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FINANCE

FINANCING STRATEGIES AND IMPLEMENTATION OF ROAD INFRASTRUCTURE PROJECTS BY THE MINISTRY OF ROADS AND TRANSPORT IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

Purpose of the study: The study sought to ascertain the effects of financing strategies on the implementation of road infrastructure projects by the Ministry of Roads and Transport in Nairobi City County, Kenya. Specifically, it examined how debt financing, public–private partnerships, national budget allocations, and transit tolls affect the implementation of road infrastructure projects.

Statement of the problem: A causal research design was employed. The target population comprised 514 employees of the Ministry of Roads and Transport. A sample size of 226 respondents was obtained using proportionate stratified sampling and Yamane's formula with a 5% margin of error. Descriptive and inferential statistics, including correlation and multiple regression analysis, were used for data analysis.

Methodology: A causal research design was employed. The target population was 514 ministry of road and transport employees. The sample size was 226 obtained using proportionate stratified

sampling and Yamane's formula with a 5% margin of error. Descriptive and Inferential statistics (correlation and multiple regression) were used for analysis.

Findings: The findings revealed that public-private partnerships, debt financing, national budget, and transit tolls had positive and significant effects on road infrastructure implementation in Nairobi City County. The results further demonstrated that combining these financing models facilitated risk sharing between public and private sectors, thereby reducing strain on public finances and improving overall project execution efficiency.

Conclusion: The study concludes that a well-structured combination of public-private partnerships, debt financing, national budget allocations, and transit tolls significantly enhances road infrastructure project implementation by the Ministry of Roads and Transport in Nairobi City County, Kenya.

Recommendations: The study recommends that the Ministry of Roads and Transport should promote stronger collaborations between public and private sectors to optimize resource allocation and attract increased private investments toward road infrastructure development. Furthermore, the Ministry should adopt more sophisticated digital tools to monitor and manage project documents, ensuring transparency, accountability, and efficiency throughout the entire road infrastructure project implementation lifecycle.

Keywords: *Financing strategies, implementation, road infrastructure projects, ministry of roads and transport, Nairobi City County, Kenya*

INTRODUCTION

Road infrastructure plays a pivotal role in economic development by facilitating seamless access to social services and income-generating activities. According to Pradhan and Bagchi (2013), infrastructure directly affects production efficiency, creating ripple effects across the entire economy. Transportation networks, when properly planned and maintained, improve connectivity and operational efficiency significantly. A well-functioning road network reduces travel duration, accelerates the movement of goods and services, and ultimately lowers overall production costs. Furthermore, stable infrastructure creates a business-friendly environment that attracts new investors, thereby promoting sustained economic growth and long-term national progress (Gisore, 2022; Ahamd, Ibrahim & Bakar, 2018). These economic benefits underscore why governments must prioritize road infrastructure development and maintenance as a core national development

agenda, particularly in rapidly urbanizing economies like Kenya where road networks directly determine the pace and sustainability of economic transformation and social service delivery to citizens.

Financing strategies are fundamental to successful road project completion and sustainability. Chami (2019) emphasizes that such strategies encompass proper planning and systematic utilization of funds for road construction, maintenance, and development. Kirima, Minja and Muthinja (2024) further argue that effective financing must incorporate accurate cost estimation and comprehensive feasibility studies conducted before project commencement. Such preparation ensures that allocated funds are sufficient to complete infrastructure without triggering cost overruns or unnecessary delays. When governments strategically employ combinations of public-private partnerships, user tolls, innovative financing instruments, and sound project planning, they are considerably better positioned to guarantee consistent availability of financial resources. This ultimately enables the construction and sustained maintenance of high-quality road networks that can support growing populations, expanding trade volumes, and increasing demands on urban transportation systems across developing economies.

Global experiences demonstrate significantly varied approaches to road infrastructure financing across different national contexts. In Pakistan, direct government financing remains the primary strategy, supplemented by external loans and grants obtained from international financial institutions and donor nations (Nisar & Asif, 2023). Australia relies on a layered combination of federal funds, state budgets, local government revenues, and private sector investments to fund various road projects (Zwalf, 2022). Brazil funds its highway development primarily through toll taxes, state concessions, and levies on petroleum products including natural gas and ethanol derivatives (Oliveira & Myers, 2021). Canada operates through a decentralized model where provincial and territorial governments manage highway planning and financing, while federal government supports specific projects through legislative funding programs, with municipalities relying on property taxes and intergovernmental tax transfer agreements (Ammar, Abdel-Monem & El-Dash, 2022).

In Africa, Public-Private Partnerships have emerged as a particularly critical instrument for infrastructure financing. Ghana has successfully utilized PPPs alongside foreign loans to execute

extensive road construction projects, improving transportation systems and regional connectivity (Badu, Owusu-Manu, Edwards, Adesi & Lichtenstein, 2018). Additionally, Ghana introduced toll roads and road user charges including fuel levies and vehicle registration fees to generate supplementary infrastructure revenue (Osei-Hwedie, 2021). The African Development Bank highlights landmark PPP successes such as South Africa's N4 Toll Road and Cote d'Ivoire's Henri Konan Bédiene Bridge as models of effective infrastructure delivery (AfDB, 2020). Beyond PPPs, sovereign wealth funds and pension funds have provided stable, long-term capital for large-scale projects, with Nigeria and South Africa strategically redirecting pension fund assets toward infrastructure investment to ensure reliable development financing (World Bank, 2019).

Kenya's road infrastructure financing is shaped by multiple complex contextual factors. Ngesa (2020) observes that financing methods are significantly determined by a country's economic status, prevailing government policies, fund availability, and specific project requirements. When funding is inadequate or difficult to mobilize, projects suffer delays, cost inflation, and sometimes outright cancellation, resulting in persistently low completion rates (Mudi, Lowe & Manase, 2022). Ondari and Gekara (2018) further note that macroeconomic conditions including inflation, exchange rate fluctuations, and GDP growth significantly influence infrastructure financing plans. Kenya also relies considerably on foreign aid and international development partner financing, whose attached conditionalities and terms can substantially affect both financing strategies and ultimate project completion outcomes (Ogweno, Muturi & Rambo, 2021). Consequently, careful evaluation and selection of complementary financing options remains critical for project managers overseeing Kenya's road infrastructure development.

Nairobi City County presents a compelling and instructive case for studying road infrastructure financing strategies. Contributing 27.5% of Kenya's total GDP with an estimated population of approximately 4.3 million people, the county is heavily dependent on reliable and efficient road networks to sustain its economic productivity. Between 2013 and 2023, Kenya Urban Roads Authority and Kenya National Highways Authority undertook 38 road infrastructure projects across the county, most of which have surpassed their original completion timelines and required revised schedules. Projects employ diverse financing models reflecting different strategic approaches -the Nairobi Expressway operates as a privately initiated PPP arrangement, while the

Ngong-Kiserian-Isinya-Imaroro road follows an annuity-based PPP model. Other projects are jointly financed through debt financing and the national budget, or funded exclusively through the consolidated fund, demonstrating the practical diversity of financing approaches applied within a single county.

STATEMENT OF THE PROBLEM

Infrastructure development remains a top priority for governments across Sub-Saharan Africa, given its essential role in fostering economic growth and modernization (AfDB, 2011). In Kenya, heavy infrastructure investments are central to achieving the goals outlined in the Vision 2030 blueprint. To support this agenda, the government has established legal and regulatory environments facilitating broad participation in infrastructure financing and accountability, particularly through Public-Private Partnerships. However, road construction and maintenance require enormous capital, and budget deficits significantly constrain government investment capacity (Ullah, Thaheem & Umar, 2017). Private sector participation has therefore become necessary to bridge financing gaps while offering investors competitive returns. Despite this, major road projects persistently experience prolonged completion timelines, largely due to bureaucratic inefficiencies embedded within public sector administrative procedures, which remain widely identified as the central obstacle to timely road infrastructure implementation across the country.

Empirical evidence consistently highlights financing structures as critical determinants of infrastructure development outcomes globally. Cytonn Investment Reports (2019–2024) revealed alarming inconsistencies in Nairobi City County's road infrastructure development, characterized by minimal project completions, dramatic activity drops potentially attributable to COVID-19 impacts, governance challenges, and financial constraints. Though a partial recovery emerged in 2023–2024, the overall trend reflects an absence of steady, sustainable progress, raising serious concerns about the effectiveness of existing financial policies. Internationally, Trigunarsyah and Too (2014) demonstrated that supportive regulatory frameworks enhance infrastructure project success in Indonesia, while Ncube (2010), examining 200 projects across 136 nations, confirmed significant positive relationships between infrastructure financing and economic growth. Debela (2019) similarly identified committed state institutions and stable legal systems as key factors in Ethiopia's road project implementation. Building on these insights, this study sought to ascertain

how financing strategies affect road infrastructure implementation in Nairobi City County, with legal framework as the moderating factor.

OBJECTIVES OF THE STUDY

i. To establish the effect of public private partnerships on implementation of road infrastructural projects by ministry of road and transport in Nairobi City County, Kenya
ii. To examine the effect of debt financing on implementation of road infrastructural projects by ministry of road and transport in Nairobi City County, Kenya
iii. To assess the effect of national budget on implementation of road infrastructural projects by ministry of road and transport in Nairobi City County, Kenya
iv. To ascertain the effect of transit toll on implementation of road infrastructural projects by ministry of road and transport in Nairobi City County, Kenya
v. To investigate the moderation effect of legal Framework on the relationship between financing strategies and implementation of road infrastructural projects by ministry of road and transport in Nairobi City County

RESEARCH HYPOTHESES

H_{01}: Public-Private Partnerships have no statistically significant effect on implementation of road infrastructural projects by ministry of road and transport in Nairobi City County, Kenya

H_{02}: Debt financing has no statistically significant effect on implementation of road infrastructural projects by ministry of road and transport in Nairobi City County, Kenya

H_{03}: National Budget has no statistically significant effect on implementation of road infrastructural projects by ministry of road and transport in Nairobi City County, Kenya

H_{04}: Transit toll has no statistically significant effect on implementation of road infrastructural projects by ministry of road and transport in Nairobi City County, Kenya

REVIEW OF LITERATURE

The review of literature is presented in sections

Theoretical Review

The study was anchored on agency theory, pecking order theory, keynesian economic theory, and public-private partnership theory. Agency Theory, formalized by Stephen Ross in 1973 and further developed by Michael Jensen and William Meckling in 1976, addressed situations where a principal entrusted an agent with executing assigned functions, creating information asymmetry since the agent possessed more task-specific knowledge. The theory provided a framework for understanding PPP dynamics, where contracts, incentives, and monitoring mechanisms reduced agency problems arising when private sector actors did not act in the public sector's best interest (Vitolla et al., 2020). Critics argued the theory oversimplified complex relationships by assuming purely self-interested agent behavior, while strict monitoring mechanisms could be prohibitively costly to administer (Wilson, 2024). This theory was relevant to the study's objective of examining PPP effects on road infrastructure implementation, as it explained how well-structured contracts and adequate penalties ensured private partners adhered to project timelines, quality standards, and cost parameters essential for successful road project delivery.

Pecking order theory, advanced by Stewart Myers and Nicholas Majluf in 1984, described how companies and governments prioritized financing sources, preferring internal funds first, then debt, and finally new equity as a last resort. Governments, like companies, favored debt financing over increasing taxes when internal funding proved insufficient, maintaining financial flexibility while minimizing capital costs (Frank et al., 2020). Critics contended the theory assumed rational debt decision-making, ignoring instances where governments over-incurred debt, threatening long-term fiscal sustainability through escalating interest obligations (Yıldırım & Çelik, 2021). This theory was directly relevant to the study's objective of examining debt financing effects on road infrastructure implementation. In Kenya's context, where tax revenues were insufficient to finance large-scale road projects, debt financing served as a practical mechanism for leveraging future economic growth, spreading project costs over time, and ensuring developmental continuity in rapidly growing areas like Nairobi.

Keynesian economic theory, developed by John Maynard Keynes during the 1930s Great Depression, maintained that government intervention through increased public spending was absolutely necessary to stimulate economic growth when private demand declined. Road infrastructure development was considered an ideal vehicle for this intervention, generating employment and productivity gains through a multiplier effect whereby each unit of public expenditure circulated through the economy creating additional economic benefits (Eichner, 2023). Critics argued the theory promoted deficit spending, resource misallocation, and risked crowding out private investment, potentially retarding long-term economic growth (Saith, 2022). This theory was highly relevant to the study's objective of examining national budget effects on road infrastructure implementation, as government budgetary allocations to road projects directly stimulated economic activity, facilitated trade, reduced transport costs, and attracted investment, aligning closely with Keynes' foundational argument that strategic public expenditure drove economic recovery and sustainable national development.

Public-private partnership theory, popularized by David Osborne and Ted Gaebler in their 1992 publication Reinventing Government, advocated for collaborative arrangements between government and private sector entities to deliver public infrastructure more efficiently. The theory held that private sector participation injected funds, skills, and operational efficiency into government projects, relieving fiscal strain while granting private partners long-term operational privileges such as user fee collection (Engel et al., 2014). Advocates argued PPPs accelerated project completion and reduced direct fiscal burdens, allowing governments to redirect attention toward other pressing national priorities (Cepparulo et al., 2019). Critics contended PPPs might ultimately increase long-term public costs, with transit fees disproportionately burdening low-income users (Leigland, 2018). This theory was particularly relevant to the study's objectives of examining both PPP and transit toll effects on road infrastructure implementation, directly explaining how privately financed toll mechanisms enabled partners to recoup investments while simultaneously funding ongoing road maintenance and improvement.

Empirical Literature Review

Studies examined the relationship between public-private partnerships and project implementation. Chibole and Mbataru (2023) explored financing models' impacts on government

road projects completion targeting 240 KENHA management personnel, establishing that financing positively and significantly impacted project completion, though their study was limited to KENHA and employed descriptive research. Mutuku and Muturi (2018) assessed financing models' impacts on Kenyan public universities' capital projects completion rates at JKUAT, finding that government and commercial bank financing positively and substantially impacted completion rates, while AIA funding demonstrated a negative but significant effect. Saisi, Ngahu and Kalio (2018) investigated financial models' influences on Egerton University's construction projects, demonstrating a strong positive correlation between infrastructural capital accessibility and successful project completion. All three studies were however limited by their focus on university settings and descriptive research designs, gaps the current study addressed through causal research targeting road infrastructure projects.

Gupta and Sharma (2021) examined how debt financing affected Indian manufacturing companies' performance, analyzing financial statements through profitability ratios and debt metrics, finding that high debt levels negatively correlated with firm performance, with excessive leverage leading to financial distress and adverse project outcomes. Deng et al. (2019) studied how debt financing influenced firms' investment efficiency in emerging markets like China, utilizing secondary data from publicly listed companies' financial reports and applying purposive sampling. Their findings revealed that high debt financing negatively correlated with investment efficiency, indicating that high leverage increased financial risks and hampered effective project delivery. Both studies presented contextual limitations, as their findings from manufacturing firms and Chinese markets could not be directly extrapolated to Kenya's road infrastructure context, and neither specifically addressed project implementation as the current study did.

Mabugu and Chitiga (2020) investigated how national budgeting affected infrastructure project implementation in South Africa, examining budgetary allocation, fiscal policy, and government prioritization using secondary data from government financial reports. Their results demonstrated a positive correlation, confirming that effective budgeting and fiscal discipline significantly improved project implementation and completion rates. Owino and Kibua (2019) narrowed their focus to national budget allocation effects on Kenya's public project implementation, collecting data through structured questionnaires among public sector officials and project managers. Their findings indicated a positive association whereby timely budget allocations enhanced project

efficiency and completion. Both studies presented gaps -Mabugu and Chitiga relied exclusively on secondary data while Owino and Kibua focused broadly on government-funded projects rather than road infrastructure specifically -limitations the current study addressed by collecting primary data targeting road infrastructure projects in Nairobi County.

Fauzan, Kuswanto and Utomo (2023) analyzed critical success factors in Indonesia's toll road infrastructure financing from toll road companies' perspectives, gathering data through a Delphi survey of infrastructure sector experts and applying purposive sampling. Their findings revealed that proper management of factors including internal rate of return, affordability, and financing choices resulted in successful toll road project implementation. Woltjer, Ruiz-Tagle and Allen (2019) examined road infrastructure development effects on local communities in peri-urban Kisumu, Kenya, and Accra, Ghana, employing mixed-method research combining interviews, surveys, and spatial analysis among peri-urban residents. Results revealed complex relationships showing both beneficial and harmful effects on community welfare and integration. Both studies presented methodological gaps -the Delphi survey approach and mixed-method design limited causal conclusions -weaknesses the current study addressed through a causal research design specifically examining transit toll effects on road infrastructure implementation in Nairobi County.

RESEARCH METHODOLOGY

This study adopted causal research, which was chosen for its ability to identify cause-and-effect relationships and make findings applicable to a broader population. It guided further inquiry and supports decision-making (Sekaran & Bougie, 2013). The target population was 514 management employees in the State Department of roads. This study employed a stratified random sampling method to guarantee representation across all relevant groups. The sample size was calculated using Yamane's formula (1967) with a 5% margin of error: Thus, 226 respondents was the sample size. Data gathering involves drawing out information, realities or evidence on study problem from a given data source (Babbie, 2002). The study collected primary data using a questionnaires. Analysis used inferential and descriptive statistics: averages, standard deviation, percentages and frequency. In order to evaluate the effects of independent and dependent variables using multiple regression analysis inferential statistics were utilized. The equation assumed by the model was:

$Y= \beta_0 + \beta_1X_1 + \beta_2X_2+ \beta_3X_3 + \beta_4X_4+ \varepsilon$…….3.1

Where:

Y= Implementation; β_0 = Constant term; X_1= Public-Private Partnership (PPP); X_2= Debt Financing; X_3= National Budget; X_4= Transit tolls

RESEARCH FINDINGS AND DISCUSSION

Response Rate

This was calculated from 226 employees of the Ministry of Roads and Transport who received questionnaires. Table 1 delineates response rate outcomes.

Table 1: Response Rate

Status of questionnaire	Number	Percentage
Returned	215	95.1%
Not returned	11	4.9%
	226	100

Source: Research Data (2025)

Table 1 illustrated findings show 95.1% response rate, attributed to 215 questionnaires being returned, while the non-response rate stands at 4.9%, corresponding to 11 questionnaires that were not returned. As Mugenda and Mugenda (2003) notes, a 70% response rate is adequate for analysis.

Descriptive Statistics Results

Descriptive like percentages (%), Mean (M) and Standard Deviation (SD) determined respondent's agreement level on statements given for each variable. The results are presented as follows.

Table 2: Descriptive Statistics of Financing Strategies

Descriptive Statistics	Mean	Std Dev
Public Private Partnership	4.27	0.73
Debt Financing	4.08	0.92
National budget	**3.77**	**1.23**
Transit Toll	**4.04**	**0.96**
Project Implementation	**3.18**	**1.82**

Source: Research Data (2025)

Descriptive statistics presented in Table 2 revealed that respondents generally concurred with statements describing how public-private partnerships and debt financing affected road

infrastructure project implementation. Public-private partnerships recorded the highest mean of 4.27 and standard deviation of 0.73, indicating that respondents viewed PPPs as significantly contributing to project implementation through improved efficiency, attraction of investors, availability of expertise, risk sharing, and pooling of resources resulting in higher quality infrastructure. These findings concurred with Chibole and Mbataru (2023), who established that financing positively and significantly impacted road project completion. Debt financing recorded a mean of 4.08 and standard deviation of 0.92, with respondents agreeing that debt financing ensured availability of essential capital for large-scale projects, enabled the Ministry to initiate and complete road construction, and facilitated loan acquisition for road maintenance, findings that partially agreed with Gupta and Sharma (2021).

National budget and transit tolls also recorded notable descriptive statistics as presented in Table 4.2. National budget registered a mean of 3.77 and standard deviation of 1.23, with respondents concurring that budgetary allocations directly influenced project planning, implementation, and maintenance, while a properly designed national budget enhanced project quality, improved safety measures, and identified priority areas requiring urgent attention. These findings agreed with Mabugu and Chitiga (2020), who demonstrated that effective budgeting and fiscal discipline significantly improved infrastructure project implementation in South Africa. Transit tolls recorded a mean of 4.04 and standard deviation of 0.96, with respondents agreeing that toll revenues were reinvested into road maintenance and new construction, tolls managed traffic flow effectively, encouraged use of alternative routes, and prioritized road projects enhancing connectivity, findings consistent with Fauzan, Kuswanto and Utomo (2023), who confirmed positive relationships between toll management and successful project implementation.

Regarding the dependent variable, Table 2 revealed a mean of 3.18 and standard deviation of 1.82 for road infrastructure project implementation, indicating respondent neutrality suggesting that implementation was not at the expected level. This finding was inconsistent with Lukale (2021), who observed that project implementation concerns had been steadily improving due to technological advancements and enhanced project management techniques. Respondents identified several factors contributing to implementation delays, including bureaucratic red tape, insufficient funds, land acquisition challenges, poor project management, political interference, and inadequate stakeholder involvement. Corresponding mitigation measures suggested included

streamlining bureaucratic processes, ensuring sufficient financing, improving land acquisition strategies, strengthening project management practices, and fostering meaningful stakeholder involvement throughout the project lifecycle. These findings collectively underscored the complexity of road infrastructure implementation challenges facing the Ministry of Roads and Transport in Nairobi City County.

Inferential Statistics Results

These included correlation and multiple regression results' analysis which are presented below:

Correlation Analysis

Table 3: Correlation Analysis

		Public-private partnership	Debt financing	National budget	Transit toll	Project implementation
Public-private partnership	Pearson Correlation	1.000				
	Sig. (2-tailed)					
	N	215				
Debt financing	Pearson Correlation	.114	1.000			
	Sig. (2-tailed)	.0123				
	N	215	215			
National budget	Pearson Correlation	.300	.163	1.000		
	Sig. (2-tailed)	.108	.207			
	N	215	215	215		
Transit toll	Pearson Correlation	.410	.307	.297	1.000	
	Sig. (2-tailed)	.200	.229	.361		
	N	215	215	215	215	
Project implementation	Pearson Correlation	.801**	.707**	.766**	.794**	1.000
	Sig. (2-tailed)	.001	.003	.003	.002	
	N	215	215	215	215	215

Source: Research Data (2025)

Public-private partnerships, debt financing, national budget and transit toll as Table 3 delineates, were highly correlated with road infrastructure projects implementation by the ministry of roads and transport in Nairobi County as indicated by respective Pearson r value of 0.801, 0.707, 0.766 and 0.794 and significance value of 0.001, 0.003, 0.003 and 0.002. Therefore, an increase in one independent variable could cause a significant improvement on the dependent variable.

Multiple Regression Analysis

The regression analysis results are presented using model summary, Analysis of Variance (ANOVA) and coefficients as follows. To assess the overall fit of the regression model, the model summary values were derived and are recorded in Table 4.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.897	0.805	0.785	1.0231

Source: Research Data (2025)

Derived outcomes indicate 0.897 R-value, suggesting a strong variables' correlation. Additionally, the R square value is reported at 0.805, implying that independent variables account for 80.5% of the variance, with 19.5% explained by other variables not studied. The adjusted R square value, which accounts for the number of predictors in the model, stands at 0.785, indicating a good fit. Furthermore, the standard error of the estimate (1.0231) gives evidence on accuracy of the predictions made by the model. The ANOVA output, summarized in Table 5, provides evidence on whether the regression model is statistically significant.

Table 5: Analysis of Variance

Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	301.245	4	75.311	79.250	0.003
	Residual	199.562	210	0.951		
	Total	500.807	214			

Source: Research Data (2025)

An F value of 79.250 ($p = 0.003 < 0.05$) confirms the model's significance. Coefficients were then analyzed to capture each predictor's individual effects, as Table 6 delineates.

Table 6: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.629	0.297		2.118	0.002
	Public private partnership	0.759	0.157	0.0218	4.835	0.003
	Debt financing	0.701	0.319	0.0367	2.197	0.004
	National debt	0.785	0.251	0.0336	3.127	0.003
	Transit toll	0.755	0.228	0.0446	3.311	0.002

Source: Research Data (2025)

The review ascertained that road infrastructure projects' implementation would be at 0.629 level without the influence of public private partnership, debt financing, national debt and transit toll. The study also revealed that an improvement on public private partnership, debt financing, national debt and transit toll would improve the implementation of road infrastructure projects by 0.759, 0.701, 0.785 and 0.755 respectively. The regression model is expressed as;

Project implementation = 0.629 + 0.759 (public private partnership) + 0.701 (debt financing) + 0.785(national debt) + 0.755 (transit toll) + ε

Hypotheses Testing

H_{01}: Public-Private Partnerships have no statistically significant effect on implementation of road infrastructural projects by ministry of road and transport in Nairobi City County, Kenya

The examination findings revealed that public-private partnerships had a positive and statistically significant effect on road infrastructure implementation ($\beta = 0.0218$; $p = 0.003 < 0.05$), leading to rejection of $H0_1$. This finding agreed with Mutuku and Muturi (2018), who established that government and commercial bank financing positively and substantially impacted capital project completion rates in Kenyan public universities.

H_{02}: Debt financing has no statistically significant effect on implementation of road infrastructural projects by ministry of road and transport in Kenya's Nairobi City County

The study established that debt financing had a positive and statistically significant effect on road infrastructure implementation ($\beta = 0.0367$; $p = 0.004 < 0.05$), leading to rejection of H02. This finding concurred with Deng et al. (2019), who demonstrated that excessive debt financing negatively affected investment efficiency in emerging markets, indicating that high leverage increased financial risks and hampered effective project implementation.

H_{03}: National Budget has no statistically significant effect on implementation of road infrastructural projects by ministry of road and transport in Kenya's Nairobi City County

The study established that national budget had a positive and statistically significant effect on road infrastructure implementation ($\beta = 0.0336$; $p = 0.003 < 0.05$), leading to rejection of H03. This finding concurred with Owino and Kibua (2019), who demonstrated that timely national budget allocations positively enhanced public project efficiency and completion rates in Kenya.

H_{04}: Transit toll has no statistically significant effect on implementation of road infrastructural projects by ministry of road and transport in Kenya's Nairobi City County

The study established that transit tolls had a positive and statistically significant effect on road infrastructure implementation ($\beta = 0.0446$; $p = 0.002 < 0.05$), leading to rejection of H04. This finding was supported by Woltjer, Ruiz-Tagle and Allen (2019), who examined road infrastructure development impacts on peri-urban communities in Kisumu, Kenya, and Accra, Ghana, revealing both positive and negative effects on community welfare and integration.

CONCLUSIONS OF THE STUDY

The study concludes that public-private partnerships and debt financing had positive and significant effects on road infrastructure project implementation in Nairobi City County. PPPs enabled risk sharing between public and private sectors, reducing strain on public finances while enhancing project efficiency and innovation, with private companies introducing new road construction technologies and traffic management systems leading to smarter urban mobility solutions. Community engagement through these partnerships further ensured infrastructure development aligned with local needs and expectations. Regarding debt financing, the study concludes that it enabled the Ministry of Roads and Transport to raise substantial capital upfront for initiating large-scale projects including highways and bridges, spreading repayment costs over extended project periods so that taxpayers were not burdened with immediate lump-sum payments,

with repayments sustained through revenues generated by the funded infrastructure projects over time.

The study further concludes that national budget allocations and transit tolls positively and significantly influenced road infrastructure project implementation in Nairobi City County. National budget provisions enabled thorough project reviews and prioritization aligned with current developmental requirements, ensuring high quality materials were utilized to produce durable roads capable of withstanding harsh weather conditions, thereby minimizing frequent repair requirements. Transit tolls provided a direct and sustainable financing mechanism for road infrastructure development, with revenue collected reinvested into construction and maintenance activities. Additionally, toll stations effectively discouraged unnecessary peak-hour travel, reducing traffic congestion significantly across major routes. Transit tolls also demonstrated notable environmental benefits by encouraging reduced private vehicle usage, consequently decreasing the number of vehicles on roads and contributing meaningfully to reductions in air pollution and carbon emissions within Nairobi City County's rapidly growing urban environment.

RECOMMENDATIONS OF THE STUDY

The study recommends that the Ministry of Roads and Transport should create an attractive environment fostering effective public-private sector interactions by streamlining processes and establishing a clear risk-sharing framework that protects interests of both parties. The Ministry should enhance training of public officials on project management and negotiation skills to strengthen collaborative dynamics with private partners. Additionally, the Ministry should initiate a dedicated public-private partnership unit to ensure transparency throughout the entire project lifecycle. The Ministry should also invest in thorough feasibility studies and comprehensive project planning to reduce risks for potential lenders and increase investor confidence. Furthermore, the Ministry should actively engage communities during project planning stages to determine their needs, gain public support, and encourage stronger public-private collaborations that enlist more investors, spread financial risks, and raise additional capital and project management expertise.

The study further recommends that the Ministry should consult communities regarding their road needs to ensure project priorities are properly aligned, while establishing robust monitoring

mechanisms to guarantee funds are directed toward highest priority areas. The Ministry should maximize procurement processes to improve efficiency and accountability, adopting technology to streamline procedures and minimize implementation delays while actively engaging the private sector to foster innovation and effectiveness in road projects. Regarding transit tolls, the Ministry should embrace advanced automatic revenue collection systems at toll booths, adopting mobile payment services alongside cash payments to alleviate traffic congestion. The Ministry should also enhance stakeholder interaction by working closely with all relevant parties to understand their needs and expectations throughout project implementation. Additionally, the Ministry should maintain transparent public communication regarding toll revenues collected and demonstrate clearly how funds are being utilized in improving road infrastructure across Nairobi City County.

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