift Valley. The selection and prioritization of road construction projects involves the local community as well.

The Arid and Semi-Arid Region has distinctive features in that it is both rural and urban in nature. It also has a lot of poorly constructed roadways. For instance, in Marsabit County, local businesses completed almost 65 percent of road construction; however these projects had poor quality and cost overruns (Homa Bay, County government, 2022). According to a 2010 World Bank report, small and medium-sized road infrastructure projects must be finished in 3–4 years, while larger projects may take up to 5–6 years. However, data from the counties under study's public works records revealed that roughly 40% of the road infrastructure projects built by local businesses faced time overruns of 1-2 years and 60% of the road projects experienced time overruns of 2-4 years (County government, Mandera 2019; Samburu, 2019; Laikipia 2019). Because many of the road

infrastructure projects built in the area by local businesses experienced cost and time overruns and were of low quality, the Arid and Semi-Arid Region was therefore perfect

1.2 Statement of the Problem

Successful road construction is a stimulus for economic development, as stated in Kenya Vision 2030 (Kenya Vision, 2030). As a result, the government has made large investments in the construction of roads (Abdi, 2021). For example, in the 2017/2018 Financial Year, Kenya National Highways Authority (KeNHA) proposed to construct 13,238.73 kilometers of roads at an outlay of Ksh. 21,459,228,002, while Kenya Rural Roads Authority (KeRRA) planned to sustain 28,244 kilometers of roads with a spending plan of Ksh. 11,893,617,021. The Kenya Urban Roads Authority (KURA), on the other hand, supposed to maintain 2,339 kilometers of roads for a total of 5,206,382,979 people (KRB, 2016). Akali (2018) laments that, despite the government's continued investment in road building, nearly 75% of all projects (road construction) in Kenya's arid and semi-arid counties encounter a number of challenges that prevent them from being finished on schedule, incurring cost overruns, or falling short of the required quality standards. Furthermore, according to Abdi (2020), only 10% of the building projects carried out in the region by construction firms registered in Kenya using Constituency Development Funds (CDF) were successfully completed. The balance were either incompletely (30%) or never finished (60%) finished and therefore if current trend in road construction continues unaddressed, Kenya's Vision 2030 of enhancing domestic and regional trade through construction and upgrading 10,000 Kilometers of the national and county roads network won't be realized.

Numerous studies employing various types of variables have examined project planning and performance. Mwanza, Namusonge, and Makokha (2020) studied the influence of project planning on the performance of construction projects in Kakamega County, Kenya. Most research in this area focuses on urban construction projects, highlighting a significant gap in understanding the specific challenges faced by road projects in arid and semi-arid counties, which may encounter unique socio-economic and environmental factors affecting their performance. . On the other hand, a study by Son, Lee, and Kim (2015) that focused on the financial performance of green

construction projects exhibits a conceptual mismatch. By applying project planning, government regulations, community participation variables on the performance of completed road project in Kenya's arid and semi-arid counties, the current study bridged the conceptual knowledge gap. Kathure and Muathe (2020) carried out a study using mixed method approach on Project Management Practices and Performance of Women Economic Empowerment in Kiambu and Nairobi Counties, Kenya where qualitative and quantitative data was analysed. The current study applied cross-sectional research design where quantitative data was analysed to meet the study objective in filling the research methodological gaps. This study aimed at examining the effect of project planning, government regulations and community participation on performance of completed road projects in arid and semi-arid counties in Kenya.

1.3 General Objective

The general objective of the study was to examine the effect of project planning, government regulations, and community participation on the performance of completed road projects in arid and semi-arid counties in Kenya.

1.3.1 Specific Objectives

The study seeks to:

- i. To assess the effect of project planning on performance of completed road projects in arid and semi-arid counties in Kenya.
- ii. To determine the mediating effect of community participation on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya.
- iii. To evaluate the moderating effect of government regulations on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya.
- iv. To establish the moderated mediation effect of government regulations and community participation on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya.

1.4 Significance of the Study

The results of this study are important because they provide relevant project management advice for new projects, guidance for the on-going and established projects, and general improvement to the environment of project implementation, particularly about road projects in Kenya's arid and semi-arid counties. Since the results of the research will give solid building blocks on which the adoption and implementation of project planning, government laws, and community engagement can be merged, policymakers should be in a position to easily embrace a model that has been tried and is functioning. In addition, the results of the research might be used by the Kenyan Parliament in order to draft laws controlling the effectiveness of road construction projects.

The study provided essential data that will function as a point of reference for academics, students, and researchers who will use this study as a foundation for examining the same location in order to uncover study gaps. Students and faculty will also be able to investigate project design, government regulations, community engagement, and the overall success of finished road construction projects in Kenya. The findings served as a theoretical framework for future research in the fields of project planning, governmental policies, community engagement, and the performance of completed road projects, among other areas of study.

The results of the research may be significant to contractors and other state organizations in deciding whether or not the organizations in charge of managing road projects in Kenya have created procedures for measuring the performance of road projects. The findings may also be helpful in identifying whether or not the businesses under review have established processes for measuring the success of road projects. The findings of the research will be beneficial to practitioners as well as government institutions since they will examine reports that are based on public sector reforms via efficient performance management approaches as a new concept for efficient and effective service delivery for firms that are a part of the public sector.

1.5 Scope of the Study

The components of road project performance, more especially project planning, government regulations, and community participation, are the focus of this research, which was conducted in the dry and semi-arid areas of Kenya. Data was provided by project managers, county public works officials, and local community leaders in order to aid the study's overall purpose. The road construction projects that were finished in Kenya's 22 arid and semi-arid counties was make up the study population. The research will be carried out and used during the months of February 2024 and September of 2024.

1.6 Limitations of the Study

The possible shortcomings of a study that are beyond of the control of the researchers are referred to as limitations. Because of the norms and regulations of the organization, local contractors are urged to keep information about their enterprises to themselves and are discouraged from disclosing it. This is one of the primary factors that are expected to restrict the usefulness of the study. This constraint was minimized by having a letter of introduction from the University to provide to the respondents. This letter assured the respondents that the information they supplied would be used purely for academic purposes.

There was slow response from responders due to the fact that they have very busy schedules. The issue was resolved because of consistent follow up over the phone by the researcher. Additionally, the researcher contacted senior management, namely the human resource managers, in order to solicit their assistance in assuring the availability of individuals designated to complete out the questionnaire.

1.7 Delimitations of the Study

The characteristics of a research that determine its boundaries and scope are referred to as its delimitations. The researchers are in charge of determining where the borders are. Only local contractors who are currently working on road projects in Kenya's arid and semi-arid areas were taken into consideration by the researcher. This guaranteed that the sample size and frame are as

accurate as possible. The engineers, technical auditors, technical consultants, surveyors, project managers, and County Government officials who are employed by Nairobi regional offices for KURA, KeRRA, KeNHA, and the country's Ministry of Public Works served as the unit of observation for this study. The research methodology for this study was cross-sectional survey, and it made use of primary data. The scope of the research was restricted to the factors being investigated, including project planning, government regulations, community participation, and the performance of previously finished road construction projects in arid and semi-arid areas of Kenya.

1.8 Chapter Summary

This chapter took into consideration the background of the problem by articulating what other academics, researchers, and practitioners in the field under consideration have discovered about the relationship between project planning, government regulations, and community participation, and how the performance of finished road projects is affected by these factors. Specifically, this chapter focused on how the performance of finished road projects is affected by these factors. In addition to that, it outlined the overall and more specific aims of the study, in addition to the significance, breadth, boundaries, and delimitations of the research.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents literature review of the study. It comprises of theoretical review pertaining to five key theories relevant to the study and the conceptual framework. It also comprises of a detailed description of the notion of project planning, government regulations, community participation, and performance, empirical studies related with the concepts under review, critique of literature and summary of literature plus research gaps pertaining to the study.

2.1 Theoretical Literature Review

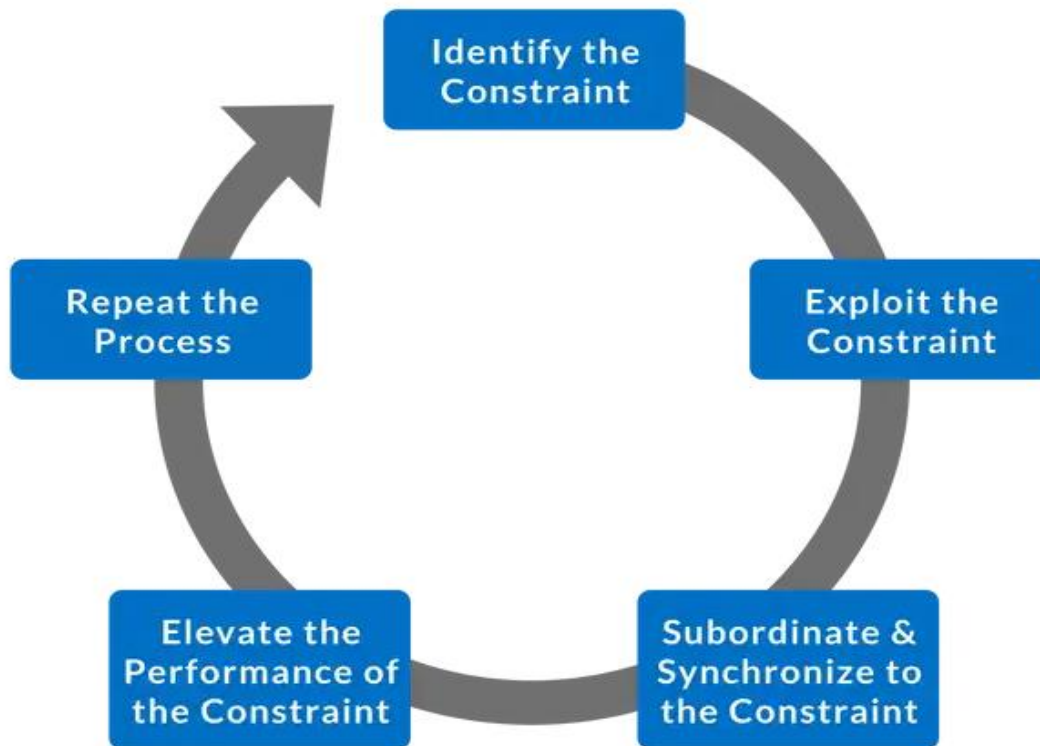
A theory is an organized set of ideas, variables, definitions, and claims that explain a natural event using a network of linked concepts, variables, definitions, and claims (Kerlinger, 1979). A research project is built on its theoretical framework, which also acts as a guide for the researcher as they create their own study inquiry (Adom, 2018). The theoretical framework serves as the structure that demonstrates the researcher's definition of methodology, philosophical and epistemological approaches, theoretical ideas, constructions, and tenants (Adom, 2018). It helps researchers build and consider formal theories as structures inside their study (Ravitch, 2016). The theoretical framework provides guidance and influences every step of the research process, including issue formulation, literature evaluation, technique, presentation, discussion of the results, conclusion drawing, and, in the end, the researcher's contribution to scholarly and academic work (Adom, 2018). In this study, four theoretical propositions formed the foundation. They included; Theory of Constraints, Stakeholder Theory, Resource Based View Theory and Regulation Theory which were linked to the scope and nature of review. The theories shed light on the study done to find out the degree to which project planning, community participation and government regulations, influences performance of completed road projects in arid and semi-arid counties in Kenya. The study was anchored on theory of constraints because the theory encourages viewing projects as interconnected systems, rather than isolated components.

2.1.1 Theory of Constraints (TOC)

Dr. Eliyahu Goldratt conceived the Theory of Constraints (TOC), and introduced it to a wide audience through his bestselling 1984 novel, “The Goal”. Because of this, TOC has kept changing and growing, and now it is an important part of best practices for management. The Theory of Constraints is a way to figure out which constraint is the biggest problem that is stopping you from reaching your goal and then gradually making that constraint better until it is no longer a problem. This kind of problem is often called a bottleneck in production. The Theory of Constraints is a scientific way to find ways to make things better. It says that every complicated system, like an industrial process, is made up of several activities that are related to each other. One of these activities limits the whole system; this is called the "weakest link in the chain." One of the things that makes the Theory of Constraints appealing is that it naturally puts growth tasks at the top of the list. The present limitation is always the most important thing. For situations where change is needed right away, TOC provides a very focused way to make quick progress. A successful Theory of Constraints implementation will have the following benefits: Increased profit is the primary goal of TOC for most companies. Fast improvement is the result of focusing all attention on one critical area: the system constraint. Improved Capacity: optimizing the constraint enables more products to be manufactured. Reduced lead times by optimizing the constraint results in smoother and faster product flow. Reduced inventory: eliminating bottlenecks means there will be less work-in-process (Şimşit, Günay, & Vayvay, 2014).

The core concept of the Theory of Constraints is that every process has a single constraint and that total process throughput can only be improved when the constraint is improved. A very important corollary to this is that spending time optimizing non-constraints will not provide significant benefits; only improvements to the constraint will further the goal (achieving more profit). Thus, TOC seeks to provide precise and sustained focus on improving the current constraint until it no longer limits throughput, at which point the focus moves to the next constraint. The underlying power of TOC flows from its ability to generate a tremendously strong focus on a single goal (profit) and to remove the principal impediment (the constraint) to achieve more of that goal. The

Theory of Constraints provides a specific methodology for identifying and eliminating constraints, referred to as the Five Focusing Steps. As shown in the following diagram, it is a cyclical process.



Source: Mishra (2020)

The Five Focusing Steps are: Identify; Identify the current constraint (the single part of the process that limits the rate at which the goal is achieved). Exploit: Make quick improvements to the throughput of the constraint using existing resources (i.e., make the most of what you have).Subordinate; Review all other activities in the process to ensure that they are aligned with and truly support the needs of the constraint. Elevate; If the constraint still exists (i.e., it has not moved), consider what further actions can be taken to eliminate it from being the constraint. Normally, actions are continued at this step until the constraint has been “broken” (until it has moved somewhere else). In some cases, capital investment may be required. Repeat; The Five Focusing Steps are a continuous improvement cycle. Therefore, once a constraint is resolved, the next constraint should immediately be addressed. This step is a reminder to never become

complacent, aggressively improve the current constraint and then immediately move on to the next constraint.

Constraints are anything that prevents the organization from making progress towards its goal. In manufacturing processes, constraints are often referred to as bottlenecks. Interestingly, constraints can take many forms, such as physical, policy, paradigm, or market. Policy constraints are the required or recommended ways of working. May be informal as described to new employees as “how things are done here”. Examples include company procedures (how lot sizes are calculated, bonus plans, overtime policy), union contracts (a contract that prohibits cross-training), or government regulations (mandated breaks). Since policy constraints often stem from long-established and widely accepted policies, they can be particularly difficult to identify and even harder to overcome. It is typically much easier for an external party to identify policy constraints since an external party is less likely to take existing policies for granted. Physical constraints are typically, it is equipment, but it can also be other tangible items, such as material shortages, a lack of people, or a lack of space. Paradigm constraints are deeply engrained beliefs or habits. For example, the belief that “we must always keep our equipment running to lower the manufacturing cost per piece”. A close relative of the policy constraint. A market constraint occurs when production capacity exceeds sales (the external marketplace is constraining throughput). If there is an effective ongoing application of the Theory of Constraints, eventually the constraint is likely to move to the marketplace (Mishra & Moktan, 2019).

According to Mishra (2020), effectively managing limitations is essential for construction schedule planning and control. The existing procedures for addressing non-precedence restrictions often include the use of trial and error methods, optimum solutions, and simulation approaches. An alternative approach to address the issue of construction restrictions is the implementation of the Theory of Constraint (TOC). The Theory of Constraints (TOC) has gained significant traction and acceptance in the manufacturing business as a means to enhance production performance. However, its use in the construction sector, particularly in the Kenyan setting, has not been thoroughly examined. The Theory of Constraints (TOC) proposes a set of five procedures to

determine the primary restriction in a system and eliminate it until it no longer hinders the system's performance. The Critical Chain Project Management (CCPM) technique is very successful in eliminating schedule limitations via the use of buffer management. Buffer management involves the manipulation of time buffers, taking into account activity time estimations and human behavioural aspects. This research has used the theory of constraints to determine the key limitations that affect the timely completion of building projects. The importance of this research lies in its ability to enhance project performance by identifying and eliminating constraints.

The study was anchored on theory of constraints because the theory encourages viewing projects as interconnected systems, rather than isolated components. This holistic perspective is crucial in this study, as the performance of road projects depends not only on individual factors like planning or regulations but also on their combined impact within the broader system of project execution and context. Additionally theory of Constraints is not just about identifying problems; it also provides tools for improvement. By analyzing constraints, you can develop actionable recommendations for optimizing project planning processes, streamlining regulations, and enhancing community engagement to address bottlenecks and improve overall road project performance. Furthermore theory of constraints emphasizes using data to identify and measure constraints. This aligns well with the potential for quantitative data collection in this study. By analyzing data on project timelines, costs, quality, and community feedback, you can identify specific bottlenecks and track the impact of interventions aimed at addressing them.

2.1.2 Stakeholder Theory

Stakeholder theory is a management and business ethics framework that acknowledges the influence and importance of various parties, not just shareholders, on a company or organization's success. It argues that businesses have a responsibility to consider the interests of all stakeholders who are impacted by their decisions and actions. In 1983, Edward Freeman introduced the stakeholder hypothesis, which posits that many parties have an impact on an organization's activities and may be seen as a consequence of those activities. Mishmish and El-Sayegh (2018), proponents of this idea, argue that organizations must include their stakeholders and prioritize their

interests. According to this concept, successful firms are those that can consider the objectives of the bulk of the firm's many stakeholders. To implement this idea effectively, one must possess a comprehensive comprehension of the diverse array of stakeholders inside an organisation, as well as the extent of their impact on the firm.

Jiang (2017), a critic of stakeholder theory, argues that its lack of clarity makes it challenging to operationalize in a scientifically testable way. Furthermore, the theory lacks efficacy in guiding decision-making, particularly in resolving conflicts of interest that often arise when addressing the diverse requirements of many stakeholders within an organization. This is another aspect where the theory is inadequate. Conversely, this idea has been used to emphasize the need to consider the interests of all relevant stakeholders while making business decisions. This theory is pertinent to this study because it suggests that the success of infrastructure projects relies on road contractors and other parties considering a diverse variety of stakeholders. Consequently, an organisation must be capable of adapting its operational approach to meet the needs of its stakeholders, effectively managing their expectations, and guaranteeing the successful completion of assigned duties. Stakeholder engagement and consideration of the social impact of road infrastructure projects are widely recognized as significant determinants of project success and are seen as key elements in this regard. Furthermore, the study recognizes the need to engage in discussions with diverse stakeholders to enhance the probability of successfully implementing road infrastructure projects (Wojewni, Dziadkiewicz, & Bęben, 2021).

This study on road project performance in dry and semi-arid areas of Kenya is greatly influenced by stakeholder theory, which considers the effects of project design, government regulations, and community participation. The internal stakeholders in road projects include government agencies, project teams, contractors, and investors. External stakeholders include local people, landowners, environmental organizations, non-governmental organizations (NGOs), and companies. Impact of Stakeholders: Project planning involves seeking feedback from stakeholders, who may provide useful insights into route selection, design considerations, and possible effects. This collaborative approach enhances the effectiveness and inclusivity of the planning process. Government

regulation may be informed by stakeholder involvement, which helps establish rules that address varied requirements and minimize negative repercussions. Community engagement: The active involvement of the community encourages a sense of ownership, enhances the likelihood of project success, and minimizes the risk of interruption or conflict.

The study used stakeholder theory to identify the primary individuals or groups that have a significant interest in or influence on a certain project or decision. Examine the individuals or groups impacted by the project and identify their particular interests and concerns. Evaluate the impact of stakeholders. Analyze the influence of various stakeholders on project planning, regulations, and community engagement. Conduct a thorough examination of various techniques used to foster participation and involvement. Evaluate the efficacy of current methods for involving stakeholders and identify opportunities for improvement. Establish a correlation between stakeholder involvement and performance. Analyze the impact of stakeholder participation on road project results, including factors such as project duration, expenses, standards, and community contentment.

2.1.3 Resource Based View Theory (RBV)

The Resource-Based View (RBV) is a management theory that focuses on how a firm can achieve sustained competitive advantage through its resources. It argues that companies can outperform their competitors by acquiring, developing, and utilizing valuable, rare, inimitable, and non-substitutable resources. According to Freeman et al. (2021), the key assumption of the resource-based view is that the organizational resources and capabilities of different organizations might differ greatly from one another and even remain constant. An improved competitive advantage often gives stakeholders a greater sense of reassurance that their contributions, whether financial or in some other form, will be recognized and put to good use.

According to Collins (2021), the concept that underpins the resource-based outsourcing method is the notion that an organization should go to an external provider in order to address any gaps in its capabilities and resources that are substantial, uncommon, distinctive, and structured. When it

comes to initiatives, stakeholders will be more interested in ones that properly manage the resources at their disposal. It is sometimes feasible to bring down the total expenses of a project by making use of resources that are contracted out. As a result, stakeholders may be convinced that the project managers are attempting to finish the project at the lowest feasible cost while still achieving the highest potential value and benefit (Collins, 2021).

In the context of the present investigation, the projects that are being financed by the County and National Government are subject to modification in line with project management. In this particular scenario, the money for the projects comes from the Ministry of Finance and Planning of the National/County Government. It is expected that the funds will be put to use so that the projects may be brought to a successful conclusion. The completed projects provide as instances of the outcomes that are specified by the theory of project management. The level of performance may be evaluated based on the degree of success with which the projects described above are completed. Collins (2021) found that project managers often lack the requisite abilities or ability to carry out all of the activities that need to be completed in order to develop and bring about the changes that their initiatives involve. The resource-based theory acknowledges the existence of both resources and cost variables, and as a consequence, it provides a framework for efficient planning that helps ensure appropriate use and distribution of resources in order to successfully complete a project.

2.1.4 Regulation Theory

Regulation Theory, also known as the Regulation School, is a critical approach to understanding the economic dynamics of capitalism. It focuses on how different forms of regulation (institutions, rules, and norms) shape and constrain capitalist growth and accumulation. In the year 1932, economist Arthur Cecil Pigou was the first person to establish the concept that would later become known as the theory of regulation. From this perspective, members of the public have expressed a desire for legislation to be enacted that would put an end to unethical business practices. It is a widely held belief that rather than catering to and serving the interests of certain special interests, rules should cater to and serve the interests of society as a whole.

Some key elements of regulation theory are: regimes of accumulation, which describe that each historical period in capitalism is characterized by a specific regime of accumulation, which describes the dominant way in which surplus value is extracted and circulated. Modes of Regulation, describes that each regime of accumulation requires a specific mode of regulation to maintain stability and prevent crises. This mode of regulation includes the following: State institutions, which describes the role of government in regulating the economy (e.g., monetary policy, social safety nets) Wage-labor nexus which describes the relationship between employers and workers, including wage levels and labor rights. Form of competition: The nature of competition between firms within the market. Crises and Transitions describes that Regulation Theory argues that each regime of accumulation eventually encounters internal contradictions and crises, leading to a period of destabilization and restructuring. This can involve changes in production methods, consumption patterns, social relations, and regulatory frameworks, eventually leading to the emergence of a new regime of accumulation (Al-Hanshi, Ojiako, & Williams, 2022)

According to Du et al. (2021), the regulatory authority is not considered to represent the private interests of the regulators, but rather the comprehensive interests of the community in which it functions. This is the conclusion reached by the authors. The fundamental argument made in favor of economic intervention is that there is now a severe market failure as a consequence of manufacturing scale and scope economies. This phenomena is made worse by the presence of incomplete markets, externalities, and the consequences on income and wealth distribution that result from information mistakes in market transactions. All of these factors add to the overall magnitude of the problem. Some theories argue that flaws in the market may be more obvious in emerging nations, which, if true, would make the case for public control a more compelling one.

This theory contributes to the research of how to make housing more affordable since government restrictions are required to rectify market faults and externalities resulting from income, wealth distribution effects, and information flow. In particular, it clarifies the reasons for the need of rules.

On the other hand, the enforcement of certain laws by the government may not be enough to bring about the type of favorable social development that is desired. According to Shen et al. (2018), one of the reasons why the real estate business in Nigeria is expanding at such a snail's pace is because the government lays restrictions on the ways in which land may be used. The idea is pertinent to the investigation because it offers support for the government regulations variable, which is one of the variables that is being explored as part of the investigation. As a result of its support for the government regulations variable, the theory is pertinent to the current investigation. The study's goal is to determine how government rules affect the relationship between project planning and the success of road projects in Kenya's arid and semi-arid counties.

2.2 Empirical Literature Review

By locating prior research that are pertinent and connected to the current investigation, a review of empirical literature has been conducted. The article's author, the study's topic, the methodology, and the study's findings are among the key topics covered. To identify the knowledge gap and determine how the study can close it, the researcher will review all pertinent empirical studies. The studies that have been evaluated also aim to produce elements and indicators connected to the performance of finished road projects.

2.2.1 Project Planning and Performance of Road Project

The empirical study on project planning and project performance was categorized using the key concepts of project planning. These ideas include project cost management, project quality management, project time planning, and project deliverables management. Planning is one of the most important aspects of any endeavor. It is a process that continues all the way through the delivery of a project. In the process of carrying out a project, one of the most important steps is called time planning, which is also known as project scheduling. Project time planning is the technique that must be followed in order to supervise the on-time completion of the project. According to Tekka and Msangi 2020, effective time management requires keeping track of and exercising control over the amount of time necessary to do each assignment.

According to Pienaar (2021), the role of time planning in a project is essential in order to maintain the proper allocation of time to the overall conduct of the project throughout the subsequent phases

of the project's natural life-cycle. He accomplished this by making use of the time management strategies of time planning, time estimating, time scheduling, and timetable control (concept, development, execution, and completion). The successful completion of a project does not need the signing of a contract with the expectation that it will be finished on time, within the allotted budget, and in a manner that is consistent with the project's scope. Accurate planning of the project's time and schedule is required for the completion of all aspects of a successful project. According to Mishmish and El-Sayegh (2018), the management of project time is the first responsibility that comes within the jurisdiction of project managers. It is also considered to be one of the most important variables in determining whether or not a project is successful.

A research on project management excellence, defined as the art of excelling in project management and carried out by Heldman (2011) and mentioned in Jiang (2017), was carried out in Washington, DC, USA. He came to the conclusion that time management is an essential part of the process of carrying out a project because it requires keeping the activities of the project on track and comparing those activities to the project schedule in order to ensure that the project is completed on time. A number of processes are included in project time management. These processes include activity definition, activity sequencing, activity resource estimate, activity duration estimation, schedule formulation, and schedule control. In this research, gaps in context as well as conceptual understanding are highlighted. The United States of America played host to the research endeavor, the focus of which was on effective project management. The current research, which will be carried out in Kenya, will place a primary focus on the performance of several road construction projects.

Kress (2014) studied the effects of material planning on project performance through a survey design of selected constructions firms. The study targeted construction projects not completed in time in London. The study found that the project management primary objective is to meet otherwise surpass the material usage sponsors anticipation of the project. According to the study these anticipations are usually expressed within 3 groupings; a given project generates preferred result with minimum defects. Cost: A given project generates preferred result for the expected cost

Schedule: A given project generates the preferred result within the expected period. However, the study did not consider many forces intervening and attempting to push projects off target.

The study by Cherng-Yee, Adriel, and Tek (2019) examined the relationship between operational quality management (TQM) and project performance in Malaysian construction organizations. Data were collected from a member list of companies from the Construction Industry Development Board (CIDB) Malaysia. A total of 161 valid responses have been returned for data analysis. The findings revealed that TQM practices were partially correlated with the project performance of Malaysian construction organizations. Specifically, operation focus and workforce focus were perceived as dominant TQM practices for project performance. This study contributes to the knowledge of TQM and project performance by providing empirical evidence on their ability to improve the Malaysian construction industry. Besides, this study provides further insight for industrial practitioners to understand the role of TQM and its ability to enhance project performance. The current study will assess the effect of project planning on performance of completed road projects in arid and semi-arid counties in Kenya.

The study by Michugu, James (2020) examined the Project factors influencing completion of Rural Roads projects in Kenya: a case of Rumuruti-Maralal Road project in Laikipia and Samburu Counties. Stakeholders' Theory was adopted. The study used a descriptive survey research approach along with interviews. The research focused on surveying 100 participants, including the personnel of KeNHA, the contractor for the Rumuruti-Maralal Road Project, and the consultant. The research used a census survey to gather data from the full target population of 100 respondents due to the limited sample size. This research utilized purposive sampling and stratified random sampling methods. To gather data, a semi-structured questionnaire and an interview guide were employed as tools. The quantitative data collected from the surveys were then coded using statistical software, which helps in organizing and analyzing the information effectively. This approach ensures that the findings are robust and can provide valuable insights into the factors influencing project planning and performance in road projects. Descriptive statistics were

calculated using arithmetic means and standard deviation. The data was shown in tables showing frequencies and percentages. The qualitative data collected from the interviews was transcribed based on themes and constructs related to the study goals, highlighting similarities and contrasts seen throughout the interviews. Secondary data that matched the study goals was gathered from published books, scientific dissertations, peer-reviewed journals, and other academic publications and supplemented with primary data. Pearson's correlation was used to analyse inferential statistics. The research results for the completion of rural road projects in Kenya showed a composite mean of 3.645 and a standard deviation of 3.321. The composite mean for stakeholders' involvement was 3.550, with a standard deviation of 3.229. The composite mean and standard deviation for project funding were determined to be 3.516 and 3.195, respectively. The composite mean and standard deviation for contract management were determined to be 3.280 and 2.939, respectively. The composite mean and standard deviation for the project requirements were determined to be 3.418 and 3.069, respectively. The research revealed that stakeholders' involvement, project funding, contract administration, and project specifications impact the completion of rural road projects in Kenya. The study suggests that the government should prioritise comprehensive stakeholder participation in projects due to their significant impact on project decisions; adequate funding is essential for project success; utilising creative contracting approaches is recommended for effective construction processes and project completion; and successful management of the interface between design and pre-construction activities is crucial for projects to be completed within quality, cost, and timelines. Areas for further investigation have been identified.

In a study conducted in 2020, Omondi and Kinoti investigated the influence of stakeholders' participation on the performance of road construction projects in Kilifi County. The research aimed to investigate the impact of project identification and project planning on the performance of road construction. The research was enriched by using stakeholder theory and the theory of reasoned action. This survey targeted 150 respondents chosen from different constituencies in Kilifi County, where road building is mostly focused. Ten project managers involved in the road building projects were among the respondents. This study used a descriptive research approach,

using SPSS as a tool for analysis and descriptive statistics for data analysis. The research used primary data that included both quantitative and qualitative information. The questionnaire was the primary approach used to gather data. The data was analysed using descriptive and inferential statistics and then shown in tables, charts, averages, frequencies, and percentages. Stakeholder involvement throughout project identification, planning, execution, and monitoring had a substantial impact on the success of road building projects in Kilifi County, Kenya. The research found that the road building projects largely included stakeholder engagement in evaluating, analysing, and choosing feasible, sustainable, and advantageous road projects for the majority of the inhabitants in the area. The research found that stakeholders were somewhat engaged in planning road construction projects to improve efficiency, collaboration, and effectiveness in project execution.

A study conducted by Gatumi Nyaga in 2022 examined the effects of project management practices on the sustainability of food security initiatives in Counties within arid lands in Kenya. The study aimed to investigate how project leadership, stakeholder involvement, project monitoring and evaluation, and capacity development techniques impact the sustainability of food security programmes. This research examined how enterprise environmental factors impact the relationship between predictor and predicted variables. The research is based on resource-based perspective theory, contingency theory, and project management competence theory. The research considered the positivist perspective suitable. Descriptive and explanatory research designs were used. The analysis focused on 413 food security initiatives carried out between 2014 and 2017 in eight dry counties in Kenya, with a sample size of 203 projects. There were 243 replies, including those from project group heads, UN agency officials, and county government representatives. The researchers used stratified random sampling to get representative samples from each of eight counties. Primary data was collected via a self-administered survey. The research used means and standard deviation to describe the distribution's features and Pearson's correlation coefficients to evaluate the degree and direction of the link. Multiple regression models helped evaluate the cause-and-effect connection among research variables. The study showed that project leadership, stakeholder involvement, project monitoring and evaluation, and capacity development initiatives

had a substantial impact on the sustainability of food security programmes. The research found that project leadership, stakeholder participation, project monitoring and assessment, and capacity development techniques enhance project sustainability.

The study by Sammy and Calvin (2020), examined the influence of Devolution Practices on food security in Arid and semi-Arid areas in reference to West Pokot County. The study was directed towards certain aims. The research was based on the theories of performance, stakeholder theory, and capability theory. The study used a descriptive research approach. The research used a simple random sampling procedure to choose a sample size of 360 respondents from a target population of 3,508 respondents. Structured questionnaires were used to gather data. The acquired data was analysed using the Statistical Package for Social Sciences version 23 to draw inferences based on the research goals. Multiple regression and correlation studies were used to determine the connection between the dependent and independent variables. The results showed a statistically significant relationship between the factors. An F test was conducted to predict the dependent variable. The obtained F value was 12.774, exceeding the critical value at the 5% significance level. This indicates a statistically significant model, with devolution practices explaining 68.0% of food security in arid and semi-arid areas in West Pokot County. The current research, which will be carried out will be carried out in all arid and semi-arid counties in Kenya and will primarily focus on the performance of several road construction projects.

In their study on practices in project planning and their influence on construction project performance in Nairobi County, Muute and James (2018) concluded that time management, financial resource planning, and human resource planning all have a positive and significant effect on construction project performance. This finding underscores the importance of these planning practices in achieving successful project outcomes, which is relevant to your focus on project planning in arid and semi-arid counties. This was one of the main takeaways from their research. In this particular investigation, the planning of financial resources, planning of human resources, planning of time management, and planning of material consumption were investigated in terms of their influence on the successful completion of building projects. Outside of Nairobi, in Kenya's

Arid and Semi-Arid Regions—both of which are extremely distinct from Nairobi—will be where this research will be conducted. It is possible that the conclusions reached from Nairobi are not relevant to comparable conditions in rural settings, particularly in arid and semi-arid parts of Kenya. As a result, there is a vacuum in our ability to evaluate the effect of project design on the performance of completed road projects in arid and semi-arid counties in Kenya.

A study was conducted in 2022 by Nzomo Patricia to investigate the effect of project planning and water project sustainability within Machakos County, Kenya. The variables included: the extent of stakeholders' participation, the influence of technology choice, the extent of project funding, and the influence of management skills held by the water committee members on sustainable management of water projects in Machakos County, Kenya. The study was guided by participatory theory, theory of change, four-capital model theory, and resource-based view (RBV) theory. The study adopted a descriptive research design and targeted project managers, water committee members, and community elders as part of the project beneficiaries from the three completed water projects in Mavoko Constituency. The population was grouped into strata as per their role; hence, stratified sampling techniques and simple random sampling were employed in selecting the respondents who took part in the study. The researcher collected primary data with the use of questionnaires that were pilot tested to confirm they would be valid and reliable, as measured by the Cronbach Alpha test. The quantitative data collected was entered into SPSS; thereafter, descriptive analysis was done, where frequency, percentages, means, and standard deviation were obtained, and inferential statistics were conducted in terms of multiple regression and correlation analysis. The researcher also conducted diagnostic tests of autocorrelation, normality, and multicollinearity. The results of the study showed that the r values ranged from 0.6 to 0.8, an indication that project planning greatly influenced water project sustainability. Stakeholder participation had the highest R values, showing it had the biggest influence on water project sustainability; this was followed by project funding, management skills, and technology choice. The findings also showed that 60.4% of the sustainability of the water projects in Mavoko Constituency in Machakos County is due to project planning.

In 2014, Githenya and Ngugi conducted research to evaluate the impact of project planning, project control, motivated project teams, and project management skills on housing project execution in Kenya. The study used descriptive research methods. Questionnaires were used to get data from project managers. A pilot study that the supervisor evaluated served to verify the research tools. The research focused on project managers who were carrying out housing projects in Nairobi. The project managers were selected using random sampling. The acquired data was analysed using the Statistical Package for Social Sciences (SPSS) to evaluate the factors influencing the execution of housing projects. Regression models were used to analyse the impact of project planning, project control, motivated project teams, and project management competence on housing project execution in Kenya. The research revealed that project planning, project control, motivated project teams, and project management competence significantly impact housing project execution in Kenya. The study identified project control measures as the most influential feature affecting the delivery of housing projects in Kenya, with a correlation value of 76.6%. The research suggests that project managers should adopt thorough control methods for all project aspects that need attention throughout the implementation period to guarantee project success. Githenya and Ngugi (2014) focused their research on the factors that would determine whether or not housing projects will be carried out in Nairobi County, Kenya. It was discovered that proper planning in projects has a significant impact on the success of the completion of housing projects in Kenya. The research was limited in scope since it only looked at housing projects and tried to establish the characteristics that influence implementation. The current research is on the performance of road projects in arid and semi-arid regions in Kenya.

The study by Akuto,(2020) investigated how the institutional factors, managerial capacities, community participation, technology adoption and how extension services influenced sustainability of of Agricultural Donor Funded Dairy Projects in Siyoi Ward,West Pokot sub-county, West Pokot County, Kenya. The study was anchored on outcomes and systems theory. The study adopted a descriptive survey research design with a target population of 330of the local households, county government officials from the Ministry of Agriculture and Pastoral Economy, the Director in charge of Livestock, Director Veterinary services, Funding Agency Officials and

the Project manager (KCSAP), beneficiaries and the community members, Dairy Farmers Association and a church representative from the Siyoi Dairy farmers and the Church community. A stratified sampling method was used to select the respondents. The sample size was determined by applying the Yamane formula, which were 180 sampling units. Stratified and purposive sampling was used to identify sampling units from the sampling frame. Questionnaires and interviews guides were used as tools of data collection. A pilot study was conducted to pretest the instruments and to determine validity and reliability of the research instrument. Qualitative data was collected by holding face to face interviews with respondents. Quantitative data was collected by administering questionnaire. The SPSS version 22 software was used to analyze the data from questionnaires while thematic analysis was used to analyze the qualitative data. In the findings, 83.1%, 83.9%, 81.8% and 78.6% of the respondents stated that managerial capacity, community participation, technology adoption and extension services largely influenced sustainability of DFDP. Further, managerial capacity, community participation, technology adoption and extension services were statistically significant as the p-value, 0.000 was less than the level of significant adopted by the study, 0.05. The current research, which will be carried out in all arid and semi-arid counties in Kenya and will primarily focus on project planning on performance of completed road projects in arid and semi-arid counties in Kenya.

A study was conducted in 2023 by Khisa and Mutuku (2023), assessed the critical success factors and performance of completed construction projects at the National Social Security Fund, Nairobi City County, Kenya. The research was based on four theories: game theory, principal-agent theory, construction management, and soft value management (SVM) theory. A descriptive research design was utilized for data gathering, analysis, presentation, and interpretation. The study focused on a target population of 512 stakeholders from six completed commercial and residential projects, with purposive sampling used to select 84 participants. Data was collected through semi-structured questionnaires and analyzed using SPSS, employing both descriptive and inferential statistics. The findings indicated an R-square value of 0.282 and an R value of 0.531. An analysis of variance (ANOVA) showed significance at $p = 0.001$, with an F statistic of 9.961, confirming that the model was appropriate for the data. The analysis also highlighted client variations ($p = 0.05$), financial

availability ($p = 0.047$), and construction disputes ($p = 0.001$) as significant factors influencing the performance of NSSF construction projects. Overall, the main findings revealed that the critical success factors examined had either a positive or negative impact on the performance of completed NSSF construction projects. The study recommends that companies adhere to project management principles to effectively manage these critical factors and reduce project delays. The current research, which will be carried out in all arid and semi-arid counties in Kenya and will primarily focus on project planning on performance of completed road projects in arid and semi-arid counties in Kenya.

2.2.2 Project planning, Community Participation and Performance of Road Projects.

Xiangshu, Zhenyu, Chunfang and Yujuan (2022), posits that sense of community mediates the community participation and Chinese residential communities. Conducted a study to assess the. A sample of 433 residents completed questionnaires regarding their sense of community, sense of community responsibility, prosocial tendencies, and community participation. Using a linear regression model, the study found that a sense of community can positively predict the level of community participation. Using multiple mediation analysis, the study found that sense of community responsibility and prosocial tendencies mediated the link between a sense of community and community participation in a sequential manner. The findings of this study complement existing research by uncovering the mechanism underlying the relationship between a sense of community and community participation. Xiangshu et al. (2022), show that various aspects in community participation variable such as sense of community responsibility can be studied as mediator and therefore the current study will assess the mediating effect of community Participation in the relationship between project planning and performance of road projects in Kenya.

Karlsson (2011) conducted research on the influence that financial planning has on the performance of projects. The research used a descriptive survey approach, and the focus of the study was on projects in Sweden. According to the findings of the research, education, culture, and socioeconomic standing are the background elements that have an effect on the techniques and

approaches used in project management. However, a significant number of middle level managers have no designated power. This is due to the fact that managers are in charge of a certain region within which they are able to make choices, and the fact that this aspect of management was not taken into account in the research presents an issue. The majority of the construction businesses have adopted more flat hierarchies, giving a significant amount of control to middle management. This is also tied to a greater degree of power inside the business, and it may alter the way that financial resources are used.

The study by Huang, Shi, Pena-Mora, Lu and Shen (2020), examined how information and communication technology (ICT) affects team social capital (SC) and project performance in the construction industry. A theoretical model depicting the interconnections between several variables is constructed. This model considers two ICT skills (connectivity and communality) and two forms of social capital (bridging and bonding), in addition to building project success. We ran a survey using 221 questionnaires to confirm the practicality of this concept. The study found that the hypotheses about the relationship between connectedness and bonding did not show significant impacts, but the hypotheses related to the other dimensions were all significant. The mediating impact of bonding on performance is greater than the effect of bridging on performance. This research enhances the field of construction project management and supply chain literature by examining how the use of information and communication technology (ICT) impacts changes in the project-level team supply chain. This study has significance for understandings how past adjustments affect building project performance. Managers should consider implementing a suitable information platform for project participants, but they should not overstate the importance of ICT connections in strengthening internal bonds. Managers should choose various project organisation members to maintain a balance between bonding and bridging social capital. The current study will determine the mediating effect of community participation on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya.

A study conducted by Ali, Zhang, Shah, Khan, and Shah in 2020 examined the mediating effects of psychological empowerment and innovative work behaviour on the relationship between humble leadership and project success. Data were collected from 337 individuals employed in the civil construction sector of Pakistan. The results showed that humble leadership is positively related to project success. Furthermore, psychological empowerment and innovative work behaviour partially mediate the relationship between humble leadership and project success. Drawing on conservation of resource theory, this study found that humble leadership is important for project success and thus extends the utility of the concept of humble leadership to the project literature. The current study will evaluate the mediating effect of community participation on the relationship between project planning and performance of completed road projects as conceptual variables in arid and semi-arid counties in Kenya rather than Pakistan.

A study conducted by Murugi and Nyang'au (2023) examined the influence of project planning on the performance of maintenance projects on trunk roads in Kenya. The study aimed to assess the correlation between project scope planning and the effectiveness of maintenance projects on trunk roads in Kenya, as well as the connection between project risk planning and the performance of maintenance projects on trunk roads in Kenya. The study used the census survey research method with a target population of 226 engineers, surveyors, and inspectors at KeNHA who are engaged in planning maintenance projects. 226 respondents were sent a questionnaire, and 210 of them answered, resulting in a 93% response rate. Descriptive and inferential statistics were used to analyse the data, using SPSS version 25 and MS Excel for data analysis. The research findings indicate that project scope planning and project risk planning significantly and positively influence project performance. The research found that project planning had a substantial impact on project performance in trunk road repair projects in Kenya. The research suggested that project planning should include considerations for maintenance, specifically focusing on scale and risk. The current study will evaluate the mediating effect of community participation on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya.

A study by Ndungu and Karugu (2019) examined the Community Participation and Performance of Donor Funded Youth Projects in Korogocho, Nairobi City County, Kenya. The study was grounded on the theory of social change, the stakeholder theory and the resource-based view theory. The study utilized a descriptive study targeting 1650 Youth initiative Kenya members and 3 project managers from Oxfam Kenya with a sample size of 165 respondents; 164 Youth initiative Kenya group members being randomly selected and 1 project manager selected from Oxfam Kenya. The study utilized primary and secondary data that was sourced using a semi-structured questionnaire and published reports respectively. The primary data was further collected using a key informant interview schedule and regression models. The collected qualitative data was analyzed using content analysis and presented in line with the study themes. The study's correlation analysis indicated there was strong positive effect of community participation in identification and planning on the project performance while the regression results indicated there is a statistically significant positive effect of community participation on the project performance.

Kihuha (2018) cited in Bhattacharya et al. (2021) conducted a study on monitoring practices and performance of global environmental facility projects in Kenya, a UN Environment Program case. The goal of the study was to evaluate the connection between Kenyan UNEP project success and planning stage stakeholder influence. The research used a descriptive statistical analysis approach with an exploratory design. The analysis showed that initiatives performed better when stakeholders were involved in the funding allocation planning process and all phases of the project, as opposed to those without Community participation. The report suggested that strategic plans be created to determine an internal process for project planning and process restructuring for Community participation (Kihuha, 2018).

Njogu (2016) studied the impact of effective personnel management planning on project success in automotive projects in Kenya. The study found that including stakeholders in project execution improves project development and human resource development in Kenya's automotive industry. According to the study, involving stakeholders in initiatives increased cost effectiveness, customer satisfaction, and project cost savings. The majority of the human resources came from the

corporation or stakeholders, which gave project management the technical ability it needed. The project now has access to enough human resources thanks to the integration of stakeholders.

Wamalwa and James (2018), in their study on critical success factors in the implementation of projects by NGOs in Busia County, evaluated the communication effect on implementation of NGO projects. The research aimed to examine the impact of communication, finance, local community engagement, and staff training on the execution of NGO projects in Busia County. The research used a descriptive methodology, using a target sample of 96 individuals who responded to a standardized questionnaire. The research revealed a strong and statistically significant correlation between communication, money, local community engagement, and staff training in the execution of NGO operations. The results revealed that communication exerted the most substantial impact on the execution of NGO initiatives, with money, local community involvement, and staff training following suit. The report suggests enhancing communication with stakeholders throughout all project stages and implementing sustainable finance practices for NGOs to efficiently carry out projects in Busia County. The current study will assess the mediating effect of community participation in the relationship between project planning and performance of road projects in Kenya.

2.2.3 Project Planning, Government Regulations and the Performance of Road Project

Mariusz, Adnan, Haque, and Isaiah (2019) investigated the moderating effect that risk management plays in project planning and the success of projects in the construction industry of the United Kingdom and Pakistan. A survey form was used to collect responses from 152 different project managers, with 76 respondents coming from each economy. In order to guarantee an accurate representation of the sample size, the purposive sampling method was used, and the RAND formula was applied in order to pick the project managers. The approach of partial least square structural equation modeling was used so that quantitative analysis could be performed. The study by Mariusz et al.'s (2019) hypothesis that the level of preparation put into a project has a substantial bearing on how well it turns out. The study results shows that, despite the fact that the construction enterprises were operating in two distinct economies, risk management served as

a substantial moderating factor in the connection between project planning and successful project completion. The purpose of the current research is to investigate the moderating influence that government regulations have on the connection between project planning and the performance of road projects in Kenyan counties that are classified as dry or semi-arid.

In 2020, Khosravi, Rezvani, and Ashkanasy did research on the influence of trust on the connection between emotional intelligence and project performance in large-scale infrastructure projects. The researchers gathered data from 365 project team members on large-scale infrastructure projects to test the approach. The empirical findings show that emotional intelligence is positively associated with performance in large-scale infrastructure projects. This connection is enhanced by emotional intelligence's negative correlation with three conflict modes (task, relationship, and process), which in turn are negatively related to performance. The research found a strong, positive correlation between team emotional intelligence and project performance ($\beta = 0.32$, $p < .01$). Moreover, interpersonal trust was shown to mitigate the adverse correlation between conflict and project performance. The current study will evaluate the moderating effect of government regulations on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya.

According to Dan, Wenfeng, and Chuanbin's hypothesis from 2021, the distribution of project control rights has a moderating effect that is counterproductive to the effect that rule governing mechanisms have on the performance of projects. An investigation on the impact of rule governance mechanism on project performance was carried out by Dan et al., (2021), who used control rights as a moderating variable in their research. This investigation focused on public rental housing public private partnership projects in China. Following the completion of the theoretical investigation and the reading of the relevant literature, hypotheses are proposed, and these hypotheses are then put to the test via the application of the structural equation model to the large sample data obtained from the questionnaire survey. Because of the public nature of projects carried out under a public-private partnership arrangement, it is unacceptable for social capital to have an excessive amount of control rights over the project. In the dynamic management process,

the degree of project control rights possessed by social capital should be balanced with the rule governance. The research conducted by Dan et al. (2021) investigated the effects of government rules as an independent variable on the success of public private partnership projects for rental housing in China, with control rights serving as a moderating variable. The purpose of this research is to investigate the moderating influence that government restrictions have on the connection between project planning and the performance of road projects in Kenyan counties that are classified as dry or semi-arid.

Research done in 2022 by Ahmed, Hussain, and Philbin examined how senior management support influences the connection between schedule delay drivers and project success. Data was gathered via a questionnaire survey from project directors, project managers, civil and construction engineers, project supervisors, and specialists working in small, medium, and big construction enterprises in key cities of Pakistan. An 84% response rate was achieved from 310 valid replies out of 368 prospective participants that took the survey. The cross-sectional data were used for testing direct correlations and moderating effects by regression analysis and the "process" technique, respectively. Schedule delays in construction projects are caused by a lack of commitment, insufficient site management, poor site coordination, unclear project scope, poor communication, bad contracts, and substantial delays due to inadequate planning. Additionally, the impact of timetable delays on project performance is influenced by several aspects of senior management support, such as resource allocation, organisational structure, communication, knowledge, and authority. The current study will evaluate the moderating effect of government regulations on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

The existing study by Joyce and Anastasia (2021) sought to establish the influence of project management practices on the implementation of county government projects in Elgeyo Marakwet County. The research aimed to determine how project planning affects the execution of county government projects in Elgeyo Marakwet County and to evaluate the impact of stakeholder involvement on the implementation of these projects. The research used a descriptive survey

approach. The target population consisted of 129 respondents, including county government officials from different departments engaged in project execution and community members. The research used census sampling. Primary data was gathered using a semi-structured questionnaire. The secondary data was acquired using a document review guide based on reports. A pilot test was conducted to evaluate the validity and reliability of the research tools. A semi-structured questionnaire was used to collect both qualitative and quantitative data. Thematic analysis, often used with a collection of texts like interview transcripts, was used to examine qualitative data. The quantitative data, in the form of a nominal scale and a Likert scale, was analysed using descriptive and inferential statistics with the assistance of SPSS version 25. The descriptive statistics in this research were mean, frequency distribution, percentages, and standard deviation. Inferential statistics, including correlation and multivariate regression analysis, were conducted thereafter. Tables and graphs, including bar charts and pie charts, were used to present the results. Correlation analysis and regression analysis were used to identify the link between dependent and independent variables. The research determines that project planning impacts the execution of county government projects in Elgeyo Marakwet County. The research indicates that stakeholder engagement influences the delivery of county government initiatives in Elgeyo Marakwet County. The research suggests that the administration of Elgeyo Marakwet County should use improved planning tools, a clear project mission, and a project vision based on the findings. The administration of Elgeyo Marakwet County should guarantee regular and efficient training for the monitoring and evaluation team. The current study will evaluate the moderating effect of government regulations on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

Ogogo, Omwenga, and Nyangau (2019) conducted a study with the purpose of examining the effects of the moderating effect of government rules on performance of government building projects in Kenya. Their research was published in the journal *Scientific Reports*. A descriptive research approach was used for this study, and simple random selection was utilized to pick a sample from among the registered architects and project managers working in Nairobi, Kenya, who were engaged in government projects. As a result, government construction projects served

as the unit of analysis, while the 728 registered architects and project managers working in Nairobi served as the unit of observation. The number of people in the sample was 251. Both qualitative and quantitative data were produced as a result of the investigation. Questionnaires were used to gather the data, and SPSS was used to do the analysis. The results of the research indicated a statistically significant and favorably correlated link between the moderating effects of government rules and the performance of government building projects in Kenya. This research will investigate whether or not government rules have a moderating influence on the link between project planning and the performance of road projects in arid and semi-arid areas of Kenya.

A study was conducted in 2024 by Rotich Chelangat to analyze the relationship between project planning and implementation of water construction projects. The study aimed to investigate how the execution of water construction projects in Bomet County is influenced by schedule planning, budget planning, communication planning, resource planning, and the integration of technology. The research used a descriptive survey approach, using water projects in Bomet County as the unit of analysis. The participants seen were project managers, finance managers, project consultants, site engineers, and county administrators engaged in the project. The study's target population was 440, and the sample size consisted of 164 respondents selected from all units of analysis. A census was conducted on all water projects started in Bomet County as part of this research. A pre-test study was conducted on 18 participants from Kajiado County to assess the reliability and effectiveness of the instruments. Data was gathered by administering a questionnaire and conducting semi-structured individual interviews. Regression analysis was used to assess the correlation between factors in project planning and the execution of water building projects using Statistical Package for Social Science (SPSS) and Analysis of Moment Structures (AMOS) software. Additional analysis was conducted to assess the model's relevance using Analysis of Variance (ANOVA), and R² was used to quantify the regression model's goodness of fit. The hypothesis was evaluated using a t-test at a 95% confidence level. The study found that schedule planning, budget planning, communication planning, and resource planning had a substantial impact on the execution of the water project. The F statistical values were 85.480, 49.64, 62.247, and 55.179, respectively, with a P-value of 0.000. The coefficient of determination for the

explanatory variable accounts for 52.7% of the variance. Technology integration, acting as a moderating variable, was discovered to impact the connection between project planning and the execution of water projects. Ultimately, the schedule, budget, communication, and resource planning had an impact on the execution of water projects, with correlation coefficients of 0.726 and 0.868 in the absence and presence of a moderator, respectively. The research suggests that arid and semi-arid areas may reproduce the results of this study to provide access to safe and clean drinking water for their residents.

According to the findings of the research conducted by Ngundo and James (2018) on the subject of the effect of project management practices on the successful implementation of government projects in Machakos County, the inability to develop project planning was the primary factor that contributed to the failure of successfully executing government projects in Machakos County. Because there was no plan for the project, the goals of the project were not established, and as a result, very few to no steps were taken to identify all of the needs for the resources that were necessary for the project, as well as the ease of project reporting and the evaluation of arrangements. The current study will evaluate the moderating effect of government regulations on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

A study by Ochenge et al., (2018) examined on the ways in which government laws influence the connection between project management strategies and the accomplishment of road infrastructure projects carried out by local enterprises in the lake basin of Kenya. The research design for this study was a survey that included descriptive and explanatory elements. The target population consisted of the 41 road infrastructure projects that were constructed in the Lake Basin Region between the years 2011 and 2016 by local enterprises. A questionnaire with a semi-structured format was used to collect the primary data for this study. According to the findings of the research, there was no moderating effect that was exerted by government policy on the correlation that existed between independent and dependent variables. A conceptual void was produced as a result of the focus of the research on methods of project management, despite the fact that these methods

are relevant to the present investigation. The expansion of the capabilities of the business will serve as the primary focus of this investigation.

2.2.4 Project Planning, Community Participation, Government Regulations and Performance of Road Project

Ming-Chuan (2017) examined the relationship between customer participation and project performance using a moderated-mediated approach. The study gathered information from 245 different software development projects by using the social networks of the authors as well as a professional data survey organization located in Beijing, China called e-Data Power. STATA 12.0 was used to conduct a hierarchical multiple regression analysis in order to assess the study hypotheses. According to the findings of the study, the positive connection between customer engagement and project success is mediated by the integration of known information. In addition, the complexity of the project has been proven to have an indirect influence on knowledge integration as well as a direct effect on the primary effect of customer involvement. Ming-Chuan's findings indicate that project complexity indirectly influences knowledge integration and customer involvement. However, the specific mechanisms through which government regulations and community participation interact with project planning and performance in the context of road projects remain underexplored. Understanding these indirect effects and the complexity of interactions is crucial for developing a comprehensive model that accurately reflects the dynamics at play. The conceptual gaps identified highlight the need for further research that considers the unique context of road projects in Kenya, the multifaceted nature of community participation, the role of government regulations, appropriate performance metrics, and the complexity of interactions among these variables. Addressing these gaps will enhance the understanding of how moderated mediation effects operate in this specific setting, ultimately contributing to more effective project planning and execution.

The purpose of this research is to investigate the moderating and mediating effects of government laws and community engagement on the link between project planning and the Performance of Road Projects in Kenya's arid and semi-arid areas.

The research by Shahzad, Benish, Talha, and Hajra (2018) studied the influence of project planning on the success of projects, taking into account the moderating function that culture plays and the mediating role that risk management plays. Using questionnaires, we were able to gather data from one hundred different project managers in Pakistan. The methods of regression and correlation were used in order to conduct the analysis, which revealed that the successful completion of a project is positively impacted by prior preparation for the project. According to the findings of the research, risk management acts as a middleman in the connection between careful project planning and successful project completion. The findings of further research indicated that culture has no role in the relationship between successful risk management and project completion.

Conceptually Shahzad et al. emphasized the role of culture in project management but conclude that it does not influence the relationship between risk management and project completion. However, the cultural dynamics in Kenya, particularly in arid and semi-arid regions, may differ significantly from those in Pakistan. The influence of local customs, beliefs, and social structures on community participation and project planning is a critical area that remains unexplored in their research. From a contextual perspective, the research is conducted in Pakistan, which may not accurately reflect the challenges and dynamics present in Kenya's arid and semi-arid counties. Factors such as climate, economic conditions, and governance structures can significantly influence project outcomes. The contextual differences necessitate a study that specifically addresses the unique challenges faced in the Kenyan context. Methodologically, The study by Shahzad et al. relies on data from 100 project managers in Pakistan, which may limit the generalizability of the findings. A larger and more diverse sample that includes various stakeholders, such as community members, local government officials, and contractors, would provide a more comprehensive understanding of the factors influencing project performance in Kenya. The purpose of this research is to investigate the moderating and mediating effects of government rules and community engagement on the connection between project planning and the performance of road projects in Kenya's arid and semi-arid areas.

Zhu, Wang, Wang, and Yu, (2021) examined the moderating role of project complexity and mediating role of project commitment on the relationship between Project manager's emotional intelligence and project performance. Emotional intelligence is considered to be important for project managers to affect project performance, but emotional intelligence does not always play an effective role. Based on conservation of resource theory, this study explores the impact of project managers' emotional intelligence on project performance. The study applied confirmatory theory by using statistical methods to test the empirical data and then accepting or rejecting the hypothesis model (Henseler et al., 2016). The research model used measures four constructs: the project manager's emotional intelligence and project commitment, project performance and project complexity. The hypotheses depicted in our conceptual model were examined with PLS-SEM by using Smart-PLS 3.2.8. The results show that the emotional intelligence of project managers affects project performance through the mediating effect of project commitment, and project complexity negatively moderates the impact of project managers' emotional intelligence on project commitment. This article provides practical guidance on how project managers can handle emotional intelligence in different complex situations and serves as a reference for the selection and appointment of project managers in complex projects. The current study will investigate the moderating and mediating effects of government rules and community engagement on the connection between project planning and the performance of road projects in Kenya's arid and semi-arid areas.

Shin and Jung (2020) conducted a study on the mediating role of community participation between physical environments, social relationships, social conflicts, and quality of life: evidence from South Korea. Using the 2015 Korean conflicts and cooperation survey, which was randomly sampled based on gender, age, and regions, this research analyzes how community participation mediates the relationships between physical environments, social relationships, social conflicts, and quality of life. The results indicate that community participation significantly enhances the quality of life for individuals who have experienced social conflict. Satisfaction with one's physical environment and personal relationships has a direct positive effect on quality of life, whereas experiences of social conflict do not influence it. This study suggests that fostering community

engagement can mitigate the negative impacts of social conflicts and enhance individuals' quality of life in the South Korean context. The Shin and Jung (2020) study shows that community participation can be applied as a mediating factor when conducting research which is social in nature similar to the current study.

Heravi et al. (2015) aimed to evaluate the degree of community participation in project development in Saudi Arabia. The investigation stated that stakeholders should be involved in project planning since they frequently supply the necessary resources and have the power to regulate resource flows and network interactions. Descriptive statistics and an exploratory research methodology were employed for the study's analysis. The analysis's findings demonstrated that the construction project's owner, developer, or project management was heavily involved in the project's planning stage and that the projects were finished. The study suggested that since contractor involvement in the planning phase was much lower than that of other stakeholders, it should be expanded or adopted. There is a need for additional analysis with a focus on completed road project performance in ASAL regions of Kenya, even if the study is related to the current study but offers a contextual gap, was conducted in Saudi Arabia, and also presents a methodological gap.

Matu, Ndunge and Mbugua (2020) assessed the moderating effect of risk management practices on the relationship between stakeholder participation throughout the project life cycle and the successful completion of urban road transport infrastructure projects in Kenya is significant. The research aimed to determine how risk management methods affect the link between stakeholder engagement in project life cycle management and the completion of urban road transport infrastructure projects in Kenya. This study used descriptive survey and correlation research designs. The sample consisted of 1593 individuals selected from various groups involved in the Kenya Urban Roads Authority (KURA) project. The groups consisted of the KURA project implementation team members (375), KURA project planners and directors (23), road contractor project management teams (781), consultants and construction supervision teams (85), representatives of project-affected individuals (213), and complementary service providers

(116).The study's sample size consisted of 310 individuals, determined using the Yamane (1967) method. The normality of the data was assessed using the Levene test, and multicollinearity was also examined. The variance inflation factor (VIF) values were found to be within the acceptable range. The study employed multiple and hierarchical regression analyses. The results indicated that when risk management was included in the second model using hierarchical regression, it was found that risk management significantly impacted the relationship between stakeholder participation in project life cycle management and the completion of urban road transport infrastructure projects. Ultimately, the level of involvement from various stakeholders in the management and execution of urban road transport infrastructure projects in Kenya is contingent upon the implementation of effective risk management strategies. This study is crucial in providing information to contractors and road agencies responsible for regulating construction. It emphasizes the importance of implementing risk management throughout all stages of construction to ensure that projects are completed on time, within budget, and according to quality standards, while also meeting stakeholder satisfaction. The research suggests that a risk matrix should be readily accessible and rigorously adhered to throughout the development of road projects across all regions of Kenya.

Matu et al. concentrate on urban road transport infrastructure projects, which may not fully capture the unique challenges faced in arid and semi-arid regions. The conceptual framework does not account for the distinct socio-economic and environmental factors that influence project performance in these rural areas, such as limited resources, different stakeholder dynamics, and varying levels of community engagement. Matu et al. do not address the role of government regulations in the project management process. In arid and semi-arid counties, government policies and regulations can significantly impact project planning and execution. Understanding how these regulations interact with community participation and project planning is crucial for your study. The current study will assess the moderated mediated effect of government regulations and community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

2.3 Knowledge Gaps

Although additional work needs to be done to fully comprehend the crucial connections between projects planning and the performance of project whose field has not been exclusively researched, the studies on performance projects presented here are encouraging. By examining the chosen independent variables on the relationship between project planning and completed road project performance in Kenya, this study seeks to fill these important gaps in the literature. By examining the four components of project planning, this study adds value to the body of existing literature by presenting actual data on the impact of project planning. To close the existing contextual, methodological, and conceptual gaps, government regulations was investigated as a moderating variable and community participation as a mediating variable on the performance of road projects in Kenya.

Table 1: Summary of Gaps of Empirical Studies

Author	Area of Study	Methodology	Study finding	Knowledge gap	Focus on the current study
Mariusz, Adnan, Haque and Isaiah (2019)	Moderating role of risk management in project planning and project success in the construction sector of the UK and Pakistan	Data was gathered from 152 project managers using a survey questionnaire and quantitative data was analysed using partial least square structural equation modeling.	<ul style="list-style-type: none"> - Project planning had a statistically significant effect on project success. - Risk management plays a crucial moderating role in the relationship between project planning and project success in the construction industries, even when considering the differences between the two economies 	<ul style="list-style-type: none"> -Contextually the study was based in UK and Pakistan and thus the results can't be generalized to Kenyan context. -Conceptually the study assessed risk management as the moderating variable in the relationship between Project planning and project success 	<ul style="list-style-type: none"> -Contextually the current study focused on road projects in arid and semi-arid region in Kenya. -Conceptually the current study assessed the mediation effect of government regulations in the relationship between project planning and performance of road projects in arid and semi-arid region in Kenya
Ming-Chuan (2017)	Assessment of moderated mediation effect of project complexity and knowledge integration on the relationship	Research empirical collected data from 245 software development projects through a professional data survey corporation (e-Data Power) in Beijing China and	<ul style="list-style-type: none"> -Knowledge integration serves as a mediator in the positive relationship between customer participation and project performance 	<ul style="list-style-type: none"> -Methodologically the collected empirical data through an online platform (e-Data Power) in Beijing China and the authors' social networks. -Contextually the study was based in Beijing China. 	<ul style="list-style-type: none"> - Methodologically the current study was cross-sectional research designs where the empirical data was collected using a questionnaire which will be dropped and picked. -Contextually the current study focused on road projects in

Author	Area of Study	Methodology	Study finding	Knowledge gap	Focus on the current study
	between Customer Participation and Project Performance	the authors' social networks.	- Project complexity strengthens the main effect of customer participation and an indirect effect of knowledge integration was found.	-Conceptually the study moderating variable was project complexity and knowledge integration as the mediating variable	arid and semi-arid region in Kenya. -Conceptually the current study examined the moderated mediated effect of government regulations and community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

Author	Area of Study	Methodology	Study finding	Knowledge gap	Focus on the current study
Dan, Wenfeng and Chuanbin (2021)	The moderating role of Control Rights on the relationship between Rule Governance Mechanism and Project Performance in Public Rental Housing Public Private Partnership Projects in China	Sample data collected by questionnaire survey and the hypothesis was tested using structural equation model.	Project control right has a negative moderating effect on the impact of rule governance mechanism on project performance.	<ul style="list-style-type: none"> - Contextually the study was on Public Rental Housing Public Private Partnership Projects in China. - Conceptually the moderating variable was project control rights with rule governance mechanism as the independent variable and project performance as dependent variable 	<ul style="list-style-type: none"> - Contextually the current study focused on road projects in arid and semi-arid region in Kenya. - Conceptually the current study assessed the moderating effect of government regulations on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

Author	Area of Study	Methodology	Study finding	Knowledge gap	Focus on the current study
Ndungu and Karugu (2019)	Community participation plays a crucial role in the performance of donor-funded youth projects in Korogocho, Nairobi City County, Kenya	study utilized primary and secondary data that was sourced using a semi-structured questionnaire and published reports respectively. Primary data was further be collected using a key informant interview schedule	Strong positive significant effect of community participation in identification and planning on the project performance	<ul style="list-style-type: none"> - Methodologically the primary data was collected using mixed method through semi-structured questionnaire and informant interview. - Contextually the study examined performance of donor funded youth projects in Korogocho, Nairobi county, Kenya - Conceptually the study assessed community participation as an independent variable and project performance as dependent variable 	<ul style="list-style-type: none"> -Methodologically the current study analysed quantitative data collected through semi structured questionnaire. - Contextually the current study focused on road project in arid and semi-arid region in Kenya. -Conceptually the current study examined the mediating effect of community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya
Matu, Ndunge and Mbugua (2020)	Assessed the moderating influence of risk management practices on the relationship between combined stakeholder	Descriptive survey and correlation research designs were undertaken where primary data was from Kenya urban roads authority (KURA) project	The combined stakeholder participation in project lifecycle management and completion of urban road transport infrastructure projects in Kenya depends on	-Conceptually the study assessed risk management practices as a moderator in the relationship between stakeholder participation as independent variable and completion of urban road transport infrastructure	The current study assessed the moderated mediated effect of government regulations and community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

Author	Area of Study	Methodology	Study finding	Knowledge gap	Focus on the current study
	participation in project life cycle management and completion of urban road transport infrastructure projects in Kenya	implementation team members	risk management practices	projects in Kenya as dependent variable	
Ochenge et al. (2018)	How government regulations affect the relationship between project management techniques and the success of road infrastructure projects carried out by local businesses in Kenya's lake basin	The study used a survey-based descriptive and explanatory research design where 41 road infrastructure projects in the Lake Basin Region built between 2011 and 2016 by local companies made up the target population	Government policy, according to the study, had no moderating influence on the correlation between independent and dependent variables	<ul style="list-style-type: none"> - Contextually the study success of road infrastructure projects carried Kenya's lake basin region - Conceptually the study assessed the moderating effect of government regulations on the relationship between project management techniques and the success of road infrastructure projects 	<ul style="list-style-type: none"> -Contextually the current study assessed the performance of road projects in arid and semi-arid counties in Kenya. -Conceptually the current study assessed the moderating effect of government regulations on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya.
Kaluai, F. K., & Muathe, S. (2020).	Project management practices and performance of	This study adopted a census research design. Semi-structured	The study revealed that risk management contributes the most	The study by Kaluai and Muathe (2020) assessed the Performance of Kenya's Women and Girls	-The current study assessed the performance of road projects in arid and semi-arid counties in Kenya.

Author	Area of Study	Methodology	Study finding	Knowledge gap	Focus on the current study
	women economic empowerment in Kiambu and Nairobi Counties, Kenya.	questionnaire was adopted for data collection.	to Performance of Kenya's Women and Girls Economic Empowerment Program followed by stakeholder involvement, Project Planning and monitoring and evaluation respectively	Economic Empowerment Program. The study conceptual variables were risk management, stakeholder involvement, Project Planning and monitoring and evaluation with no mediators or moderators	-The current study conceptual gaps are project planning, government regulations as moderator and community participation as a mediator.
Makokha, E. N. (2020).	Influence Of Project Stakeholders 'practice On Performance Of Construction Projects In Kakamega County, Kenya	The study adopted a mixed research design which included descriptive survey, and correlation. The sampling technique that was used was stratified random sampling and purposive sampling. Questionnaires was used as the main data collection instruments while Multiple sources were used to	The study found out that project stakeholders' practice had a strong positive significant influence on performance of construction projects in Kakamega County, Kenya.	Project management, and practices were the study's conceptual variables Performance of construction projects in Kakamega County, Kenya was the dependent variable	-The current study conceptual gaps are project planning, government regulations as moderator and community participation as a mediator -The current study assessed the performance of road projects in arid and semi-arid counties in Kenya. -The study data is purely quantitative

Author	Area of Study	Methodology	Study finding	Knowledge gap	Focus on the current study
		collect secondary data; the respondents filled in the answers in the spaces provided to collect information required.			

2.4 Research Hypotheses

This research is meant to test the following null hypotheses:

- H₀₁:** There is no significant effect of project planning on performance of road projects in arid and semi-arid counties in Kenya.
- H₀₂:** There is no significant mediation effect of community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.
- H₀₃:** There is no significant moderation effect of government regulations on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.
- H₀₄:** There is no significant moderated mediation effect of government regulations and community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

2.5 Conceptual Framework

A visual representation that depicts the relationship between independent factors and the dependent variable is referred to as the conceptual framework (Mugenda & Mugenda, 2013). The relationship between the variables under study is conceptualized by the researcher, who then illustrates it graphically or diagrammatically. The conceptual framework will serve as the study's overall framework. The following factors will direct the study's design as we create the conceptual framework. Project planning is the independent variable, performance of the completed road project is the dependent variable, government regulations are the moderating variable, and community participation is the mediating variable. The independent variable interacts with the moderating and mediating variables to determine performance of the road project which includes stakeholders satisfaction, project duration, cost, quality and adaptability.

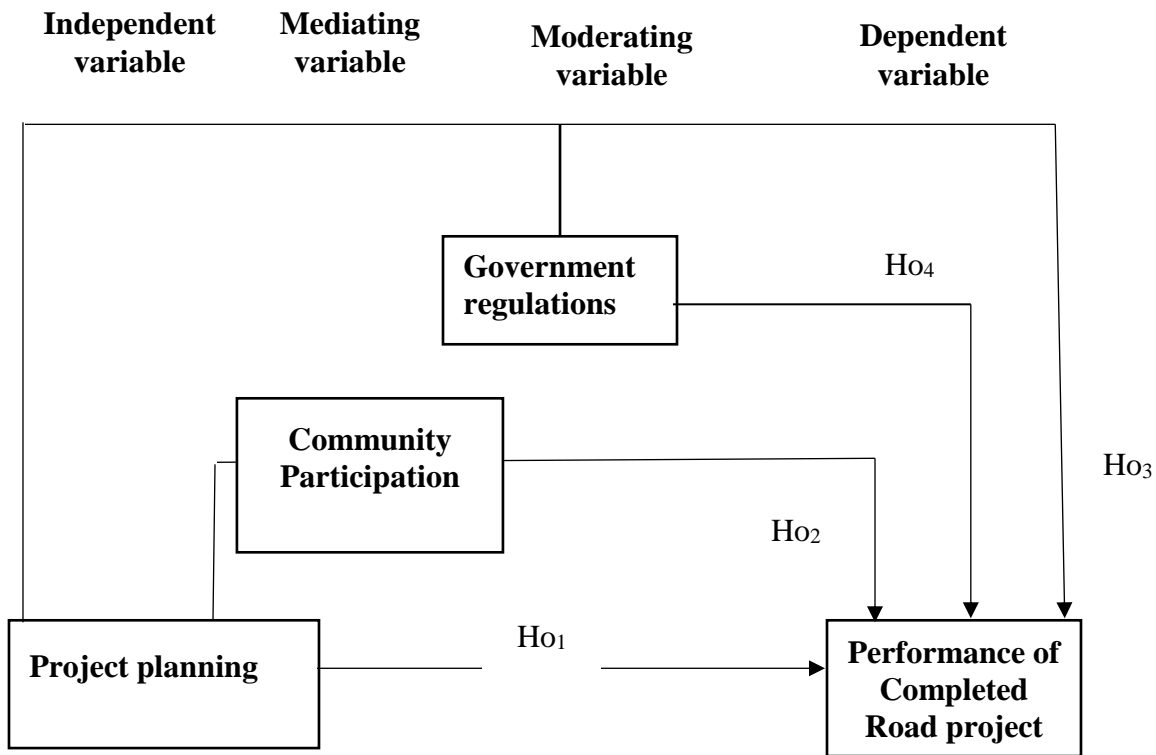


Figure 1: The Conceptual Framework

2.6 Operationalization of study variables

The variables in this study are conceptualized and operationalized as follows:

Table 2: Operationalization of study variables

Variable	Indicator	Measurement	Type scale	Questionnaire of Section and Question Number
Independent Variable: Project planning	<ul style="list-style-type: none"> ● Cost management ● Scope management ● Time management ● Risk management 	5-point Likert Scale 1=Strongly Disagree 5=Strongly Agree	Type -Interval -Inferential statistics - Descriptive statistics	Section B Q5-Q17

Variable	Indicator	Measurement	Type	Scale	of	Questionnaire Section and Question Number
Mediating Variable: Community participation	<ul style="list-style-type: none"> • Community empowerment • Communication • Grievance management 	5-point Likert Scale 1=Strongly Disagree 5=Strongly Agree	Type	-Interval -Inferential statistics - Descriptive statistics		Section C Q18-Q29
Moderating Variable: Government regulation	<ul style="list-style-type: none"> • Regulatory framework • Code of conduct 	5-point Likert Scale 1=Strongly Disagree 5=Strongly Agree	Type	-Interval -Inferential statistics - Descriptive statistics		Section D Q30 – Q43
Dependent Variable: Project performance	<ul style="list-style-type: none"> • Project budget • Project time • Project quality • Project adaptability • Stakeholder satisfaction 	5-point Likert Scale 1=Strongly Disagree 5=Strongly Agree	Type	-Interval -Inferential statistics - Descriptive statistics		Section E Q44-Q58

2.7 Chapter Summary

Theoretical and empirical reviews were carried out in this chapter, the outcome of which was the identification of research gaps and an explanation of how those gaps were filled by this study. There was a focus on identifying the research's anchor theory in addition to other relevant theories and then explaining how those ideas are important to the investigation. The theory of limitations is an important part of the research since it serves as the anchor theory. Both a narrative and a diagrammatic representation (in the form of a conceptual model) were used to describe the conceptual framework of the study, as well as outline the research hypotheses that would be tested. And last, the variables of the research were operationalized so that it would be easier to quantify them.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The research methodology section outlines the framework for the research methods used. It is essential for developing a clear methodology to address the study questions effectively. In this section, the researcher discussed several key topics, including the research philosophy adopted, the research design, the population of the study, sampling methods, data collection and processing techniques, diagnostic tests, and the ethical considerations involved in the research.

3.1 Research Philosophy

A research philosophy is a viewpoint on the collection, analysis, and utilization of information regarding phenomena (Saunders et al., 2012). Using a quantitative research approach, this study made conclusions and take research concerns into account. Three main areas of research philosophy are ontology, epistemology, and axiology (Scotland et al., 2012). The three main approaches to study are positivism, interpretivism, and realism. Depending on the methodology to be utilized for the study, a constructivist or a positivist research philosophy was appropriate. The guiding principle of a realist research philosophy is that what our senses reveal to be true is that objects have an existence apart from human thought that is there is a reality distinct from thought (Scotland et al., 2012). Ontologically, critical realism makes the assumption that reality exists even though it is frequently incomprehensible. Realism distinguishes between the real world, the real world's actual happenings, and the empirical events that a researcher observes and documents. Furthermore, it is asserted in realism that there are real-world entities with the ability to behave and a propensity to be acted upon by others (Easton, 2010).

The positivist research ethos was the foundation of this study. A study can create hypotheses based on the pertinent theories that are now in existence thanks to the positivist philosophical method (Moon et al., 2019). Then, in order to address the study objectives and achieve the research goals, these hypotheses are evaluated and either verified or rejected using quantitative and statistical methodologies. According to Kennedy (2017), The positivist approach requires that the research

be conducted in a way that is value-free and objective, that the researcher be independent and should not be affected by the subject of the research, that the end goal of the research be law, such as generalizations similar to those that are produced by natural scientists, and that the emphasis of the research be on quantifiable observations that can be used for statistical analysis (Kennedy, 2017) To accurately identify the specific conditions under which project planning impacts the performance of completed road projects in Arid and Semi-Arid counties in Kenya, the positivist approach was used because the research included the use of identified theories in the development of hypotheses which was later tested and confirmed by the study findings. Additionally, positivism philosophy is adopted because the study seeks to employ quantifiable data in a regression model to support the findings, and because this approach emphasizes quantifiable observations that was used for statistical analysis.

3.2 Research Design

A research design serves as the guide for gathering, measuring, and analyzing data (Cooper & Schindler, 2014). The credibility of the research findings might be impacted by typical types of research designs. Case studies, polls, action research, and experimental design are some of them (Bryman & Bell, 2011; Farquhar, 2012). The experimental design gives statistical inference a high degree of confidence, ensuring that the significant link found increases reliability and, as a result, achieves an internal validity that shows cause-and-effect relationships between the two variables (Maxwell, 2010). Because of the experimental design's intimate ties to laboratory research, this study did not use it. The desire to investigate a phenomenon in its actual setting led to the requirement for this design (Saunders et al., 2012).

The capacity to mix qualitative and quantitative data gathering methods is the key component of case study design, which, to some extent, improves the robustness of the analysis and so adds value to the findings (Yin, 2014). Cross-sectional surveys have been utilized by other researchers to examine related studies (Gituro & Awino, 2011; Kariuki, 2014). These researchers considered these surveys to be appropriate and credible. Since project planning is a wide notion that may be investigated via a survey, this approach is adaptable due to the development of the convergence pattern, the overall interpretation of the relationships between the study variables is supported.

Due to the requirement to gather data from multiple organizations simultaneously and analyze it in accordance with predetermined hypotheses and objectives, this approach was considered suitable. The researcher had the chance to obtain a thorough understanding of the influence of project design, government regulations, Community participation, and performance of road projects in Kenya's arid and semi-arid counties by using this approach.

Cross-sectional studies are descriptive and can be used to support cause and effect conclusions. Contrary to longitudinal studies, which involve numerous observations made of the study group over time, cross-sectional surveys involve the collection of data at a specific point in time. In contrast to longitudinal designs, which examine variables over time, the cross-sectional design is suited for studies when data is obtained from a large sample with multiple variables being evaluated at the same time (performance). Mugenda and Mugenda (2013) report's that cross-sectional survey design may be used to explain or explore the existing status of two or more variables at a specific moment in time, and is typically the most appropriate measure of characteristics of large populations, it has been regarded as optimal.

3.3 Target Population

The target population was all the 88 completed road projects in ASAL Region, Kenya from 2016 to 2020 and therefore the study adopt a census research method. Most road projects in Kenya take 3-6 years to finish hence the choice of 6years (GoK, 2010). The study unit of analysis will be the 88 road projects constructed and completed during the 6 years period as per KeNHA, KURA, and KeRRA annual reports of the years 2016, 2017, 2018, 2019, and 2020 as shown in appendix V. The units of observation for the study were the contracted company's project managers, county public works officers and the local community leaders in all 88 completed road projects. Therefore the target population of the study was 198 respondents.

Table 3: Population Distribution

Category	Unit No.
Contracted company's project managers	88
Local community leaders	88
County public works officers	22
Total	198

Source: KURA, KenHA, KeRRA, 2021

3.4 Sample and Sampling Techniques

A sample is a smaller, more representative group of individuals that is chosen from a larger population. Through the analysis of the sample, one may derive findings that can be applied to the broader population of interest (Sekaran & Bougie, 2011). This research utilized purposive sampling. Purposive sampling targets specific criteria or characteristics, making it ideal for studies that require specialized participants or specific conditions (Sekaran & Bougie, 2011). . In order to fulfill the main aim of this study, which is to examine the effect of project planning, government regulations, and community participation on the effectiveness of finished road projects in arid and semi-arid counties in Kenya, the most valuable participants are the project managers from the contracted company, the public works officers from the county, and the leaders of the local community. Therefore, convenience sampling was employed. The research had a sample size of 198, as shown in Table 3.

3.5 Data collection and instruments

To get the quantitative data, questionnaires were sent to study respondents. A questionnaire is said to be an objective way of gathering data from a group (Saunders & Lewis, 2016). It is an affordable method of collecting quantitative data for analysis. The anonymity provided by questionnaires encourages respondents to respond. It offers a means for the easy comparison of uniform data collecting (Saunders & Lewis, 2016). The researcher handed out the questionnaires using either the drop-and-pick approach or the electronic option using e-mail for more convenience to the respondents. Each respondent received one set of a questionnaire. A questionnaire with a 5-likert scale was utilised to gather primary data from the research chosen respondents. The five sections

of the questionnaire were used to collect data from respondents about various study-related topics. Socio-demographic factors is covered in Section A, project planning is covered in Section B, Community participation questions is covered in Section C, government regulations were covered in Section D, and road project performance questions is covered in Section E. This study questionnaires were administered to 198 respondents.

3.6 Pilot Study

A pilot test is an investigation which is carried out on a small group of respondents to make sure the questions being asked in the questionnaire are reliable (Marczyk, DeMatteo & Festinger, 2005). Pilot testing is indeed crucial as it ensures the viability of your research tools before a large-scale rollout. By testing the questionnaire for reliability and validity, you can identify any potential issues early on. The questionnaire was pre-tested in a pilot study before actual data collection begins. For high precision and due to time, cost and practicality of the pilot study, 1% to 10% of the sample will constitute the pilot test size (Arain, Campbell, Cooper & Lancaster, 2010). This study had 20 questionnaires for pilot study, representing 10% of study population, which were sent to the respondents via e-mail because this is faster, cheaper and reliable. The pilot study was conducted in Nairobi since majority of the road construction companies have their head offices in Nairobi.

3.7 Reliability

The reliability of this study was evaluated using Cronbach's alpha. The correlation values between the responses on an evaluation instrument are usually calculated using the internal consistency test known as Cronbach alpha (Kennedy, 2017). Cronbach alpha determines the correlation between each and every variable in every² possible combination. The degree to which a group of measurement items could be interpreted as measuring a single latent variable is indicated by Cronbach's Alpha (α) (Cronbach, 1951). A Cronbach Alpha Coefficient of 0.7 and above was considered acceptable, according to Rahi (2017), because random error will always occur, regardless of the study's methodology. According to Kennedy (2017), the Cronbach's Alpha cutoff varies depending on the discipline and type of investigation. They contended that a value of 0.6 is normally acceptable for brand-new instruments whereas a value beyond 0.7 is

generally accepted. For construct validity, the study used Kaiser- Meyer - Olkin (KMO) and test of Sphericity as used by Dikko (2016). The Kaiser-Meyer-Olkin (KMO) Test evaluates the suitability of the study data for factor analysis.

3.8 Validity

How well a measurement tool or instrument measures what it purports to measure and so enables proper score interpretation is known as validity (Nachmias&Nachmias, 2008). According to Mugenda and Mugenda (2013), validity is the precision, veracity, and significance of results that are based on information gathered through the use of a tool or scale for each study construct or variable. Validity comes in three different flavors. These three concepts are construct validity, content validity, and external validity (Saunders *et al.*, 2009).The study used a sufficient sample size to guarantee external validity. To accurately evaluate the qualities of the study variable for content validity, the research instrument's questions was matched. Construct validity is a measurement of how precisely and meaningfully a theoretical notion was reflected or represented in the data collected by an instrument. To determine whether the study instrument is valid, the researcher will perform factor analysis (Trochim, 2006).

3.9 Data Analysis

In order to emphasize important information, data analysis entails analyzing, manipulating, and modeling the data. Descriptive statistics like mean and standard deviation was utilized to display the responses of the respondents in a clear and concise manner. Wilson (2010) claims that descriptive statistics enable researchers to both characterize the data and present it in various ways. Since it is appropriate for social science research that calls for the coding of variables, the Statistical Package for Social Sciences (SPSS) version twenty four (24) was utilized to further analyze the data gathered from the field (Nachmias & Nachmias, 2008). The data acquired was presented in a systematic manner with the use of tables and charts.

Inferential statistics was employed to ascertain the association between the research variables and the predicted results. To examine the impact that a combination of independent, moderating, and mediating variables has on the dependent variable, the researcher used a multiple regression model.

Multiple regression models, according to Saunders et al. (2012), are the best for explaining data and inferential statistics for testing hypotheses and drawing conclusions. The study's data are normally distributed. The F-statistics Analysis of Variance (ANOVA) will be used to quantify the statistical significance between the variables, test the research hypothesis, and make study-related conclusions. The Baron and Kenny (1986) model was used by the researcher to determine the moderating and mediating effects of the variables. These are the regression models:

Model 1: Effect of Project Planning on Completed Road Project Performance

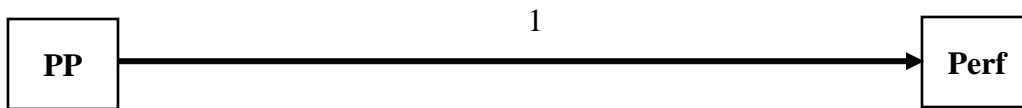


Figure 2: Conceptual Model for Direct Relationship

Where; PP = Project Planning; Perf = Project performance; β_0 = Constant; β_1 = coefficients of predictor; e = Error term; $Perf = \beta_0 + \beta_1 PP + e$

Model 2: Model for Mediated Relationship;

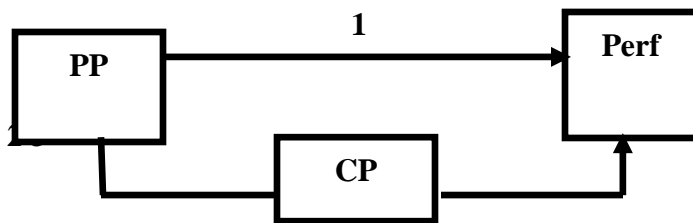


Figure 3: Conceptual Model for Mediating Relationship

Where; PP = Project Planning; CP=Community Participation; Perf = Project performance; β_0 = Constant; $\beta_1 .. \beta_6$ = coefficients of predictor; e = Error term;

Step 1: Regress Perf on PP and note the level of significance of the relationship between Perf and PP

$$Perf = \beta_0 + \beta_1 PP + e$$

Step 2: Regress CP on PP and note the level of significance of the relationship between CP and PP;

$$CP = \beta_2 + \beta_3 PP + e;$$

Step 3: Regress Perf on CP and note the level of significance of step 1 to 3;

$$Perf = \beta_0 + \beta_4 CP + e;$$

Step 4: Regress Perf on PP and CP and note the significance of the relationship;

$$Perf = \beta_6 + \beta_7 PP + \beta_8 CP + e;$$

Meaning that there should be an influence of the mediating variable on the envisaged result determining the treatment; that is, is significant if $p \leq 0.05$.

In order to move to step four, existence of significant treatment on the outcome between steps one to three has to be established and thus mediation is supported in step 4 if steps 1, 2, and 3 are met. If one or more of these relationships (path 1, 2 or 3) are non-significant, the conclusion will be that mediation will not likely exist (Baron & Kenny, 1986). If all variables are significant, for full mediation to take place, the residual direct effect of the treatment variable (PP) on the outcome, represented by β_5 , must be smaller in absolute value than the overall treatment effect from step 1, which is β_1 . If β_5 is not smaller, it indicates that the mediation is partial. Understanding this distinction is crucial for grasping the nature of the relationships between your variables and the degree of mediation occurring.

Model 3: Model for Moderated Relationship;

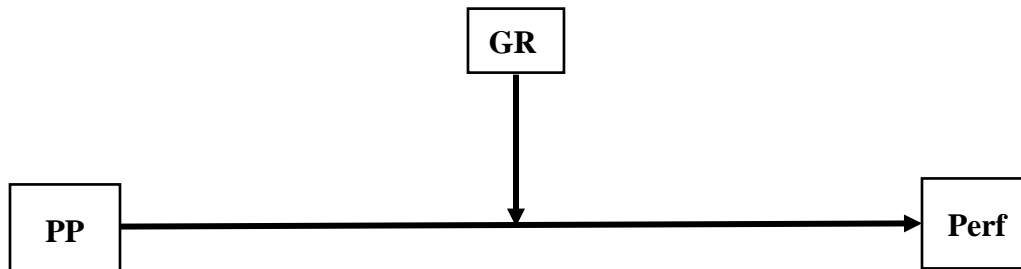


Figure 4: Conceptual model Moderating Relationship

Where; PP = Project Planning; GR=Government Regulation; Perf = Project performance; β_0 = Constant; $\beta_1.. \beta_3$ = coefficients of predictor; e = Error term;

Step 1: Regress PP on Perf and take note of the R-squared value obtained (R^2_1)

$$\text{Perf} = \beta_0 + \beta_1\text{PP} + e$$

Step 2: Introduce the moderating variable I_c and take note of the new R-squared obtained (R^2_2)

$$\text{Perf} = \beta_0 + \beta_1\text{PP} + \beta_2\text{GR} + e$$

The difference in the two values of R- squared obtained ($R^2_1 - R^2_2$) represents the moderating effect of GR on the relationship between PP and Perf

Step 3: $\text{Perf} = \beta_0 + \beta_1 \text{PP} + \beta_2\text{GR} + \beta_3\text{PP}*\text{GR} + e$

β_3 represents the effect of the moderating variable Government Regulation on the relationship between Project Planning and Project performance. To interpret the results of the model, p-value of β_3 was compared with the level of significance for the study (0.05). If the p-value of β_3 exceeds 0.05, then the research fails to reject the null hypothesis referring to the moderated relationship.

Model 4: Model for Moderated Mediation Effect.

According to Hayes and Preacher (2013), although moderation and mediation are individually useful, integrating both into a single model allows researchers to examine even more nuanced relationships among variable of the study. In the perspective of Borau et al. (2015), mediating effect is referred to as indirect effect, while the moderating effect is referred to as conditional effect. The combined forms are referred to as indirect conditional processes or moderated mediation models, and allows for an in-depth evaluation of whether an indirect effect is moderated by another variable. Moderated mediation effect of government regulation and community participation on the relationship between project planning and performance will be achieved through conditional process model containing a mediation process (PP → CP → Perf) combined with the moderator effect of the CP→ Perf effect by GR. as depicted in (figure 5, with subsequent paths in figure 6). As espoused by Hayes (2018), the bootstrap re-samples for the moderated mediation effect were done with 5,000 samples and a bias corrected 95% confidence interval at each level of the influence of the moderating variable. Figure 6 presents both Panel A and Panel B paths in a conceptual diagram, which translates into two sets of equations as follows:

$$CP = i_2 + \beta_1 PP + \beta_2 GR + \beta_3 PP * GR + e_{cp} \dots \dots \dots (1)$$

$$Perf = i_3 + c'_1 PP + c'_2 GR + c'_3 PP * GR + b_m + e_{perf} \dots \dots \dots (2)$$

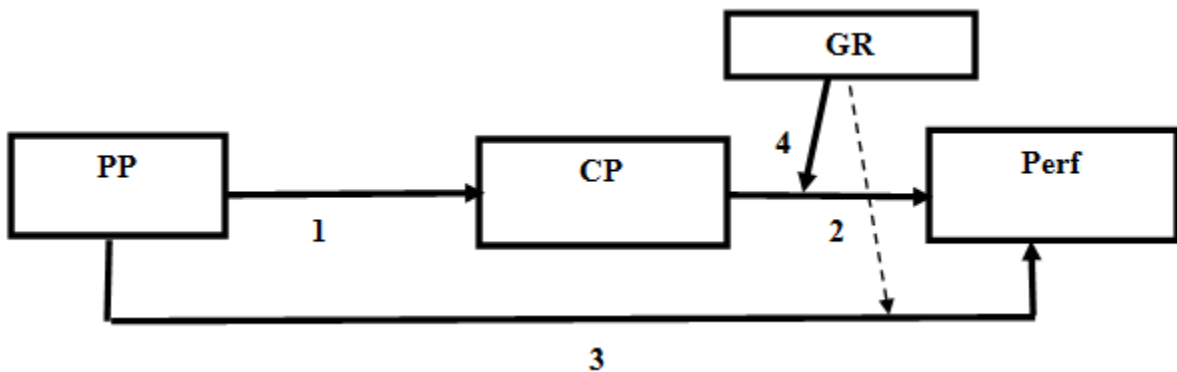


Figure 5: Conceptual Model for Moderated Mediation Effect (Indirect Conditional Effect)
 Where; PP = Project Planning; GR=Government Regulation; CP=Community Participation; Perf = Project performance;

Panel A:

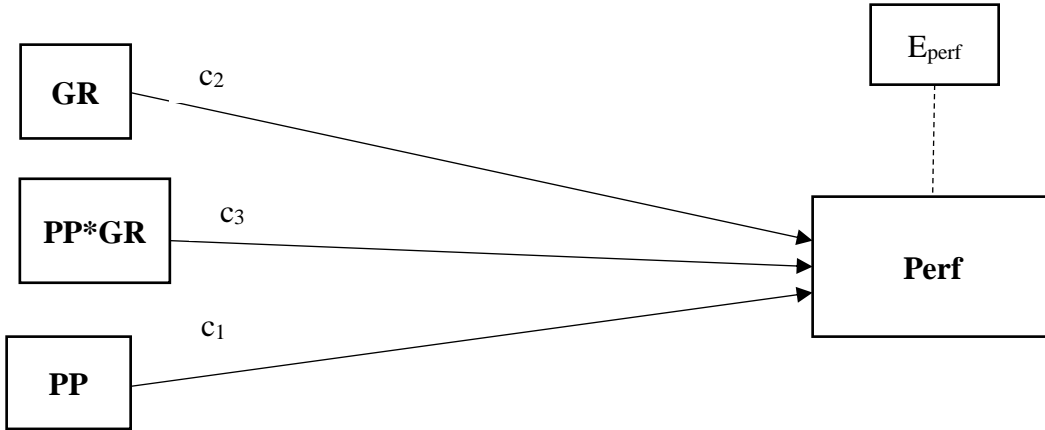


Figure 6: Moderated Mediation Relationship Paths (Statistical Models – Panels A & B)

Panel B:

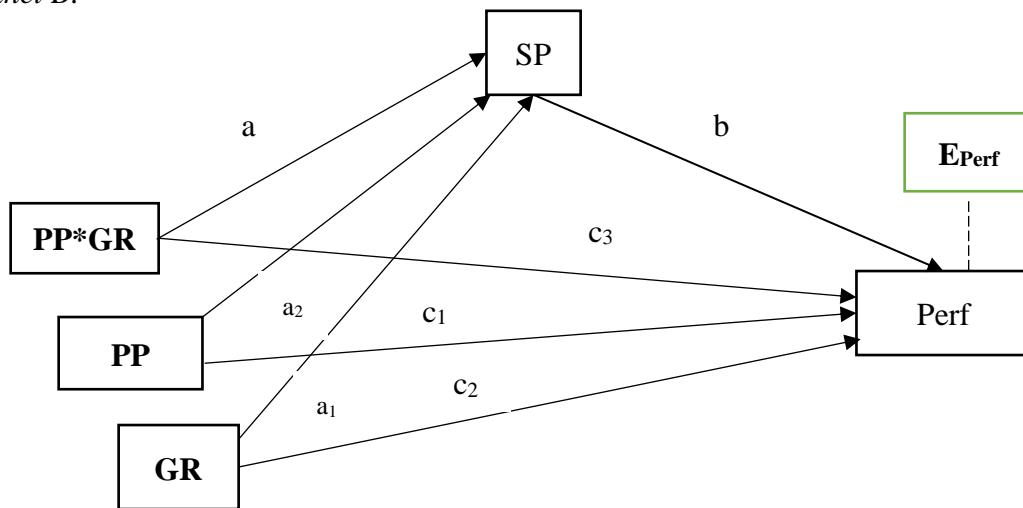


Figure 6: Moderated Mediation Relationship Path

Direct effect of PP on Perf is c'. The Conditional indirect effect of PP on Perf through CP = $(a + a_1GR)b$; (e_p = error term).

Table 4: Summary of Research Objectives and Hypotheses Testing

Research Objectives	Hypotheses	Analytical Model	Interpretation of Results
i. To assess the effect of project planning on performance of completed road projects in arid and semi-arid counties in Kenya	H₀₁: There is no significant effect of project planning on performance of completed road projects in arid and semi-arid counties in Kenya	Multiple Regression Model: $P = \beta_0 + \beta_1 L_s + e$ $P = \beta_0 + X_1 M_w + X_2 S_v + X_3 C_p + X_4 E_h + X_5 E_a + e$	If p-value > 0.05 fail to reject the null hypothesis. But if p-value is < 0.05 reject the null hypothesis. R ² - explains the extent leadership practices accounts for changes in performance, the higher the R ² the more predictable the model (R ² ≥ 0.7 = Strong extent) β_1 is significant β_3 is significant β_5 is significant β_6 controlling for PP is significant. Significance: p-value ≤ 0.05 Reject null hypothesis
ii. To determine the mediation effect of community participation on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya.	H₀₂: There is no significant mediating role of community participation on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya.	Multivariate Model for Mediation: Step 1: Perf = $\beta_0 + \beta_1 PP + e$; Step 2: CP = $\beta_2 + \beta_3 PP + e$; Step 3: Perf = $\beta_4 + \beta_5 CP + e$; Step 4: Perf = $\beta_4 + \beta_5 PP + \beta_6 CP + e$;	Significance: p-value ≤ 0.05 Reject null hypothesis
iii. To assess the moderating effect of government regulations on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya	H₀₃: There is no significant moderating effect of government regulations on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya.	Multivariate Model for Moderation; Step 1: Perf = $\beta_0 + \beta_1 PP + e$ Step 2: Perf = $\beta_0 + \beta_1 PP + \beta_2 GR + e$ Step 3: Perf = $\beta_0 + \beta_1 PP + \beta_2 GR + \beta_3 PP * GR + e$	Moderation is present if interaction term, e, explains a statistically significant variance in the dependent variable, Perf. Significance: - if p-value ≤ 0.05, then reject null hypothesis Large change in R ² – enhanced moderation. Reduced change in R ² – weak moderation. No change in R ² – antagonistic moderation effect.

Research Objectives	Hypotheses	Analytical Model	Interpretation of Results
iv. To establish the moderated mediation effect of government regulations and community participation on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya	H ₀₄ : The moderated effect of government regulations and community participation on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya	Moderated Mediation Effect Model: - $CP = i_2 + \beta_1 PP + \beta_2 GR + \beta_3 PP * GR + e_{cp}$ $Perf = i_3 + c'_1 PP + c'_2 GR + c'_3 PP * GR + b_m + e_{perf}$	R ² for goodness of fit with the following interpretations: If R ² ≤ 0.5 – Weak If 0.5 ≤ R ² ≤ 0.7 – Moderate If R ² ≥ 0.7 – Strong F- Value, t-Value at level of significance = 0.05. If p-Value ≤ 0.05, then reject null hypothesis.

3.10 Diagnostic Tests

Diagnostic tests was carried out by the researcher before the multiple regression analysis. Testing statistical issues and ensuring adherence to the classical linear regression model (CLRM) was beneficial. Homoscedasticity, multi-collinearity, normality, linearity, and autocorrelation are among the diagnostic tests. These techniques were used to make sure that drawn conclusions do not violate any of the multiple regression analysis's assumptions.

3.10.1 Homoscedasticity

Homoscedasticity is the assumption of equal standard deviations of Y values about the population regression line, regardless of the value of X. Homoscedasticity is the extent to which the data values for the dependent and independent variables have equal variances (Hair, et al., 2010). However, if the variances happen to be unequal, then heteroscedasticity exists. Homoscedasticity refers to the level of homogeneity of variance that assumes dependent variable(s) exhibit equal levels of variance across the range of predictor variable(s) (Hair et al., 2010). It gives the assumption that the criterion variable exhibits equal levels of variance across the range of predictor variables. Thus, the normality is assumed because when the multivariate normality assumption is met, the relationships between variables are homoscedastic.

Homoscedasticity can be assessed graphically, as well as statistically (Hair et al., 2010). First, visual scatter plots are produced for a fair level of homoscedasticity. Hence, regression analysis using heteroscedastic data will still provide unbiased results for the relationship between the predictor and the dependent variable. The Levene's test is an inferential statistic used to assess the equality of variances for a variable calculated for two or more groups (Levene, 1961). It tests if k samples do have equal variances (homogeneity of variance or homoscedasticity). The Levene's test, tests the null hypothesis that the population variances are equal. The study uses the 0.05 significance level to determine statistical significance so, if Levene's test shows a significance value of less than 0.05, then it is concluded that the variances are significantly different meaning the study's statistical test (t-test or F-test) is invalid and therefore conclusive inferences cannot be made from it. Likewise, if Levine's test shows a significance value of greater than 0.05, then the conclusion is that the variances are not significantly different. This confirms the validity of t-test or F-test results (Bryk & Raudenbush, 1988; Anderson, 2013).

3.10.2 Normality

Normality of data refers to when data is distributed evenly or equally on both sides of the mean value. Normality test is used to determine whether sample data has been drawn from a normally distributed population (within some tolerance) and that the data set is well modelled by a normal distribution (Hair et al., 2010). However, these are not always required for normality test in analysing the data, but are found to be better if the variables are normally distributed. The statistical method can assess the normality of the data (Hair et al., 2010). Kurtosis and Skewness tests and the Kolmogorov and Shapiro methods are primarily used by researchers to test the normality of data distribution (Hair et al., 2011).

This study applied SPSS 25.0 for initial descriptive statistics to identify Skewness and kurtosis. In addition, Kolmogorov-Smirnov and Shapiro-Wilk statistic tests (Field, 2013) were employed to examine the normality of data. The other test that was used to assess the normality is the Shapiro-Wilk test. This tests the null hypothesis that a given sample came from a normally distributed population. The test rejects the hypothesis of normality when the p-value is less than or equal to the value of alpha (level of significance which in this study will be set at 0.05). That is,

should the value of significance of the Shapiro-Wilk Test result be found to be greater than 0.05, then the data was said to be normal and if it was below 0.05, then the data was said to significantly deviate from a normal distribution. This numerical test was further enhanced with the graphical test of Q-Q plots (Schutzenmeister, Jensen & Piepho, 2012). Based on the Q-Q plots, when the data is normally distributed, the data points are close to the diagonal line but when data points are scattered far from the line in a physical non-linear fashion, the data was regarded as not normally distributed Field (2013) has justified that a test with a large sample size is very sensitive, and a minor deviation from normality is enough to bias any statistical procedures that is applied to the data. Thus, a significant test does not reveal departure from normality of data.

These tests are conducted in order to determine the distribution of the data. Data that is not normally distributed provides estimates that have incorrect t-tests, F-tests, and chi-square test results (Razali & Wah, 2011). Non-normal distribution occurs when one of the variables has the wrong functional form. Kolmogorov-Smirnov (KS) Test was used to check for normality.

Null Hypothesis (H₀): The data follows a normal distribution.

Alternative Hypothesis (H_A): The data does not follow a normal distribution.

This means that if the KS test yields a low p-value, you would reject the null hypothesis, suggesting that the data does not conform to a normal distribution. Probabilities that are >0.05 indicates that the data is normally distributed while < 0.05 indicates that the data is not normally distributed (Pennsylvania State University, 2017a).

3.10.3 Linearity

Linearity means that the predictor variables in the regression have a straight-line relationship with the outcome variable. In order to determine whether or not the relationships between the predictor variables (the independent variable) and the result variables (the dependent variable) were linear, an analysis of variance (ANOVA) test was carried out. In order to determine whether or not linearity was present, the study used a linear modeling. Linear modeling involves creating a model

that assumes a linear relationship between the independent and dependent variables. This means that changes in the independent variable(s) will result in proportional changes in the dependent variable. Linear models are generally easier to interpret and implement. They provide a straightforward equation of the form $Y=a+bX$, where Y is the dependent variable, X is the independent variable, a is the intercept, and b is the slope. This study adopted Linear Regression which is used for predicting a continuous outcome based on one or more predictors. Linear regression is based on the assumption that there is a linear connection between the variables that are independent and those that are dependent. According to Kothari and Garg (2014), the rejection of the null hypothesis is an indication that there is a substantial linear connection between the variables that are independent and those that are dependent with respect to it. A p-value greater than 0.05 suggests that the null hypothesis (which typically states that there is no significant departure from linearity) cannot be rejected. Therefore, you can conclude that the relationship between the variables can be adequately described by a linear model.

3.10.4 Test of Multicollinearity

Multicollinearity is the extent to which a variable can be explained by the other variables (Loo et al., 2015). It also refers to the high inter-correlations among the predictor variables. Multicollinearity complicates the interpretation of the results as it becomes difficult to ascertain the effect of any single variable because of their interrelationships. Multicollinearity occurs when there is strong correlation between two or more variables in the model. A high level multicollinearity will increase the standard errors of the b-coefficients, and will generate a threat to the model, which can be problematic to multivariate analyses. Multicollinearity can be identified by checking the correlation matrix for high correlations. Another method to diagnose multicollinearity is to check the Variance Inflation Factor (VIF) and collinearity diagnostics of tolerance statistics.

According to Hair et al. (2011), if the VIF is greater than 10 and the tolerance is less than 0.1, a serious problem is indicated. Therefore, it becomes important to ensure that no multicollinearity exists among the predictor variables. There are two most popular ways of testing for

multicollinearity in the data: a) Tolerance, and b) Variance Inflation Factor (VIF). VIF can be derived from Tolerance by inverting it. According to Hair et al. (2011), multicollinearity exists among the predictor variables when the value of Tolerance is less than 0.10 and the value for VIF is more than 10. Tolerance and VIF can be calculated using SPSS v.25 while performing multiple regressions.

The study used the independent average for each of the variables. Multicollinearity was tested using variance inflation factor VIF in all the analysis and it ranged from 1 to 4 which would not be a cause of concern, according to Yu, et al. (2015) who indicate that where $VIF \geq 10$ indicate presence of Multicollinearity. The presence of multicollinearity does not reduce the reliability of the model but affects the individual predictors. Variance Inflation Factors (VIF) and Tolerance tests were used to test for the presence of multicollinearity in the model. A VIF of greater than five but less than 10 indicates moderate multicollinearity, VIF level which is higher than 10 indicates serious multicollinearity requiring correction (Pennsylvania State University, 2017b). A VIF value of between 1 and 5 indicates little or no correlation. A high tolerance value indicates an overlap between the variables, the lower the tolerance values indicate low degree of correlation among variables under ideal conditions. According to Hossain (2012) tolerance values of less than 0.2 are as a rule of thumb considered unacceptable. In order to deal with multicollinearity, the data can be transformed into the first difference to remove trend or multicollinearity (Gujarati, 2003).

3.11 Ethical Consideration

Similar to other social studies, this investigation considered ethical issues such as contacting the relevant institutions, including the university and the National Commission for Science, Technology, and Innovation (NACOSTI), to obtain the necessary approval permits. The ethical guidelines was followed in this study to protect respondents' sentiments and dignity when asking tough questions. A letter of introduction from the researcher was attached as well, guaranteeing the respondents' privacy.

3.11.1 Voluntary participation: all potential participants were informed that they are free to choose whether they want to participate, and they can withdraw from the study anytime without any negative repercussions.

3.11.2 Informed consent: information was provided to research respondents that included, who is doing the research, the purpose of the research, what data is being collected, how the results of the study were used and who the results will be shared with.

3.11.3 Anonymity: This means that at no time will the researcher or anyone associated with the study know the identity of the participants. In this research, the information collected was not contain any identifiable information, and the risk of being able to attribute data to particular individuals is therefore low.

3.11.4 Confidentiality: means that proper safeguards are in place to protect the privacy of participants and their information from unauthorized access, use, disclosure, modification, loss, and theft. This was enforced by encrypting computer-based files and store documents such as signed consent forms in a locked file cabinet and remove personal identifiers from study.

3.12 Chapter Summary

This chapter outlines the methodology utilized to investigate the performance of road projects in arid and semi-arid counties. The study employs a quantitative research approach, which is particularly suited for analyzing numerical data and establishing relationships between variables. The study focused specifically on arid and semi-arid counties, characterized by unique challenges that influence road project outcomes. Data was collected using structured surveys distributed to relevant stakeholders, including community members, project managers, and government officials. This method allows for the collection of standardized responses that can be quantitatively analyzed.

Participants were selected based on predetermined criteria to ensure a representative sample that accurately reflects the target population. The data analysis involved correlation analysis to explore the relationships between project planning, community participation, and government regulations, addressing issues such as delays, cost overruns, and quality concerns. Ethical considerations, including obtaining informed consent and ensuring confidentiality, was integral to the research process.

CHAPTER FOUR

DATA ANALYSIS AND RESEARCH RESULTS

4.0 Introduction

This chapter outlines the findings of the investigation. The study primarily concentrated on the impact of project planning, community participation, and government regulations on the performance of road projects in Kenya's arid and semi-arid counties. The chapter is organized using response rate, demographic information, descriptive statistics, factor analysis, diagnostic tests, and inferential statistics. The data collected from the research were analyzed, and the results were interpreted in relation to the study's overall objectives.

4.1 Response Rate

The term "response rate" refers to a measurement of the inclusion of all sample members in the final data sets in a study by Orodho (2009). It is calculated by dividing the number of completed interviews with respondents by the total number of respondents in the entire sample, which includes both respondents and non-respondents. In the current study, the data was collected from the contracted company's project managers, county public works officers, and local community leaders in all 88 completed road projects for the last 6-year period as per KeNHA, KURA, and KeRRA annual reports of the years 2016, 2017, 2018, 2019, and 2020. The study's sample had 198 target respondents, of whom 161 questionnaires were accurately completed and returned, resulting in a response rate of 81.3%. The response rate in this research was considered suitable, along with Kothari's (2011) assertion that a response rate over 70% is judged adequate for a particular study. A study conducted by Gall, Borg, and Gall (1996) has demonstrated that an 80% response rate is deemed excellent in quantitative research within the field of Social Sciences. Similarly, Fincham (2008) has corroborated this finding, stating that a response rate of 60% is considered appropriate in research. Additionally, Mangione (1995) has revealed that a response rate exceeding 85% is regarded as excellent for self-administered questionnaires. The response rate for this research was deemed to be commendable for further analysis, since it exceeded 80%.

Table 5: Response Rate

Questionnaire	Frequency	Percentage
Returned	161	81.3%
Non returned	37	18.7%
Total	198	100

4.2 Pilot Study Results

Pilot testing is the preliminary review of the questionnaire in order to determine its practicality prior to beginning the research project. Pilot testing the research instrument provides input on the clarity of the respondents' grasp of the questions they were asked, as well as helping in assessing if the instrument answers to the research questions as intended. The questionnaires for this research were pilot tested on a sample of 20 respondents, representing 10% of the overall population. Validity and reliability testing were included in the pilot tests.

4.2.1 Reliability Test Results

The concept of instrument dependability pertains to the instrument's capacity to provide measurements that are consistent and steady throughout time. The objective of ensuring dependability in a research is to reduce the occurrence of mistakes and biases (Yin, 2013). To improve the reliability of the research instrument, a preliminary survey was conducted to assess and enhance the coherence and comprehensibility of the questionnaire prior to the commencement of data collecting. The current study used Cronbach's Alpha (Cronbach, 1951) to assess the reliability of the suggested constructs. Cronbach's alpha, renowned for its robustness and adaptability, is a statistical measure that evaluates the internal consistency or interrelatedness of items (Tavakol & Dennick, 2011). The alpha coefficient has the ability to assume a range of values, spanning from zero, indicating a lack of internal consistency, to one, signifying a state of

total internal consistency. According to Clarkson (2015) and Nunally (2018), an alpha value of 0.7 is considered the minimal threshold for acceptability, whereas values of 0.8 and above do not significantly contribute to the scale of dependability. Therefore, in accordance with the arguments presented by the Tavakol and Dennick, (2011), a threshold of 0.7 was established as the minimum acceptable value for Cronbach's alpha in this study, indicating the reliability of a measurement scale. Conversely, a measurement scale with an Cronbach's alpha value exceeding 0.9 was deemed to be of high quality (Churchill & Peter, 1984). The study tool reliability results are presented in table 6.

Table 6: Reliability Results

Variable	Items	Cronbach Alpha	Remark
Project Planning	34	0.964	Reliable
Community Participation	27	0.919	Reliable
Government Regulations	37	0.970	Reliable
Performance	15	0.889	Reliable

The results in table 6 indicate that the Cronbach alpha coefficient for the variable of Project Planning is 0.964, based on a total of thirty-four (34) items. This suggests that the items used to measure the Project Planning variable were reflective of a shared underlying trait, since these items have been used by other studies and then enhanced via iterative processes. The Cronbach's alpha coefficients for the variables of Community Participation, Government Regulations, and performance were found to be 0.919, 0.097, and 0.889, respectively. These values suggest that the items within each variable construct were reflective of a common underlying disposition. The findings suggest that all constructs had good levels of dependability, as seen by their coefficient values. This suggests that each of the variables have a dependable index measure, hence confirming the instrument's reliability in gathering data.

4.2.2 Validity Test Results

In order to evaluate the validity of the study, the researcher used factor analysis with principal component analysis to examine the extent of variation among the observed variables that were connected with each other. Varimax rotation method was used; this is because it aims to make the factor loadings as close to 1 or -1 for each variable, making the factors easier to interpret. This analysis allowed for the identification and elimination of any duplicated or outlier items. Factor analysis is a statistical methodology used to discern a limited number of fundamental dimensions or factors that may effectively capture the associations among interconnected variables. The methodology is often used to quantify variables that are not amenable to direct measurement, to condense extensive datasets, and to construct and evaluate hypotheses.

In this study, conducting factor analysis is an excellent approach to test the validity of the research instrument. The use of the Kaiser-Meyer Olkin (KMO) measure of sampling adequacy is also a crucial step, as it helps ensure that the sample size is sufficient for reliable factor analysis results. This process will enhance the credibility of the findings and support the overall integrity of the research. Yin (2014) asserts that the Kaiser-Meyer-Olkin (KMO) measure is employed as a statistical tool to assess and validate the suitability of employing factor analysis. In essence, the KMO measure is utilised to determine whether the gathered data is sufficient and appropriate for conducting inferential statistical tests, such as factor analysis, regression analysis, and other related statistical analyses. The KMO statistic indeed varies between 0 and 1. A value of 0 suggests that the sum of partial correlations is large compared to the sum of correlations, which indicates that factor analysis may not be suitable due to diffusion in the correlation patterns. Conversely, a value close to 1 indicates that the correlation patterns are compact, making it more likely that factor analysis will reveal distinct and meaningful factors. This understanding is crucial for interpreting the results of your factor analysis accurately. The research used the Kaiser-Meyer-Olkin (KMO) and Barlett's Test of Sphericity to assess the appropriateness of the sample. In order for a dataset to be considered suitable and sufficient for statistical analysis, it is necessary for the Kaiser-Meyer-Olkin (KMO) measure to exceed a threshold of 0.5 (Field, 2000). Table 7 shows the Kaiser-Meyer-Olkin (KMO) and Barlett's Test of Sphericity results.

Table 7: KMO and Sphericity results.

Variable	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	Sig.
Project Planning	0.884	6197.837	561	.000
Community Participation	0.873	3609.497	190	.000
Government Regulations	0.803	10224.656	666	.000
Performance	0.843	1824.208	78	.000

The result in table 7 indicates that the Kaiser- Meyer- Olkin (KMO) index was more than 0.5. Project Planning (KMO =0.884, Chi-square (χ) = 6197.837, df = 561 and Sig. Level =0.000); Community Participation (KMO =.0.873, Chi-square (χ) = 3609.497, df = 190 and Sig. Level =0.000); Government Regulations (KMO =0.803, Chi-square (χ) = 10224.656, df = 435 and Sig. Level =0.000); Performance (KMO =0.843, Chi-square (χ) = 1824.208, df = 78 and Sig. Level =0.000). The p-value obtained from the Bartlett's test of Sphericity was found to be 0.000, indicating that it fell below the predetermined threshold for assessing the significance and validity of the data. The obtained result suggests a statistically significant association between the variables. Based on the statistical analysis presented above, it can be observed that all the Kaiser-Meyer-Olkin (KMO) scores were found to be statistically significant, surpassing the threshold of 0.70. This indicates that all the items included in the analysis were deemed valid for subsequent statistical procedures, including factor analysis, regression analysis, and other relevant statistical tests.

4.3 Factor Analysis

This section provides an overview of the factor analysis findings pertaining to the constructs of Project Planning, Community Participation, Government Regulations and Performance Variables.

Confirmatory factor analysis (CFA) was performed using the statistical software SPSS. Principal axis factoring (PAF) and varimax rotation were used to facilitate data reduction and determine the latent construct indicators that most effectively account for the research variables. The use of PAF was chosen due to its ability to provide more accurate and reliable insights into the underlying structure of a group of variables, taking into consideration the interrelationships among the observed variables (Hershberger, 2005). The researchers used Kaiser's criteria, which involves considering eigenvalues greater than 1, as well as Cattell's Scree test, to ascertain the appropriate amount of components to maintain in the analysis. The consideration of these two criteria was deemed necessary due to the potential unreliability of depending just on one criterion for determining the number of elements to maintain (Field, 2005, 2009). A variable was created so that the proportion of total variance explained was equal to or higher than 45% ($\geq 45\%$). Only factor loadings that were equal to or higher than .30 were maintained, whereas any loading below .30 was not included. According to Costello and Osborne (2005), a factor loading of .30 was regarded to be low.

4.3.1 Factor Analysis for Project Planning

A factor analysis was performed on the statements pertaining to project planning. The concept of project planning has been classified into four distinct dimensions, namely Cost Management, Scope Management, Risk Management and Time Management. Factor analysis was used in the research to examine the presence of associated variables and see whether any redundant data could be removed. The analysis facilitates the examination of the interrelationships' structure via the identification and definition of various components. The process of factor analysis was used to reduce the dimensions of the statements in the Statistical Package for the Social Sciences (SPSS) software. Principal axis factoring and varimax rotation techniques were utilised for this purpose. The aim was to reduce the amount of data and discover the latent variable items that most effectively elucidate the concept of project planning.

According to Watkins, (2018), the acceptable value of factor loading is generally considered to be 0.5 or greater. This threshold indicates that the observed variable significantly contributes to the

latent factor it is intended to measure. Loadings at this level suggest that the variable explains a substantial portion of the variance in the factor. In this procedure, coefficients with an absolute value below 0.5 were eliminated, resulting in the inclusion of only those components that exhibit great relevance and effect in the construction of variables. According to Watkins, (2018), it is recommended to suppress coefficients with an absolute value below 0.5 during component analysis. This approach ensures that only items with substantial relevance and effect in variable creation are included. The process of extracting the components adhered to the Kaiser Criterion, which considers an eigenvalue of 1 or above as an indication of a distinct factor. In the context of project planning, it was found that all thirty four (34) statements exhibited factor analysis coefficients with an absolute value over 0.3. Consequently, all of these statements were included in the construction of the composite variable representing project planning. The results of the Total Variance analysis demonstrate that the thirty four (34) statements pertaining to project planning may be effectively grouped into a single factor, as seen in Table 8. Hair et al (2012) suggest that the collective variation accounted for by all components should be within the range of 45% to 60% for social science research. This research used a criterion of 45% or more total variation explained by the retrieved component. The factor loading of the retrieved items for project planning is shown in **Appendix IV**. Table 8 presents the components (items) and the corresponding percentage of the total variance elucidated.

Table 8: Total Variance Explained for Project Planning Variable

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.676	46.106	46.106	15.676	46.106	46.106
2	3.803	11.186	57.292			
3	2.774	8.159	65.451			
4	1.885	5.543	70.994			
5	1.471	4.326	75.320			
6	1.148	3.376	78.696			

7	1.087	3.198	81.894
8	.705	2.074	83.969
9	.543	1.597	85.566
10	.471	1.384	86.950
11	.430	1.264	88.214
12	.413	1.214	89.428
13	.379	1.116	90.544
14	.341	1.002	91.546
15	.296	.869	92.416
16	.264	.777	93.192
17	.245	.719	93.912
18	.226	.664	94.576
19	.210	.619	95.195
20	.194	.570	95.764
21	.179	.527	96.291
22	.169	.497	96.788
23	.150	.442	97.230
24	.143	.420	97.650
25	.135	.398	98.047
26	.127	.375	98.422
27	.109	.320	98.742
28	.093	.275	99.017
29	.080	.235	99.252
30	.071	.208	99.460
31	.065	.190	99.650
32	.059	.175	99.824
33	.047	.138	99.962
34	.013	.038	100.000

Extraction Method: Principal Component Analysis.

4.3.2 Factor Analysis for Community Participation

A factor analysis was performed on the statements pertaining to community participation. The concept of community participation has been classified into three distinct dimensions, namely community empowerment, community intercommunication and community grievance management. Factor analysis was used in the research to examine the presence of associated variables and see whether any redundant data could be removed. The analysis facilitates the examination of the interrelationships' structure via the identification and definition of various components. The process of factor analysis was used to reduce the dimensions of the statements in the Statistical Package for the Social Sciences (SPSS) software. Principal axis factoring and varimax rotation techniques were utilised for this purpose. The aim was to reduce the amount of data and discover the latent variable items that most effectively elucidate the concept of community participation.

According to Watkins, (2018), the acceptable value of factor loading is generally considered to be 0.5 or greater. This threshold indicates that the observed variable significantly contributes to the latent factor it is intended to measure. Loadings at this level suggest that the variable explains a substantial portion of the variance in the factor. In this procedure, coefficients with an absolute value below 0.5 were eliminated, resulting in the inclusion of only those components that exhibit great relevance and effect in the construction of variables. According to Watkins, (2018), it is recommended to suppress coefficients with an absolute value below 0.5 during component analysis. This approach ensures that only items with substantial relevance and effect in variable creation are included. The process of extracting the components adhered to the Kaiser Criterion, which considers an eigenvalue of 1 or above as an indication of a distinct factor. In the context of community participation, it was found that twenty (20) out of total twenty seven (27) statements exhibited factor analysis coefficients with an absolute value over 0.5. Consequently, the twenty (20) statements were included in the construction of the composite variable representing project planning while seven (7) statements were eliminated. The eliminated statements were seven (7) Community Grievance Management based statements three to seven. The results of the Total

Variance analysis demonstrate that the twenty (20) statements pertaining to community participation may be effectively grouped into a single factor, as seen in Table 9. Hair et al (2012) suggest that the collective variation accounted for by all components should be within the range of 45% to 60% for social science research. This research used a criterion of 45% or more total variation explained by the retrieved component. The factor loading of the retrieved items for community participation is shown in **Appendix IV**. Table 9 presents the components (items) and the corresponding percentage of the total variance elucidated.

Table 9: Total Variance Explained for Community Participation Variable

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.865	49.324	49.324	9.865	49.324	49.324
2	3.308	16.539	65.863			
3	1.942	9.710	75.573			
4	1.326	6.629	82.202			
5	.681	3.403	85.604			
6	.418	2.089	87.694			
7	.350	1.752	89.445			
8	.313	1.567	91.012			
9	.294	1.469	92.481			
10	.254	1.268	93.750			
11	.218	1.090	94.840			
12	.195	.975	95.815			
13	.178	.892	96.707			
14	.152	.761	97.467			
15	.126	.632	98.100			
16	.123	.614	98.714			
17	.085	.427	99.141			
18	.073	.365	99.506			

19	.055	.276	99.782
20	.044	.218	100.000

Extraction Method: Principal Component Analysis.

4.3.3 Factor Analysis for Government Regulations

A factor analysis was performed on the statements pertaining to government regulations. The concept of government regulations has been classified into two distinct dimensions, namely regulatory framework and code of conduct. Factor analysis was used in the research to examine the presence of associated variables and see whether any redundant data could be removed. The analysis facilitates the examination of the interrelationships' structure via the identification and definition of various components. The process of factor analysis was used to reduce the dimensions of the statements in the Statistical Package for the Social Sciences (SPSS) software. Principal axis factoring and varimax rotation techniques were utilised for this purpose. The aim was to reduce the amount of data and discover the latent variable items that most effectively elucidate the concept of government regulations.

According to Watkins, (2018), the acceptable value of factor loading is generally considered to be 0.5 or greater. This threshold indicates that the observed variable significantly contributes to the latent factor it is intended to measure. Loadings at this level suggest that the variable explains a substantial portion of the variance in the factor. In this procedure, coefficients with an absolute value below 0.5 were eliminated, resulting in the inclusion of only those components that exhibit great relevance and effect in the construction of variables. According to Watkins, (2018), it is recommended to suppress coefficients with an absolute value below 0.5 during component analysis. This approach ensures that only items with substantial relevance and effect in variable creation are included. The process of extracting the components adhered to the Kaiser Criterion, which considers an eigenvalue of 1 or above as an indication of a distinct factor. In the context of project planning, it was found that all thirty seven (37) statements exhibited factor analysis coefficients with an absolute value over 0.3. Consequently, all of these statements were included in the construction of the composite variable representing government regulations. The results of

the Total Variance analysis demonstrate that the thirty seven (37) statements pertaining to government regulations may be effectively grouped into a single factor, as seen in Table 10. Hair et al (2012) suggest that the collective variation accounted for by all components should be within the range of 45% to 60% for social science research. This research used a criterion of 45% or more total variation explained by the retrieved component. The factor loading of the retrieved items for project planning is shown in **Appendix IV**. Table 10 presents the components (items) and the corresponding percentage of the total variance elucidated.

Table 10: Total Variance Explained for Government Regulations Variable

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	18.043	48.765	48.765	18.043	48.765	48.765
2	4.109	11.106	59.872			
3	2.902	7.844	67.716			
4	2.026	5.475	73.192			
5	1.766	4.773	77.964			
6	1.193	3.225	81.189			
7	.974	2.632	83.821			
8	.864	2.336	86.157			
9	.702	1.897	88.054			
10	.665	1.799	89.853			
11	.552	1.491	91.343			
12	.500	1.351	92.694			
13	.360	.972	93.667			
14	.308	.832	94.498			
15	.278	.751	95.250			
16	.255	.689	95.939			
17	.229	.618	96.557			
18	.211	.570	97.127			

19	.187	.506	97.632
20	.153	.414	98.046
21	.115	.310	98.357
22	.107	.288	98.645
23	.090	.244	98.889
24	.067	.180	99.069
25	.061	.164	99.233
26	.059	.158	99.391
27	.046	.124	99.515
28	.037	.099	99.615
29	.032	.088	99.702
30	.032	.086	99.788
31	.025	.068	99.857
32	.020	.055	99.912
33	.015	.042	99.954
34	.009	.023	99.977
35	.004	.012	99.989
36	.003	.007	99.996
37	.001	.004	100.000

Extraction Method: Principal Component Analysis.

4.3.4 Performance Total Variance Explained

A factor analysis was performed on the statements pertaining to performance. Factor analysis was used in the research to examine the presence of associated variables and see whether any redundant data could be removed. The analysis facilitates the examination of the interrelationships' structure via the identification and definition of various components. The process of factor analysis was used to reduce the dimensions of the statements in the Statistical Package for the Social Sciences (SPSS) software. Principal axis factoring and varimax rotation techniques were utilised for this

purpose. The aim was to reduce the amount of data and discover the latent variable items that most effectively elucidate the concept of performance.

According to Watkins, (2018), the acceptable value of factor loading is generally considered to be 0.5 or greater. This threshold indicates that the observed variable significantly contributes to the latent factor it is intended to measure. Loadings at this level suggest that the variable explains a substantial portion of the variance in the factor. In this procedure, coefficients with an absolute value below 0.5 were eliminated, resulting in the inclusion of only those components that exhibit great relevance and effect in the construction of variables. According to Watkins, (2018), it is recommended to suppress coefficients with an absolute value below 0.5 during component analysis. This approach ensures that only items with substantial relevance and effect in variable creation are included. The process of extracting the components adhered to the Kaiser Criterion, which considers an eigenvalue of 1 or above as an indication of a distinct factor. In the context of performance, it was found that two (2) out of total fifteen (15) statements exhibited factor analysis coefficients with an absolute value over 0.3. Consequently, the thirteen (13) statements were included in the construction of the composite variable representing performance while two (2) statements were eliminated. The results of the Total Variance analysis demonstrate that the twenty (20) statements pertaining to performance may be effectively grouped into a single factor, as seen in Table 11. Hair et al (2012) suggest that the collective variation accounted for by all components should be within the range of 45% to 60% for social science research. This research used a criterion of 45% or more total variation explained by the retrieved component. The factor loading of the retrieved items for community participation is shown in **Appendix IV**. Table 11 presents the components (items) and the corresponding percentage of the total variance elucidated.

Table 11: Total Variance Explained for Performance Variable

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.441	49.547	49.547	6.441	49.547	49.547
2	2.184	16.799	66.346			

3	1.525	11.732	78.078
4	.737	5.672	83.751
5	.559	4.299	88.050
6	.353	2.717	90.767
7	.263	2.023	92.789
8	.221	1.699	94.489
9	.210	1.619	96.108
10	.184	1.416	97.523
11	.140	1.078	98.601
12	.113	.872	99.473
13	.068	.527	100.000

Extraction Method: Principal Component Analysis.

4.4 Tests of statistical assumptions

The statistical assumptions were assessed in order to determine whether the data satisfied the assumptions of normality, linearity, homogeneity, and collinearity. Based on the outcomes of these tests, various measures such as central tendency, dispersion, significance tests, association tests, and prediction were conducted.

4.4.1 Linearity

Linearity refers to the state whereby the predictor variables inside a regression model have a linear or straight association with the dependent variable. This implies that there is a proportionate relationship between the change in the outcome variable and the change in the predictor variable(s). The linearity test is used to assess the fulfillment of the linearity assumption inside the regression model. This assumption has significant importance since it serves as the fundamental basis for the model. In the event that the assumption of linearity is not satisfied, it is possible that the outcomes derived from the regression model might be erroneous or deceptive. The assessment

of linearity is often conducted via the use of analysis of variance (ANOVA). ANOVA, short for analysis of variance, is a statistical procedure used to assess and compare the means of two or more distinct groups. In the realm of linearity testing, the analysis of variance (ANOVA) is used to assess the disparity in the average value of the result variable across various levels of the predictor variable(s). If the condition of linearity is met, it may be inferred that the average value of the dependent variable remains relatively constant across different values of the independent variable(s). However, in cases when the assumption of linearity is not satisfied, it is seen that the average value of the result variable exhibits non-linear variations across distinct values of the predictor variable(s).

Table 12 demonstrates a statistically significant linear relationship between the dependent variable, performance of completed road projects in arid and semi-arid counties in Kenya, and the independent variables: project planning, community participation, and government regulations. This is shown by a significance value (Sig-value) of less than 0.05 ($p < 0.05$). As presented in Table 12. The observation that the significance value for the departure from linearity is greater than 0.05 ($p > 0.05$) indicates that there is no statistically significant evidence to suggest that the relationship between the performance (predicted) and predictor variables namely; variables, namely project planning, community participation, and government regulations, deviates from linearity. This means that the linear model which this study is using is appropriate for the data, as the lack of significant departure implies that the assumptions of linearity hold true. Hence, there exists a direct correlation between project planning, community participation, government regulations and performance.

Table 12: Linearity results

Variable		Sum of Squares	F	Sig.
Performance * project planning	Linearity	25.554	120.438	.000

Variable		Sum of Squares	F	Sig.
	Deviation from Linearity	10.952	1.173	.248
Performance * community participation	Linearity	26.306	117.480	.000
	Deviation from Linearity	7.954	.888	.659
Performance * government regulations	Linearity	13.872	46.642	.000
	Deviation from Linearity	19.076	.987	.518

4.4.2 Normality Test

According to Pallant (2010), many of the statistical procedures including correlation, regression, t-tests, and analysis of variance, namely parametric tests, assume that the data follows a normal distribution or a Gaussian distribution (after Johann Karl Gauss, 1777–1855); that is, it is assumed that the populations from which the samples are taken are normally distributed. The assumption of normality is especially critical when constructing reference intervals for variables (Royston, 1991). Normality and other assumptions should be taken seriously, for when these assumptions do not hold, it is impossible to draw accurate and reliable conclusions about reality (Oztuna, 2006). According to Elliott and Woodward (2007), with large enough sample sizes (> 30 or 40), the violation of the normality assumption should not cause major problems; this implies that we can use parametric procedures even when the data are not normally distributed. In this study the sample size was above 40 and therefore normality tests had to be conducted.

The consideration of normalcy is particularly crucial when establishing reference ranges for variables (Royston, 1991). The importance of considering normality and other assumptions cannot be overstated, since the absence of these assumptions renders it unfeasible to derive precise and

dependable inferences about the nature of reality (Oztuna, 2006). The normality of the data was assessed by several statistical techniques, including the examination of skewness and kurtosis statistics, the use of a one-sample Shapiro-Wilk test, and the analysis of a normal Q-Q curve.

Table 13: skewness and kurtosis statistics

Variable	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Project planning	-.527	.191	.018	.380
Community participation	-1.006	.191	1.611	.380
Government regulations	-.572	.190	-.136	.378
Performance	-.210	.191	-.232	.380

Skewness is used to assess the magnitude by which a distribution of a variable is symmetrical; a measure of whether the distribution is too peaked is referred to as kurtosis. If the measure of skewness is 0, then the research data are perfectly symmetrical, although this is not likely in the real world data. A general rule of the thumb states that, if the level of skewness is less than -1 or greater than 1, then the distribution is highly skewed; if level of skewness is between -1 and -0.5 or between 0.5 and 1, then the distribution is moderately skewed; and if the level of skewness is between -0.5 and 0.5, then the distribution is approximately symmetric (George & Mallery, 2010). As shown in table 13, Project planning (-0.527), Community participation (-1.006), Government regulations (-0.572) and performance (-0.210), had skewness of between -1 and -0.5, a range that was considered acceptable in proving normal distribution of research data. For kurtosis, the general guideline is that if the statistic number is +2, the distribution is too peaked and when the statistic number is less than -2, the distribution is too flat. Kurtosis is said to be appropriate from a range of +2 to -2 (Brown, 2006). Therefore, statistics for the current variable as indicated for Project planning (0.018), Community participation (1.611), Government regulations (-0.136) and performance (-0.232) were in overall terms within the acceptable range.

The Shapiro-Wilk test of normality is used to assess the normality of a dependent variable across various levels of an independent variable. The Shapiro-Wilk test, a statistical technique for assessing normality, was used in this research to examine the normality of the data. In order to apply a linear model to a set of data, it is necessary for the research variables to have a normal distribution (Ghasemi & Zahedias, 2012). This assessment determines the degree of normalcy of the data by identifying the presence of skewness, kurtosis, or both. The Shapiro-Wilk test is derived from the correlation between the data and the associated normal scores (Peat & Barton, 2005). It has been shown to possess more statistical power compared to the Kolmogorov-Smirnov (K-S) test, even when the Lilliefors adjustment is used (Steinskog, 2007). The Shapiro-Wilk test is often used to assess the adequacy of a test for normality, specifically its capacity to identify whether a sample is derived from a distribution that is not normal (Thode, 2002). The Shapiro-Wilk test is often suggested by academics as the optimal method for assessing the normality of data. The Shapiro-Wilk statistics exhibit a range of values between zero and one. When the p-value (denoted as Sig.) obtained from the Shapiro-Wilk Test exceeds 0.05, it indicates that the data may be considered normally distributed. If the value is less than 0.05, the data exhibits a considerable departure from a normal distribution. The findings of the Shapiro-Wilk test are shown in Table 14.

Table 14: Shapiro-Wilk test

Variable	Shapiro-Wilk (Sig.)
Project planning	0.110
Community participation	0.231
Government regulations	0.133
Performance	0.097

According to Table 14, since the Shapiro-Wilk significant value (Sig.) is greater than 0.05, it indicates that the data follows a normal distribution. This means that for all the study variables, the assumption of normality was not violated, which is important for the validity of your statistical analyses. Having normally distributed data allows for the use of various parametric tests, enhancing the robustness of your findings.

To assess normality visually, we can utilize the output of a normal Q-Q Plot. When the data is normally distributed, the points will align closely with the diagonal line. However, if the points deviate significantly from the line in a clear non-linear manner, it indicates that the data is not normally distributed. The results of a normal Q-Q plot were used to graphically depict normality of research data distribution. As depicted in figure 2, the data for dependent variable performance of completed road projects in arid and semi-arid counties in Kenya is normally distributed.

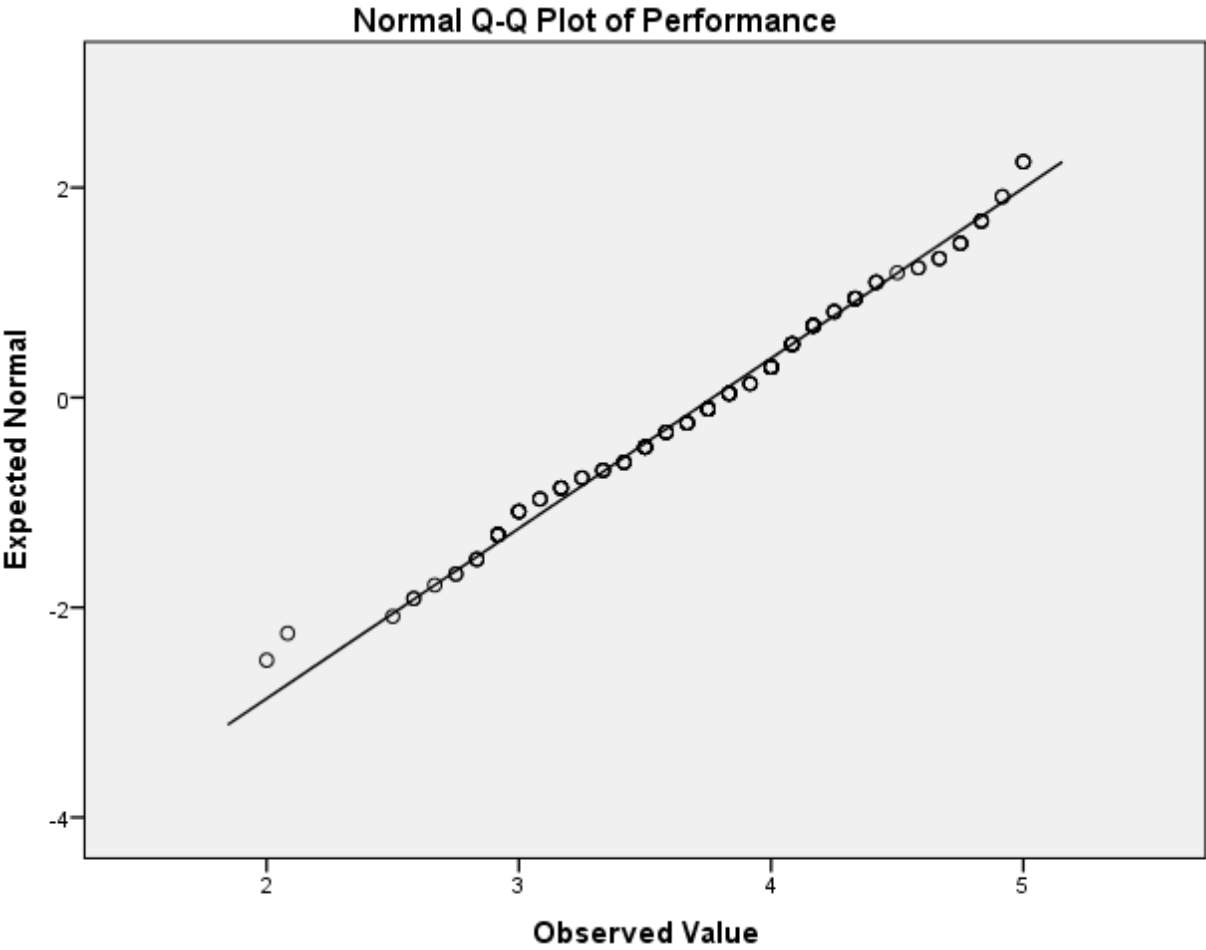


Figure 7: Normality Q-Q Plot for Performance

4.4.3 Multicollinearity Test

Multicollinearity may occur when many variables measure the same underlying construct (Hair, Money, Page, & Samouel, 2007). Multicollinearity refers to the presence of a strong correlation

among independent variables that are intended to serve as predictors of the dependent variable. The presence of Multicollinearity among the variables has a substantial effect on the regression analysis and statistical outcomes of the study. The presence of Multicollinearity may be identified by the use of Collinearity tests. According to Cohen *et al*, (2003), the suggested cut-off point for multi-Collinearity is tolerance level of 0.8. Also, Hair et al., (2006) proposed a cut-off point for determining presence of multi-Collinearity at a VIF of less than 10. Any VIF value greater than 10, indicates high variance inflation, meaning that, that variable is redundant with other variables. In this study, adopting a tolerance value of less than 0.8 and a VIF value of less than 10 is a good approach to assess multicollinearity among the independent variables. By testing these values, as shown in table 15, it is ensured that there are no significant issues related to multicollinearity, which is crucial for the reliability of the regression analyses. This step helps confirm that the relationships among the independent variables do not distort the results of the study

Table 15: Multicollinearity Test (Tolerance and VIF)

Research Variables	Collinearity Statistics	
	Tolerance	VIF
Project Planning	.816	1.225
Community participation	.563	1.776
Government regulations	.544	1.838

Table 15 presents the tolerance and VIF values for the independent variables in relation to the dependent variable. The variables' tolerance and VIF values are as follows: for Project Planning, the tolerance is 0.816 and the VIF is 1.225; for Community participation, the tolerance is 0.563 and the VIF is 1.776; and for the Government regulations, the tolerance is 0.544 and the VIF is 1.838. The research findings indicated the absence of Multicollinearity between the dependent and independent variables.

4.4.4 Homoscedasticity Test

According to Daniel (2015), the Levene test is used to assess the homogeneity or equality of variances between two samples or groups. The independent samples t-test is predicated on the assumption of essentially identical variances across the sample groups, or what is known as homogeneity of variance. This means that the variances of the groups are of the same kind or sort. The Levene test is used to assess the equality of variances between two samples, specifically examining the homogeneity of variance. The Levene test is initiated without a specific hypothesis. In this scenario, the null hypothesis posits that there is no significant difference between the variances of the first and second groups. In the context of Levene's test, it is desirable for the variances to be equal. Specifically, a non-significant result in Levene's test aligns with the assumption of the independent sample t-test, where the variances of the groups are assumed to be equal. Consequently, a non-significant outcome in the Levene's test is preferred as it indicates that the variances are not significantly different. In the SPSS software, a Levene test is automatically undertaken whenever an independent sample T-test is performed. If the significance level (Sig.) is found to be larger than 0.05, it may be concluded that Levene's Test is non-significant, indicating that equal variances are assumed.

Table 16: Levene's Test Results

Variable	Levene's Statistic	df1	df2	Sig.	Comment
Project Planning	1.001	31	119	.477	p>0.05 hence equal variance
Community participation	1.233	32	115	.428	p>0.05 hence equal variance
Government regulations	0.914	32	121	.312	p>0.05 hence equal variance

Dependent Variable: performance

The results presented in Table 16 indicate the homogeneity findings, with significant p-values for Levene's test being 0.477 for project planning, 0.428 for community participation, and 0.312 for

the external environment. Since all the p-values from Levene’s test are greater than 0.05, the test is not significant at $\alpha \leq 0.05$, confirming homogeneity.

The homogeneity test was performed using Levene’s test for equality of variances, as shown in Table 16. The Levene’s statistics for project planning, community participation, and external government regulations were 1.001, 1.233, and 0.914, respectively. Since these statistics are all below 5, the research data conforms to the assumptions of homogeneity of variances.

Homoscedasticity means that the variance of the dependent variable remains consistent across the data, while heteroscedasticity suggests that the variance of the dependent variable varies across the data.

4.5 General Characteristics of the Study Sample

Demographic data may be used to uncover sample biases such as oversampling or under sampling of certain groups. This information may then be utilised to modify the study's conclusions or to interpret them with care. Demographic data may be utilised to determine how the study's results may change among various demographic categories, such as age, gender, race, ethnicity, income, and level of education. This study sorts the following demographic data; respondent category, age, level of formal education and work experience.

4.5.1 Respondent category

This research aimed to gather data on the respondent category of the participants. The data collected from the field pertaining to the respondent category of the participants was subjected to statistical analysis, and the findings were precisely presented in Table 17.

Table 17: Respondent Category

Respondent Category	Frequency	Percent
Project managers	65	40.3
Local Community leader	74	46.0

County public works officer	22	13.7
Total	161	100.0

The finding in table 17 indicates that 74 of the study respondents representing 46 percent of the total response rate were local community leaders. The study's sample size on the local community leader's category was 88 respondents and therefore a response of 74 respondents means the local community opinions were well captured and represented in this study. The study results also indicate that the 65 of the respondents, representing 40.3 percent of the total response rate were projects managers. The study's sample size on project managers' category was 88 respondents and therefore a response of 65 respondents, it means that projects managers' opinions were well captured and represented in this study. Further the study results shows that 22 of the study respondents representing 13.7 percent of the total response rate were county public works officer. The study's sample size on the county public works officer category was 22 respondents and therefore a response of 22 respondents means all county public works officers in all 22 in arid and semi-arid counties in Kenya were well captured and represented in this study. This means that county public works officers' opinions were well captured and represented in this study. The findings in table 17 means that the responses from the three categories of study respondents were well represented and the study results will be representative opinion of all the categories.

4.5.2 Age of the Respondent

This research aimed to gather data on the age of the respondents. The data collected from the field pertaining to the age of the respondent was subjected to statistical analysis, and the findings were precisely presented in Table 18.

Table 18: Respondents Age

Age group	Frequency	Percent
18 -25 years old	10	6.2
26-35 years old	34	21.1
36-45 years old	37	23

46-55 years old	56	34.8
Over 55 years old	24	14.9
Total	161	100.0

The table 18 results show that respondents in the age group 46–55 years old were highly represented, forming 34.8 percent of the respondents, they were followed by respondents on age group 36-45 years old that formed 23 percent of the respondents and the respondents on age group 26-35 years old formed 21.1 percent of the study respondents. Lastly the respondents on age group Over 55 years old formed 14.9 percent of the respondents followed by respondents on 18 -25 years old that formed 6.2 percent of the study respondents. From the study results it can be shown that respondents with age group between 26 years old and 55 years old represented a combined percentage of 78.9 % which means that the study respondents were mature people who had knowledge on the area of study.

4.5.3 Level of Education of the Respondent

This research aimed to gather data on the Level of Education of the Respondent. The data collected from the field pertaining to the education level of the respondent was subjected to statistical analysis, and the findings were precisely presented in Table 19.

Table 19: Level of formal education

Level of Education	Frequency	Percent
Basic Education (Primary or Secondary)	10	6.2
Certificate	8	5.0
Diploma	79	49.1
Undergraduate	40	24.8
Masters	24	14.9
Total	161	100.0

The profile of the respondents as shown in table 19 shows that the study sample was made up of a well-informed respondents which has the ability to provide the study with better information which

will add potential value to the study been sought. The highest number of respondents of 49.1 percent had diploma qualifications, followed by respondents who had undergraduate bachelor's degree qualifications at 24.8 percent, while 14.9 percent of the respondents had postgraduate Master's degree qualifications. Those respondents with certificate qualifications were 5 percent and those with Basic Education (Primary or Secondary) qualifications were 6.2 percent. This shows that most of the respondents had formal qualification and understood the importance of roads to their local community prosperity. A significant portion of the respondents involved in the road projects were well educated and possessed relevant knowledge for project management. This educational background among County public works officers, project managers, and local community leaders is likely to enhance their skills, enabling them to effectively tackle tasks and meet the goals set by their institutions. Such competencies are essential for addressing challenges in project planning and execution, particularly in the context of road projects in arid and semi-arid counties. The findings in Table 19 also corroborate with the studies by King and McGrath (2002) which indicates that in today's constantly fluctuating environment, education was a major factor that impacts positively on peoples performance as well as the firms' growth.

4.5.4 Work Experience of the Respondent

This research also aimed to gather data on the work experience of the Respondent. The data collected from the field pertaining to the work experience of the respondent was subjected to statistical analysis, and the findings were precisely presented in Table 20.

Table 20: Work Experience of the respondents

Years	Frequency	Percent
Less than 5 years	11	6.8
5- 9 years	50	31.1
10- 14 years	59	36.6
More than 14 years	41	25.5
Total	161	100.0

The study finding in table 20 shows that 59 of the respondents had a work experience of between 10-14 years representing 36.6 percent of the respondents, also 50 of the respondents had a work

experience of between 5-9 years representing 31.1 percent of the respondents. Those respondents with work experience of more than 14 years were 41 respondents representing 25.5 percent while those with less than 5 years of experience were 11 respondents representing 6.8 percent of the study respondents. The findings of the study show that most of the respondents were experienced and well-positioned to provide credible information and feedback that was sought. These findings indicate that respondents who have longer working period in a given organization, projects and areas have a greater experience of how to carry out the duties effectively.

4.6 Descriptive Statistics

Descriptive statistics, namely the mean and standard deviation, were used to assess the degree of agreement on the effect of project planning, government regulations, and community participation on the performance of completed road projects in arid and semi-arid counties in Kenya. The high mean value indicates a strong agreement with the claims, while the standard deviation provides information about the extent of variation from the mean.

4.6.1 Descriptive Statistics of variable Project Planning

The aim of the study was to evaluate how project planning impacts the performance of finished road projects in arid and semi-arid counties in Kenya. To achieve this, the study adopted a five point likert scale in which the respondents were requested to indicate the extent to which they supported some attributes in project planning. The rating was on a Liker-type scale of 1 to 5 where 1= strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. The research responses were rated using mean and standard deviation to summarize the findings of the study as shown in table 21.

Table 21: Project Planning

Statement	Mean	Std. Deviation
Project is completed without any struggle PP_CM_10	4.22	.834
Budget for the project is properly determined PP_CM_9	4.18	.858
The budgeted funds is enough to complete the project PP_CM_8	4.15	.903
The project planning platform offers better project cost management tools than the traditional methods PP_CM_1	4.10	.831

Statement	Mean	Std. Deviation
Cost management from project planning is easy to understand thus enabling faster decision making PP_CM_6	4.10	.903
The modeling of exact materials enables the exact estimation of material costs PP_CM_4	4.04	.869
Time helps in setting goals of the project PP_TM_1	3.98	.873
Activity duration was well estimated PP_TM_6	3.96	.858
Project planning generates more accurate cost management within a much shorter period than the traditional methods PP_CM_2	3.95	.812
Project cost is well estimated PP_CM_7	3.94	.861
Cost management which are planned tend to be more dependable PP_CM_3	3.93	.830
Carrying out a value engineering exercise is easier on the project cost management platform PP_CM_5	3.93	.852
All projects were completed on the agreed time PP_TM_8	3.93	.932
The project was completed on the original(planned) schedule PP_TM_7	3.92	.922
Project management tools and Techniques (PMTT) contributes significantly to project implementation success. PP_RM_1	3.89	.878
Risk assessment during the program cycle is essential PP_RM_6	3.89	.859
Lack of project risk management skills has contributed to failure of programs. PP_RM_4	3.88	.857
Schedules were well developed PP_TM_5	3.87	.845
Inadequate frameworks for risk management structures for mitigation of risks have led to failure in implementation of projects PP_RM_2	3.86	.884
Time helps in prioritizing for a better performance PP_TM_2	3.86	.898
All material resources allocated are well utilised PP_SM_8	3.86	.877
Project organization was well communicated during scope planning phase PP_SM_6	3.85	.882
Risk management area has received considerable attention by management during project implementation. PP_RM_5	3.85	.903
It shows chronological order of project activities PP_TM_3	3.84	.870
Appropriate resources is provided PP_SM_7	3.84	.898
Project Scope is well specified PP_SM_9	3.84	.870
The duration of the project is clearly planned for during scope planning PP_SM_3	3.83	.905

Statement	Mean	Std. Deviation
The organisation identifies clear path of the project PP_TM_9	3.82	.921
Adoption of project management approach assists in eliminating the wastage of time which have been directed to tasks that are irrelevant. PP_RM_3	3.81	.882
All activities to be carried out during the project execution are defined during scope planning PP_SM_1	3.81	.984
During scope planning, resources required for the project are set out in the project plan PP_SM_2	3.78	.899
The project scope is well specified during planning phase PP_TM_4	3.78	.866
The views of all project stakeholders are taken into account in scope planning PP_SM_4	3.72	.995
Scope planning is a very important step in ensuring successful implementation of a project PP_SM_5	3.71	.920
Average	3.91	0.883

Results in table 21 gives aggregate mean score of 3.91 and a standard deviation of 0.883. High value of the aggregate mean shows that the respondents affirmed that project planning factors were relevant and important towards determining the performance of completed road projects in arid and semi-arid counties in Kenya. Majority of the respondents strongly agreed with project planning statement with a mean of 4.22 and standard deviation of 0.834 that Project is completed without any struggle, they also strongly agreed with a mean of 4.18 and standard deviation of 0.858 that Budget for the project is properly determined. The respondents also strongly agreed with a mean of 4.15 and standard deviation of 0.903 that the budgeted funds is enough to complete the project and with a mean of 4.10 and standard deviation of 0.831 that the project planning platform offers better project cost management tools than the traditional methods. The respondents also strongly agreed with project planning factor with a mean of 4.10 and standard deviation of 0.904 that Cost management from project planning is easy to understand thus enabling faster decision making. Additionally the respondents agreed with a mean of 4.04 and standard deviation of 0.869 that the modeling of exact materials enables the exact estimation of material costs and with a mean of 3.98

and standard deviation of 0.873 they agreed with statement that time helps in setting goals of the project.

Additionally the respondents agreed with project planning statement that activity duration was well estimated with a mean of 3.96 and standard deviation of 0.853. They also agreed with a mean of 3.96 and standard deviation of 0.812 that project planning generates more accurate cost management within a much shorter period than the traditional methods. Further the respondents agrees that Project cost is well estimated with a mean of 3.94 and standard deviation of 0.861 and with a mean of 3.93 and standard deviation of 0.830 that Cost management which are planned tend to be more dependable. The respondents also concurred with project planning statement with a mean of 3.93 and standard deviation of 0.852 that carrying out a value engineering exercise is easier on the project cost management platform. They also agreed with a mean of 3.93 and standard deviation of 0.932 that all projects were completed on the agreed time and with a mean of 3.92 and standard deviation of 0.922 that the project was completed on the original (planned) schedule. Further the respondents agreed with mean of 3.89 and standard deviation of 0.878 that project management tools and techniques (PMTT) contributes significantly to project implementation success and that Risk assessment during the program cycle is essential with a mean of 3.89 and standard deviation of 0.859.

The respondents concurred with the a mean of 3.82 and standard deviation of 0.921 that the organisation identifies clear path of the project and a mean of 3.81 and standard deviation of 0.882 that adoption of project management approach assists in eliminating the wastage of time which have been directed to tasks that are irrelevant. They also concurred with statements that all activities to be carried out during the project execution are defined during scope planning with mean of 3.81 and standard deviation of 0.984. They also concurred with a mean of 3.78 and standard deviation of 0.899 that during scope planning, resources required for the project are set out in the project plan. The respondents also concurred with a mean of 3.78 and standard deviation of 0.866 that the project scope is well specified during planning phase, they further concurred with statements that the views of all project stakeholders are taken into account in scope planning and

that the scope planning is a very important step in ensuring successful implementation of a project with a mean of 3.72 and 3.71 and standard deviation of 0.995 and 0.920 respectively.

4.6.2 Community Participation

The objective of the study was to evaluate the mediating effect of community participation on the relationship between project planning and the performance of completed road projects in arid and semi-arid counties in Kenya. To accomplish this, the study utilized a five-point Likert scale, asking respondents to indicate the degree to which they agreed with various attributes related to community participation. The scale ranged from 1 to 5, where 1 represented "strongly disagree," 2 indicated "disagree," 3 was "neutral," 4 meant "agree," and 5 stood for "strongly agree." The research responses were analyzed using mean and standard deviation to summarize the findings, as presented in Table 22.

Table 22: Community Participation

Statement	Mean	Std. Deviation
The community empowerment provide them with complete freedom to take up judicious decisions on project performance CP_CE_2	3.93	.916
Involving Community members in monitoring of project progress is helpful in ensuring project effectiveness CP_CE_8	3.93	.898
Community members are allowed to share information which is an effective way of reducing costs during project performance CP_CE_1	3.91	.900
Community empowerment encourages participative decision making during project performance CP_CE_3	3.87	.874
Community members intercommunication leads to allocation of right authority for effective project performance CP_CI_8	3.86	.818
This firm has in place a good stakeholder grievance management system CP_CGM_2	3.86	.737
Community members involvement in management of funds enable smooth running of the program CP_CE_7	3.85	.831
Community members are fully involved in the entire project management cycle CP_CE_4	3.84	.898
Community members grievances can derail project success CP_CGM_1	3.84	.848

Statement	Mean	Std. Deviation
Community members' analysis allows the project managers to determine what motivates the community to the project CP_CI_5	3.84	.912
Organizations consider strong intercommunication between team members and community members CP_CI_7	3.84	.771
Training of the Community members improves the capability of making decisions of the program CP_CE_6	3.84	.908
Community members' views are considered in decision making with regard to projects CP_CI_4	3.83	.970
We regularly share information with Community members CP_CI_3	3.83	.891
Involving Community members in identification of project has enabled the project to be relevant to their needs CP_CE_10	3.82	.880
Community members involvement help in creating ownership of the project CP_CE_5	3.81	.891
Throughout the project, each Community member is managed to ensure their expressions are being met CP_CI_6	3.76	.905
Involving Community members in project risk management has made the project work better CP_CE_9	3.76	.941
Community intercommunication is key in attaining success of project performance CP_CI_1	3.76	.927
There exists a Community intercommunication framework in project performance CP_CI_2	3.71	.996
Average	3.71	0.996

Results in table 22 gives aggregate mean score of 3.71 and a standard deviation of 0.996. The moderate value of the aggregate mean value shows that the respondents affirmed that community participation factors need to be improved in order to be effective towards the performance of completed road projects in arid and semi-arid counties in Kenya. Majority of the respondents strongly agreed with community participation statement with a mean of 3.93 and standard deviation of 0.916 that community empowerment provide them with complete freedom to take up judicious decisions on project performance, they also strongly agreed with a mean of 3.93 and standard deviation of 0.898 that involving Community members in monitoring of project progress is helpful in ensuring project effectiveness. The respondents also highly ranked statement that

Community members are allowed to share information which is an effective way of reducing costs during project performance with a mean of 3.91 and standard deviation of 0.900. Moreover the respondents also strongly agreed with a mean of 3.87 and standard deviation of 0.874 that the community empowerment encourages participative decision making during project performance.

Additionally the respondents agreed with a mean of 3.86 and standard deviation of 0.818 that the community members' intercommunication leads to allocation of right authority for effective project performance. They also agreed with a mean of 3.86 and standard deviation of 0.737 that the firm has in place a good stakeholder grievance management system and that the community member's involvement in management of funds enable smooth running of the program with a mean of 3.85 and standard deviation of 0.831. It was also agreed with a mean of 3.84 and standard deviation of 0.898 that the community members are fully involved in the entire project management cycle and that the community member's grievances can derail project success with a mean of 3.84 and standard deviation of 0.848. They respondents also concurred with statement that the community members' analysis allows the project managers to determine what motivates the community to the project with a mean of 3.84 and standard deviation of 0.912. The respondents further reported with a mean of 3.84 and standard deviation of 0.717 that organizations consider strong intercommunication between team members and community members and that training of the community members improves the capability of making decisions of the program with a mean of 3.84 and standard deviation of 0.908. They also agreed that with a mean of 3.83 and standard deviation of 0.970 that community members' views are considered in decision making with regard to projects.

Further the respondents fairly agreed with a mean of 3.83 and standard deviation of 0.891 with statement that they regularly share information with community members and that involving Community members in identification of project has enabled the project to be relevant to their needs with a mean of 3.83 and standard deviation of 0.880. Additionally the respondents reported with a mean of 3.81 and standard deviation of 0.891 that the Community member's involvement helps in creating ownership of the project. The respondents also concurred with a mean of 3.76

and standard deviation of 0.905 that throughout the project, each Community member is managed to ensure their expressions are being met. They also fairly concurred a mean of 3.76 and standard deviation of 0.941 that involving Community members in project risk management has made the project work better and that community intercommunication is key in attaining success of project performance a mean of 3.76 and standard deviation of 0.927. Finally the respondent reported with a mean of 3.71 and standard deviation of 0.996 that there exists a community intercommunication framework in project performance.

4.6.3 Government Regulations Descriptive Statistics

The aim of the study was to evaluate the moderating effect of government regulations on the relationship between project planning and the performance of completed road projects in arid and semi-arid counties in Kenya. To achieve this, the study employed a five-point Likert scale, asking respondents to indicate how much they agreed with various statements regarding government regulations. The scale ranged from 1 to 5, where 1 meant "strongly disagree," 2 indicated "disagree," 3 was "neutral," 4 represented "agree," and 5 stood for "strongly agree." The responses were analyzed using mean and standard deviation to summarize the findings, as illustrated in Table 23.

Table 23: Government Regulations

Statement	Mean	Std. Deviation
Law provides a transparent process for road projects GR_RF_2	4.16	.873
KeNHA effectively implements environmental policies GR_CC_13	4.15	.868
There is a clear institutional framework for approval of road projects GR_RF_1	4.09	.865
National government listen to grievances presented to them by the community members CP_CGM_8	4.09	.840
A clear policy framework helps public sector to understand the core rationale in road projects construction GR_RF_3	4.06	.875
KeRRA board eliminates unfair competition for work among road construction personnel GR_CC_12	4.02	.782
KeRRA effectively implements environmental policies GR_CC_15	4.01	.829
KURA effectively implements environmental policies GR_CC_14	4.00	.844

Statement	Mean	Std. Deviation
KeNHA carries out on-site inspection GR_CC_16	3.99	.848
KeNHA standardizes construction techniques and material GR_CC_22	3.98	.778
KeRRA promotes continuous professional development of road construction personnel GR_CC_6	3.97	.720
County government listen to grievances presented to them by the community members CP_CGM_9	3.96	.828
There is regular follow up to ensure that right decision is made that is satisfactory to all parties CP_CGM_3	3.96	.817
KURA carries out on-site inspection GR_CC_17	3.96	.745
The process of approving road plans is long leading to delays in project delivery. GR_RF_13	3.96	.817
Enacted Laws have penalties on errand contractors to increase compliance GR_RF_10	3.91	.805
A clear policy framework helps the private sector to understand the core rationale in road projects construction GR_RF_4	3.91	.914
The government has adequate institution capacity to enforce the building construction regulations GR_RF_9	3.90	.776
KeRRA certifies road constructors GR_CC_21	3.89	.730
KURA certifies road constructors GR_CC_20	3.89	.811
Government involves the stakeholders in policy formulation GR_RF_11	3.88	.794
KURA board eliminates unfair competition for work among road construction personnel GR_CC_11	3.86	.762
Community members are actively engage in problem solving process CP_CGM_5	3.86	.771
KeNHA certifies road constructors GR_CC_19	3.86	.779
Government roads department issues construction permits on time GR_RF_12	3.86	.805
KeNHA ensures that road construction personnel are licensed in road projects management GR_CC_1	3.85	.808
Adequate regulatory framework are proven drivers for successful completion of road projects GR_RF_5	3.85	.838
KeRRA standardizes construction techniques and material GR_CC_24	3.84	.749

Statement	Mean	Std. Deviation
KeRRA ensures that road construction personnel are licensed in road projects management GR_CC_3	3.83	.752
There exist good relationships between stakeholders in road projects CP_CGM_6	3.83	.826
KURA ensures that road construction personnel are licensed in road projects management GR_CC_2	3.82	.798
KURA promotes continuous professional development of road construction personnel GR_CC_5	3.81	.754
When the decision is not satisfactory at the local level, there is an opportunity to take it to higher offices CP_CGM_7	3.80	.797
KURA ensures enhancement of ethical practice by road construction personnel GR_CC_8	3.80	.697
KURA standardizes construction techniques and material GR_CC_23	3.80	.852
KeNHA promotes continuous professional development of road construction personnel GR_CC_4	3.80	.792
KeNHA ensures enhancement of ethical practice by road construction personnel GR_CC_7	3.79	.794
There is documented evidence of community members grievances from projects ending up in courts of law CP_CGM_4	3.77	.793
A combination of the leading features of both the public and private partners produces a higher value road projects GR_RF_6	3.75	.793
Regulations issue guidelines for the management of natural resources during road construction GR_RF_8	3.71	.856
KeNHA board eliminates unfair competition for work among road construction personnel GR_CC_10	3.70	.706
KeRRA ensures enhancement of ethical practice by road construction personnel GR_CC_9	3.70	.750
KeRRA carries out on-site inspection GR_CC_18	3.65	.825
Regulations enforces effective mitigation measures for significant negative impacts of road construction projects GR_RF_7	3.58	.905
Average	3.88	0.804

Results in table 23 gives aggregate mean score of 3.88 and a standard deviation of 0.804. The moderate value of the aggregate mean score shows that the respondents affirmed that government

regulations factors need to be improved in order to be effective towards the performance of completed road projects in arid and semi-arid counties in Kenya. Majority of the respondents strongly agreed with government regulation statement with a mean of 4.16 and standard deviation of 0.873 that the Law provides a transparent process for road projects, they also strongly agreed with a mean of 4.15 and standard deviation of 0.868 that KeRRA effectively implements environmental policies. The respondents strongly agreed with a mean of 4.09 and standard deviation of 0.865 that there is a clear institutional framework for approval of road projects and that the National government listen to grievances presented to them by the community members with a mean of 4.09 and standard deviation of 0.840. The respondents also strongly agreed with a mean of 4.06 and standard deviation of 0.875 that the KeNHA clear policy framework helps public sector to understand the core rationale in road projects construction, they further strongly agreed with a mean of 4.02 and standard deviation of 0.782 that the KeRRA board eliminates unfair competition for work among road construction personnel and that KeRRA effectively implements environmental policies with a mean of 4.01 and standard deviation of 0.829.

The respondents further agreed that with a mean of 4.00 and standard deviation of 0.844 that KURA effectively implements environmental policies and KeNHA carries out on-site inspection with a mean of 3.99 and standard deviation of 0.848. The respondents agreed that KeNHA standardizes construction techniques and material and KeRRA promotes continuous professional development of road construction personnel with a mean of 3.98 and 3.97 and standard deviation of 0.778 and 0.720 respectively. Further majority of respondents reported with a mean value of 3.96 and standard deviation of 0.828 that the county government listens to grievances presented to them by the community members they also reported with a mean value of 3.96 and standard deviation of 0.817 that there is regular follow up to ensure that right decision is made that is satisfactory to all parties. Majority with a mean value of 3.96 and standard deviation of 0.745 reported that KURA carries out on-site inspection and that the process of approving road plans is long leading to delays in project delivery with a mean value of 3.96 and standard deviation of 0.815.

Majority of the respondents also concurred with a mean value of 3.91 and standard deviation of 0.805 that the Enacted Laws have penalties on errand contractors to increase compliance and with a mean value of 3.91 and standard deviation 0.914 they agreed that a clear policy framework helps the private sector to understand the core rationale in road projects construction.

They further concurred with a mean value of 3.90 and standard deviation of 0.776 that the government has adequate institution capacity to enforce the building construction regulations. It was also reported with a mean value of 3.89 and standard deviation of 0.730 and 0.811 that the KeRRA and KURA certifies road constructors and that the Government involves the stakeholders in policy formulation with a mean value of 3.88 and standard deviation of 0.794.

The respondents also concurred with a mean value of 3.86 and standard deviation of 0.762 that KURA board eliminates unfair competition for work among road construction personnel and that the community members are actively engage in problem solving process. They also agreed with a mean value of 3.86 and standard deviation of 0.805 that the government roads department issues construction permits on time and that KeNHA ensures that road construction personnel are licensed in road projects management with a mean value of 3.85 and standard deviation of 0.808. The respondents also concurred with a mean value of 3.85 and standard deviation of 0.808 that adequate regulatory framework are proven drivers for successful completion of road projects and that there exists a good relationships between stakeholders in road projects with a mean value of 3.83 and standard deviation of 0.826.

Additionally the respondents fairly agreed with a mean value of 3.77 and standard deviation of 0.793 that there is documented evidence of community member's grievances from projects ending up in courts of law and with a mean value of 3.75 and 0.793 agreed to statement that a combination of the leading features of both the public and private partners produces a higher value road projects. Further the respondents fairly concurred that the regulations issue guidelines for the management of natural resources during road construction with a mean value of 3.71 and standard deviation 0.856. They also agreed with a mean value of 3.70 and standard deviation of 0.750 that KeRRA ensures enhancement of ethical practice by road construction personnel and that KeRRA carries out on-site inspection with a mean value of 3.65 and standard deviation of 0.825. They finally

agreed with a mean value of 3.58 and standard deviation of 0.905 that the regulations enforce effective mitigation measures for significant negative impacts of road construction projects.

4.6.4 Performance of Road Projects Descriptive Statistics

The aim of the study was to evaluate the performance of road projects in arid and semi-arid counties in Kenya. To accomplish this, the study utilized a five-point Likert scale, where respondents were asked to indicate the degree to which they agreed with various attributes related to performance. The scale ranged from 1 to 5, with 1 representing "strongly disagree," 2 as "disagree," 3 as "neutral," 4 as "agree," and 5 as "strongly agree." The research responses were analyzed using mean and standard deviation to summarize the findings, as presented in Table 24.

Table 24: Performance of Road Projects

Statement	Mean	Std. Deviation
Stakeholders are always satisfied with the project outcome PER_5	4.10	.868
Contractors deliver road projects that meet clients' quality PER_4	4.04	.883
Contractors complete road projects within the given time limit PER_3	3.98	.798
The firm flexibly adjusts project focus in case of challenges PER_6	3.98	.844
The firm creatively solves problems related to projects PER_8	3.96	.774
A project is considered successful when it meets the need of stakeholders PER_12	3.93	.803
Road project is completed within the budgeted cost PER_2	3.91	.890
Project success will be determined by timely completion of the project PER_14	3.91	.840
The firm is able to handle unpredictable work situations PER_7	3.91	.696
Contractors undertake road projects PER_1	3.90	.823
When a project achieves the desired outcome, it's considered successful PER_11	3.86	.939
Performance is associated with several factors (such as time, cost, quality, client satisfaction, productivity, and safety) PER_10	3.85	.768
Situation assessments is performed to enable us detect early cues or changes in projects requirement PER_9	3.83	.826
Average	3.83	0.827

Results in table 24 gives aggregate mean score of 3.83 and a standard deviation of 0.827. This shows that the performance of road projects in arid and semi-arid counties in Kenya was moderate because the composite mean value of all the items measures of performance was 3.83 and a standard deviation of 0.827 on a five point likert scale of 1 to 5. The respondents agreed with a mean value of 4.10 and standard deviation of 0.868 that the stakeholders are always satisfied with the project outcome and with a mean value of 4.04 and standard deviation of 0.883 that the contractors deliver road projects that meet clients' quality. They also agreed with a mean value of 3.98 and standard deviation of 0.798 that the contractors complete road projects within the given time limit and with a mean value of 3.98 and standard deviation of 0.844 that the firm flexibly adjusts project focus in case of challenges. They also reported that the firm creatively solves problems related to projects with a mean value of 3.96 and standard deviation of 0.744 and that a project is considered successful when it meets the need of stakeholders with a mean value of 3.93 and standard deviation of 0.803. The respondents further agreed with a mean value of 3.91 and standard deviation of 0.890 that the Road project is completed within the budgeted cost and that project success will be determined by timely completion of the project with a mean value of 3.91 and standard deviation of 0.840.

Additionally the respondents agreed with a mean value of 3.91 and standard deviation of 0.696 that the firm is able to handle unpredictable work situations. They also reported with a mean value of 3.90 and standard deviation of 0.823 that the contractors undertake road projects and that when a project achieves the desired outcome, it's considered successful with a mean value of 3.86 and standard deviation of 0.939. The respondents concurred with a mean value of 3.85 and standard deviation of 0.768 that the performance is associated with several factors (such as time, cost, quality, client satisfaction, productivity, and safety). Finally with a mean value of 3.83 and standard deviation of 0.826 the respondents agreed that the situation assessment is performed to enable us detect early cues or changes in projects requirement.

4.7 Inferential statistics

The researcher aimed to examine the bivariate connection between the study variables: project planning, community participation, government regulations and performance of road projects. The

primary focus of this analysis was the Pearson correlation finding. Additionally, the research aimed to examine the study hypotheses, and the regression method was applied to achieve this objective.

4.7.1 Correlation analysis

According to Sekaran and Bougie (2010), Pearson correlation analysis is a statistical method used to determine the strength, direction, and significance of the link between two variables. A positive correlation coefficient indicates a greater degree of relationship between variables. Moreover, the correlation might exhibit either a positive or negative value, contingent upon the nature of the association between the variables (Hair et al., 2007).

Table 25: Correlation Analysis Results

		Performanc e	Project planning	Community participation	Government regulations
Performance	Pearson Correlation	1	.648**	.657**	.477**
	Sig. (2-tailed)		.000	.000	.000
	N	161	161	161	161
Project planning	Pearson Correlation	.648**	1	.651**	.368**
	Sig. (2-tailed)	.000		.000	.000
	N	161	161	161	161
Community participation	Pearson Correlation	.657**	.651**	1	.406**
	Sig. (2-tailed)	.000	.000		.000
	N	161	161	161	161
Government regulations	Pearson Correlation	.477**	.368**	.406**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	161	161	161	161

***. Correlation is significant at the 0.01 level (2-tailed).*

The correlation findings showed that there is a strong positive significant relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya since the $r=0.648$ and $p\text{-value}<0.001$. On the relationship between community participation and performance of road projects in arid and semi-arid counties in Kenya, the study results showed that there is strong positive significant relationship since the $r=0.657$ and $p\text{-value}<0.001$. On the relationship between government regulation and performance of road projects in arid and semi-arid counties in Kenya, the study results showed that there was moderate positive significant relationship since the $r=0.477$ and $p\text{-value}<0.001$. These results emphasize on the critical significance of project planning, community participation and government regulations on project planning and performance of road projects in arid and semi-arid counties in Kenya.

4.8 Regression Analysis and Test of Hypotheses

Regression analysis, which includes simple regression analysis, multiple regression analysis, and stepwise regression analysis, along with Pearson's product correlation analysis, was employed to identify the type and extent of the relationships between the variables being studied. This approach was also used to test the proposed hypotheses. Hypotheses were formulated in accordance with the study goals. The hypotheses were tested using simple regression analysis to test the direct association hypothesis one, stepwise regression analysis to examine the indirect hypotheses two and three, and multiple regression analysis to evaluate hypothesis four. The selection of the appropriate analytical instrument was determined by the study's purpose, the nature of the data, and the measurement scales used. The hypotheses were evaluated using a 95 percent confidence level ($\alpha = 0.05$), so the decision to reject or fail to reject a null hypothesis was made based on the calculated p-values. In instances where the p-value is less than 0.05, the research has rejected the null hypotheses. Conversely, when the p-value is greater than 0.05, the study has failed to reject the hypotheses. The analysis of data and subsequent discussions also included the examination of correlations (R), coefficients of determination (R^2), F-statistic values (F), and beta values (β). Moreover, when the F-statistic increases, the level of significance of the model also increases. The impact of the independent variable on the dependent variable, whether positive or negative, was elucidated by examining the sign of the beta (β) coefficient. The R-value quantifies the degree of

association between variables, whereas t-values indicate the statistical significance of individual variables. The results are given in accordance with the study's goals and accompanying hypotheses.

4.8.1 Effect of project planning on performance of completed road projects

This part pertains to the primary research purpose of the study, which aimed to assess the effect of project planning on performance of completed road projects in arid and semi-arid counties in Kenya. The accomplishment of this objective was realised by the systematic examination of the proposed hypothesis in the following manner:

Ho1: There is no significant effect of project planning on performance of completed road projects in arid and semi-arid counties in Kenya.

The use of basic linear regression, which produced the regression coefficients, coefficient of determination (R^2), analysis of variance (ANOVA), and model coefficients, allowed for the evaluation of the hypothesis' statistical significance. The examination included assessments of goodness of fit in terms of overall significance, individual significance, and diagnostic testing. The aforementioned results are shown in Table 26, Table 27, and Table 28.

Table 26: Model summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change
					F Change	df1	df2	
.648 ^a	.420	.416	.47153	.420	114.931	1	159	.000

a. Predictors: (Constant), Project planning

According to the data shown in Table 26, the model demonstrated a high level of accuracy in predicting the effect of the independent variable, namely project planning, on the performance of completed road projects in arid and semi-arid counties in Kenya. The coefficient of determination the adjusted R-square (R^2) for this relationship was calculated to be 0.416. This finding suggests that the concept of project planning accounted for 41.6% of the observed differences in the performance of road projects in arid and semi-arid counties in Kenya. Additionally, it can be

inferred that 58.4% of the observed variances in the performance of road projects in arid and semi-arid counties in Kenya may be attributed to unaccounted components within the current model.

Table 27: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	25.554	1	25.554	114.931	.000 ^b
Residual	35.352	159	.222		
Total	60.906	160			

a. Dependent Variable: Performance

b. Predictors: (Constant), Project planning

In order to assess the statistical performance of the regression model used in this work, an analysis of variance (ANOVA) test was conducted. The results of this test are shown in Table 27. The analysis of variance (ANOVA) findings (F = 114.931, p-value = 0.000) suggest that the regression model exhibited statistical significance and effectively captured the associations between project planning and performance of road projects in arid and semi-arid counties in Kenya.

Table 28: Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	.097	.345		.282	.778	-.583	.778		
Project planning	.917	.086	.648	10.721	.000	.748	1.086	1.000	1.000

a. Dependent Variable: Performance

The effect of project planning was found to be statistically significant at the individual level ($\beta = 0.648$, $t = 10.721$, $p\text{-value} = 0.000 < 0.05$), as shown in Table 28. This finding suggests that there is a positive relationship between project planning and the performance of road projects in arid and semi-arid counties in Kenya. Specifically, for each unit increase in project planning, there is a corresponding gain of 0.917 units in performance of road projects, assuming all other parameters remain the same. The relationship between the variables may be mathematically represented by the equation $Y = 0.097 + 0.917X$. The correlation between the variables is positive. In conclusion, the findings of this study offer empirical support for the notion that project planning has a significant impact on the performance of completed road projects in arid and semi-arid counties in Kenya. As a result, the null hypothesis (H_{01}), which posited that *there is no significant effect of project planning on performance of completed road projects in arid and semi-arid counties in Kenya*, was rejected. Consequently, the researcher concluded that there is indeed a significant effect of project planning on the performance of road projects in arid and semi-arid counties in Kenya.

4.8.2 Mediation effect of community participation on the relationship between project planning and performance of road projects

The second aim of this study was to assess how community participation acts as a mediator in the relationship between project planning and the performance of road projects in arid and semi-arid counties in Kenya. To explore this, a stepwise regression analysis was performed to analyze the connection between community participation and project planning, while also determining how well community participation predicts the performance of road projects in these regions. The following is a stepwise study illustrating both direct and indirect relationships, based on the methodology proposed by Baron and Kenny (1986).

1. Project Planning Predicting Performance of road projects

This step aimed to validate the significance of the relationship between project planning (X) and the performance of road projects in arid and semi-arid counties in Kenya (Y), represented as $X \rightarrow Y$. As indicated in Table 26, Table 27, and Table 28, when project planning is held constant, the

performance of road projects in arid and semi-arid counties in Kenya remains at 0.097. This suggests that the relationship is consistent and provides important insights into the impact of project planning on project performance.. In addition, an enhancement in project planning by a solitary unit leads to an increase in performance of road projects in arid and semi-arid counties in Kenya by 0.917 units with a p-value of $0.000 < 0.05$. Findings shows that adjusted R-squared = 0.416 with F-calculated = 114.931 at a 2-tailed test at 95% confidence level and a p-value = $0.000 < 0.05$ as well as a significant positive elasticity (0.917). This implies that, project planning significantly predict constant performance of road projects in arid and semi-arid counties in Kenya: $Y = 0.097 + 0.917X$.

2. Project planning predicting community participation

This step was intended to confirm whether the relationship between project planning (X) and community participation (Z) is significance of illustrated as $X \rightarrow Z$.

Table 29: Model summary for project planning and community participation

R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics F Change	df1	df2	Sig. F Change
.651 ^a	.424	.420	.38574	.424	116.991	1	159	.000

a. Predictors: (Constant), Project Planning

Results in table 29 show an adjusted R-Square of 0.420 with Sig= 0.000 where p-value<0.05. This implies that project planning explains 42% percent of the variation in community participation.

Table 30: Analysis of Variance (ANOVA) on project planning and community participation

	Sum of Squares	df	Mean Square	F	Sig.
Regression	17.408	1	17.408	116.991	.000 ^b
Residual	23.659	159	.149		
Total	41.066	160			

a. Dependent Variable: Community participation

b. Predictors: (Constant), Project planning

As shown in table 30, $F_{\text{calculated}} = 116.991$ at 2-tail test and 95% confidence level. Results also show $p\text{-value} = 0.000 < 0.05$. This further enhances the inference that project planning significantly influences community participation.

Table 31: Regression Coefficients on project planning and community participation

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.839	.282		2.978	.003
Project planning	.757	.070	.651	10.816	.000

a. Dependent Variable: Community participation

Findings as shown in table 31 show that, when project planning is held constant, community participation remains at 0.839. Additionally, a one unit increase in project planning leads to an increase in community participation by 0.757 units with a $p\text{-value} < 0.05$. Consequently, the researcher summarizes that, project planning significantly and positively predicts community participation as summarized by the following model:

$$Z = 0.839 + 0.757X$$

3. Community participation predicting performance of completed road projects

This step was intended to confirm whether the relationship between community participation (Z) and performance of road projects (Y) is significance of illustrated as $Z \rightarrow Y$.

Table 32: Model summary for community participation and performance of completed road projects

R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change
					F Change	df1	df2	
.657 ^a	.432	.428	.46649	.432	120.886	1	159	.000

a. Predictors: (Constant), Community participation

Results in table 32 show an adjusted R-Square of 0.428 with Sig= 0.000 where p-value<0.05. This implies that community participation explains 42.8% percent of the variation performance of road projects in arid and semi-arid counties in Kenya.

Table 33: Analysis of Variance (ANOVA) on community participation and performance of completed road projects

	Sum of Squares	df	Mean Square	F	Sig.
Regression	26.306	1	26.306	120.886	.000 ^b
Residual	34.600	159	.218		
Total	60.906	160			

a. Dependent Variable: performance of road projects

b. Predictors: (Constant), Community participation

As shown in table 33, F-calculated = 120.886 at 2-tail test and 95% confidence level. Results also show p-value = 0.000 < 0.05. This further enhances the inference that community participation significantly influences performance of road projects in arid and semi-arid counties in Kenya.

Table 34: Regression Coefficients on community participation and performance of road projects

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.672	.284		2.365	.019
Community participation	.800	.073	.657	10.995	.000

a. Dependent Variable: performance of road projects

Findings as shown in table 34 show that, when community participation is held constant, performance of completed road projects remains at 0.672. Additionally, a one unit increase in community participation leads to an increase in performance of road projects by 0.800 units with a p-value of 0.000 < 0.05. Consequently, the researcher summarizes that, community participation

significantly and positively predicts performance of road projects in arid and semi-arid counties in Kenya as summarized by the following model:

$$Y = 0.672 + 0.800Z$$

4. Project planning and community participation predicting performance of road projects

This step was intended to confirm whether project planning (X) and community participation (Z) significantly performance of road projects in arid and semi-arid counties in Kenya expressed as $Z|X \rightarrow Y$

Table 35: Coefficient of Determination on project planning and community participation predicting performance of road projects

R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change
					F Change	df1	df2	
.718 ^a	.516	.510	.43203	.516	84.159	2	158	.000

a. Predictors: (Constant), Project planning, Community participation

The findings shown in Table 35 indicate that the adjusted R-Square value is 0.510, which is statistically significant at a significance level of 0.05. The p-value of 0.00 further supports this conclusion. This finding suggests that there is a significant relationship between project planning and community participation on performance of road projects in arid and semi-arid counties in Kenya, accounting for 51% percent of the observed variance. This implies that the effect of project planning and community participation on performance of road projects in arid and semi-arid counties in Kenya is high. Additionally, this finding suggests that a 49% percent of the observed differences in performance of road projects in arid and semi-arid counties in Kenya cannot be accounted for just by the variables of project planning and community participation included in this particular model.

Table 36: Analysis of Variance (ANOVA) on project planning and community participation predicting performance of road projects

	Sum of Squares	df	Mean Square	F	Sig.
Regression	31.416	2	15.708	84.159	.000 ^b
Residual	29.490	158	.187		
Total	60.906	160			

a. Dependent Variable: performance of road projects

b. Predictors: (Constant), Project planning, Community participation

As shown in table 36, F-calculated = 84.159 at 2-tail test and 95% confidence level. Results also show p-value = 0.000 < 0.05. This reinforces the premise that project planning and community participation have a substantial impact on the success of road projects. Therefore, the greater the level of project planning and community participation, the higher the performance of road projects in arid and semi-arid counties in Kenya.

Table 37: Regression Coefficients on project planning and community participation Predicting performance of road projects

	Unstandardized Coefficients		Standardized	t	Sig.
	B	Std. Error	Coefficients		
(Constant)	-.320	.324		-.988	.325
Community participation	.498	.089	.409	5.604	.000
Project planning	.541	.103	.382	5.232	.000

a. Dependent Variable: performance of road projects

The results in table 37 show that the coefficients of project planning on performance of road projects when the mediator community participation is controlled to be $\beta = 0.541$ and its significant p-value = 0.000 < 0.001. So the relationship between project planning and performance of road projects is still significant when the mediator community participation is controlled. The study shows that community participation is a partial mediator in the relationship between project

planning on performance of road projects. This can be proven by the fact that the coefficients in table 28 between project planning and performance of road projects in arid and semi-arid counties in Kenya is $\beta = 0.917$ and its significant p-value = $0.000 < 0.05$. This coefficient value reduces to $\beta = 0.541$ when a mediator community participation is introduced in the relationship between project planning on performance of road projects and therefore this means that community participation partially mediates the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

These findings were summarized in a model as:-

(ii) *Performance of road projects = -0.32 + 0.541(project planning) + 0.498 (community participation).*

The null hypothesis (H_{02}), which posited that *there is no significant mediation effect of community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya*, was rejected. Consequently, the researcher concluded that there is indeed a significant mediation effect of community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

4.8.3 The Moderating effect of government regulations on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

The third objective of this study was to evaluate the degree to which government regulations serves as a moderator in the association between project planning and performance of road projects in arid and semi-arid counties in Kenya. This was done through testing the hypothesis H_{03} : *There is no moderating effect of government regulations on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya*. To test this null hypothesis, a hierarchical multiple regression analysis was conducted. The test for moderation was checked and tested using the regular linear regression menu item in SPSS using the methodology outlined

by Baron and Kenny (1986). This was attained by examining the regression pathways of project planning, government regulations and performance of road projects. Regression analysis was carried out in a hierarchical process with an interaction term, which is a product of project planning and government regulations, introduced as an additional predictor. The hierarchical models applied are discussed below:

Table 38: Adjusted R-squared for the moderating effect of government regulation on the relationship between project planning and performance of road projects

R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change
					F Change	df1	df2	
.697 ^a	.485	.479	.44537	.485	74.526	2	158	.000
.738 ^b	.545	.536	.42024	.059	20.462	1	157	.000

a. Predictors: (Constant), Government regulations, Project planning

b. Predictors: (Constant), Government regulations, Project planning, Interaction Term

Table 38 presents the percent of variability in the performance of completed road projects in arid and semi-arid counties in Kenya (dependent variable) that *Project planning* and *Government regulations* (predictors) can account for. In model two, with the introduction of the interaction term in model, the adjusted R squared (R^2) changes positively from 0.479 to 0.536 an increase of 0.059 with standard error of the estimation decreasing to 0.42024, hence there was a positive change in adjusted R-squared and thus the change was significant given $p\text{-value} = 0.000 < 0.001$.

Table 39: ANOVA for the moderating effect of government regulations on the relationship between project planning and performance of road projects

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29.566	2	14.783	74.526	.000 ^b
	Residual	31.341	158	.198		
	Total	60.906	160			
2	Regression	33.179	3	11.060	62.624	.000 ^c
	Residual	27.727	157	.177		
	Total	60.906	160			

a. *Dependent Variable: Performance*

b. *Predictors: (Constant), Government regulations, Project planning*

c. *Predictors: (Constant), Government regulations, Project planning, Interaction Term*

The analysis of variance depicted in table 39 was intended to evaluate if Government regulations and Project planning in model 1 and if Government regulations, Project planning and Government regulations multiplied by Project planning (interaction term) in model 2 are significant. The ANOVA was also intended to determine whether the amount of variance that model 1 and model 2 accounted for (with the interaction term) is registering more than model 1 (that is characterized without the interaction term). The Findings of the analysis indicate that the model in its entirety is significant given that $F = 74.526$, $p\text{-value} = 0.000 < 0.001$ for model 1, and $F = 62.624$, $p\text{-value} = 0.000 < 0.001$ for model 2.

Table 40: Model Coefficients for the moderating effect of government regulations on the relationship between project planning and performance of road projects

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.704	.371		-1.897	.060
	Project planning	.773	.087	.546	8.895	.000
	Government regulations	.342	.076	.276	4.497	.000
2	(Constant)	.578	.450		1.283	.201
	Project planning	.509	.101	.359	5.056	.000
	Government regulations	-.097	.121	-.078	-.804	.423

Interaction Term	.099	.022	.518	4.523	.000
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a. Dependent Variable: Performance

In table 40 we are interested in the coefficient (Beta) values of project planning, government regulations and interaction term (project planning and government regulations). From model 1 the impact of project planning to performance of road projects is significant with a coefficient (β) = 0.546 and p-value = 0.000 < 0.001. The impact of the moderating variable (government regulations) on performance of road projects is also significant with a coefficient (β) = 0.276 and p-value = 0.000. In model 2, the model results show that the interaction term (project planning and government regulations) is significant with a coefficient (β) = 0.518 and p-value = 0.000 < 0.001. This means that government regulation affects the strength of the relationship between project planning and performance of road projects. Therefore government regulations moderate the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

The moderating model can be summarized as:

(iii)...*Performance of road projects = -0.704 + 0.773 (Project planning) + 0.342 (Government regulations)*

(iv)....*Performance of road projects = 0.578 + 0.509 (Project planning) - 0.097 (Government regulations) + 0.099 (project planning and government regulations).*

The researcher therefore, Rejects the null hypothesis three ($H0_3$) and consequently concludes that there is significant moderating effect of government regulations on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

4.8.4 The Moderated Mediation of government regulations, community participation on project planning and performance of road projects.

The fourth objective of the study was to determine the moderating effect of government regulations on the mediating role of community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya. This was done through testing the hypothesis $H0_4$: *There is no significant moderated mediating effect of government*

regulations and community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya.

The moderated mediation effect, also known as the conditional indirect effect, occurs when the independent variable (X) has a direct effect on the dependent variable (Y) and also when the independent variable (X) has an indirect effect on the dependent variable (Y) through a mediator variable, and both the direct and indirect effects are influenced by a third variable called a moderator. To confirm the moderated-mediation effect, Hayes (2013) proposed a process for the confirmation of the two effects:

- i. From the results of the Hayes-Macro Process, check the index of moderated mediation, check the lower and upper level confidence intervals (LLCI and ULCI), and zero (0) must be outside the LLCI and ULCI (that is, zero is not in between the LLCI and ULCI) if the moderated mediation has to be significant.
- ii. Next, look for the DIRECT EFFECT in the results. Here, you check the effect of independent variables (X) on the dependent variables (Y). The results of X->Y should be significant (that is, zero shouldn't be in between the LLCI and ULCI); if this is confirmed, the direct and indirect effects are significant.

The robustness of the bootstrapping method is particularly beneficial, as it remains effective regardless of the distribution of the variables or the sample size. By generating confidence intervals, you can make statistical inferences about the conditional indirect links, ultimately revealing how the independent variable influences the dependent variable through the interplay of the mediating and moderating variables. This approach should provide valuable insights into the relationships within your study on project planning and community participation. Hayes and Preacher (2013) refer to conditional indirect effects when the moderating variable has an influence on the indirect effect of the independent variable on the dependent variable via the mediating variable and to conditional direct effects when the effect of the moderating variable is localised on the direct link between the independent variable and the dependent variable. Simultaneous analysis of these different effects is needed to produce reliable and robust results (Hayes & Preacher, 2013a, 2013b). Andrew Hayes PROCESS macro model, offers several advantages: (1) it overcomes the limitations of traditional sequential approaches, which test for mediation and moderation effects

separately; (2) it leads to more rigorous and precise results using the bootstrapping procedure; (3) it can be used both with conventional multiple regressions and with structural equation methods (Hayes and Preacher, 2013); and (4) it has been made increasingly simple and accessible through ready-to-use macros. Given the level of refinement and ease of use of the PROCESS macro developed by Hayes (2013a, 2013b), as well as the frequency with which it is used by researchers whose work has been published in the highest-ranking journals, it is recommended to use this tool when testing for conditional indirect effects (Sylvie et al., 2015). The test results for the moderated mediation are presented in parts from tables 41, 42, 43 and 44 and explained after the tables.

Table 41: Index of Moderated Mediation

Conditional direct effect(s) of Project planning on performance of road projects:						
Govt_Reg	Effect	se	t	p	LLCI	ULCI
-3.043	.268	.134	2.008	.046	.004	.532
.000	.215	.133	1.614	.109	-.048	.479
3.043	.162	.163	1.997	.320	.159	.484
Conditional indirect effects of Project planning on performance of road projects:						
INDIRECT EFFECT:						
Project planning -> community participation -> performance of road projects:						
Govt_Reg	Effect	BootSE	BootLLCI	BootULCI		
-3.043	.239	.079	.096	.405		
.000	.174	.065	.053	.310		
3.043	.109	.066	-.020	.248		
Index of moderated mediation:						
Index	BootSE	BootLLCI	BootULCI			

Govt_Reg	-.021	.011	-.047	-.005
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Govt_Reg (Government Regulations)

The table 41 shows that results at 95% confidence interval (CI) in section ‘Index of Moderated mediation’ at the bottom of the table. The moderated mediation effect is significant as the CI excludes zero [-0.047; -0.005]. With these bootstrapping results the study hypothesis (H0₄) stating that *there is no significant moderated mediated effect of government regulations and community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya* is therefore rejected.

After such results in table 41, where the index of moderated mediation is significant, It is now possible to localize the moderating effect: on the second mediation segment and on the direct effect. Table 42 shows the results of interactive terms (Int_1), that is the moderating effect of government regulations on the second segment of the mediating relationship between community participation and performance of road projects in arid and semi-arid counties in Kenya.

Table 42: Indirect Path Effect

OUTCOME VARIABLE: Community participation						
Model Summary						
R	R-sq	MSE	F	df1	df2	p
.693	.480	.136	29.965	3.000	157.000	.000
Model						
	coeff	se	t	p	LLCI	ULCI
constant	3.925	.036	108.417	.000	3.853	3.996
Proj_pla	.422	.154	2.736	.007	.117	.727
Govt_Reg	.050	.018	2.707	.008	.013	.086
Int_1	.052	.028	1.967	.044	.106	.113

Product terms key:

Int_1 : Proj_Pla x Govt_Reg

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.027	3.486	1.000	157.000	.064

Proj_Pla (Project Planning), Govt_Reg (Government Regulations), Int_1 (Interactive term 1)

The results in table 42 involves observing the significance and Confidence Interval is of the first interactive terms (Int_1), which corresponds to $(M \times V) \rightarrow Y$, that is, the moderating effect of government regulations on the second segment of the mediating relationship between community participation and performance of road projects in arid and semi-arid counties in Kenya. The results show that the indirect path is significant with coefficient (coeff.) = 0.05, and p-value = 0.008 and with Lower and Upper Confidence interval excluding Zero CI = [0.013; 0.086]. Further the first interactive term (Int_1) is significant with (coeff. = 0.052, p=0.044) and Lower and Upper Confidence interval excluding Zero CI=[0.106; 0.113].

Further table 43 displays the results of direct path and interactive terms (Int_2) which corresponds to $(X \times V) \rightarrow Y$, that is, the moderating effect of government regulations on the direct link between project planning and performance of road projects in arid and semi-arid counties in Kenya.

Table 43: Direct Path Effect

OUTCOME VARIABLE: performance of road projects						
Model Summary						
R	R-sq	MSE	F	df1	df2	p
.742	.551	.175	69.119	4.000	156.000	.000
Model						
coeff	se	t	p	LLCI	ULCI	

constant	2.189	.357	6.137	.000	1.484	2.893
Proj_pla	.488	.133	4.614	.000	.280	.679
Com_part	.413	.090	4.588	.000	.235	.591
Govt_Reg	.0249	.078	3.745	.000	.102	.397
Int_2	.017	.022	2.799	.026	.060	.026

Product terms key:

Int_2 : Proj_pla x Govt_Reg

Test(s) of highest order unconditional interaction(s):

	R-Square-chng	F	df1	df2	p
X*W	.002	.638	1.000	156.000	.426

Proj_Plan (Project Planning), Com_part (Community participation), Govt_Reg (Government Regulations), Int_2 (Interaction Term 2)

Results in table 43 shows that, the direct path of project planning to performance of road projects is significant with (coeff. = 0.488, p=0.000) and with Lower and Upper Confidence interval (CI) excluding Zero CI = [0.280; 0.679]. The second interactive term (Int_2) is significant with (coeff.= 0.017, p=0.026) and Lower and Upper Confidence interval excluding Zero CI = [0.060; 0.026]. We can therefore conclude that both the Confidence Interval (CI) for indirect path, direct path, and First and Second Interaction term excludes zero. This means that the moderator (Government Regulations) has an influence on the direct link between project planning and performance of completed road projects (X→Y). It also means that the moderator (Government Regulations) also has an influence on the mediation between community participation and performance of road projects (M→Y). The final step as shown in table 44 is to observe the results of the 95% CI in section ‘Conditional indirect effects of X on Y for the different moderator values’ at the bottom of the output page.

Table 44: Conditional Indirect Result

Conditional indirect effects of X on Y:

INDIRECT EFFECT:

Proj_pla -> Com_part -> Perf_tot

Govt_Reg	Effect	BootSE	BootLLCI	BootULCI
-3.043	.239	.079	.096	.405
.000	.174	.065	.053	.310
3.043	.109	.066	.020	.248

Proj_pla (Project Planning), Com_part (Community participation), Govt_Reg (Government Regulations), Perf_tot (performance of road projects)

Results in table 44, shows three Lower and Upper Confidence Intervals (LLCI and ULCI) for each government regulations (moderator) value at: (1) mean minus one standard deviation (-1SD), (2) mean (SD) and (3) mean plus one standard deviation (+1SD). The analysis produced the following intervals:

- Mean minus standard deviation (lower external environment): CI=[0.096; 0.405];
- Mean (average external environment): CI=[0.053; 0.310];
- Mean plus standard deviation (higher external environment): CI=[0.020; 0.248]

These results in table 44 shows that the conditional indirect effect of government regulations is significant in the lower, average, and higher external environment since the 95% Confidence Interval excludes zero.

The study null hypothesis (H0₄) that states that there is no significant moderated mediated effect of government regulations and community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya is here by rejected. The model explaining the results enumerated in Table 42 and 43 is given by:

Performance of road projects through Indirect Path:

(iv).....*Performance of road projects = 3.925 +0.422 (project planning) + 0.05(government regulations) + 0.052 (project planning * government regulations)*

Performance of road projects through direct Path:

(v)... *Performance = 2.189 +0.488 (project planning) + 0.413 (community participation) + 0.249 (government regulations) + 0.017 (project planning * government regulations)*

4.9 Results Discussion

This part presents the research findings by elucidating the discrepancies and agreements of the results in relation to the findings of comparable studies about the particular problems examined in this study. This encompasses comprehensive analyses of the correlations among research variables (such as project planning, community participation, government regulations, and performance of road projects) in arid and semi-arid counties in Kenya, in light of the specific findings pertaining to the four study objectives.

4.9.1 Project planning and performance of road completed projects.

The results of this study highlighted the effect of project planning on performance of completed road projects in arid and semi-arid counties in Kenya. The study findings revealed and established the overall aggregate mean score of 3.91 and a standard deviation of 0.883. High value of the aggregate mean shows that the respondents affirmed that project planning factors were relevant and important towards determining the performance of road projects in arid and semi-arid counties in Kenya. Majority of the respondents strongly agreed that project is completed without any struggle, and that the Budget for the project is properly determined. The respondents also strongly agreed that the budgeted funds is enough to complete the project and that the project planning

platform offers better project cost management tools than the traditional methods. The respondents also strongly agreed with project planning factor that cost management from project planning is easy to understand thus enabling faster decision making. Additionally the respondents agreed that the modeling of exact materials enables the exact estimation of material costs and that time helps in setting goals of the project. Additionally the respondents agreed that in project planning activity duration should be well estimated and that project planning generates more accurate cost management within a much shorter period than the traditional methods. Further the respondents agree that Project cost is well estimated and cost management which is planned tend to be more dependable and carrying out a value engineering exercise is easier on the project cost management platform.

These results were in concurrence with results by Pienaar (2021) who defined time planning in a project as the function required maintaining the appropriate allocation of time to the overall conduct of the project through the ensuing stages of its natural life-cycle. He did this by using the techniques of time planning, time estimating, time scheduling, and schedule control (concept, development, execution, and finishing). Success in a project does not entail signing a contract and anticipating that it would be completed on schedule, within budget, and in accordance with the project's scope. Accurate project time/scheduling planning is necessary in all facets of a project's success. According to Mishmish and El-Sayegh (2018) Project time management is the first task that falls within the purview of project managers and is regarded as one of the key factors in project success. Further the study results correspond to those of Heldman (2011) cited in Jiang (2017) conducted a study on project management excellence as the art of excelling in project management in Washington DC, USA. The researcher discovered that time management is a crucial component of project execution since it involves keeping project activities on track and comparing those activities to the project schedule to guarantee that the project is finished on schedule. Activity definition, activity sequencing, activity resource estimation, activity length estimation, schedule formulation, and schedule control are some of the procedures that make up project time management.

The findings of this specific research were based on the null hypothesis, which posits that there is no statistically significant effect of project planning on the performance of road projects that have been completed in dry and semi-arid counties in Kenya. The research findings indicate a robust positive and statistically significant association between project planning and the performance of road projects that have been completed in arid and semi-arid areas within Kenya. The findings of this study align with the research conducted by Muute and James (2018), who determined that effective time management, meticulous financial resource planning, and strategic human resource planning have a statistically significant and favorable impact on the overall performance of building projects.

Accordingly, the study findings which led to the rejection of the null hypothesis established that performance of completed road projects in arid and semi-arid counties in Kenya was significantly and positively influenced by project planning. This is evident from the findings that there was strong positive correlation between project planning and performance of road projects and that variation in performance of completed road projects can be explained by a unit change in project planning. Effectively, this means that an enhancement in the quality of practice of project planning will increase performance of road projects in arid and semi-arid counties in Kenya. The study therefore established that project planning greatly but positively impacts the increase performance of completed road projects in arid and semi-arid counties in Kenya in several areas namely; Project time, Project quality, Project adaptability and Stakeholder satisfaction. This confirms a statistically significant positive effect of that variation in performance of road projects can be explained by a unit change in project planning on performance of road projects in arid and semi-arid counties in Kenya hence the basis for rejection of the null hypothesis (H_0) that there is no significant effect of project planning on performance of road projects in arid and semi-arid counties in Kenya.

These results are in line with Githenya and Ngugi (2014) study that focused on determinants of implementing the housing projects in Nairobi County Kenya. The study established that planning in projects had a major effect on the execution of housing projects in Kenya. This study therefore established that project planning greatly and positively impacts the performance of road projects

in arid and semi-arid counties in Kenya in several areas namely; Project time, Project quality, Project adaptability and Stakeholder satisfaction. The study results further concur with the study by Michugu, (2020) who examined the Project factors influencing completion of Rural Roads projects in Kenya: a case of Rumuruti-Maralal Road project in Laikipia and Samburu Counties. From the findings, the study concluded that stakeholders' participation, project financing, contract management, and project specifications significantly influence the completion of rural road projects in Kenya. This highlights the importance of engaging various stakeholders and ensuring proper financial and management practices to enhance project outcomes. Understanding these relationships can be crucial for addressing the challenges faced in rural road project implementations.

4.9.2 Community participation, Project planning and performance of road projects

The second objective of the study was to determine the mediating (intervening) effect of community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya. The moderate value of the aggregate mean value showed that the respondents affirmed that community participation factors need to be improved in order to be effective towards the performance of road projects in arid and semi-arid counties in Kenya. Majority of the respondents strongly agreed with community participation statement that community empowerment provide them with complete freedom to take up judicious decisions on project performance, they also strongly agreed that involving community members in monitoring of project progress is helpful in ensuring project effectiveness. The respondents also highly ranked statement that Community members are allowed to share information which is an effective way of reducing costs during project performance and that the community empowerment encourages participative decision making during project performance.

Additionally, the respondents agreed that the community members' intercommunication leads to allocation of right authority for effective project performance and that the firm has in place a good stakeholder grievance management system and that the community member's involvement in

management of funds enable smooth running of the program. The community members are fully involved in the entire project management cycle and that the community member's grievances can derail project success. They respondents also concurred that the community members' analysis allows the project managers to determine what motivates the community to the project and that organizations consider strong intercommunication between team members and community members and that training of the community members improves the capability of making decisions of the program. They also agreed that community members' views are considered in decision making with regard to projects. These study results are in agreement with Kihuha (2018) cited in Bhattacharya et al. (2021) conducted a study on monitoring practices and performance of global environmental facility projects in Kenya, a UN Environment Program case. The goal of the study was to evaluate the connection between Kenyan UNEP project success and planning stage stakeholder influence. The analysis showed that initiatives performed better when stakeholders were involved in the funding allocation planning process and all phases of the project, as opposed to those without Community participation. The study concludes that community participation aspects of community empowerment, communication and grievance management have an encouraging and substantial relationship to performance of completed road projects in arid and semi-arid counties in Kenya.

This study objective was pursued on the basis of the null hypothesis that there is no mediation effect of community participation on the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya. The study findings rejected the null hypothesis and established that community participation did partially mediate the relationship between project planning and performance of completed road projects in arid and semi-arid counties in Kenya. The study revealed that there was strong positive correlation between project planning, community participation and performance of road projects and that variation in performance of completed road projects are explainable by a unit change in project planning and community participation which means an increase in mean index of community participation will increase the relationship between project planning and performance of road projects by a positive

unit. The study therefore established that community participation positively impacts project planning on performance of road projects in arid and semi-arid counties in Kenya.

These findings concurred with Xiangshu, Zhenyu, Chunfang, and Yujuan's (2022) results, which supported the idea that a sense of community plays a role in the link between community participation and Chinese residential communities, agreed with these results. It was found that a sense of community responsibility and prosocial tendencies acted as mediators between a sense of community and involvement in the community. This relationship happened in a step-by-step way. This was the case for the relationship between a sense of community and involvement in the community. The findings of this research shed light on the mechanism that underlies the relationship between a sense of community and involvement in one's own local community, making the findings of this study an important contribution to the work that has been done in the past. In addition, the results are in line with what Ndungu and Karugu (2019) discovered during their investigation of community engagement and the efficacy of donor-funded youth initiatives in Korogocho, which is situated in Nairobi City County, Kenya. Ndungu and Karugu conducted their study in Korogocho. The correlational analysis of the study indicated that community participation in identification and planning had a strong positive effect on the performance of the project, and the results of the regression analysis indicated that community participation had a statistically significant positive effect on the performance of the project.

4.9.3 Government regulations, project planning and performance of road projects

The primary aim of this research was to examine the moderating influence of government regulations on the association between project planning and the performance of road projects that have been completed in arid and semi-arid areas within Kenya. The research results have shown the significance of government regulations in influencing the outcomes of road projects that have been completed in dry and semi-arid areas within Kenya. The government regulations consisted of a Regulatory framework and a Code of conduct.

The study results revealed a moderate value of the aggregate mean score showing that the respondents affirmed that government regulations factors need to be improved in order to be effective towards the performance of road projects in arid and semi-arid counties in Kenya. Majority of the respondents strongly agreed that in government regulation the Law provides a transparent process for road projects, they also strongly agreed that KeRRA effectively implements environmental policies. The respondents strongly agreed that there is a clear institutional framework for approval of road projects and that the National government listen to grievances presented to them by the community members. The respondents also strongly agreed that the KeNHA clear policy framework helps public sector to understand the core rationale in road projects construction, they further they strongly agreed that the KeRRA board eliminates unfair competition for work among road construction personnel and that KeRRA effectively implements environmental policies. The respondents further agreed that KURA effectively implements environmental policies and KeNHA carries out on-site inspection. The respondents agreed that KeNHA standardizes construction techniques and material and KeRRA promotes continuous professional development of road construction personnel. Further majority of respondents reported that the county government listens to grievances presented to them by the community members and that there is regular follow up to ensure that right decision is made that is satisfactory to all parties. Majority reported that KURA carries out on-site inspection and that the process of approving road plans is long leading to delays in project delivery.

The findings of this study are consistent with the findings of Ngundo and James (2018), who conducted a study on the impact of project management practices on the implementation of government projects in Machakos County. Their study concluded that the absence of proper project planning was a significant factor contributing to the failure of government projects in Machakos County. The present research aligns with the findings of Mariusz, Adnan, Haque, and Isaiah (2019) as it investigates the moderating influence of risk management on project planning and project success within the construction industry of the United Kingdom and Pakistan. According to Marius et al. (2019), project planning was shown to have a statistically significant influence on the success of projects. Moreover, the influence of risk management on the

association between project planning and project performance in the construction industry remains strong, even when considering the distinct economic contexts of the two industries.

The primary aim of this research was to investigate the potential moderation impact of government regulations on the association between project planning and performance of finished road projects in arid and semi-arid counties in Kenya. This investigation was conducted under the assumption of the null hypothesis, which posits that no such moderation effect exists. The results of the research have refuted the null hypothesis and have shown the presence of a substantial moderating impact of government regulations on the correlation between project planning and the performance of finished road projects in arid and semi-arid counties in Kenya. The findings of the moderator test indicate that government regulations play a moderating role in the association between project planning and the performance of completed road projects in arid and semi-arid counties in Kenya. Additionally, the independent variable of project planning is found to be a predictor of the performance of completed road projects in these regions. Additionally, the results obtained from the bootstrapping analysis indicated the presence of a statistically significant interaction effect, as well as a substantial moderation index.

The study results showed that the impact of project planning to performance of road projects is significant with a coefficient (β) = 0.546 and p-value = 0.000 < 0.001. The impact of the moderating value (government regulations) on performance of road projects is also significant. Hence with a coefficient (β) = 0.276 and p-value = 0.000 < 0.001. In model 2, the model results show that the interaction term (project planning and government regulations) is significant with a coefficient (β) = 0.518 and p-value = 0.000 < 0.001. This means that government regulation affects the strength of the relationship between project planning and performance of road projects. Therefore government regulations moderate the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya. Therefore, it can be inferred that there is a significant connection between government regulations and project planning in terms of the performance of finished road projects in arid and semi-arid counties in Kenya. This suggests

that the influence of project planning on the performance of road improvements in arid and semi-arid regions in Kenya is contingent upon governmental regulations.

The findings of the current study are consistent with the research undertaken by Ogogo, Omwenga, and Nyangau (2019), which sought to examine the influence of government regulations as a moderating variable on the efficacy of government construction projects in Kenya. The findings of the research revealed a significant and positive association between the moderating impact of governmental regulations and the implementation of government infrastructure projects in Kenya. The results of this study are consistent with the research carried out by Mariusz, Adnan, Haque, and Isaiah (2019), which examined the moderating effect of risk management on project planning and project success in the construction sector in the United Kingdom and Pakistan. The study conducted by Marius et al. (2019) revealed a substantial correlation between project planning and project success. Furthermore, it has been shown that the relationship between project planning and project performance within the construction sector is significantly influenced by risk management, even when examining two separate economies.

The current study is different from what Ocheng et al. (2018) found because it looks into how government rules affect the link between project management methods and how well road infrastructure projects in Kenya's lake basin area are completed by local businesses. The study revealed that the influence of government policy on the association between the independent and dependent variables was not found to be significant. Furthermore, the researchers Dan, Wenfeng, and Chuanbin (2021) say that the distribution of project control rights negatively affects the link between systems that enforce rules and project performance. Dan et al. (2021) performed recent research to investigate the impact of rule governance systems on project performance within the context of public-private partnership (PRHPPP) projects in China. The researchers also aimed to ascertain if control rights serve as a mitigating component in this association.

4.9.4 Government regulation, community participation, project planning and performance of road projects.

The fourth objective of the study was to examine the moderating effect of government regulations on the mediating role of community participation in the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya. This study objective was built on the hypothesized statement that there is no significant moderated mediated effect of government regulations and community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya. The study findings rejected the null hypothesis since the study results showed that the moderated mediation index being significant. The bootstrapping results revealed that the index for moderated mediation effect is significant as the confidence interval (CI) [-0.047; -0.005] where the zero (0) is outside the confidence interval and thus moderation mediation is significant. The index of moderated mediation was tested with a 95% bias-corrected bootstrap confidence interval based on 5,000 replications. The model results showed that there was strong significant positive correlation between all the study variables namely; project planning, community participation, government regulations and performance of road in arid and semi-arid regions in Kenya.

The study tested the moderated mediation also called conditional indirect effect, which occurs when the independent variable (project planning) has a direct effect on the dependent variable (performance of road) and also when the independent variable (project planning) has indirect effect on the dependent variable (performance of road) through the mediating variable (community participation) and both direct and indirect effect are influenced by the moderating variable (government regulations). The model coefficients showed that the direct association between project planning performance of completed road in arid and semi-arid regions in Kenya was found to be moderated by government regulations. The bootstrapping results showed that the index of moderation mediation is significant; the direct path of project planning to performance of road projects is significant with (coeff. = 0.488, $p=0.000$) and with Lower and Upper Confidence interval excluding Zero CI = [0.280; 0.679]. Further the second interactive term was significant with (coeff. = 0.017, $p=0.026$) and Lower and Upper Confidence interval excluding Zero CI =

[0.060; 0.026]. We can therefore say that both the Confidence Interval (CI) for Indirect path, Direct path, First and Second Interaction term excludes zero, indicating that the moderator (Government Regulations) has an influence on the direct link between (project planning → performance of completed road projects), that is project planning and performance of road projects and on the second half of the mediation (community participation → performance of completed road projects), that is, the link between community participation and performance of road projects.

These results conform to the study by Shin and Jung (2020) conducted a study on the mediating role of community participation between physical environments, social relationships, social conflicts, and quality of life: evidence from South Korea. The analysis results indicate that community participation serves as a crucial mediating factor in enhancing the quality of life for individuals affected by social conflict. It's interesting to note that while satisfaction with physical surroundings and interpersonal relationships has a direct positive influence on quality of life, experiences of social conflict do not seem to impact it directly. This suggests that fostering community engagement can effectively mitigate the adverse effects of social conflicts, ultimately leading to an improved quality of life for individuals, particularly in the South Korean context. This insight could be valuable for the study on project planning and community participation in road projects. Additionally the study results are in agreement with Heravi et al. (2015) aimed to evaluate the degree of community participation in project development in Saudi Arabia. The investigation stated that stakeholders should be involved in project planning since they frequently supply the necessary resources and have the power to regulate resource flows and network interactions. The analysis's findings demonstrated that the construction project's owner, developer, or project management was heavily involved in the project's planning stage and that the projects were finished. The study suggested that since contractor involvement in the planning phase was much lower than that of other stakeholders, it should be expanded or adopted.

The study results concur with Matu, Ndunge and Mbugua (2020) who assessed the moderating influence of risk management practices on the relationship between combined stakeholder participation in project life cycle management and completion of urban road transport

infrastructure projects in Kenya. The findings revealed that when risk management was modeled in the second model through hierarchical regression, it was established that risk management had a huge influence on the relationship of stakeholder participation in project life cycle management and completion of urban roads transport infrastructure projects. Finally the results concurred with Ming-Chuan (2017) who assessed the Customer Participation and Project Performance: A Moderated-Mediation Examination. The research collected data from 245 software development projects through a professional data survey corporation (e-Data Power) in Beijing China and the authors' social networks. The research found that knowledge integration mediates the positive relationship between customer participation and project performance. Additionally, project complexity strengthens the main effect of customer participation and an indirect effect of knowledge integration was found.

4.10 Summary of Research Findings

The study investigates the impact of project planning on the performance of road projects in arid and semi-arid counties in Kenya. The results show that project planning factors are crucial for project success. Respondents agreed that project completion is easy, budgets are properly determined, and the project planning platform offers better cost management tools than traditional methods. They also agreed that cost management from project planning is easy to understand, enabling faster decision making. They also agreed that modeling exact materials enables accurate estimation of material costs and that time helps set project goals. They also agreed that accurate project time/scheduling planning is necessary for all facets of a project's success. The research found a robust positive and statistically significant association between project planning and the performance of road projects in arid and semi-arid areas within Kenya. The variation in performance of road projects can be explained by a unit change in project planning.

The study aimed to investigate the mediating effect of community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya. The respondents agreed that community participation factors need improvement for effective project performance. They believed that community empowerment allows for judicious

decisions and involving community members in monitoring project progress is beneficial. Sharing information among community members reduces costs and encourages participative decision-making. Intercommunication between community members leads to the allocation of right authority for effective project performance. A good stakeholder grievance management system is in place, and community members are fully involved in the entire project management cycle. The study found a strong positive correlation between project planning, community participation, and project performance, with variation in performance explained by a unit change in project planning and community participation. These findings align with Xiangshu, Zhenyu, Chunfang, and Yujuan's (2022) results, which suggest a sense of community plays a role in the link between community participation and Chinese residential communities.

The study investigates the impact of government regulations on project planning and road project performance in arid and semi-arid Kenyan regions. Results show that government regulations, including a regulatory framework and a Code of conduct, significantly influence project outcomes. The majority of respondents believe that these regulations provide a transparent process, effectively implement environmental policies, and have a clear institutional framework for approval. The KeRRA board eliminates unfair competition for work among road construction personnel, while the county government standardizes construction techniques and materials, promotes continuous professional development, and listens to community grievances. The study suggests that the influence of project planning on the performance of road improvements in these regions is contingent upon governmental regulations.

The study investigates the role of government regulations, community participation, and project performance in the completion of road projects in Kenya's arid and semi-arid counties. The results show a strong positive correlation between project planning, community participation, government regulations, and road project performance. The indirect effect, where project planning directly affects road project performance, is moderated by government regulations. The findings align with previous research on community participation's role in improving quality of life for people with social conflict experiences. The study also supports other studies on stakeholder involvement in

project development, revealing that knowledge integration mediates the positive relationship between customer participation and project performance. Project complexity strengthens the main effect of customer participation, while knowledge integration indirectly affects project performance.

4.11 Optimal Model

Based on the study findings, a model optimization was conducted. The aim of model optimization was to guide in derivation of the final model where only the significant variables are included for objectivity. Results were arrived at through running multiple regressions. Results of the new conceptual framework are presented in Figure 4. As shown in Figure 4, no variable was dropped since all the variables were significant. The indicators forming the variables were arranged in order of their impact they had on the dependent variable.

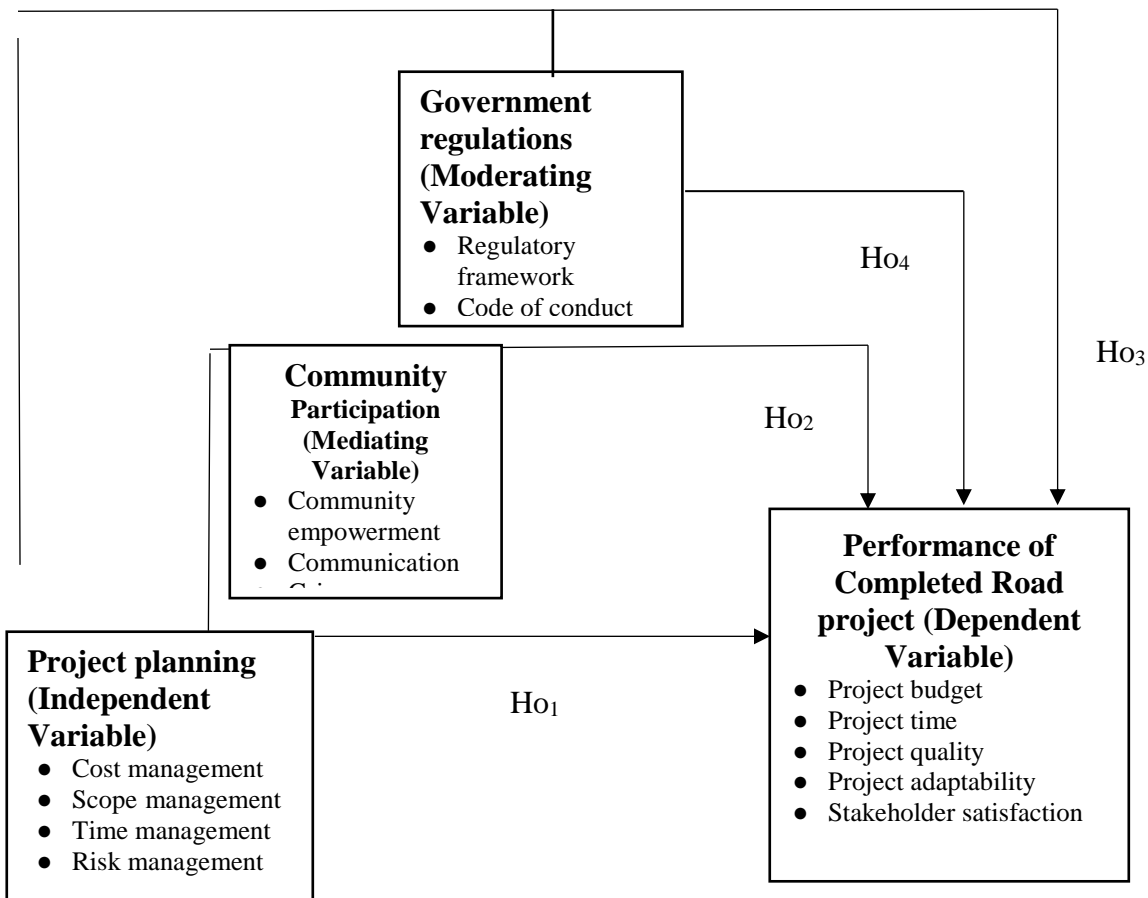


Figure 4: Optimized Conceptual Model

4.10 Chapter Summary

The findings of the investigation are presented in this chapter. The study focused on analyzing the influence of project design, government regulations, and community engagement on the effectiveness of road projects in the arid and semi-arid regions of Kenya. The chapter presented and analyzed the study results on response rate, demographic data, descriptive statistics, factor analysis, diagnostic tests, and inferential statistics. Furthermore, the research data was assessed, and the conclusions were analyzed in reference to the study's main objectives.

Additionally the chapter provided the summary of major findings of the various tests which were carried out on the hypotheses of this study and the relevant discussions in each case. The study sought to establish the influence of project planning, community participation, government regulations and performance of road projects in arid and semi-arid counties in Kenya.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter, a summary of the most important results and conclusions drawn from the research is presented. The purpose of this research was to determine the extent to which project planning, community participation, and the government regulations all have an impact on the performance of completed road projects in arid and semi-arid counties in Kenya. It was the descriptive and inferential statistical analysis results that were used to test the research hypotheses. These results were then used to make a summary of the most important findings and conclusions, which was in line with the study's goals.

5.2 Summary of Study

The first objective of the study examined the effect of project planning on performance of completed road projects in arid and semi-arid counties in Kenya using a simple regression model. The study respondents affirmed that project planning factors were relevant and important towards determining the performance of completed road projects in arid and semi-arid counties in Kenya. The study respondents emphasized several important aspects of project planning that should be put into consideration, including that the project should be completed without any struggle and that the budget for the project should be properly determined. Additionally, in project planning, the budgeted funds should be enough to complete the project, and the project planning platform should be used as it offers better project cost management tools than the traditional methods. The respondents also strongly agreed with the project planning factor that cost management from project planning is easy to understand, thus enabling faster decision-making. To facilitate better project planning, the modeling of exact materials enables the exact estimation of material costs, and enough time should be allocated as it helps in setting the goals of the project. Additionally, the respondents agreed that in project planning, activity duration should be well estimated and that project planning generates more accurate cost management within a much shorter period than the

traditional methods. Further, the project cost should be well estimated, cost management should be planned to be more dependable, and a value engineering exercise should be carried out on the project cost management platform.

The first objective of the study examined the effect of project planning on performance of road projects in arid and semi-arid counties in Kenya using a simple regression model. The correlation analysis results established there existed a strong positive significant correlation of $r=0.648$ and $p\text{-value}<0.001$ between project planning and performance of road projects in arid and semi-arid counties in Kenya. Regression result revealed that the concept of project planning accounted for 41.6% of the observed differences in the performance of road projects in arid and semi-arid counties in Kenya. Additionally this means that 58.4% ($100 - 41.6$) of the observed variances in the performance of road projects in arid and semi-arid counties in Kenya may be attributed to unaccounted components within the current model. As a result, the null hypothesis (H_{01}), which posited there is no significant effect of project planning on performance of road projects in arid and semi-arid counties in Kenya was rejected. Consequently, the researcher concluded that there is indeed a significant effect of project planning on performance of road projects in arid and semi-arid counties in Kenya. This finding implies that of performance of road projects exhibits positive and significant correlation with project planning accounting for significant 41.6% of performance of completed road projects in arid and semi-arid counties in Kenya.

The second objective of the study was to determine the mediating (intervening) effect of community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya. The majority of the respondents strongly agreed with the community participation statement that community empowerment provides complete freedom to take up judicious decisions on project performance. Also, involving community members in the monitoring of project progress is helpful in ensuring project effectiveness. The community members should be allowed to share information, which is an effective way of reducing costs during project performance, and community empowerment encourages participative decision-making during project performance. Additionally, community members' intercommunication leads to the allocation of the right authority for effective project performance,

and the firm's should have in place a good stakeholder grievance management system. The community members' involvement in the management of funds enables the smooth running of the program. The community members should be fully involved in the entire project management cycle, and the community members' grievances can derail project success. The community members' analysis allows the project managers to determine what motivates the community to the project and that organizations should consider having strong intercommunication between team members and community members and that training the community members improves their capability of making program decisions. Further, the community members' views should be considered in decision-making with regard to projects.

The correlation analysis results established there existed a strong positive significant correlation of $r=0.657$ and $p\text{-value}<0.001$ between community participation and performance of completed road projects in arid and semi-arid counties in Kenya. This study objective was pursued on the basis of the null hypothesis that there is no mediation effect of community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya. The study findings rejected the null hypothesis (H_02), and established that community participation did partially mediate the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya. The study revealed that there was strong positive correlation between project planning, community participation and performance of road projects and that variation in performance of completed road projects are explainable by a unit change in project planning and community participation which means an increase in mean index of community participation will increase the relationship between project planning and performance of completed road projects by a positive unit. The study therefore established that community participation positively impacts project planning on performance of road projects in arid and semi-arid counties in Kenya.

The primary aim of this research third objective was to examine the moderating influence of government regulations on the association between project planning and the performance of road projects that have been completed in arid and semi-arid areas within Kenya. The study results revealed a moderate value of the aggregate mean score, showing that the respondents affirmed that

government regulations factors need to be improved in order to be effective towards the performance of road projects in arid and semi-arid counties in Kenya. The majority of the respondents strongly agreed that in government regulation, the law provides a transparent process for road projects. It was also noted that KeRRA should effectively implement environmental policies, that there should be a clear institutional framework for approval of road projects, and that the national government should listen to grievances presented to them by community members. The respondents also strongly agreed that the KeNHA should have a clear policy framework that helps the public sector understand the core rationale for road project construction, that the KeRRA board should eliminate unfair competition for work among road construction personnel, and that the KeRRA effectively implements environmental policies. The respondents further agreed that KURA should effectively implement environmental policies and that KeNHA should carry out on-site inspections. KeNHA should standardize construction techniques and materials, and KeRRA should promote the continuous professional development of road construction personnel. A further majority of respondents reported that the county government should listen to grievances presented to them by community members and that there should be regular follow-up to ensure that the right decision is made that is satisfactory to all parties. The majority reported that KURA carries out on-site inspections and that the process of approving road plans is usually long, leading to delays in project delivery.

The correlation analysis results established there existed a strong positive significant correlation of $r= 0.477$ and $p\text{-value}<0.001$ between government regulations and performance of road projects in arid and semi-arid counties in Kenya. The research results have shown the significance of government regulations in influencing the outcomes of road projects that have been completed in dry and semi-arid areas within Kenya. The government regulations consisted of a Regulatory framework and a Code of conduct. The primary aim of this research was to investigate the potential moderation impact of government regulations on the association between project planning and performance of road projects in arid and semi-arid counties in Kenya. This investigation was conducted under the assumption of the null hypothesis (H_0), which posits that no such moderation effect exists. The results of the research have refuted the null hypothesis and have shown the

presence of a substantial moderating impact of government regulations on the correlation between project planning and the performance of road projects in arid and semi-arid counties in Kenya. The findings of the moderator test indicate that government regulations play a moderating role in the association between project planning and the performance of road projects in arid and semi-arid counties in Kenya. Additionally, the independent variable of project planning is found to be a predictor of the performance of road projects in these regions. Additionally, the results obtained from the bootstrapping analysis indicated the presence of a statistically significant interaction effect, as well as a substantial moderation index.

Lastly, the fourth objective of the study assessed examine the moderating effect of government regulations on the mediating role of community participation in the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya. This study objective was built on the hypothesized statement that there is no significant moderated mediated effect of government regulations and community participation on the relationship between project planning and performance of road projects in arid and semi-arid counties in Kenya. The study findings rejected the null hypothesis (H_{04}) since the study results showed that the moderated mediation index being significant. The bootstrapping results revealed that the index for moderated mediation effect is significant as the confidence interval (CI) [-0.047; -0.005] where the zero (0) is outside the confidence interval, indicating that the moderated mediation is indeed significant. Testing the index of moderated mediation with a 95% bias-corrected bootstrap confidence interval based on 5,000 replications strengthens the reliability of your findings. The model results revealing a strong significant positive correlation among all the study variables suggest that the relationships been investigating are robust, supporting the hypothesis regarding; project planning, community participation, government regulations and performance of road in arid and semi-arid regions in Kenya. The study tested the moderated mediation also called conditional indirect effect, which occurs when the independent variable (project planning) has a direct effect on the dependent variable (performance of road projects) and also when the independent variable (project planning) has indirect effect on the dependent variable (performance of road projects) through the mediating variable (community participation) and both direct and indirect effect are influenced by the

moderating variable (government regulations). The model coefficients showed that the direct association between project planning performance of road in arid and semi-arid regions in Kenya was found to be moderated by government regulations. The bootstrapping results showed that the index of moderation mediation is significant; the direct path of project planning to performance of road projects is significant. We can therefore say that both the Confidence Interval (CI) for Indirect path, Direct path, First and Second Interaction term excludes zero, indicating that the moderator (Government Regulations) has an influence on the direct link between (project planning → performance of road projects), that is project planning and performance of road projects and on the second half of the mediation (community participation → performance of road projects), that is, the link between community participation and performance of road projects.

5.3 Study conclusions

The study aimed to examine the effect of project planning on the performance of road projects in arid and semi-arid counties in Kenya. The results showed a strong positive correlation between project planning and project performance, accounting for 41.6% of the observed differences. This rejected the null hypothesis (H_{01}), which suggested no significant effect of project planning on project performance. The researcher concluded that project planning significantly influenced the performance of road projects in both arid and semi-arid counties, indicating a positive and significant correlation between project planning and project performance. This suggests that project planning plays a crucial role in determining the success of road projects in Kenya.

The study second objective of the study was to determine the mediating effect of community participation on the relationship between project planning and the performance of road projects in arid and semi-arid counties in Kenya. The majority of respondents agreed that community empowerment provides complete freedom to make judicious decisions on project performance. The correlation analysis results showed a strong positive and significant correlation between community participation and the performance of completed road projects in arid and semi-arid counties. The study rejected the null hypothesis (H_{02}) and found that community participation partially mediates the relationship between project planning and the performance of road projects.

The study found a strong positive correlation between project planning, community participation, and the performance of road projects, and that variation in project performance can be explained by a unit change in project planning and community participation. Thus, the study concluded that the community participation positively mediates project planning and performance of road projects in arid and semi-arid counties in Kenya.

The third objective of this study was to examine the moderating influence of government regulations on the association between project planning and the performance of road projects in arid and semi-arid areas of Kenya. The results showed a moderate aggregate mean score, indicating that government regulations need improvement to be effective in achieving successful outcomes in these regions. The correlation analysis revealed a strong positive and significant correlation between government regulations and the performance of completed road projects in arid and semi-arid counties. The research also revealed the significance of government regulations, which consist of a regulatory framework and a code of conduct, in influencing the outcomes of road projects in dry and semi-arid areas. The results reject the null hypothesis and showed a substantial moderating impact of government regulations on the correlation between project planning and the performance of completed road projects in arid and semi-arid counties. The independent variable of project planning was found to be a predictor of the performance of completed road projects in arid and semi-arid counties. The bootstrapping analysis revealed a statistically significant interaction effect and a substantial moderation effect.

Lastly the study aimed to examine the moderating effect of government regulations on the mediating role of community participation in the relationship between project planning and the performance of road projects in arid and semi-arid counties in Kenya. The fourth study hypothesis was that there was no significant moderated-mediation effect between government regulations and community participation. The bootstrapping results showed a significant moderated mediation effect, with the confidence interval outside zero. The model results showed a strong positive correlation between project planning, community participation, government regulations, and the performance of roads in arid and semi-arid regions. The study also examined the moderated mediation, or conditional indirect effect, which holds that project planning, has a direct effect on

the performance of roads and an indirect effect through community participation under the influence of governmental regulations.

5.4 Recommendation

Based on research findings and conclusions of this study, the key recommendations are described in these sub-sections.

5.4.1 Recommendations for Practice

The study results showed that there is strong positive correlation of project planning, community participation and government regulations on performance of road projects in arid and semi-arid counties in Kenya. The recommendations were developed on the basis of the findings obtained from the completion of each specific goal. In light of the findings of the study, it has been suggested that the institutions of concern, KeNHA, KeRRA, and KURA, should carry out extensive site inspections and surveys. This would enable them to systematically identify and evaluate all potential risks and complexities, which is an essential part of the procedure for project planning. The relevance of this issue is especially obvious in the context of road projects located in arid and semi-arid parts of Kenya, where the unfavorable environmental conditions and limited availability of resources can create significant difficulties. This subject is particularly important because of the proximity of this problem to these regions. In addition, the study recommends the development of comprehensive and workable project designs that take into account the one-of-a-kind conditions that are typical of arid and semi-arid regions. In this context, "factors" refer to things like the extreme environmental conditions, the restricted availability of resources and specialized labor, and the need to connect with local people and stakeholders.

It is crucial to build and maintain active participation with local communities and stakeholders in a timely and regular way in order to receive their useful input and endorsement. Establishing and maintaining active interaction with regional communities and stakeholders may help with this. This strategy will make it easier to build good connections and trust, and it will also ensure that the project is carried out in a manner that is consistent with the needs and preferences of the local community. It is of the utmost importance to make use of appropriate technologies and materials that are well suited to the difficult environmental conditions. The road construction project will

benefit from this measure's contribution to the enhancement of durability and lifespan. In order for businesses to ensure the effective completion of projects to a significant degree, it is important for such organizations to put in place comprehensive systems of quality control and monitoring. The early detection and resolution of any difficulties will be considerably easier thanks to this technique, which will significantly increase the likelihood that the road project will be successfully completed to the satisfaction of all parties concerned.

5.4.2 Recommendations on Policy

The present study provides evidence of a positive association between the project planning, community participation and government regulations on performance of road projects in arid and semi-arid counties in Kenya. The research makes several policy based recommends. It is vital to give priority to investing in project planning and capacity development by dedicating appropriate resources towards extensive project planning and feasibility assessments. This is because it is essential to give investment in project planning and capacity development the highest priority. This includes the provision of resources for the conduct of exhaustive site studies, assessments of the consequences on the environment, and the facilitation of processes for the engagement of stakeholders. There is a need for greater investment in training and development efforts that target project planners and engineers, with the purpose of expanding their knowledge and understanding of the design and execution of road projects within arid and semi-arid regions. The training and development programs target project planners and engineers. Facilitating the dissemination of best practices and lessons learned among project planners and stakeholders requires the adoption of knowledge-sharing platforms and collaboration techniques. This is a vital component of the process.

In addition, the findings of the study recommend the use of procedures that enhance transparency and accountability in project planning and management. This may be accomplished by ensuring that all of the project's plans, finances, and technical specifications are easily accessible to the general public, which will in turn encourage openness and accountability. It is strongly suggested that independent evaluation mechanisms be developed in order to evaluate the quality and

efficiency of project planning and execution. In addition, it is recommended to encourage public participation and to include stakeholders at each level of the project, including the design, the implementation, and the assessment stages.

The report concludes by recommending that institutional frameworks for project management and oversight be improved across all levels of government by developing roles and responsibilities for project management and oversight that are clear and precisely defined. In order to improve the efficiency of project planning and execution, it is essential to reduce the amount of time and money spent on administrative tasks while simultaneously streamlining the processes involved in those tasks. It is advised that resources be allocated towards technological breakthroughs and innovation in order to maximize the effectiveness of project management techniques. This comprises the use of software for project management as well as the use of data analytics.

5.4.3 Recommendations for Theory

The public interest theory of regulation was conceived as a result of the findings of a research that investigated a model for measuring the performance of road authorities in conserving road assets. The findings of the study provided a wealth of insights and recommendations for future researchers, as well as theoretical frameworks. Establishing project planning frameworks that are especially adapted to the contextual needs of arid and semi-arid settings is an absolute necessity if one wants to successfully handle the one-of-a-kind difficulties that are offered by arid and semi-arid environments. The process of developing project planning frameworks that are adapted to the specific qualities of arid and semi-arid environments. In addition, the planning frameworks for the project should include the incorporation of the concepts of environmental sustainability, community participation, and climate change resilience. It is advised that case studies and comparative analyses be used when evaluating the efficacy of project planning frameworks that have been adapted to specific circumstances in order to get accurate results.

Second, it is essential for academics to conduct an in-depth study and analysis of the use of cutting-edge technologies and methods in the context of project planning and management. The purpose of this article is to investigate the ways in which geospatial technology, remote sensing, and data analytics can enhance the process of project planning and site inspections. Analyze how well the use of building information modeling (BIM) and other digital technologies may improve the design, coordination, and cooperation of a project. This research should focus on locating acceptable technologies and procedures for the design and implementation of projects in arid and semi-arid parts of the world.

5.5 Suggestions for Future Research

The present study proposes two areas for further investigation. Beyond planning, participation, and regulations, another crucial factor often shrouded in complexity is financing. Delving into the diverse financing mechanisms employed for these projects, from government allocations to public-private partnerships and international aid, can unlock vital insights. Analyzing the effectiveness of each mechanism in resource allocation, cost efficiency, and long-term project sustainability is crucial. Moreover, investigating the presence and impact of corruption within these financing channels necessitates unflinching attention. Quantifying the financial losses due to corruption, understanding its risk factors within specific financing models, and proposing anti-corruption measures can significantly improve project outcomes. The research would answer key questions such as:

- i. How do different financing mechanisms (such as government funding, PPPs, aid) compare in terms of cost efficiency, transparency, and long-term sustainability for road projects in these regions?
- ii. What are the most prevalent forms of corruption encountered in road project financing, and how do they impact project performance and resource allocation?
- iii. Can quantitative analysis of project budgets, contracts, and procurement processes combined with qualitative interviews with stakeholders and whistleblower accounts reveal patterns of corruption and inform effective anti-corruption strategies?

Such a study will have an impact because uncovering the intricate web of financing and tackling corruption head-on can revolutionise project success. Transparent and efficient financing mechanisms ensure resources reach their intended use, while robust anti-corruption measures safeguard against financial leakages and foster public trust. This, in turn, empowers communities to hold actors accountable and contributes to more equitable and sustainable development throughout these regions.

5.6 Chapter Summary

This chapter outlines the study summary, conclusions and recommendations that were developed from the study's results.. The proposals were classified into three categories: recommendations for practical application, recommendations for policy implementation, and recommendations for theoretical development. Moreover, the chapter included recommendations for prospective investigations.

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APPENDICES

Appendix I: Introduction Letter

Tiksan Abdi

The Management University of Africa,
P.O. Box 29677-00100, Nairobi, Kenya

Date:

The General Manager,

Company

P.O. Box.....

Nairobi

Dear Sir/Madam,

RE: REQUEST FOR COLLECTION OF RESEARCH DATA

I am a Doctor of Philosophy student pursuing management and leadership from the Management University of Africa, researching project planning, government regulations, community participation, and performance of completed road projects in arid and semi-arid counties, in Kenya. Your firm has been identified to participate in this study through your managers who would be requested to voluntarily fill out the attached questionnaire.

I guarantee any information provided will be held in confidence and shall only be used for this academic (thesis) study. No study firm or respondents will be named in the study, its results, or recommendation. The study will have a direct benefit to the study firms and the researcher will share the findings and recommendations with the firm that will wish to read the final report

Yours Faithfully,

Tiksan Abdi

Appendix II: Questionnaire

Dear Respondent,

The purpose of this study is to assess project planning, community participation, government regulations and performance of completed road projects in arid and semi-arid counties in Kenya. It is an academic research conducted in partial fulfillment for the award of Doctor of Philosophy Degree in Management and Leadership of Management University of Africa. You are therefore kindly requested to fill this questionnaire to facilitate the study of the subject. The information obtained will be utilized strictly for academic purposes and will be handled with the utmost confidentiality.

SECTION A: DEMOGRAPHIC INFORMATION

1. Respondent Category

- | | | |
|-----------------------------|---|-----|
| Project managers | 0 | [] |
| Local Community leader | 1 | [] |
| County public works officer | 2 | [] |

2. Please select your age range in complete years;

- | | | |
|-------------------|---|-----|
| 18 -25 years old | 0 | [] |
| 26-35 years old | 1 | [] |
| 36-45 years old | 2 | [] |
| 46-55 years old | 3 | [] |
| Over 55 years old | 4 | [] |

3. Please select your Level of formal education

- | | | |
|--|---|-----|
| Basic Education (Primary or Secondary) | 0 | [] |
| Certificate | 1 | [] |
| Diploma | 2 | [] |
| Undergraduate | 3 | [] |
| Masters | 4 | [] |
| PhD | 5 | [] |

4. Please select your Work Experience in complete years

- | | | |
|-------------------|---|-----|
| Less than 5 years | 0 | [] |
| 5- 9 years | 1 | [] |

10- 14 years 2 []

More than 14 years 3 []

SECTION B: PROJECT PLANNING

Please use the point scale below to indicate your level of agreement by ticking each one of the box in a given statements.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

	Cost Management	1	2	3	4	5
1.	The project planning platform offers better project cost management tools than the traditional methods					
2.	Project planning generates more accurate cost management within a much shorter period than the traditional methods					
3.	Cost management which are planned tend to be more dependable					
4.	The modeling of exact materials enables the exact estimation of material costs					
5.	Carrying out a value engineering exercise is easier on the project cost management platform					
6.	Cost management from project planning is easy to understand thus enabling faster decision making					
7.	Project cost is well estimated					
8.	The budgeted funds is enough to complete the project					
9.	Budget for the project is properly determined					
10.	Project is completed without any struggle					
	Scope Management	1	2	3	4	5
1.	All activities to be carried out during the project execution are defined during scope planning					

2.	During scope planning, resources required for the project are set out in the project plan					
3.	The duration of the project is clearly planned for during scope planning					
4.	The views of all project stakeholders are taken into account in scope planning					
5.	Scope planning is a very important step in ensuring successful implementation of a project					
6.	Project organization was well communicated during scope planning phase					
	Scope Management	1	2	3	4	5
7.	Appropriate resources is provided					
8.	All material resources allocated are well utilised					
9.	Project Scope is well specified					
	Risk Management	1	2	3	4	5
1.	Project management tools and Techniques (PMTT) contributes significantly to project implementation success.					
2.	Inadequate frameworks for risk management structures for mitigation of risks have led to failure in implementation of projects					
3.	Adoption of project management approach assists in eliminating the wastage of time which have been directed to tasks that are irrelevant.					
4.	Lack of project risk management skills has contributed to failure of programs.					
5.	Risk management area has received considerable attention by management during project implementation.					
6.	Risk assessment during the program cycle is essential					
	Time Management	1	2	3	4	5
1.	Time helps in setting goals of the project					
2.	Time helps in prioritizing for a better performance					
3.	It shows chronological order of project activities					
4.	The project scope is well specified during planning phase					

5.	Schedules were well developed					
6.	Activity duration was well estimated					
7.	The project was completed on the original(planned) schedule					
8.	All projects were completed on the agreed time					
9.	The organisation identifies clear path of the project					

SECTION C: COMMUNITY PARTICIPATION

Please use the point scale below to indicate your level of agreement by ticking each one of the box in a given statements.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

	Community empowerment	1	2	3	4	5
1.	Community members are allowed to share information which is an effective way of reducing costs during project performance					
2.	The community empowerment provide them with complete freedom to take up judicious decisions on project performance					
3.	community empowerment encourages participative decision making during project performance					
4.	Community members are fully involved in the entire project management cycle					
5.	Community members involvement help in creating ownership of the project					
6.	Training of the Community members improves the capability of making decisions of the program					
7.	Community members involvement in management of funds enable smooth running of the program					
8.	Involving Community members in monitoring of project progress is helpful in ensuring project effectiveness					
9.	Involving Community members in project risk management has made the project work better					

10.	Involving Community members in identification of project has enabled the project to be relevant to their needs					
	Community intercommunication					
1.	Community intercommunication is key in attaining success of project performance					
2.	There exists a Community intercommunication framework in project performance					
3.	We regularly share information with Community members					
4.	Community members' views are considered in decision making with regard to projects					
5.	Community members' analysis allows the project managers to determine what motivates the community to the project					
6.	Throughout the project, each Community member is managed to ensure their expressions are being met					
	Community intercommunication	1	2	3	4	5
7.	Organizations consider strong intercommunication between team members and community members					
8.	Community members intercommunication leads to allocation of right authority for effective project performance					
	Community Grievance Management					
1.	Community members grievances can derail project success					
2.	This firm has in place a good stakeholder grievance management system					
3.	There is regular follow up to ensure that right decision is made that is satisfactory to all parties					
4.	There is documented evidence of community members grievances from projects ending up in courts of law					
5.	Community members are actively engage in problem solving process					
6.	There exist good relationships between stakeholders in road projects					
7.	When the decision is not satisfactory at the local level, there is an opportunity to take it to higher offices					
8.	National government listen to grievances presented to them by the community members					
9.	County government listen to grievances presented to them by the community members					

SECTION D: GOVERNMENT REGULATIONS

Please use the point scale below to indicate your level of agreement by ticking each one of the box in the given statements.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

	Regulatory Framework	1	2	3	4	5
1.	There is a clear institutional framework for approval of road projects					
2.	Law provides a transparent process for road projects					
3.	A clear policy framework helps public sector to understand the core rationale in road projects construction					
	Regulatory Framework	1	2	3	4	5
4.	A clear policy framework helps the private sector to understand the core rationale in road projects construction					
5.	Adequate regulatory framework are proven drivers for successful completion of road projects					
6.	A combination of the leading features of both the public and private partners produces a higher value road projects					
7.	Regulations enforces effective mitigation measures for significant negative impacts of road construction projects					
8.	Regulations issue guidelines for the management of natural resources during road construction					
9.	The government has adequate institution capacity to enforce the building construction regulations					
10.	Enacted Laws have penalties on errand contractors to increase compliance					
11.	Government involves the stakeholders in policy formulation					
12.	Government roads department issues construction permits on time					
13.	The process of approving road plans is long leading to delays in project delivery.					
	Code of Conduct	1	2	3	4	5

1.	KeNHA ensures that road construction personnel are licensed in road projects management					
2.	KURA ensures that road construction personnel are licensed in road projects management					
3.	KeRRA ensures that road construction personnel are licensed in road projects management					
4.	KeNHA promotes continuous professional development of road construction personnel					
5.	KURA promotes continuous professional development of road construction personnel					
6.	KeRRA promotes continuous professional development of road construction personnel					
7.	KeNHA ensures enhancement of ethical practice by road construction personnel					
8.	KURA ensures enhancement of ethical practice by road construction personnel					
9.	KeRRA ensures enhancement of ethical practice by road construction personnel					
10.	KeNHA board eliminates unfair competition for work among road construction personnel					
	Code of Conduct	1	2	3	4	5
11.	KURA board eliminates unfair competition for work among road construction personnel					
12.	KeRRA board eliminates unfair competition for work among road construction personnel					
13.	KeNHA effectively implements environmental policies					
14.	KURA effectively implements environmental policies					
15.	KeRRA effectively implements environmental policies					
16.	KeNHA carries out on-site inspection					
17.	KURA carries out on-site inspection					
18.	KeRRA carries out on-site inspection					
19.	KeNHA certifies road constructors					

20.	KURA certifies road constructors					
21.	KeRRA certifies road constructors					
22.	KeNHA standardizes construction techniques and material					
23.	KURA standardizes construction techniques and material					
24.	KeRRA standardizes construction techniques and material					

SECTION E: PERFORMANCE OF ROAD PROJECT

Please use the point scale below to indicate your level of agreement by ticking each one of the boxes in the given statements.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

	Statement	1	2	3	4	5
1	Contractors undertake road projects					
2	Road project is completed within the budgeted cost					
3	Contractors complete road projects within the given time limit.					
4	Contractors deliver road projects that meet clients' quality.					
5	Stakeholders are always satisfied with the project outcome					
6	The firm flexibly adjusts project focus in case of challenges					
7	The firm is able to handle unpredictable work situations					
8	The firm creatively solves problems related to projects					
9	Situation assessments is performed to enable us detect early cues or changes in projects requirement					
10	Performance is associated with several factors such as time, cost, quality, client satisfaction, productivity, and safety.					

11	When a project achieves the desired outcome, it's considered successful					
12	Project is considered successful when it meets the need of stakeholders					
13	Project is considered successful when it satisfies quality expectations					
14	Project success will be determined by timely completion of the project					
15	Cost have been reduced due to adoption of regulatory frameworks					

-The End-

Appendix III: Completed Road in the ASAL Region between 2016 and 2019

No	Name of the Road Project	Name of firm	County
1	Junction B8 - Masalani	Warsan Construction	Garissa
2	Sultan Hamud Kasikeu-Wautu-Kyambeke- Kikoko(D515)	M/s Pidngich Technologies Limited	Makueni
3	A8 Lukenya - KamuluMunyu - A3 JuncKilimambogo	M/s Wigo International Contractors Ltd	Makueni
4	Junct A2 Makuyu - Junct A3 Kilimabogo(Gatuanayaga)	Dittman Construction co. Ltd	Makueni
5	Chuluni – Mwitika	M/s Tablee Company Limited	Kitui
6	Mwitika – Twambui	M/s Winmesh Limited	Kitui
7	Twambui- Chifiri	Mutomo - South Kitui N.R Gate	Kitui
8	Junc B86/B88 Kone Kalite-Junc B86/B88 Waldena	Kithimb Construction co. Ltd	Kilifi
9	Kiserian - OITepesi (B19) Road	Maki Construction co. Ltd	Kajiado
10	OITepesi - Magadi (B19) Road	Metrix Construction co. Ltd	Kajiado
11	Namanga- Amboseli Gate - A5 Junction (Kimana) (B54) Road	SynchroConsult Associates Ltd	Kajiado
12	Magadi Exit Gate (West) - Oloiborto (CB Narok) (B19) RoadKaj/Mach	Shako & Partners Construction Co.Ltd	Kajiado
13	Isinya - Konza (Jn A8) (B50) Road	Mastow Construction co. Ltd	Kajiado
14	B19 Jn Kamukuru-Elangata (B51) Road	UniConsult Kenya Ltd	Narok
15	Elangata - Kajiado A2 Jn (B51) Road	Metrix Construction co. Ltd	Kajiado
16	Modika (Junct C81) - Hagalbul (A3) Road	Macruf Investors Ltd	Narok
17	Hagalbul - Daadab (A3) Road	Farris Suppliers & Construction company Ltd	Garissa
18	Hola - Waldena (B88) Road	Gedox Associates	Tana river
19	Junct (C116) Samatar - Bojiyare (A13) Roads	Macruf Investors Ltd	Isiolo
20	Rhamu -Quimbiso (A13) Road	Metrix Construction co. Ltd	Mandera
21	Quimbiso - Mandera (A13) Road	Dittman Construction co. Ltd	Mandera
22	Dabel - Buna (A14) Road	Salmtech connect Ltd	Wajir

23	JunctU E 5008 (Eldas) - Junct E 833 Griftu (A14) road	ArmittechConstruction co. Ltd	Wajir
24	Daradhe AP Camp - Illeret - Police Border Post (Km 80 - Daradhe AP Camp -A4 (JN B76))	Maiteri Associates	Marsabit
25	Saru - Jn A4 (Buluk) (B76 (JN A4) - Sabarai - Saru)	Odongo & Partners Construction	Marsabit
26	Elhadi - Forolle - Jn A2 (Turbi) (Km 200 - Forolle –Turbi)	Metrix Construction co. Ltd	Samburu
27	A2 Laisamis -Bisan Biliqu (Laisamis - Koya - Kom KWS)	Max Engineering & Construction Co.Ltd	Samburu
28	Bisan Biliqu - Merti - Hadado (Kom KWS - Merti)	Varstech Construction co. Ltd	Isiolo
29	Kamweline – Kachuru	M/s Robet Contractors Limited	Laikipia
30	A4 South Horr (Nursery) - Jn Civicon Road - Illuat -	M/s Amas Trading Company ltd	Marsabit
31	Ngurunit - Jn Civicon Road (A2 Laisamis)	M/s Akorayan Contractors Ltd.	Marsabit
32	Dabel - JN A2 (Oda)	Metrix Construction co. Ltd	Marsabit
33	Aitong - Mara River (B1) Road	M/s Kenle Investment Limited	Marsabit
34	Narok - Narusura (B19) Road	M/s Libhope Investment Limited	Narok
35	arusura - Morijo (B19) Road	M/s Shansan Logistics Limited	Turkana
36	Morijo - Oloiborto (CB Kajiado (B19) Road	M/s Sowis Enterprises Limited	Kajiado
37	Chesoi-Chesongoch	M/s Dibe Merchants Limited	Baringo
38	watate-Rukanga-Guranze-Lunga Lunga	Wanjohi Construction co. Ltd	Kwale
39	Kone Kalite - Sala Gate	Wavetech Construction co. Ltd	Kwale
40	LungaLunga - Kinango – Marere	M/s Groupage Ventures Limited.	Kwale
41	Ijara – Hulugo	Wanjohi Construction co. Ltd	Garissa
42	Wote - Athi River	Wavetech Construction co. Ltd	Makueni
43	Athi River – Kitui	M/s Civiscope Limited	Makueni
44	Kamuwongo – Ciangera	Machara and Partners Construction Ltd	Taita-Taveta
45	Migwani – Mbondoni	M/s Winmesh Limited	Tharaka Nithi

46	Junct A2 Makuyu - Junct A3 Kilimabogo(Gatuanyaga)	R & B Consultants Ltd	Makueni
47	Junc B86/B88 Waldena - JuncJunc B86/B87 Chifiri	Mastan Construction co. Ltd	Tana river
48	JuncJunc B86/B87 Chifiri - Junc A3/B86 Bangali	M/s Winmesh Limited	Tana river
49	Twambui- Chifiri	SteveGatesConstruction company	Tana river
50	Mutomo - South Kitui N.R Gate	S. R Manga and Associates	Kitui
51	South Kitui N.R Gate- Kone Kalite	Wanjohi Construction co. Ltd	Kitui
52	Junc B86/B88 Kone Kalite-Junc B86/B88 Waldena	Wavetech Construction co. Ltd	Tana river
53	Kapenguria town roads	Urban building contractors	West pokot
54	Tartar junction – KamuinoChewoyet –Sakas in west pokot county	RavinaAgency Limited	West Pokot
55	Bugar - Chebiemit / Jnct D329 (Kaplolo) - Kaplamai - Jnct C50 Kruger Farm	Stecol Corporation	Baringo
56	Olchobezi - Kabolecho - Mgondo/Mogondo - Changina - EmurruaDikirr	Parbat Siyani Ltd & Elite Earthmovers Ltd Jv	Narok
57	Kapsigilai-Tenden/Access To Schools	Stecol Corporation	Baringo
58	Mumbuni-KathianiThwake River	M/s Kibinico Limited	Makueni
59	Athi River –Bisil	M/s Policol International Company Ltd	Kajiado
60	Eldoret-Ziwa-Moi Bridge Roads	M/s Anole Construction Company Ltd	Baringo
61	Southern Bypass (Ole Sereni - Ngong Road Interchange)	M/s BomelliGroupLtd	Kajiado
62	Southern Bypass, (Ngong Road Interchange - Kikuyu)	M/s Shawasha Company Ltd	Kajiado
63	Bute Town roads	Center star co. Ltd	Wajir
64	Banisa Township roads	Aridlands Communication Ltd.	Mandera
65	Eldas Township Roads	Lilaaf Construction Company Ltd.	Wajir
66	Habaswein Township Roads	Coolio Enterprise Ltd.	Wajir

67	Mandera Town Roads Phase II	Derow construction Co. Ltd	Mandera
68	Ngeria – Timboroa	M/s Akorayan Contractors Ltd.	Laikipia
69	Maua Town Roads	Golden Ruby Investments Ltd	Meru
70	Garissa Township Roads	Ogle Construction Ltd.	Garissa
71	Tarbaj Roads in Wajir County	Baraki international Ltd	Wajir
72	Kwale – Ukunda Township Roads	Paradigm construction Co. Ltd	Kwale
73	Bomas - Kiserian (B19) Road	M/s Geomet Company Limited	Kajiado
74	Kajiado Town roads Phase 1	Star general contractors	Kajiado
75	A3 Jn – Bulla Madina – Sankuri – Kengen road in Garissa	MWarsan Construction Co.Ltd	Garissa
76	Marsabit County HQs road	Mibasa Limited	Marsabit
77	Bugar - [JN B16] Iten (B77) Road	M/s Geomet Company Limited	Baringo
78	Kimutwa - Makaveti - Kwa Mutisya	LilaafConstructon Co Ltd	Makueni
79	Kwa Vonza-Kenyatta University- Mikuyuni Primary- South Eastern Kenya University Road	Briidgeways Construction	Kitui
80	Soy-Kipsangui- Kabenes& Eldoret - Kiplombe- Soy	China Henan Chico	Baringo
81	Mandera town Road	Frontier Eng. Limited	Mandera
82	Marekebuni-Majengo-Marafa-Sosoni Road (D553)	A. A. Bayasuff& Sons Ltd	Kilifi
83	Junction B8 - Masalani	Warsan Construction	Tana River
84	Sultan Hamud Kasikeu-Wautu-Kyambeke- Kikoko(D515)	Kabuito Contractors	Makueni
85	Embu Hsp - Kathangariri - Kiajokoma - Runyenjes - Mugui - Mbui Njeru - Kanja - Sikago	S. S. Mehta &Son Ltd	Embu
86	Isiolo Town Roads Lot 1	Shibli Enterprises Ltd	Isiolo
87	Malindi – Kakoneni –Sala Gate Road(C103) And SabakiMarikebuni Road(D553)	S. S. Mehta & Sons Ltd	Kilifi

88	Imaroro-Mashru-Isara	Stecol Corporation	Narok
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KeNHA, KURA and KeRRA Annual Reports (2017/2018, 2018/2019, 2019/2020)

Appendix IV: Factor Loadings

Project Planning Factor	Factor Loadings			
The project planning platform offers better project cost management tools than the traditional methods PP_CM_1	.782			
Project planning generates more accurate cost management within a much shorter period than the traditional methods PP_CM_2	.702			
Cost management which are planned tend to be more dependable PP_CM_3	.740			
The modeling of exact materials enables the exact estimation of material costs PP_CM_4	.794			
Carrying out a value engineering exercise is easier on the project cost management platform PP_CM_5	.753			
Cost management from project planning is easy to understand thus enabling faster decision making PP_CM_6	.761			
Project cost is well estimated PP_CM_7	.741			
The budgeted funds is enough to complete the project PP_CM_8	.715			
Budget for the project is properly determined PP_CM_9	.777			
Project is completed without any struggle PP_CM_10	.706			
All activities to be carried out during the project execution are defined during scope planning PP_SM_1	.715			
During scope planning, resources required for the project are set out in the project plan PP_SM_2	.774			
The duration of the project is clearly planned for during scope planning PP_SM_3	.726			

The views of all project stakeholders are taken into account in scope planning PP_SM_4	.706			
Scope planning is a very important step in ensuring successful implementation of a project PP_SM_5	.794			
Project organization was well communicated during scope planning phase PP_SM_6	.800			
Appropriate resources is provided PP_SM_7	.790			
All material resources allocated are well utilisedPP_SM_8	.805			
Project Scope is well specified PP_SM_9	.783			
Project management tools and Techniques (PMTT) contributes significantly to project implementation success. PP_RM_1	.793			
Inadequate frameworks for risk management structures for mitigation of risks have led to failure in implementation of projects PP_RM_2	.790			
Adoption of project management approach assists in eliminating the wastage of time which have been directed to tasks that are irrelevant. PP_RM_3	.771			
Lack of project risk management skills has contributed to failure of programs. PP_RM_4	.705			
Risk management area has received considerable attention by management during project implementation. PP_RM_5	.727			
Risk assessment during the program cycle is essential PP_RM_6	.709			
Time helps in setting goals of the project PP_TM_1	.765			
Time helps in prioritizing for a better performance PP_TM_2	.703			
It shows chronological order of project activities PP_TM_3	.753			
The project scope is well specified during planning phase PP_TM_4	.736			
Schedules were well developed PP_TM_5	.785			
Activity duration was well estimated PP_TM_6	.796			
The project was completed on the original(planned) schedule PP_TM_7	.711			
All projects were completed on the agreed time PP_TM_8	.709			
The organisation identifies clear path of the project PP_TM_9	.717			
Community Participation Factor				

Community members are allowed to share information which is an effective way of reducing costs during project performance CP_CE_1		.776		
The community empowerment provide them with complete freedom to take up judicious decisions on project performance CP_CE_2		.742		
Community empowerment encourages participative decision making during project performance CP_CE_3		.736		
Community members are fully involved in the entire project management cycle CP_CE_4		.758		
Community members involvement help in creating ownership of the project CP_CE_5		.798		
Training of the Community members improves the capability of making decisions of the program CP_CE_6		.715		
Community members involvement in management of funds enable smooth running of the program CP_CE_7		.736		
Involving Community members in monitoring of project progress is helpful in ensuring project effectiveness CP_CE_8		.785		
Involving Community members in project risk management has made the project work better CP_CE_9		.791		
Involving Community members in identification of project has enabled the project to be relevant to their needs CP_CE_10		.700		
Community intercommunication is key in attaining success of project performance CP_CI_1		.726		
There exists a Community intercommunication framework in project performance CP_CI_2		.769		
We regularly share information with Community members CP_CI_3		.714		
Community members' views are considered in decision making with regard to projects CP_CI_4		.702		
Community members' analysis allows the project managers to determine what motivates the community to the project CP_CI_5		.761		
Throughout the project, each Community member is managed to ensure their expressions are being met CP_CI_6		.782		
Organizations consider strong intercommunication between team members and community members CP_CI_7		.728		

Community members intercommunication leads to allocation of right authority for effective project performance CP_CI_8		.763		
Community members grievances can derail project success CP_CGM_1		.743		
This firm has in place a good stakeholder grievance management system CP_CGM_2		.756		
Government Regulations Factor				
There is a clear institutional framework for approval of road projects GR_RF_1			.732	
Law provides a transparent process for road projects GR_RF_2			.786	
A clear policy framework helps public sector to understand the core rationale in road projects construction GR_RF_3			.701	
A clear policy framework helps the private sector to understand the core rationale in road projects construction GR_RF_4			.705	
Adequate regulatory framework are proven drivers for successful completion of road projects GR_RF_5			.708	
A combination of the leading features of both the public and private partners produces a higher value road projects GR_RF_6			.530	
Regulations enforces effective mitigation measures for significant negative impacts of road construction projects GR_RF_7			.766	
Regulations issue guidelines for the management of natural resources during road construction GR_RF_8			.775	
The government has adequate institution capacity to enforce the building construction regulations GR_RF_9			.773	
Enacted Laws have penalties on errand contractors to increase compliance GR_RF_10			.827	
Government involves the stakeholders in policy formulation GR_RF_11			.769	
Government roads department issues construction permits on time GR_RF_12			.759	
The process of approving road plans is long leading to delays in project delivery. GR_RF_13			.798	
KeNHA ensures that road construction personnel are licensed in road projects management GR_CC_1			.750	

KURA ensures that road construction personnel are licensed in road projects management GR_CC_2			.745	
KeRRA ensures that road construction personnel are licensed in road projects management GR_CC_3			.765	
KeNHA promotes continuous professional development of road construction personnel GR_CC_4			.785	
KURA promotes continuous professional development of road construction personnel GR_CC_5			.741	
KeRRA promotes continuous professional development of road construction personnel GR_CC_6			.701	
KeNHA ensures enhancement of ethical practice by road construction personnel GR_CC_7			.773	
KURA ensures enhancement of ethical practice by road construction personnel GR_CC_8			.701	
KeRRA ensures enhancement of ethical practice by road construction personnel GR_CC_9			.774	
KeNHA board eliminates unfair competition for work among road construction personnel GR_CC_10			.783	
KURA board eliminates unfair competition for work among road construction personnel GR_CC_11			.751	
KeRRA board eliminates unfair competition for work among road construction personnel GR_CC_12			.755	
KeNHA effectively implements environmental policies GR_CC_13			.786	
KURA effectively implements environmental policies GR_CC_14			.702	
KeRRA effectively implements environmental policies GR_CC_15			.714	
KeNHA carries out on-site inspection GR_CC_16			.797	
KURA carries out on-site inspection GR_CC_17			.798	
KeRRA carries out on-site inspection GR_CC_18			.778	
KeNHA certifies road constructors GR_CC_19			.756	
KURA certifies road constructors GR_CC_20			.798	
KeRRA certifies road constructors GR_CC_21			.790	
KeNHA standardizes construction techniques and material GR_CC_22			.827	
KURA standardizes construction techniques and material GR_CC_23			.773	
KeRRA standardizes construction techniques and material GR_CC_24			.800	

Performance Factor				
Contractors undertake road projects PER_1				.842
Road project is completed within the budgeted cost PER_2				.825
Contractors complete road projects within the given time limit PER_3				.825
Contractors deliver road projects that meet clients' quality PER_4				.807
Stakeholders are always satisfied with the project outcome PER_5				.807
The firm flexibly adjusts project focus in case of challenges PER_6				.814
The firm is able to handle unpredictable work situations PER_7				.778
The firm creatively solves problems related to projects PER_8				.790
Situation assessments is performed to enable us detect early cues or changes in projects requirement PER_9				.766
Performance is associated with several factors (such as time, cost, quality, client satisfaction, productivity, and safety) PER_10				.728
When a project achieves the desired outcome, it's considered successful PER_11				.721
A project is considered successful when it meets the need of stakeholders PER_12				.713
Project success will be determined by timely completion of the project PER_14				.701

APPENDIX V: Moderated Mediation Analysis Output

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 3.3 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

Model : 8
Y : Perf_tot
X : Proj_pla
M : Com_part
W : Govt_Reg

Sample
Size: 161

OUTCOME VARIABLE:
Com_part

Model Summary

R	R-sq	MSE	F(HC4)	df1	df2	p
.693	.480	.136	29.965	3.000	157.000	.000

Model

	coeff	se(HC4)	t	p	LLCI	ULCI
constant	3.925	.036	108.417	.000	3.853	3.996
Proj_pla	.422	.154	2.736	.007	.117	.727
Govt_Reg	.050	.018	2.707	.008	.013	.086
Int_1	.052	.028	1.967	.044	.106	.113

Product terms key:

Int_1 : Proj_pla x Govt_Reg

Test(s) of highest order unconditional interaction(s):

	R2-chng	F(HC4)	df1	df2	p
X*W	.027	3.486	1.000	157.000	.064

 Focal predict: Proj_pla (X)
 Mod var: Govt_Reg (W)

Conditional effects of the focal predictor at values of the moderator(s):

Govt_Reg	Effect	se(HC4)	t	p	LLCI	ULCI
-3.043	.579	.181	3.205	.002	.222	.936
.000	.422	.154	2.736	.007	.117	.727
3.043	.265	.171	1.551	.123	-.072	.602

Moderator value(s) defining Johnson-Neyman significance region(s):

Value	% below	% above
2.029	74.534	25.466

Conditional effect of focal predictor at values of the moderator:

Govt_Reg	Effect	se(HC4)	t	p	LLCI	ULCI
-8.392	.856	.288	2.976	.003	.288	1.424
-7.621	.816	.270	3.024	.003	.283	1.349
-6.851	.776	.253	3.073	.003	.277	1.275
-6.081	.736	.236	3.120	.002	.270	1.203
-5.311	.697	.220	3.162	.002	.261	1.132
-4.540	.657	.206	3.194	.002	.251	1.063
-3.770	.617	.192	3.211	.002	.237	.996
-3.000	.577	.180	3.203	.002	.221	.933
-2.230	.537	.170	3.160	.002	.201	.873
-1.459	.497	.162	3.068	.003	.177	.818
-.689	.458	.157	2.920	.004	.148	.767
.081	.418	.154	2.711	.007	.113	.722
.851	.378	.154	2.447	.015	.073	.683
1.622	.338	.158	2.144	.034	.027	.650
2.029	.317	.161	1.975	.050	.000	.634
2.392	.298	.164	1.823	.070	-.025	.621
3.162	.258	.172	1.502	.135	-.081	.598
3.932	.219	.183	1.197	.233	-.142	.579
4.703	.179	.195	.917	.361	-.206	.564
5.473	.139	.209	.666	.507	-.273	.551
6.243	.099	.224	.443	.658	-.343	.541
7.013	.059	.240	.247	.805	-.414	.533

Data for visualizing the conditional effect of the focal predictor:
 Paste text below into a SPSS syntax window and execute to produce plot.

```
DATA LIST FREE/
  Proj_pla Govt_Reg Com_part .
BEGIN DATA.
  -.436 -3.043 3.521
  .000 -3.043 3.773
  .436 -3.043 4.025
  -.436 .000 3.741
  .000 .000 3.925
  .436 .000 4.109
  -.436 3.043 3.961
  .000 3.043 4.077
  .436 3.043 4.192
END DATA.
GRAPH/SCATTERPLOT=
  Proj_pla WITH Com_part BY Govt_Reg .
```

OUTCOME VARIABLE:
 Perf_tot

Model Summary

R	R-sq	MSE	F(HC4)	df1	df2	p
.742	.551	.175	69.119	4.000	156.000	.000

Model

	coeff	se(HC4)	t	p	LLCI	ULCI
constant	2.189	.357	6.137	.000	1.484	2.893
Proj_pla	.488	.133	4.614	.000	.280	.679
Com_part	.413	.090	4.588	.000	.235	.591
Govt_Reg	.066	.018	3.745	.000	.031	.101
Int_2	.017	.022	-.799	.426	.060	.026

Product terms key:

Int_1 : Proj_pla x Govt_Reg

Test(s) of highest order unconditional interaction(s):

R2-chng	F(HC4)	df1	df2	p
---------	--------	-----	-----	---

X*W .002 .638 1.000 156.000 .426

Focal predict: Proj_pla (X)
Mod var: Govt_Reg (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

```
DATA LIST FREE/  
  Proj_pla Govt_Reg Perf_tot .  
BEGIN DATA.  
  -.436 -3.043 3.470  
  .000 -3.043 3.587  
  .436 -3.043 3.704  
  -.436 .000 3.694  
  .000 .000 3.788  
  .436 .000 3.881  
  -.436 3.043 3.917  
  .000 3.043 3.988  
  .436 3.043 4.059  
END DATA.  
GRAPH/SCATTERPLOT=  
Proj_pla WITH Perf_tot BY Govt_Reg .
```

***** DIRECT AND INDIRECT EFFECTS OF X ON Y *****

Conditional direct effect(s) of X on Y:

Govt_Reg	Effect	se(HC4)	t	p	LLCI	ULCI
-3.043	.268	.134	2.008	.046	.004	.532
.000	.215	.133	1.614	.109	-.048	.479
3.043	.162	.163	.997	.320	-.159	.484

Conditional indirect effects of X on Y:

INDIRECT EFFECT:

Proj_pla -> Com_part -> Perf_tot

Govt_Reg	Effect	BootSE	BootLLCI	BootULCI
-3.043	.239	.079	.096	.405
.000	.174	.065	.053	.310

3.043 .109 .066 .020 .248

Index of moderated mediation:

	Index	BootSE	BootLLCI	BootULCI
Govt_Reg	-.021	.011	-.047	-.005

***** BOOTSTRAP RESULTS FOR REGRESSION MODEL PARAMETERS *****

OUTCOME VARIABLE:

Com_part

	Coeff	BootMean	BootSE	BootLLCI	BootULCI
constant	3.925	3.926	.035	3.855	3.994
Proj_pla	.422	.414	.141	.145	.694
Govt_Reg	.050	.051	.017	.017	.084
Int_1	-.052	-.053	.023	-.104	-.013

OUTCOME VARIABLE:

Perf_tot

	Coeff	BootMean	BootSE	BootLLCI	BootULCI
constant	2.189	2.199	.347	1.507	2.876
Proj_pla	.215	.219	.132	-.049	.477
Com_part	.413	.411	.088	.237	.586
Govt_Reg	.066	.066	.017	.032	.101
Int_1	-.017	-.018	.020	-.059	.019

***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:

95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:

5000

W values in conditional tables are the mean and +/- SD from the mean.

NOTE: A heteroscedasticity consistent standard error and covariance matrix estimator was used.

NOTE: The following variables were mean centered prior to analysis:

Govt_Reg Proj_pla

NOTE: Variables names longer than eight characters can produce incorrect output.

Shorter variable names are recommended.

----- END MATRIX -----

APPENDIX VI: NACOSTI LICENSE



REPUBLIC OF KENYA



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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