

Establishment of a Strategic Financing Mechanism for Sustained Construction and Maintenance of Zambia's Public Roads-A Case for Lusaka District

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ABSTRACT: Investment in physical infrastructure, such as roads, bridges, airports, sea ports, water ports, railways etc., is a fundamental ingredient in the growth and economic development of a country. Compared to countries like Singapore, South Korea and China, countries in Sub-Saharan Africa have significantly underinvested in infrastructure over the years, resulting in stunted growth. Zambia, which has a large infrastructure funding gap, and a ballooning government debt, cannot rely solely on the government to meet its infrastructure funding needs. This study looked at establishment of a strategic financing mechanism for sustained construction and maintenance of Zambia's public roads- a case of Lusaka district. The study adopted pragmatism philosophy, focusing on practical, real-world outcomes. It combined quantitative and qualitative methods to address establishment of a strategic financing mechanism for sustained construction and maintenance of Zambia's public roads (Tashakkori & Teddlie, 2010). A mixed-methods approach was used, integrating both qualitative and quantitative techniques. Qualitative methods (interviews, focus groups) explored strategic mechanism of sustained financing for construction and maintenance of Zambia's public roads, while quantitative surveys measured ways of sustaining the financing for construction and maintenance of the public roads. This approach provided a comprehensive understanding of how to have a strategic mechanism to fund the construction and maintenance of public roads in Zambia (Creswell & Plano Clark, 2017). The study applied both deductive and inductive approaches. Data collected was analysed using the Dedoose Software for the qualitative part and for the quantitative part a thematic analysis was used to come up with the results. Zambia has in place legal and institutional frameworks (Tembo, 2015) that are necessary for effective and efficient road asset management. This study established that a number of financing strategies or frame works for road construction and maintenance such as RoadSIP 1 and II and RoadSIP III (yet to be launched), performed fairly well albeit some challenges. It also established that most road projects under implementation are under the government's balance sheet and that, the Road sector's indebtedness to local Contractors and Consultants was increasing and the financing gap was widening. Zambia would need to spend an average of \$1.6 billion a year over the decade 2022–30 to develop the infrastructure found in the rest of the developing world (Foster and Dominguez, 2010). To close this financial gap required raising more funds and looking for more effective ways to meet infrastructure targets. The study established that since traditional funding methods for road construction and maintenance in Zambia such as tax revenues and loans are becoming unsustainable, there is need to look for other alternatives. The study established the potential strategic sources of funding for sustained construction and maintenance of Zambia's public roads include public private partnerships, equity financing, road tolls and establishment of a State Infrastructure Bank(s). The study also established a Strategic Road Financing Framework (SRFFW) that clearly illustrates the interconnection between institutional governance, revenue diversification, community engagement, and sustainability. To Address financing challenges, it was recommended that there is need to increase Public-Private Partnerships (PPPs) by inviting the private sector to participate in the construction, maintenance, and financing of roads.

KEYWORDS: Road Construction and Maintenance, Strategic Funding, Private Public Partnerships, Inadequate Financing, Strategic Road Financing Framework.

1.0 INTRODUCTION

This chapter provides an overview of the study, setting the foundation for understanding the research conducted to help understand the background of the growing global interest in the uptake of strategic financing mechanisms for sustained construction and maintenance of public roads in both developed and developing nations. It explained the trigger of this interest as the quest for additional sources of capital and/or as a means of enhancing value for money for public service delivery. The

Establishment of a Strategic Financing Mechanism for Sustained Construction and Maintenance of Zambia's Public Roads-A Case for Lusaka District

chapter also highlighted the limited uptake of strategic financing mechanisms for sustained construction and maintenance of Zambia's public roads; a look at Lusaka district and the road sector in general despite the government's initiative as far back as 2009 to have introduced and enacted the Public Private Partnership (PPP) Act.

1.1 Background

Historically, the management of roads was undertaken by the Department of Public Works from Zambia's independence up to the mid 1990's (World Bank, 2014). Thereafter, the road construction projects are managed by the Road Development Agency (RDA), enacted under the Public Roads Act No.12, 2002, as the mandated body to care for and maintain all public roads. The Act also allows the RDA to delegate its role to other government departments and ministries who manage township and feeder roads. Financing of the road sector is legally provided through Road Sector Annual Work Plans (RSAWPs) from the Ministry of Finance and National Planning channeled through the National Road Fund Agency who manages the Road Fund or financing basket for the road sector. The RSAWP's are typically financed at 44% and 56 % (2021) from local and external funding, respectively. Zambia has in place legal and institutional frameworks (Tembo,2015) to support the management of the road network as an asset through the Road Fund. The available financing strategy that the Zambian government has employed is the Road Sector Investment Programme, ROADSIP, which forms part of the external financing supporting the RSAWPs from the World Bank, European Investment Bank, African Development Bank and other cooperating partners as well as direct financing from the treasury, loans from local Banks and other financing institutions. The ROADSIPs I and II ran from 1998 to 2013, thereafter the successor programmes were temporal as ROADSIP III was being reviewed. To date in 2025, ROADSIP III, the financing framework and successor programme for the ROADSIPs, is yet to be launched by the government. The study therefore aimed to propose a strategic financing mechanism for the sustained construction and maintenance of Zambia's public roads for Lusaka district. It is expected that proper delivery of road projects must be accompanied by proper planning and adequate financing (World Bank, 2015). As important as it is to construct and maintain roads, of utmost importance is to have a sustained financing mechanism in place to achieve this (World Road Association, 2014).

1.2 Statement of the Problem

The central issues in Zambia's roads sector are shaped by the country's geography and history because of the importance of good roads to support delivery of economic and social services. Worldwide, funding of the road sector poses challenges due to the perception that it shows "a government at work" status when road projects are launched. (Raballand et al, 2013). However, high investments in the road sector are not necessarily synonymous with efficient investments. Zambia being one of the largest, most sparsely populated countries in the world has challenges in financing maintenance of its road network. In fact, in Africa, it has the largest per person per dollar ratio of maintenance implication (Raballand and Whitworth, 2020). Post-independence financing was not an issue because the government had prosperous status and regarded a middle-income country. Financing, however became a challenge when Zambia's economy declined in the 1970 and 80's (Hill and Mc Pherson, 2004). Suspension of funding from the donors in 2009, due to mismanagement of the road sector agencies caused by political interference and over procurements in 2008, did not help matters (Raballand et al, 2013). The government still had to fund the sector and try to upgrade some sections of the network that were not economically viable due to social factors and population integration that was started by after Zambia's independence (Raballand and Whitworth, 2020). Despite huge investments in this sector, projects have been known to delay, overrun budgets and fall short of the desired quality due mainly to inadequate funding (Zambia:Lusakatimes.com, 2021)Therefore, this study was conducted in an effort to come up with a strategy to help the government establish a financing mechanism to improve the management, construction, and maintenance of Zambia's public roads in a sustained manner particularly for Lusaka District with the identified financing gap (NRFA Annual report 2019).

1.3 Specific Research Objectives

- I. Explore how the current financing strategies for the public road construction and maintenance projects have performed in Zambia having interrogated the institutional perception on reliable financing;
- II. Determine strategic potential sources of funds for financing for sustained construction and maintenance of public road projects in Zambia- a case for Lusaka district;
- III. Develop a framework for establishment of a strategic financing mechanism for sustained construction and maintenance of public road projects in Zambia-a case for Lusaka district.

Establishment of a Strategic Financing Mechanism for Sustained Construction and Maintenance of Zambia's Public Roads-A Case for Lusaka District

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter begins by providing the study on theoretical literature to understand empirical literature, and then literature on the existence, nature, and looking at strategic financing mechanisms for sustained road construction and maintenance from various studies in various nations. Fundamentally, this chapter provided the understanding of the concept of strategic financing mechanism for sustained construction and maintenance of public roads, highlighting some of the methods of financing with a view of strategically come up with a mechanism for coming up with a strategic financing mechanism for the construction and maintenance of public roads in Zambia with focus on Lusaka district. It also provided an overview of the history of the study as well as discussing studies on financing for road construction and maintenance before focusing on four different perspectives: a global perspective, a continental perspective, regional perspective and the Zambian perspective. This was to help come up with key theoretical background, literature review according to the research objectives of the study which gave the literature gap, empirical studies, theoretical framework, and conceptual framework to help inform the study.

2.2 Empirical Review (Theoretical framework)

Literature review delves into prior surveys, research published in books, scholarly articles, and any other sources relevant to a particular issue, area of research, or theory (Fink, 2014). This helped in providing a description, a summary and a critical evaluation of the subject matter which was investigated (Fink, 2005). The following two theories Neoclassical Growth Theory and Endogenous Growth Theory were selected as the two theories to guide the study based on the research questions: (i) Neoclassical Growth Theory (Solow, 1956) which focuses on capital and natural resource utilization. This, in line with the study, acknowledged that there was a link between good road networks which are vital and economic development, serving as the backbone of trade and productivity. (ii) Endogenous Growth Theory (Romer, 1990) which emphasizes capital investment returns and "learning-by-doing." It also highlights human capital development, knowledge, and skills improvement for sustainable economic growth because for a meaningful development in any community to take place, the citizens of the area should be involved in the process and when they do there is a sense of ownership of the projects being implemented.

The two mainstream theories, neoclassical growth theory and endogenous growth theory, by attaching and aligning relevance to economic development, provided a foundation to link road infrastructure investment to economic growth and explained the role of sustained investments in fostering long-term development and innovation. They therefore helped to guide the study by combining resource optimization for developing sustained strategic road financing mechanisms, while complementing each other. The implications of these theories for economic development, impact of road transport infrastructure on the industrial structure, the connection of transport to the distribution of productive forces, the strength of transport infrastructure on economic ties helped to interlink the establishment of a strategic financing mechanism for sustained construction and maintenance of Zambia's Public roads.

2.3 Inadequate financing arrangements in the road sector

The literature review explores that Zambia would need to spend an average of \$1.6 billion a year over the decade 2022–30 to develop the infrastructure found in the rest of the developing world (Foster and Dominguez, 2010). This is equivalent to 20 percent of Zambia's GDP (similar to what China invested in infrastructure in the mid-2000s), and is about double the country's rate of investment in recent years. The power sector alone accounts for 32 percent of these spending needs. This funding requirement brought about an infrastructure financing gap.

Zambia's infrastructure funding gap of \$500 million a year (6.5 percent of GDP) could be largely offset by strategic policy choices. Closing the gap requires raising more funds and looking for more cost-effective ways to meet infrastructure targets. As posited by the World Bank, eliminating overengineering in the road sector could save \$60 million (World Bank 2014). Zambia's infrastructure situation is more hopeful than that of many other African countries though, despite being substantial, meaning it can dramatically be reduced through measures to stem inefficiencies and lower costs. Funding in the road sector however, has been inadequate to meet the demands for construction and maintenance of the public roads, year in and year out (RoadSIP I, 1997). With little funds available for construction of new roads, road maintenance has not been spared, especially in rural areas where certain sections of the road become impassable due to washed-away bridges, for example "Dundumwezi cut off", in the rain season (Pheonix News, 2021). The main reason why road maintenance is underfunded is that road user's pay very little for the use of the road network (Heggie, 1994). They pay the usual import duties, excise taxes and sales taxes, but so does everyone else. Road user charges in the form of vehicle license fees, a specific surcharge added to the price of fuel (the fuel levy), and international transit fees rarely cover more than 50 percent of expenditures on maintenance and, in some countries, barely cover

Establishment of a Strategic Financing Mechanism for Sustained Construction and Maintenance of Zambia's Public Roads-A Case for Lusaka District

25 percent. However, most road expenditures are still financed from general tax revenues (as government grants) and donor-financed loans and grants, (World Bank 2014).

2.4 Strategic Financing Mechanism for Construction and Maintenance of Public Roads-Global, Continental, Regional and Local Perspective

All countries need an efficient and extended road transport system to sustain both the social development and the economic competitiveness (John-Pau and Rodrigue, 2020). The latest trends show that the demand for road infrastructure is constantly growing, despite the negative impact of the financial and economic crisis on public and private financing. Global spending regarding road transport infrastructure actually accounts for roughly US\$580 billion worldwide, and is projected to quickly increase up to \$ 1.13 trillion by 2025 (Micci, 2016). In general, financing of projects or huge investments can be complicated as investment capital may come from different sources such as bank financing (domestic and foreign), insurance companies, conduit-loan securitization and single-asset securitization (Elgemony, 2002).

Developing economies are continuing to grow; in particular Asia's share of global road infrastructure spending is expected to rise from 59.5% in 2013 to 65.5% by 2025 (Micci, 2016). The increase in road users, however, is expected to boost spending in Latin America and Middle East markets too, while Africa's road investments may remain limited (2.09% by 2025). Traditionally, road infrastructure funding has been primarily borne by the public sector either using money from the general budget or funds from other particular sources (local taxes, fuel taxes, taxes on new vehicle acquisitions, and vehicle registration licenses) (World Bank, 2014). Many countries turn to tolling as a primary way to raise funds due to the global financial crisis. Road Authorities have also increased the range of contractual arrangements to engage the private sector. Innovative financing mechanisms can consider capital instruments, debt instruments or other innovative methods such as value capture.

Given that road transport is the most dominant mode of transport for the movement of goods, services and passengers in the Southern African Development Community (SADC) region, the trading bloc signed a Regional Road Infrastructure Policy to help have coordinated and collaborative way of development due to the observed insufficient budgetary allocations to the road sector. Zambia has made major strides with regards to improving its main trunk road network which connects it to its international border entry points. Despite relatively low road densities, analysis suggests Zambia's primary and secondary road networks provide basic regional and national connectivity (Foster and Dominguez, 2011). More than 50 percent of Zambia's paved road networks are in good or fair condition, on par with its middle-income neighbors and well ahead of the typical performance of resource-rich countries in Africa. The establishment of a second-generation road fund in the country however, has improved allocation of resources, (Kalaluka, 2015).

This study therefore aimed to establish a strategic mechanism that will not only help the government have in place actionable strategies helping and contributing to long-term road sustainability and improved service delivery but that it would help unveil weaknesses in the current systems which could be strengthened to enhance establishment of a strategic financing mechanism for sustained construction and maintenance of Zambia's public roads in particularly for Lusaka district. The study would further propose fit for purpose measures, where necessary, for the broader road network.

2.5 Knowledge Gap

The literature review cites credible sources. The empirical data cited in the literature review, sourced from authoritative persons like Ian G Heggie, considered as the father of road maintenance research in developing countries; authoritative institutions such as the World Bank, African Development Bank, Road Development Agency, National Road Fund also lent credibility and authenticity to the study. A significant gap exists which is the lack of an established financing mechanism for sustainable construction and maintenance of public roads in general and no record of a similar study was found by the researcher. This knowledge gap highlights content and knowledge gap regarding the topic of strategic sustained mechanism for construction and maintenance of public roads to enhance future studies' robustness and reliability.

Establishment of a Strategic Financing Mechanism for Sustained Construction and Maintenance of Zambia's Public Roads-A Case for Lusaka District

2.4 Conceptual framework

2.4.2 Conceptual Framework

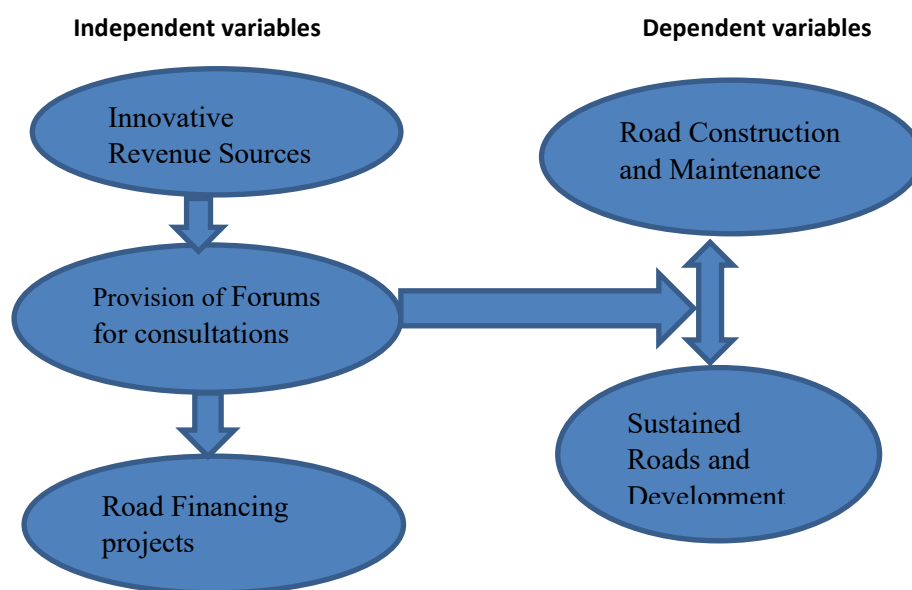


Figure 1: Study's Conceptual Framework

Source: Researcher's Design (2025)

The framework inspires the research questions and has been premised on previous practices in financing of infrastructure project particularly for road construction and maintenance. The conceptual framework has emerged from the research questions and will provide a contextualized structure for what exactly the research explored. The overall objective of the research helped to establish a strategic mechanism for sustained financing for construction and maintenance of Zambia's public roads for Lusaka district.

3.0 METHODOLOGY

The research Pragmatism philosophy guided the approach to the study. This helped shape the research methods and provided a foundation for understanding establishment of a strategic financing mechanism for sustained construction and maintenance of public roads in Zambia (Saunders, Lewis, & Thornhill, 2019). The study adopted pragmatism philosophy, focusing on practical, real-world outcomes. It combined quantitative and qualitative methods to address establishment of a strategic financing mechanism for sustained construction and maintenance of Zambia's public roads (Tashakkori & Teddlie, 2010). A mixed-methods approach was used, integrating both qualitative and quantitative techniques. Qualitative methods (interviews, focus groups) explored strategic mechanism of sustained financing for construction and maintenance of Zambia's public roads, while quantitative surveys measured ways of sustaining the financing for construction and maintenance of the public roads. This approach provided a comprehensive understanding of how to have a strategic mechanism to fund the construction and maintenance of public roads in Zambia (Creswell & Plano Clark, 2017). The study applied both deductive and inductive approaches. The deductive approach tested existing theories, such as the Theory of Planned Behavior, through surveys. The inductive approach used qualitative data to uncover new insights and patterns, enhancing the theoretical framework (Saunders et al., 2019; Guba & Lincoln, 1994). An explanatory sequential research design was employed, where quantitative data was collected first, followed by qualitative data to explain the findings in more detail. This approach ensured a comprehensive understanding of sustained financing for construction and maintenance of Zambia's public roads (Creswell, 2014; Johnson & Onwuegbuzie, 2004). The study focused on stakeholders in the Lusaka district for the professionals who were involved in project management and financing for construction and maintenance of public roads in Zambia. The population representatives were from the Ministry of Finance and National Planning, Ministry of Local Government and Rural Development, Road Development Agency, National Road Fund Agency, Zambia National Service and Local Authorities. This selection was made by only picking institutions involved in the implementation of public road works and secondly, by only targeting a population of those officers involved in project financing and road maintenance within these institutions' activities and its relevance to the study's objectives (Bryman, 2016). A sample size of 324 was calculated using Yamanes formula for a population of 1,700, with a margin of error of 0.05. The researcher collected 209 responses, 65 percent of the target sample size, due to logistical and budgetary constraints (Saunders et al., 2019). For qualitative data, 12 participants were selected based on theoretical saturation. These included the top managers from the institutions that were the

Establishment of a Strategic Financing Mechanism for Sustained Construction and Maintenance of Zambia's Public Roads-A Case for Lusaka District

Ministry of Finance and National Planning, Ministry of Local Government and Rural Development, Road Development Agency, National Road Fund Agency, Zambia National Service and Local Authorities and were involved in project finance and management. The sample size was adequate for obtaining diverse perspectives while maintaining data depth (Guest, Bunce, & Johnson, 2006). Purposive sampling which is a form of non-probability sampling technique was employed in this research as it was requires to identify experts in the field of project financing and road construction and maintenance who gave relevant responses in addressing the research questions, ensuring a diverse and representative sample (Bryman, 2016). Data collection included both primary and secondary data. Primary data were collected through surveys, interviews, and focus groups, while secondary data were sourced from relevant industry reports and academic literature. Surveys were administered to 209 participants, interviews were conducted with 10 key stakeholders, and focus group discussions were organized with consumer groups (Creswell, 2014). Quantitative data were analyzed using Dedoose software, employing descriptive statistics and regression analysis. The qualitative data were analyzed using thematic analysis to identify recurring themes and patterns related to strategic sustained financing for construction and maintenance of Zambia's public roads (Braun & Clarke, 2006).

4.0 FINDINGS

The findings are presented in accordance with how the research questions were presented and were addressed as follows:

- How have the current financing strategies for sustained construction and maintenance of Zambia's public roads performed in line with institutional perceptions regarding reliable financing for construction and maintenance of the public roads?
- What are the strategic potential sources of funds for financing of public road construction and maintenance projects in Zambia?
- What strategic framework could spur sustained financing of public road construction and maintenance projects in Zambia?

4.1 How the current financing strategies for sustained construction and maintenance of Zambia's public roads have performed in line with institutional perceptions regarding reliable financing for construction and maintenance of public roads:

The following figure gives a representation of the responses from the respondents:

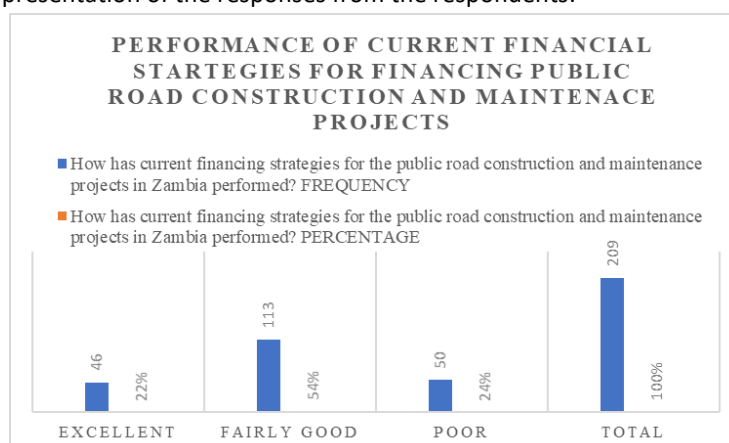


Figure 4.1.1 Performance of current strategies for public road construction and maintenance

The demographic distribution reveals that the respondents views regarding the performance of current financing strategies for the public road construction and maintenance projects in Zambia as follows: 46 respondents who represented 22% of the total respondents indicated that the current financing strategies performed excellently, 113 respondents who represented 54% of the total respondents indicated that the current financing strategies for road construction and maintained in Zambia performed fairly. The other of respondents 50 who represented 24% of the total respondents indicated that the current financing strategies have performed poorly.

The respondents were also asked to indicate the challenges that have affected the performance of current financing strategies for the public road construction and maintenance projects in Zambia. The following was their response: 35% of the respondents indicated insufficient annual budgetary allocation to road maintenance programs as a challenge, 15% indicated discrepancy in the policy pronouncement and policy documents as RoadSIP II did not outline PPP as one of the models to financing the Road Sector 30% indicated outdated strategic mechanism as a challenge as the RoadSIP II is not in harmony with the 8th National Development Plan, and 20% indicated politics.

The figure below summarizes the challenges:

Establishment of a Strategic Financing Mechanism for Sustained Construction and Maintenance of Zambia's Public Roads-A Case for Lusaka District

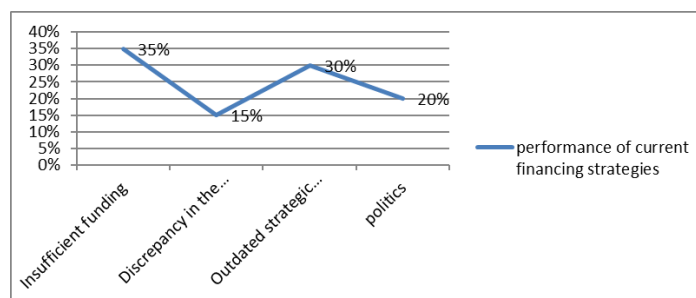


Figure 4.1.2: Current challenges affecting performance of financing strategies for the public road construction and maintenance projects in Zambia

The researcher also sought to have an insight into the institutional perceptions regarding the need for reliable financing for construction and maintenance of the Zambia's public roads. The institutional heads and their deputies were targeted as they were in charge of management of the public sectors' construction and maintenance projects. The figure below provides the responses and perception thereof:

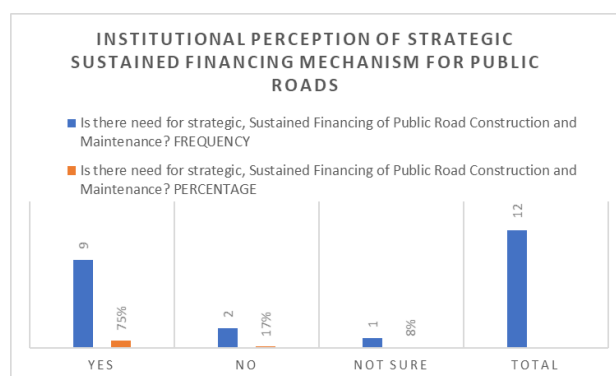


Figure 4.1.3: Institutional Perception on need for need for sustained strategic financing

4.2 What the strategic potential sources of funds for financing of public road construction and maintenance projects in Zambia are.

The second objective of the study sought to identify strategic potential sources of funds for financing for sustained construction and maintenance of public road projects in Zambia. The respondents were interviewed in order to achieve this objective. the following are the findings:

4.2.1 Public-private Partnership (PPP)

The study findings revealed that one of the strategic potential sources of funds for financing for sustained construction and maintenance of public road projects in Zambia is Public-Private Partnership as a promising mechanism for attracting private funds without immediately raising taxes or borrowing. The figure below presents this finding which showed that 81% of the respondents said yes, while 19% of the respondents disagreed. This confirms that the majority of respondents view PPP's as a potential source of funds for financing for sustained construction and maintenance of public road projects in Zambia.:

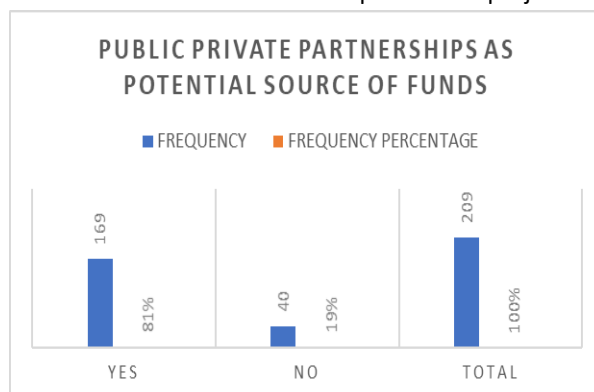


Figure 4.2.1 PPP's as a potential source of alternative financing for the public road construction and maintenance projects in Zambia

Establishment of a Strategic Financing Mechanism for Sustained Construction and Maintenance of Zambia's Public Roads-A Case for Lusaka District

4.2.2 State infrastructure banks

Another identified potential source of funds for financing for sustained construction and maintenance of public road projects in Zambia is establishment of State Infrastructure Banks. The figure below summarizes respondent's views that establishment of State Infrastructure Banks could be a potential source of funds for financing for sustained construction and maintenance of public road projects in Zambia. This is evidenced by the majority highlighted as 70% who agreed, while 20% disagreed and 10% were unsure

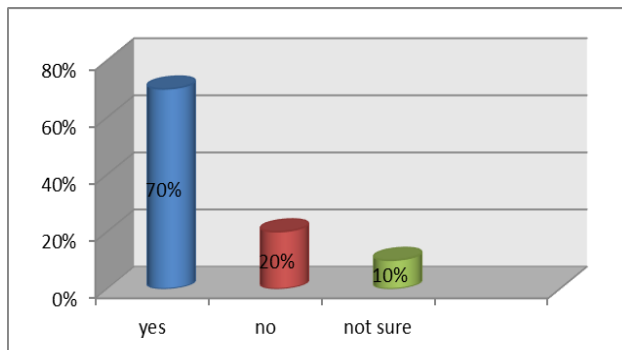


Figure 4.2.2 State infrastructure banks as a potential source of funds for sustained road construction and maintenance of Zambia's public roads

4.2.3 Equity financing

The study also identified Equity financing as a viable source of funds for financing for sustained construction and maintenance of public road projects in Zambia. The figure below shows respondents views that equity financing is identified as a strategic potential source of funds for financing for sustained construction and maintenance of public road projects in Zambia. 65% of the respondents said yes, 20% refused and 15% were unsure

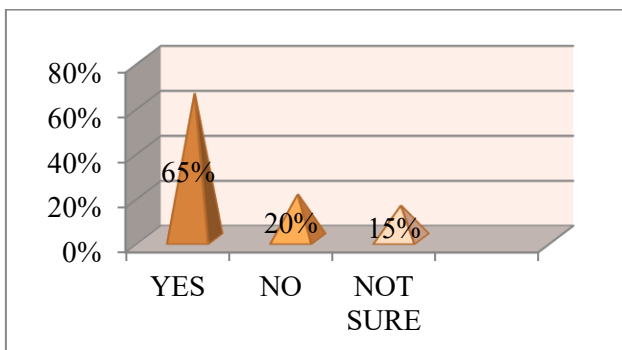


Figure 4.2.3: Equity financing as a potential source of funds for sustained construction and maintenance of Zambia's public roads

4.2.4 Grants

It was also revealed by the figure below through respondents' responses that another strategic potential source of funds for financing for sustained construction and maintenance of public road projects in Zambia was grants. The majority of respondents viewed grants from Cooperating Partners as a strategic potential source of funds for financing for sustained construction and maintenance of public road projects in Zambia represented as 75% who agreed, 20% disagreed while 5% were unsure.

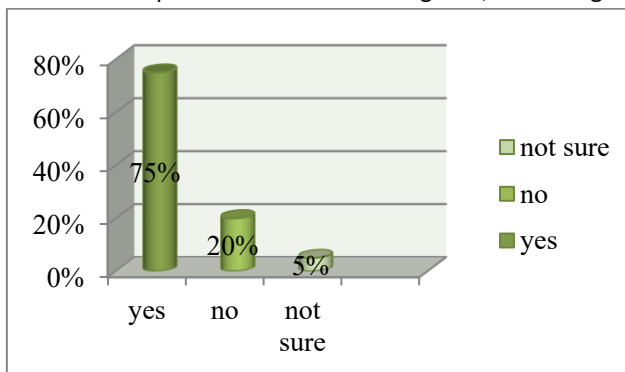


Figure 4.2.4 Grants as a source of funds for road construction and maintenance

Establishment of a Strategic Financing Mechanism for Sustained Construction and Maintenance of Zambia's Public Roads-A Case for Lusaka District

4.2.5 Road fund (Fuel Levy)

Fuel levy was another strategic potential source of funds identified for financing for sustained construction and maintenance of Zambia's public road. The respondent's views are summarized in the graph below with 70% of the respondents indicating it as yes, 20% refused and 10% were unsure.:

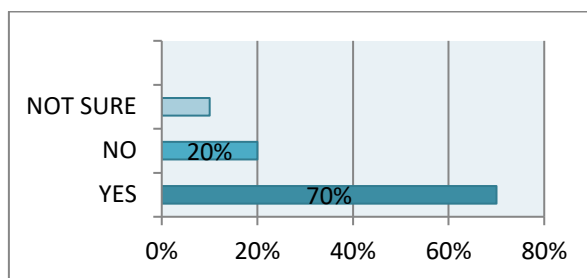


Figure 4.2.6 Road fund as a source of funds for road construction

4.2.6 Road Tolling Program

The findings of the study also revealed that Road Tolling Program is another strategic potential source of funds for financing for sustained construction and maintenance of public road projects in Zambia. The respondent's views are summarized in the figure below and show the majority agreed that the road tolling programme was a strategic potential source of funds for financing sustained construction and maintenance of Zambia's public roads as 78% of the respondents agreeing and 22% of them disagreeing.

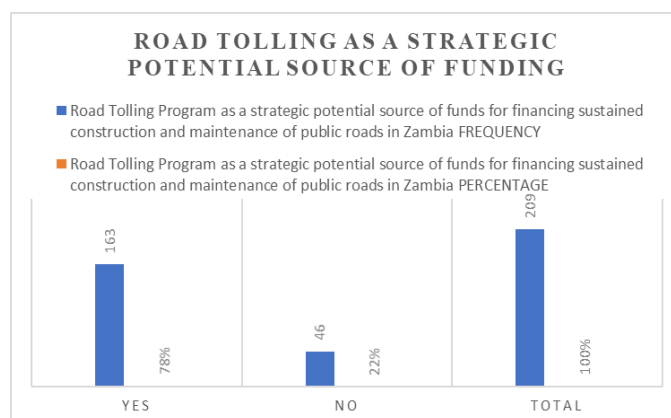


Figure 4.2.7 Road Tolls as a source of funds for road construction and maintenance

4.3 Framework for establishment of a reliable strategic financing mechanism for sustained construction and maintenance of public road projects in Zambia

The study in its third objective, sought to develop a framework to spur establishment of a reliable strategic financing mechanism for sustained construction and maintenance of Zambia's public roads. Below were the views from respondents on the best framework for reliable strategic financing mechanism for sustained construction and maintenance of public road projects in Zambia.

The following highlights the findings for developing a framework to spur establishment of a reliable strategic financing mechanism for sustained construction and maintenance of Zambia's public roads for Lusaka district:

- There was need to establish a locally sustainable Pavement Management Systems (PMS) to fully understand the condition of the roads at network level and prioritize maintenance of critical roads.
- Fund the maintenance backlog to help improve the road network to a sustainable manner and acquire cooperating support in good time before roads degenerate to unsustainable levels.
- The best framework for financing road construction and maintenance depends on the local context, but it often involves a combination of public and private funding, and a focus on sustainable practices.
- Ring fence all types of road user fees for road construction and maintenance and maintenance of roads could be sustained if the road user charges that are realised are strictly reserved for maintenance of the existing core road network.
- Streamlining the authority in the management of roads by creating a more credible and sustainable systems for financing road network by encouraging private participation.
- Utilization of toll fees strictly on maintenance activities and Government to finance capital interventions such as rehabilitation and upgrading using the

Establishment of a Strategic Financing Mechanism for Sustained Construction and Maintenance of Zambia's Public Roads-A Case for Lusaka District

GRZ budget line from the National Treasury. vii) Have stakeholder engagements on the best approach to utilize public funds for sustainability and functionality with regards the funds.

From the responses that were received, the establishment of the Strategic Road Financing Framework (SRFFW) required to be looked at in a multifaceted approach and developed which would clearly illustrate the interconnections between institutional governance, revenue diversification, community engagement, and sustainability.

5.0 DISCUSSION OF FINDINGS

5.1 Performance of the current financing strategies for the public road construction and maintenance projects in Zambia having interrogated the institutional perceptions on sustained strategic financing

The study revealed that the current financing strategies for the public road construction and maintenance projects in Zambia performed fairly though far from excellent. Challenges affecting the current financing strategies include Insufficient Annual Budgetary Allocation for Road Maintenance Programs, Discrepancy in the Policy Pronouncement and Policy Documents, and Outdated Strategic Mechanisms. These findings are in agreement with existing studies as Mwangi (2021) in Kenya highlighted that insufficient funding for road construction and maintenance can lead to poor road quality, increased costs, and less frequent maintenance. This study has also established from the findings that the Institutional Perceptions on Strategic, Sustained Financing of Public Road Construction and Maintenance that funding for road maintenance is often postponed when budgets are tight; maintenance deferral can be expensive in the long term. Short-term cost savings from deferring maintenance may be outweighed, even in present value terms, by the consequent need for more expensive treatments in the future. The cost of repairs increases disproportionately as the condition of the pavement decreases over its life (Heggie, 1991). Deferring pavement preventive maintenance or rehabilitation can lead to a substantial increase in required repair costs (Bhatti, 2024).

Most highway agencies face the situation where their funding needs for maintenance and rehabilitation activities exceed the available budget. As a result, they have no choice but to reduce the levels of service their roads provide to users (Amin, 2022). Models such as the World Bank's Highway Development and Management Model (version 4) can be used to assist with the determination of road user and road agency costs. This model simulates pavement deterioration, maintenance costs and road user costs as a function of road characteristics and pavement condition (Kerali, 1999).

5.2 Strategic potential sources of funds for financing for sustained construction and maintenance of Zambia's public road projects in Lusaka District.

The study identified strategic potential sources of funds for financing for sustained construction and maintenance of public road projects in Zambia as **Public Private Partnerships (PPP's)** in agreement with a study by Makhovikova and Efimova (2022) in Ghana which revealed that the PPP arrangement for funding is gradually becoming the most viable option for attracting capital for road projects. Financing highway infrastructure through a PPP arrangement has two interrelated components, namely, project capital and project revenue. In project development, consideration is given to the mechanism of funds attraction and income derived from project operation, which is used to repay the capital and operating costs. **Equity Financing** was also identified as a viable source of funds for financing for sustained construction and maintenance of Zambia's public roads. Equity means owners stake or interest in a company. Equity finance is a method of raising fresh capital for reinvestment through issuance or sale of shares to the public. Equity finance is germane in public finance because governments in the developed and developing countries actively and directly participate in production and commercial activities just like privately owned enterprises do, primarily to further social outcomes, provide physical infrastructure, and to create market stability within and across the supply chains. "Government or State-Owned Enterprises (GOEs or SOEs)" and defined as enterprises where state has significant control through full, majority, or significant minority ownership (OECD, 2005). **Road tolling** was also identified as a strategic potential source of funds for financing for sustained construction and maintenance of Zambia's public roads. This is in agreement with a study done by Mwangi (2021) in Kenya who found out that Toll roads can be a source of funds for road construction because they allow the government to recover the costs of construction and maintenance through toll charges. Toll roads can be attractive to investors because they can recover the costs of construction, maintain and operate directly.

The study also established a framework in view of the presented modes of funding road infrastructure, with a funding approach that meet sustainability criteria (environmental, social and good governance dimensions), blend the sectoral strengths and best practices, and balance the capital structure. That is, such method should utilize both revenue and debt finance, integrating public and private financing capabilities, and improve quality of natural and human environment.

The study revealed that the best proposed framework of a reliable strategic financing mechanism for sustained construction and maintenance of Zambia's public road in Lusaka District is one that involves a combination of public and private funding. Fig 5.1

Establishment of a Strategic Financing Mechanism for Sustained Construction and Maintenance of Zambia's Public Roads-A Case for Lusaka District

represents the Strategic Road Financing Framework (SRFFW)-Zambia: framework for the Strategic Road Financing Framework (SRFFWK)

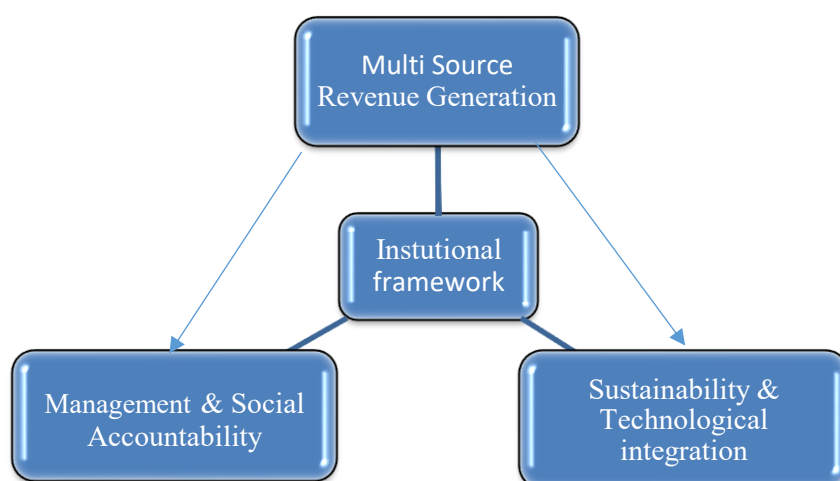


Fig 5.1 Strategic Road Financing Framework (SRFFW)-Zambia: framework for the Strategic Road Financing Framework (SRFFWK)

6.0 CONCLUSION

This study sought to explore strategic financing mechanism for sustained construction and maintenance of Zambia's public roads for Lusaka District. The study showed that such sustained construction and maintenance of public networks are key enablers of economic growth, productivity and social well-being. Well-functioning networks contribute to prosperity on many fronts by, for example, enabling growth through reduced business costs, improving access to markets and improving labour mobility. The study established that Zambia has had a number of financing strategies or frame works for road construction and maintenance such as RoadSIP I and RoadSIP II and yet to be launched RoadSIP III. The performance of these frameworks was assessed and it was established that they have performed fairly well though with some challenges such as inadequate budgetary allocation from government, politics, discrepancy in the policy pronouncement and policy documents and outdated strategic mechanisms. The study also established that since traditional funding methods for road construction and maintenance in Zambia such as tax revenues and loans are becoming unsustainable there is need to look for other alternatives. The study established that some of the strategic potential sources of funds for financing for sustained construction and maintenance of public road in Zambia-Lusaka District include public private partnerships, equity financing, road tolls and establishment of State Infrastructure Bank(s). The study was able to develop a framework for sustained financing of construction and maintenance of Zambia's public roads.

7.0 RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made:

- (1) **Increase public-private partnerships (PPPs):** The government can invite the private sector to participate in the construction, maintenance, and financing of roads.
- (2) **Improve the PPP policy:** The government can improve the PPP policy to address challenges such as non-financial viability of concessions and lack of time, resources, and knowledge.
- (3) **Expand toll roads:** The government can expand the use of toll roads to help finance road construction and maintenance.
- (4) **Increase resource flows:** The government and donors can increase resource flows to develop the capacity to prepare, negotiate, and transact projects.
- (5) **Improve institutional capacity:** The government can improve institutional capacity to manage the public road infrastructure and road safety areas.
- (6) **Develop an annuity road funding model:** Develop an annuity road funding model where successful bidders raise at least 70% of the total project cost.
- (7) **Establish State Infrastructure Bank(s):** There is need for the government to establish State Infrastructure bank(s) which will look at raising and securing funds for bridging the financing for the purpose of constructing important roads.

Establishment of a Strategic Financing Mechanism for Sustained Construction and Maintenance of Zambia's Public Roads-A Case for Lusaka District

8.0 FUTURE RESEARCH RECOMMENDATIONS

This research is expected to help the Zambian Government use the developed framework to help in improvement of funding for construction and maintenance of Zambia's public roads starting with Lusaka district. Taking note that no similar study has been undertaken regarding the topic, this study gives an opportunity for similar studies to be undertaken regarding sustained and strategic financing of construction and maintenance of Zambia's public roads.

Further studies can be undertaken possibly to the other districts and the country as a whole on a national level to help improve the outcome of the overall funding model(s) for sustained and strategic financing of construction and maintenance of Zambia's public roads. Further studies can be undertaken to appreciate this.

9.0 STUDY LIMITATIONS AND CONTRIBUTION TO THE BODY OF KNOWLEDGE

The results and recommendations from this research are expected to help the Zambian Government put in place and establish a strategic financing mechanism for sustained construction and maintenance of public roads in Zambia, which the researcher was able to establish for the case of Lusaka district. However, the study faced limitations due to time and funding constraints to channel the finding for the entire country.

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