

# ROAD ASSETS MAINTENANCE, BUDGETARY ALLOCATION AND THE PERFORMANCE OF ROAD AGENCIES IN KENYA

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## ABSTRACT

Although the introduction of the Kenya Roads Board in 2000 and the subsequent enactment of the Kenya Roads Act in 2007, with its provision for the creation of the KeNHA, KURA, and KeRRA, has been seen as a step towards improving the legal and institutional structures related to road development and preservation, the quality of road assets is still below the expected standards. If the current situation on road asset maintenance is not addressed, it will be difficult for Kenya to achieve SDG 11.2 and the Kenya Vision 2030. This study sort to determine the mediating effect of budgetary allocation on the relationship between road assets maintenance and the performance of road agencies in Kenya. The study was guided by administrative management theory, The Budgeting Theory and the agency theory. Positivism research philosophy and cross-sectional research design was used. The study target population comprised of the five road agencies in Kenya. The unit of observation comprised of 251 staff from the five road agencies in Kenya. The data was collected using self-administered questionnaires and used SPSS version 26 for diagnostic tests, descriptive, and regression analysis. The correlation analysis results showed that there is moderate positive and significant correlation ( $r=0.546$ ,  $p<0.05$ ) between Budgetary Allocation and performance of road agency. The results show coefficient of determination of outcome variable budgetary allocation was  $R^2=0.2878$  implying road assets maintenance contributes a variation effect of 28.78% on budgetary allocation. The partial effect of road asset maintenance on budgetary allocation was positive and significant ( $\beta=0.5391$ ,  $p\text{-value}<0.005$ ). Similarly, the coefficient of determination for outcome variable road agencies performance was  $R^2=0.3314$  and significant at 95% significance level ( $p<0.005$ ) implying road assets maintenance and budgetary allocation both contributes 33.14% variation in road agencies performance in Kenya. The researcher concluded that there is indeed a significant a partial mediation effect of budgetary allocation on the relationship between Road asset maintenance and performance of road agencies in Kenya. These findings highlight the significant role of budgetary allocation in influencing the relationship between road assets maintenance and the performance of road agencies. It underscores the importance of effective budget planning, timely approval of key policy documents, and the allocation of adequate funds to support road assets programs and projects. The research also suggests that road agency management should exhibit a considerable degree of inventiveness, adaptability, and ingenuity in their approach to road maintenance, with the ultimate objective of attaining cost-effectiveness and the overarching goal of enhancing the country's road transport network.

**Keywords:** Road Assets Maintenance; Budgetary Allocation; Performance; Road agencies; Kenya

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### **1.1 Introduction**

The role of road transportation in promoting economic growth in African nations is of great importance, since it accounts for a significant proportion, ranging from 80% to 90%, of their total trade in goods and services. To ensure the efficient management of this vital resource, it is essential for governments to implement appropriate legislation, plans, and institutions. To assess the elements that promote or hinder the achievement of intended results, it is important to organize and analyze them (Suresh et al., 2021). The road network is a substantial public asset, owned by the government and managed by road agencies. The entities tasked with the operation, enhancement, and upkeep of the network have limitations in relation to their financial and human resources. Concurrently, it is imperative for them to additionally endeavor to meet the escalating expectations of the general populace in terms of safety, dependability, ecological sustainability, and comfort (Hayat et al., 2019). Road asset maintenance is a multifaceted approach that combines principles of engineering, ethical business conduct, and economic justification. In addition, the use of this approach also encompasses the evaluation of the financial value of the infrastructure asset, so enabling the allocation of investments towards the asset that merits the highest priority (Schoenmaker & De Bruijn, 2020).

In African countries, like to other developed areas, the term "infrastructure" refers to the basic physical and organizational structures that are required for the proper functioning of a civilization. These frameworks include several elements, including housing, security, industries, buildings, roads, bridges, health services, and governance, among other components. Infrastructure, as per the definitions provided by Olufemi (2020) and Sullivan and Sheffrin (2021), covers a range of constituent elements that are indispensable for the operational efficiency of an economy. These elements comprise firms, goods, services, and facilities. Therefore, the significance of infrastructure development in assessing the achievements of democratic leaders and its role as a vital element of efficient democratic government cannot be overstated. However, the condition in several African countries has been marked by constraints on road maintenance as a result of increasing costs, limited resources, increased use of the road network, and budgetary constraints.

### ***1.1.1 Road Assets Maintenance***

Road Asset Maintenance (RAM) refers to a systematic and structured approach that centers on the prioritizing and management of road infrastructure, including elements such as bridges and pavement. The primary objective of RAM is to effectively oversee, maintain, and enhance the overall state of these assets (Tee & Ekpiwhre, 2019). According to the study conducted by Kim et al. (2018), the primary aim of this particular methodology is to effectively and consistently oversee tangible assets and their corresponding expenses, efficacy, and potential hazards throughout their complete lifespan, ultimately working towards the strategic goals of the organization. The aforementioned notion highlights the connection between asset management and the attainment of corporate goals.

The establishment of this link is achieved through the integration of several elements, such as strategic, operational, economic, engineering, and other activities. The ultimate goal is to provide the necessary service level in a manner that is both efficient and cost-effective. Hence, asset management may be seen as the focal point of convergence for several operations. In addition to the maintenance of bridges and pavements, the concept of RAM encompasses the entire infrastructure under the authority of the agency. The main aim of this effort is to ensure the preservation, restoration, and long-term sustainability of infrastructure throughout its entire lifecycle. The use of Random Access Memory (RAM) technology, in conjunction with the proposed integration of infrastructure asset maintenance, is anticipated to provide enhanced efficiency in resource allocation for the agency. The incorporation of a feedback loop that assesses progress in relation to objectives has significant significance, and the evaluation of performance is a crucial component within the RAM model. The current body of research has extensively investigated several aspects of road asset maintenance, thereby impacting the selection of variables for analysis in this study (Schoenmaker & De Bruijn, 2020).

### ***1.1.2 Budgetary Allocation***

The fundamental contours of the phases that are included in the budgeting cycle are generally agreed upon by the majority of people. However, scholarly studies into the reform of public fund management have brought to light the absence of a framework for the distribution of money that is broadly agreed by all parties concerned. This lack of a framework has made it more difficult to reform public fund management. According to Kwarteng (2018), the concept of budget allocations concentrates the bulk of its emphasis on the subsequent stages of a process, such as

execution, monitoring, accounting, and assessment. This is because these phases are the ones that directly affect the outcome of the process.

According to Alam (2019), one alternative theory pertains to the process of allotting resources and revenue via mechanisms like as taxes, spending, and the management of public debt. In other words, this idea focuses on fiscal policy. It is vital for governments to correctly adopt and carry out a well-executed budget allocation if they want to be successful in accomplishing their long-term objectives and ambitions. This is because failure to do so will prevent them from being able to do so. In order to successfully address the demands of a number of various stakeholders while at the same time creating and maintaining relationships, this calls for the use of a broad range of efficient strategies and communication channels.

### ***1.1.3 Organisational Performance***

The Kenya National Roads Authority, often known as KeNHA, is in charge of overseeing the management of Kenya's national trunk roads, in addition to being responsible for their construction, maintenance, and repair. This responsibility is within the purview of the KeNHA's authority. The road network is divided into three unique classifications: Class A, Class B, and a specific subset of routes that is referred to as Class C. Class A is the most important classification, while Class B is the second most important classification. A subset of routes known as Class C is considered to be more specialized. Two separate organizations are assigned the responsibility of maintaining the many kinds of highways that fall within their respective spheres of authority. KeRRA is accountable for supervising the administration and maintenance of rural roads that are classified as Class D, Class E, and a section of Class C, in addition to supervising the maintenance and administration of other rural roads that are not classified. In contrast, it is KURA's job to maintain and administer urban roadways located within municipalities, especially those that are classified as national highways. Specifically, this responsibility extends to the management of national highways. These roadways are included in this classification.

Similar to KeNHA, KURA is established under the Kenya Roads Act, 2007 (Republic of Kenya, 2007). This act provides the legal framework for KURA to undertake critical tasks related to urban road infrastructure (Republic of Kenya, 2007). KURA focuses on planning, design, construction, and maintenance of urban road infrastructure in major cities and towns across Kenya (Kenya Urban Roads Authority, n.d.). Their core mission is to improve urban mobility,

reduce congestion, and enhance the overall urban environment through well-developed and maintained urban road networks (Kenya Urban Roads Authority, n.d.). Also established under the Kenya Roads Act, 2007 (Republic of Kenya, 2007), KeRRA has a distinct mandate (Republic of Kenya, 2007). This act defines KeRRA's role in managing and maintaining rural road infrastructure in Kenya (Kenya Rural Roads Authority, n.d.). Their primary focus is developing, upgrading, and maintaining rural roads to improve accessibility and connectivity in rural areas (Kenya Rural Roads Authority, n.d.). This focus on rural infrastructure development supports agricultural activities and enhances socio-economic development in rural communities (Kenya Rural Roads Authority, n.d.).

### ***1.2 Statement of the Problem***

Road assets stakeholders especially the public and road users do have a vested interest in road assets maintenance and standards, as poor road conditions can lead to fatalities, vehicle damage, increased fuel costs, and job loss (Alusa & Kalui, 2021). Although the introduction of the Kenya Roads Board in 2000 and the subsequent enactment of the Kenya Roads Act in 2007, with its provision for the creation of the KeNHA, KURA, and KeRRA, has been seen as a step towards improving the legal and institutional structures related to road development and preservation (Kiprono & Matsumoto, 2018), the quality of road assets is still below the expected standards. Latest ranking of Kenya's road quality as assessed by World Economic Forum's road quality indicators survey - in 2019 stood at 4.1 with a decline in trend from 2017 clearly demonstrating the reducing road assets maintenance resulting in high vehicle operating costs and restraining socioeconomic growth (Mushori et al., 2020). If the current situation on road asset maintenance is not addressed, it will be difficult for Kenya to achieve SDG 11.2 and the Kenya Vision 2030; therefore, a study on the performance of road agencies in Kenya charged with road asset maintenance is crucial.

### ***1.3 Research Objective***

To determine the mediating effect of budgetary allocation on the relationship between road assets maintenance and the performance of road agencies in Kenya

### ***1.4 Research Hypothesis***

H<sub>01</sub>: There is no significant mediating effect of budgetary allocation on the relationship between road assets maintenance and performance of road agencies in Kenya.

## **2.0 LITERATURE REVIEW**

### **2.1 Theoretical Literature**

#### **2.1.1 The Administrative Management Theory**

following aspects: the utilization of scientific management principles to ascertain the most optimal approach for task completion; the selection of employees based on their skills and areas of expertise; the maximization of operational efficiency; decision-making authority vested in a singular individual or a limited group of authoritative figures; prioritization of productivity as the primary objective; and the elevation of profit growth as a paramount concern (Benn et al., 2014). The management theories provided by Fayol have faced substantial criticism due to the significant transformations that have occurred in management theory since his time. The views he presents are seen as antiquated when compared to the prevailing ideas in contemporary culture, which prioritize leadership over management across many situations. The planning functions he has remain pertinent to the field of management, since they continue to be used for the purpose of overseeing tasks and personnel. The aforementioned functions served as the fundamental principles for the administrative school of management, which revolved on the six core functions of forecasting, planning, organizing, commanding, and coordinating. The present theory will function as a foundation for the independent variable "road assets maintenance" and will help to elucidating how the enhancement of predictable and controllable behaviors inside road agencies may lead to improved management of road assets, as per the specific criteria outlined in the research.

#### **2.1.2 The Budgeting Theory**

In 1987, Hirst presented an innovative theory of budgeting that advocated for the establishment of a control system to effectively detect and manage probable risks and rewards via the processes of planning and budgeting. This theory was referred to as the control system budgeting theory. According to Shields and Young (1993), the utilization of the aims and performance of an organization may be leveraged as a technique to achieve effective budgeting. This is one of the ways that this can be accomplished. Implementing a strategic strategy is crucial in order for a company to establish financial stability and properly anticipate its financial performance via budgeting. Both of these goals may be accomplished by a company. According to Wasieleski and Weber (2017), the majority of businesses use a standard operating process for yearly

budgeting in order to successfully monitor their financial performance and spot any irregularities.

Budgetary theory provides insights into how financial resources are allocated to different sectors and agencies. In the context of road agencies in Kenya, budgetary theory helps understand how funds are allocated to support road asset maintenance, rehabilitation, and development. It explores the decision-making process behind the allocation of financial resources to road agencies based on specific categories of roads. Budgetary theory encompasses performance-based budgeting, which focuses on linking budget allocations to the performance and outcomes of agencies. In the study, budgetary theory can be applied to assess the impact of budgetary allocation on the performance of road agencies in Kenya. It examines whether the allocation of funds based on performance criteria, such as road asset maintenance and regulatory compliance, influences the overall performance of road agencies.

### **2.1.3 Agency Theory**

The agency theory, which was first developed by Stephen Ross and Barry Mitnick (Mitnick, 1975), places an emphasis on the significance of distinguishing between ownership and control, which results in the emergence of an inherent agency problem. According to Murtaza et al. (2021), the theory places an emphasis on how important it is for boards of directors to be independent in order to protect the best interests of shareholders. As a result, the theory supports the idea that non-executive directors should be included on boards, given that these directors are seen to be the ones who are most equipped to successfully represent the concerns of shareholders. The aforementioned concept is of considerable significance in the field of study because it relates to the complex interaction that exists between those in charge of maintaining roadways and the general populace, who use their democratic right to vote for those in charge of the government. In this scenario, the general populace is the legal owner of road assets, and they are the ones who form road agencies via the proper governmental channels in order to exercise control over the administration of such assets. It is essential that those in charge of roads do their jobs in a manner that is to the greatest advantage of the general public. Nevertheless, due to the possibility of limitations in the general public's knowledge and capability to effectively manage the activities of road agencies, the government assumes the role of a governing body, which is frequently referred to as the "Board," to exercise supervision and ensure that road agencies operate in a manner that is consistent with the public's best interests. This ensures that road



agencies operate in a manner that is in line with the public's best interests. As a result, this theoretical framework will act as the basis for the dependent variable in the study, and it will also help in clarifying the phenomena of performance exaptation among road agencies, as seen by the general public and enforced by the authorities of the government.

## ***2.2 Empirical Literature Review***

### ***2.2.1 Road Asset Management, Budgetary Allocation and Organisational Performance***

Over the course of many years, the governments of the United States of America, Taiwan, and the Guangdong Province of China were analysed in research carried out by Lee and Wang (2015). The purpose of the study was to determine the impact that budgetary allocation had on spending patterns. Their results were presented in an academic article that was published in the journal Finance and Accounting Research. According to the findings of the research, the method by which monetary resources are allotted in each of the three nations has a number of repercussions on the pace at which expenditures are rising. These outcomes were determined by comparing the growth rates of total expenditures in each of the three countries. Additional evidence of a considerable link with growth was found in Taiwan; however, the regression coefficients for the United States and China indicated negative values, although they did not attain statistical significance. This might be because the United States and China have larger sample sizes than Taiwan does. In China, everything worked out just like this. The current study assessed the mediating effect of budgetary allocation on the relationship between road assets maintenance and performance of road agencies in Kenya.

Namara Beamanya (2021), assessed the performance of road maintenance local contractors in Uganda: a case of the Uganda National Roads Authority Lira station. The current study will assess the mediating effect of budgetary allocation on the relationship between road assets maintenance and performance of road agencies in Kenya. Road maintenance in Uganda is necessary to retain the road's original state, protect nearby resources, and assure user safety. Poor surface quality, markings, and signs on some roads indicate that the road sector has not improved enough, and the government is still losing billions of shillings in shoddy works and services delivered by road maintenance local contractors, increasing maintenance backlog. The Uganda National Roads Authority Lira Station case study evaluated local road repair providers. Using



random and purposive selection, 87 respondents were chosen from 103 respondents. Static analysis was done on questionnaire data.

Critical elements impacting road maintenance local contractors' performance were identified using relative relevance index (RII). Through literature study and document analysis, significant road maintenance contractor performance criteria were discovered. For a framework to improve road maintenance local contractor performance, RII prioritized these elements. Contractor's managerial skills (RII= 0.1088), financial capacity (RII= 0.893), experience (RII= 0.855), cost factors (RII= 0.854), technology (RII= 0.846), procurement process on contractors selection (RII= 0.845), time factors (RII= 0.839), health & safety standards (RII= 0.838), and design changes (RII= 0.828) were the critical factors affecting road maintenance loc A framework showed that road repair project planning relied on contractor management abilities and expertise. Local contractors' road maintenance project implementation depended on financial capacity, cost considerations, procurement procedure on contractor selection, health & safety requirements, schedule factors, and design revisions. Management abilities were the biggest element in Ugandan road repair contractors' performance, according to the research. The research advised focusing on contracts managing abilities as they had the biggest influence on Local Contractor performance. The current study assessed the mediating effect of budgetary allocation on the relationship between road assets maintenance and performance of road agencies in Kenya.

A study by Kaburi (2021) examined the effect of Performance Based Contracting on Road Asset Management in Kenya: A Case of Nairobi-Moyale Road in Kenya. The study was guided by the following specific objectives; to analyse the effect of monitoring intensity on road asset management, to determine the effect of road financing on road asset management, and to examine the effect of contractor's competence on road asset management of Nairobi-Moyale Road. The researcher used explanatory and descriptive research design. The population of the study was 127 and comprised of road contractors, road managers, company foremen, project engineers, Kenya National Highways Authority officials. Stratified random sampling was used to select the sample size which was a total of 104 respondents. A questionnaire was developed by the researcher based on the specific objectives of the study for data collection and it was pilot tested using ten respondents. Descriptive statistics was utilized for analysis of quantitative data to create mean, and standard deviation from the responses given by the respondents. Inferential

statistics like correlation and regression analysis was used. The Statistical Package for Social Sciences (SPSS) version 26 program was used to organize and analyse the collected data. Study findings were presented in charts, tables, and graphs. Monitoring is regularly done through gathering and processing of vital project information and there has been continuous in the tracking of key elements of project by those are involved in the maintenance of the road. Monitoring intensity had a Pearson correlation of ( $r = 0.782$  p-value  $< .05$ ), an indication of statistically significant relationship with road asset management. An adjusted R-square showed that monitoring intensity explains 60.7 % of variation in road asset management. Secondly, the governments through the ministry have created the right conditions for optimizing operation and maintenance of the road project. The study established that road financing had a Pearson correlation of ( $r = 0.835$ , p-value  $< .05$ ). This was found to be statistically significant as the significant value was 0.000 which is less than 0.05. Thirdly, there are competent contractors who regularly deliver results that the organization desires and that project managers regularly receive education and attend training courses to update their skills. The study established that contractor's competence had a Pearson correlation of ( $r = 0.719$ , p-value  $< .05$ ), this was found to be statistically significant as the significant value was 0.000 which is less than 0.05.

### 2.3 Conceptual framework

#### Independent variable

##### Road Asset Maintenance

- Speed of repair response to road defects,
- Compliance with inspection plans,
- Road safety
- Environmental impact,
- User satisfaction

#### Dependent variable

##### Performance of Road Agencies

- Roads maintenance Project's completion rate
- Budgetary absorption rate
- Value for money in road asset investments

##### Budgetary Allocation

- Budgeting and budget planning.
- Funds allocation adequacy.
- Budget implementation performance
- Budget monitoring, evaluation and control

### **3.0 RESEARCH METHODOLOGY**

#### ***3.1 Research Philosophy***

The term "research philosophy" was coined by Saunders (2017), who described it as "a system of assumptions and ideas underlying the creation and evolution of knowledge in a specific area of study." According to Saunders (2017), the positivist premise that objective facts provide the greatest scientific evidence is likely to result in a large choice of quantitative research methodologies. This is expected to be the case since the positivist assumption assumes that objective facts give the best scientific evidence. The present research used a positivist philosophical framework by integrating established theories to formulate hypotheses, then subjecting them to evaluation and validation via the examination of study findings. Moreover, the researcher used positivist philosophy by maintaining objectivity in relation to the study components, using quantitative data analysis procedures, and thus achieving generalizability in the targeted research outcomes.

#### ***3.2 Research Design***

Research design can be described as an organized plan for achieving the goals of a study and how to answer its associated questions (Saunders et al., 2019). This study will adopt a cross-sectional survey research design because the design is best suited for finding out the prevalence of a phenomenon, situation, problem, attitude or issue, by taking a cross-section of the population as it stands at the time of the study (Kumar, 2014). This study used the cross-sectional survey technique, which is typically associated with a deductive approach to answer questions regarding who, what, where, how much or how many (Cooper & Schindler, 2006).

#### ***3.3 Target Population***

Target population of a study, as operationalized by Banerjee and Chaudhury (2010), is an entire group from which the researcher's information interest is required to be ascertained. The study target population comprised of the three road agencies in Kenya namely KeNHA, KeRRA, and KURA; Public Service Performance Management & Monitoring Unit (PSPMMU); and Kenya Road Board (KRB) as unit of analysis. The unit of observation comprised of management and staffs of these agencies, and drawn from Supply Chain, Finance and Engineering departments that are involved in road maintenance.

### 3.4 Sample Size and Sampling Design

Sampling is defined as a process of selecting a part of the total population present the whole group. According to Kothari and Gang (2014), this is done in order to create a miniature version of the larger population. In order to acquire an accurate representation of the population, the study applied Role's Sample Determination formula (Charan & Biswas, 2013; Singh & Masuku, 2014) shown below.

$$n = \frac{N}{1 + Ne^2}$$

Where:         $n$  = the sample size  
                   $N$  = the target population  
                   $e$  = margin of error ( $e \leq 0.05$ )

The computed sample size taking 0.05 as the sampling margin of error, and target population of 151 therefore, is 153 as shown below.

$$n = \frac{251}{1 + 251(0.05)^2} = 154.22427 \cong 154$$

The study divided the population into stratum based on the department for each road agency. The population of each subcategory or stratum was then determined and used to estimate weight or proportion that was then used to compute the respondents to be drawn from each stratum. Thus, the proportionate sampling was adopted in selecting the respondent as shown in the sample frame Table 1. In addition, purposive sampling method was used in identifying two senior evaluation officers/managers for interview purposes from PSPMMU and KRB to provide data for triangulation of main research result and findings.

Table 1: Sample Frame

Department Category	Road Agency	Population (N)	Weight (N/251)	Sample
Supply Chain	KeNHA	24	0.0956	11
	KURA	25	0.0996	15
	KeRRA	23	0.0916	14
Finance	KeNHA	21	0.0837	13
	KURA	25	0.0996	15
	KeRRA	22	0.0956	11
Engineers	KeNHA	35	0.1394	21
	KURA	33	0.1316	20
	KeRRA	41	0.1633	24
Performance & Monitoring Unit	PSPMMU	2		2

Department Category	Road Agency	Population (N)	Weight (N/251)	Sample
Regulator	KRB	2		2
Total		<b>251</b>	1.0000	154

### 3.5 Data Collection Procedures

This research utilized primary data in order to answer the study's specific aims. A questionnaire was employed for this purpose due to its ability to allow respondents to fill it out without assistance, anonymously, and being relatively cheaper and faster than other methods while reaching a bigger sample size (Creswell, 2009).

### 3.6 Pilot Testing

According to the opinions of Cooper and Schindler (2014), the phase of the research process that is devoted to the gathering of data often begins with the pilot testing of the data collection instrument. The researcher carried out a pilot study at in three road agencies namely KURA, KeRRA and KeNHA. The choice of the pilot population was justified in that they also form the study population thus high degree of homogeneity in characteristics and attributes. Mugenda and Mugenda (2012) pointed out that the sample size to be utilised for testing is governed by cost, time and efficiency, however 5-10% of the study sample is accepted. The pilot test used was 10% of the study sample, which is 15 respondents (10% of 154).

### 3.7 Research Model Equations:

Step 1 - X predicting Y to test for path 'c' alone,

$$\text{PERF} = \beta_0 + \beta_1 \text{RAM} + \varepsilon$$

Where; PERF = is the Performance of Road Agencies,

RAM = is the Road assets maintenance,

$B_0$  = is the intercept,

$\beta_1$  = is the regression coefficients,

$\varepsilon$  = is the Error term

Step 2 - X predicting M to test for path 'a'

$$\text{BA} = \beta_0 + \beta_1 \text{RAM} + \varepsilon$$

Where BA = Budgetary Allocation

Step 3 - M predicting Y to test the significance of path 'b' alone.

$$\text{PERF} = \beta_0 + \beta_1 \text{BA} + \varepsilon$$

Step 4 - Multiple regression with X and M predicting Y.

$$\text{PERF} = \beta_0 + \beta_1 \text{RAM} + \beta_2 \text{BA} + \varepsilon$$

## 4.0 DATA ANALYSIS AND RESEARCH RESULTS

### 4.1 Demographic Characteristics

The outcomes as shown in Table 2 shows that 3 respondents indicated that they hold doctoral (PhD) this represented 2.5% of the respondents, while 74 of the respondents had Master's degree which represented 60.7% of the respondents, those with Bachelor Degree were 42 representing 34.4% of the respondents. Finally the respondents with Diploma were 3 representing 2.5% of the respondents. The respondents were asked to indicate the number of years worked in the road sector. From the responses to the question it was found that 1 respondent representing 0.8% had worked in the sector for 1 to 5 years, 10 respondents representing 8.2% had worked in the sector for 6 - 10 years, 19 respondents representing 15.6% had worked in the sector for 11 - 15 years and 92 respondents representing 75.4% had worked in the sector 16 - 20 years.

Table 2: Demographic Characteristics

Demographic Profile		Frequency	%
<b>Highest level of education</b>	Doctoral (Ph.D)	3	2.5
	Masters	74	60.7
	Bachelor Degree	42	34.4
	Diploma	3	2.5
<b>Number of years worked with the agency</b>	1 - 5 Years	14	11.5
	6 - 10 Years	23	18.9
	11 - 15 Years	79	64.8
	16 - 20 Years	6	4.9
<b>Years worked in your current position/appointment</b>	1 - 5 Years	58	47.5
	6 - 10 Years	38	31.1
	11 - 15 Years	25	20.5
	16 - 20 Years	1	0.8

According to the findings in Table 2, the respondents who had worked in the agency for a period of 1-5 years were 14 representing 11.5% of the respondents, the respondents who had worked in the agency for a period of 6- 10 years were 23 representing 18.9% of the respondents. The respondents who had worked in the agency for a period of 11 - 15 years were 79 representing

64.8% of the respondents while the respondents who had worked in the agency for a period of 16 - 20 years were 6 representing 4.9% of the respondents.

## **4.2 Hypothesis Testing**

### **4.2.1 Budgetary allocation, Road assets maintenance and the performance of road agencies in Kenya**

The objective of the study was to establish the mediating effect of budgetary allocation on the relationship between road assets maintenance and the performance of road agencies in Kenya. The objective's null hypothesis stated that there is no significant mediating effect of budgetary allocation on the relationship between road assets maintenance and performance of road agencies in Kenya was tested using Baron and Kenny's (1986) mediation analysis based on a 4-stepwise methodology effect analysis (direct, indirect, total effect with mediator, total effect without mediator).

The Four Step Mediation Methodology (PROCESS Model 4) was adopted to establish the intervening effect as proposed by Baron and Kenny (1986) and Preacher and Hayes (2004). The direct and indirect effects of road asset maintenance were derived for two models, one estimating the mediator budgetary allocation from road assets maintenance and the second estimating the road agencies performance from both road assets maintenance and budgetary allocation as shown in equations 3 and 4 respectively.

According to Baron and Kenny (1986) a Three Steps regression analysis establish that zero-order relationship existed among the variables and situations where one or more of the relations is non-significant depicts no possibility of mediation, however if they are significant relationships from step 1 through 3, one proceeds to step 4 where mediation is supported if the effect of road asset maintenance remains significant after controlling budgetary allocation. If budgetary allocation remains insignificant when a road asset is controlled, there is full mediation, and if both road assets maintenance and budgetary allocation significantly predict road agencies performance there is partial mediation.

The full result of PROCESS output for simple mediation analysis (Model 4) is shown in Appendix I with summary of key statistics depicted in Table 3.



**Table 3: Summary of Meditation Analysis Result (PROCESS Output – Model 4)**

Outcome Variable	R	R Square	MSE	P	$\beta$ RAM(P)	$\beta$ BA(P)
<b>Budgetary allocation</b>	.5365	.2878	.2797	.000	.5391(.00)	-
<b>Performance of Road agencies</b>	.5757	.3314	.2874	.000	.2261(.017)	.4483(.00)
<b>Total effect Model</b>	.4468	.1996	.3412	.000	.4678 (.0000)	-
<b>Total, Direct, and Indirect Effect of Road asset maintenance and Budgetary allocation on Performance of Road agencies</b>						
	Effect	BootSE	t	P	LLCI	ULCI
<b>Total effect of X (BA) on Y</b>	.4678	.0855	5.470	.000	.2985	.6371
<b>Direct effect of X on Y</b>	.2261	.0930	2.431	.016	.0420	.4103
<b>Indirect effect of X on Y (FI)</b>	.2416	.0221	6	5	.1230	.3869

Level of confidence for all confidence intervals in output: 95%

Number of bootstrap samples for percentile bootstrap confidence intervals: 10000

From Table 3, the results show coefficient of determination of outcome variable budgetary allocation was  $R^2=0.2878$  implying road assets maintenance contributes a variation effect of 28.78% on budgetary allocation. This variation is significant given the p-value was less than 0.005. The partial effect of road asset maintenance on budgetary allocation was positive and significant ( $\beta=0.5391$ , p-value<0.005).

Similarly, the coefficient of determination for outcome variable road agencies performance was  $R^2=0.3314$  and significant at 95% significance level (p<0.005) implying road assets maintenance and budgetary allocation both contributes 33.14% variation in road agencies performance in Kenya. The partial effect for road asset maintenance and budgetary allocation were both positive and significant at  $\beta=0.2261$  (p=0.0165) and  $\beta=0.4483$  (p<0.005) respectively.

Result for the total effect model shows a coefficient of determination  $R^2=0.1996$  and p<0.005 implying that road assets maintenance alone contributes 19.96% variation in performance of road agencies in Kenya. The partial effect results was  $\beta=0.4678$  (p<0.005) suggesting road asset maintenance has significant partial contribution to performance of road agencies in Kenya.

The study findings show that road assets maintenance directly contributes 28.78% variation on budgetary allocation and 19.96% on performance of road agencies. However, road assets

maintenance combined with budgetary allocation contributes 33.14% variation on financial performance implying present of mediation effect as combined variation is higher than the total effect variation. The total, direct and indirect effect of road assets maintenance on performance of road agencies was assessed based on asymmetric bootstrap confidence intervals using 10,000 bootstrap runs. Results shows that the total effect of road assets maintenance on performance of road agencies was 0.4678, significant at 95% bias-bootstrap ( $p < 0.005$ ) with Lower and Upper limit confidence intervals of 0.2289 and 0.6371 respectively. The direct effect of road assets maintenance on performance of road agencies was 0.2261 and significant at 95% bias-bootstrap ( $p = 0.0165$ ) with lower and upper confidence interval of 0.042 and 0.4103 respectively. Finally, the indirect effect of budgetary allocation on the relationship between road asset maintenance and performance of road agencies was estimated at 0.2416 with bootstrapping standard error of 0.0675, lower and upper bootstrap limits of 0.1230 and 0.3868 respectively.

From the above result, it can be deduced that the total and direct effects were both positive and significant and different from zero, as evidenced by a 95% bias-bootstrap confidence interval that is entirely above zero. Similarly, the indirect effect is also positive and significant and different from zero implying presence of a partial mediation effect on the mediating role of budgetary allocation on the relationship between road assets maintenance and performance of road agencies in Kenya.

(ii).....*Performance of road agencies* =  $1.9178 + 0.4678 (\text{road asset maintenance}) + 0.2416 (\text{budgetary allocation})$ .

As a result, the null hypothesis ( $H_{02}$ ), which posited there is no significant mediating effect of budgetary allocation on the relationship between road assets maintenance and performance of road agencies in Kenya was rejected. Consequently, the researcher concluded that there is indeed a significant a partial mediation effect of budgetary allocation on the relationship between Road asset maintenance and performance of road agencies in Kenya.

### ***Result Discussions***

The correlation analysis results showed that there is moderate positive and significant correlation ( $r = 0.546$ ,  $p < 0.05$ ) between Budgetary Allocation and performance of road agency. The results show coefficient of determination of outcome variable budgetary allocation was R-squared

change of  $R^2=0.2878$  implying road assets maintenance contributes a variation effect of 28.78% on budgetary allocation. This variation is significant given the p-value was less than 0.005. The partial effect of road asset maintenance on budgetary allocation was positive and significant ( $\beta=0.5391$ ,  $p\text{-value}<0.005$ ). Similarly, the coefficient of determination for outcome variable road agencies performance was  $R^2=0.3314$  and significant at 95% significance level ( $p<0.005$ ) implying road assets maintenance and budgetary allocation both contributes 33.14% variation in road agencies performance in Kenya. The partial effect for road asset maintenance and budgetary allocation were both positive and significant at  $\beta=0.2261$  ( $p=0.0165$ ) and  $\beta=0.4483$  ( $p<0.005$ ) respectively. Result for the total effect model shows a coefficient of determination  $R^2=0.1996$  and  $p<0.005$  implying that road assets maintenance alone contributes 19.96% variation in performance of road agencies in Kenya. The partial effect results were  $\beta=0.4678$  ( $p<0.005$ ) suggesting road asset maintenance has significant partial contribution to performance of road agencies in Kenya. As a result, the null hypothesis ( $H_{01}$ ), which posited there is no significant mediating effect of budgetary allocation on the relationship between road assets maintenance and performance of road agencies in Kenya was rejected. Consequently, the researcher concluded that there is indeed a significant a partial mediation effect of budgetary allocation on the relationship between Road asset maintenance and performance of road agencies in Kenya.

The results are in line with the budgeting theory, particularly with regard to the assumption that the majority of firms plan their budgeting process annually, managing their performance and monitoring any differences (Wasieleski & Weber, 2017). The findings are compatible with this assertion. Lee and Wang (2015) undertook an analysis of the influence of budgetary allocation on the spending behaviour of the governments of the United States of America, Taiwan, and the Guangdong Province of China over the course of a number of years. The study reported that budget allocation had differing impacts on the spending growth rate in the three countries. Further findings of a significant relationship to growth were established in Taiwan, yet the regression coefficients for the U.S. and China were negative but not statistically significant.

When it comes to the empirical review, the results are in line with those of Odhiambo (2014), who discovered that budgetary restrictions, human capital, and narrative information all had a substantial influence on the distribution of funds for county government projects. The findings are compatible with Odhiambo's findings. They were also partly consistent with the study that

was conducted by Lee Wang (2015), who discovered that budget allocation had different impacts on the spending growth rate. A significant relationship to growth was established in Taiwan, while the regression coefficients for the United States and China were negative but not statistically significant. In Taiwan, a significant relationship with growth was established. Lastly, the results are in agreement with the research that was carried out by Sodikov and Jamshid (2015), who argued that policy concerns strongly impact road asset performance. These policy issues include defining long-term objectives, increasing the road network, and budget-level components.

Further the study results are similar to those Ngah and Bontis (2016) on their study on knowledge management capabilities and organizational performance in roads and transport authority of Dubai: The mediating role of learning organization found out that there is a strong and statistically significant correlation between knowledge management skills and organizational success. Additionally the study found out that the link between knowledge management skills and organizational performance is entirely mediated by the concept of a learning organization. This paper aims to provide practitioners with recommendations that provide alternative ways to address their inadequacies and establish methods to enhance the efficacy of their knowledge management skills. The present study found that budgetary allocation was a partial mediator in the association between road asset upkeep and the performance of road agencies in Kenya.

## **5.0 CONCLUSIONS AND RECOMMENDATIONS**

The results of the study indicated a moderate positive and significant correlation between budgetary allocation and the performance of road agencies. This suggests that the allocation of funds has a notable impact on the overall performance of road agencies in Kenya. The findings also revealed that road assets maintenance accounts for a variation effect of 28.78% on budgetary allocation. Additionally, it was observed that budgetary allocation partially mediates the relationship between road assets maintenance and the performance of road agencies in Kenya. These findings highlight the significant role of budgetary allocation in influencing the relationship between road assets maintenance and the performance of road agencies. It underscores the importance of effective budget planning, timely approval of key policy documents, and the allocation of adequate funds to support road assets programs and projects.

The study provides valuable insights for policymakers and road agency officials, emphasizing the need for strategic resource allocation and budgetary management to optimize the performance of road agencies and enhance the overall quality of road infrastructure in Kenya.

The research also suggests that road agency management should exhibit a considerable degree of inventiveness, adaptability, and ingenuity in their approach to road maintenance, with the ultimate objective of attaining cost-effectiveness and the overarching goal of enhancing the country's road transport network. The study indicates that it is crucial for road agency management to establish proficient and strategic planning in budget management, as this has a direct and substantial influence on their overall performance. Looking at the results for the partial mediation effect of budgetary allocation, we can conclude that having a sufficient budget is a very important part of making sure that road assets are properly maintained.

At the policy level, it is essential for the government to prioritize the deployment of adequate financial resources and the promotion of innovation in the upkeep of road assets. The implementation of this technique is of utmost importance in the reduction of expenses and the efficient provision of value to the populace. Furthermore, it is essential for the government to strengthen regulatory measures for road agencies in order to maximize their operational performance and attain higher levels of effectiveness and efficiency. The attainment of this objective may be optimally achieved by the implementation of robust policies, the promotion of innovation and modernization of infrastructure, and the establishment of best practices within a realistic legal framework.

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