





“Financing public infrastructure in Zimbabwe: Current trends and future alternatives”

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FINANCING PUBLIC INFRASTRUCTURE IN ZIMBABWE: CURRENT TRENDS AND FUTURE ALTERNATIVES

Abstract

Zimbabwe requires USD2 billion annually until 2032 for financing economic infrastructure. However, the Government of Zimbabwe currently affords about 20% of this financing requirement leaving an 80% gap. The aim of the study was to establish the main sources of finance for economic public infrastructure and recommend alternative financing sources to supplement the current sources. The qualitative descriptive study collected primary data through 23 interviews conducted with officials from ministries of the Government of Zimbabwe, government departments and parastatal enterprises. Secondary data was obtained from documentary analysis. The study revealed bilateral loans from the China Exim Bank as the main source of finance for economic infrastructure, contributing USD2.1 billion whilst budget appropriations from the Government of Zimbabwe contributed USD1 billion during the 10-year period under study. Infrastructure finance was also obtained from development partners (USD200 million) and commercial and multilateral lenders (USD400 million). The study recommends developing a framework that promotes and protects private sector and/or innovative financiers of infrastructure through policy stability.

Keywords

economic infrastructure, infrastructure financing,
innovative infrastructure financing, infrastructure
project bonds, Public Private Partnership, bilateral loan,
China Exim Bank

JEL Classification

H41, H54

INTRODUCTION

After the 2008 global financial crisis, infrastructure development has become a priority in the global development agenda (Anguelov, 2020). Countries must meet the Sustainable Development Goals (SDGs) some of which directly pertain to the development of infrastructure (Bhattacharya et al., 2015). The need and significance of any country having an advanced and dependable infrastructure system cannot be stressed in relation to national development (Ngowi et al., 2006). Public infrastructure is important for economic and social uses, which has resulted in a perpetual quandary with economists advocating for private entrepreneurship whilst social philosophers advocate for public interests in the provision of infrastructure (Ngowi et al., 2006). Therefore, infrastructure is classified as either social or economic infrastructure amongst many classifications highlighted by scholars (Baldwin & Dixon, 2008; Chen & Bartle, 2017). Social and economic infrastructure is equally affected by financial challenges when competing for inclusion in resource-constrained national budgets (Wentworth & Makokera, 2015). The paper explores financing of economic infrastructure, that is, telecommunication, transportation, electric power, as well as water and sanitation infrastructure in Zimbabwe.

Globally, governments have failed to finance all their infrastructure requirements due to limited fiscal capacity, exacerbated by the 2008 global financial crisis (Inderst, 2017). Infrastructure financing gaps are a perpetual global challenge estimated to be between USD 1 trillion and USD 6 trillion annually (Bhattacharya et al., 2015). Africa requires about USD 108 billion (AfDB, 2015), whilst the Sub-Saharan Africa (SSA) requires about USD 93 billion annually for financing its infrastructure (Gutman et al., 2015). Similarly, Zimbabwe requires about USD 2 billion annually between 2012 and 2032 for financing infrastructure (AfDB, 2011). The infrastructure financing requirements cannot be met by the public sector alone, financing through budget appropriations and government grants funded from taxes (Mostafavi et al., 2014). The private sector must actively finance public infrastructure to bridge financing gaps (Inderst, 2013).

On the other hand, public ownership and control of infrastructure is no longer a viable financing option due to the dearth of financial resources and the need to enhance efficiency in the provision of public infrastructure services (Ray, 2015). Similarly, developing countries face challenges attracting significant private sector financing (OECD, 2019) and official development assistance cannot meet financing gaps for developing countries (Tomalty, 2007). Therefore, infrastructure finance to meet SDGs targets and enhance productivity remains elusive for many developing countries including Zimbabwe, despite the World Economic Forum recognizing infrastructure as a fundamental for global competitiveness for countries (Schwab, 2019). This paper examines the current financing landscape of economic public infrastructure and considers apt alternatives for mitigating the financing gap in Zimbabwe.

1. LITERATURE REVIEW

The main sources of infrastructure finance are grouped into the public sector, private sector, and innovative financing (Inderst, 2013). Many countries have financing challenges for maintaining existing and/or developing new infrastructure (O'Neill, 2017). It is therefore imperative to review the literature on the financing of public infrastructure in developed countries and in emerging markets to draw lessons for Zimbabwe and other developing countries.

Infrastructure financing in developed countries has gone full circle from periods of predominant state-financing to periods of privatization and innovative financing (Inderst, 2017). Thus, developed countries have used different infrastructure financing instruments at different times. However, the public sector remains the dominant infrastructure financier contributing 55% in Germany, about 54% in France, 59% in the United States of America, and 77% in Japan (Inderst, 2013). Resurgence in public sector financing of infrastructure was after the 2008 global financial crisis which reduced the financial sector's loan advances to public sector projects (Inderst, 2017). The public sector was expected to stimulate economic activity through increased public infrastructure fi-

ancing in countries significantly affected by the financial crisis.

After the global financial crisis, there was notable growth in the equity financing of infrastructure through listed infrastructure stocks/equities in Europe. Listed companies have been raising finance through issuing stocks/securities on the stock markets (Inderst, 2013). In 2011, listed infrastructure securities represented about 6% of the global stock markets' capitalization most of which are in developed countries (Inderst, 2013). It became difficult to obtain bank loans for public sector projects, after the global financial crisis and alternative financing instruments were developed such as project bonds (Paterson-Jones, 2019; Richter & Horsch, 2020). In the European Union (EU), private sector financing of public infrastructure was enhanced through the Project Bond Initiative 2020, which turned out to be a superior credit enhancement tool than conventional tools (European Commission, 2011; Richter & Horsch, 2020). The EU also developed the Juncker fund for strategic investments, for kick-starting economic activity through public infrastructure investments (Paterson-Jones, 2019).

Project bonds are novel financing instruments in Europe but are used commonly in North America

with Canada having a renowned and well-developed project bonds market (Inderst, 2017). The UK financed public infrastructure using green or climate bonds also known as green finance (Inderst, 2017). The Australian government continually reduced public financing of infrastructure from about 5% of the GDP in the mid-1980s to less than 3% by the end of the 1990s in favor of private sector financing (O'Neill, 2017). Private sector financing of infrastructure in Australia peaked at 55% of total financing in 2008 before falling to below 50% after the global financial crisis (O'Neill, 2017). There is significant financing of infrastructure in Australia through public-private partnerships (O'Neill, 2017).

The use of innovative project finance in the form of public-private partnerships (PPPs) to finance infrastructure in Europe notably began in the early 2000s (Engel et al., 2010). Italy adopted PPPs and experienced growth in the PPP market when compared to the public infrastructure market between 2000 and 2013 (Carbonara & Pellegrino, 2014). PPPs have stood out as the most used infrastructure financing mechanism involving public and private sector players, enabling financing of government services through collaborative efforts (Carbonara & Pellegrino, 2014).

The level of infrastructure-related expenditure was recorded highest in emerging economies, including India, China, Brazil, and Russia (Tortajada, 2016). The value of good and appropriate public infrastructure and the significance of its positive effects on stirring economic growth and plummeting poverty cannot be disputed (Tortajada, 2016). As a result, emerging markets' governments have prioritized investments into infrastructure and set commensurate policies to attract finance for the development of infrastructure (Chotia & Rao, 2018). It is therefore important to draw lessons for Zimbabwe and other developing countries.

Traditionally, the Indian government was responsible for providing basic infrastructure (Chotia & Rao, 2018). Financing of infrastructure in India is analyzed between pre-liberalization and post-liberalization eras (Chotia & Rao, 2018). During the pre-liberalization period, the government was both facilitator and provider of finance for infrastructure, whilst after liberalization, there were

multiple players in infrastructure development (Chotia, 2017). Post-liberalization, after 1991, India made significant progress towards attracting private sector investments into infrastructure (Chotia, 2017). As a result, India recorded the world's second-largest road network by 2016 (5.23 million kilometers) and was ranked as having the second-largest telecommunication network in the world with about 1.05 billion subscribers in 2016 (Chotia, 2017). The infrastructure financing system in India is made up of government budget, debt, and equity financing (Tortajada, 2016). The public sector remains the major financier of infrastructure in India.

The Asian Development Bank in 2009 estimated that Asia required about USD 8 trillion to finance infrastructure between 2010 and 2020, of which more than half (circa 53%) was required by China (Tortajada, 2016). China's economic growth and rise in demand for infrastructure were driven by urbanization which grew from 17.9% in 1978 to 53.7% in 2013 and was expected to reach 60% in 2020 (Tortajada, 2016; Wang et al., 2011). The infrastructure financing architecture in urban China is significantly different from other countries (Wu, 2010). Chinese municipal governments cannot generate enough infrastructure finance from taxes, and they have restricted borrowing powers (Wong & Bird, 2008). Provision of public services is a local governments' responsibility with little to no revenue support or any transfer system from the central government (Wu, 2010). The boom in infrastructure in China was financed through borrowing from local financial markets (Tsui, 2011). China has as a result become an international case study for developing countries to emulate.

The Banco Nacional de Desenvolvimento Econômico e Social (BNDES), a public sector development financial institution, was the major financier of public infrastructure in Brazil until the mid-2010s when its subsidized financing became stressed (Cavalcante, 2020). Brazil is leading in financing infrastructure through PPPs, whose success stories are case studies for many developing countries (Albalade et al., 2015). Similarly, Chile is well known for attracting private sector investments into public infrastructure due to high transparency (Albalade et al., 2015). Therefore, Chile

finances most transport infrastructure through PPPs and has mastered risk management for PPP infrastructure projects (Albalade et al., 2015). There are infrastructure financing gaps in Brazil and Chile as the state of the infrastructure is both insufficient and/or substandard in quality (Armijo & Rhodes, 2017). The paper reviews financing of infrastructure in developing countries especially in the Sub-Saharan Africa.

Developing countries continue facing infrastructure deficits due to financing challenges, because there have not been sustained investments into public infrastructure, especially in proportion to the growth in urbanization (White & Wahba, 2019). Conventional sources of finance such as public sector investments and official development assistance cannot meet infrastructure financing requirements for developing countries (Tomalty, 2007). Therefore, it is imperative to leverage private sector investments to mitigate the infrastructure financing gaps (Osei-Kyei & Chan, 2017; White & Wahba, 2019).

The infrastructure situation is worse in African developing countries, which are mostly located in the Sub-Sahara African (SSA) region (ACBF, 2016). The SSA region generally has the least developed infrastructure (AU, 2014). The SSA region is the most power-poor region, requiring about USD 41 billion annually for maintaining, operating, rehabilitating, and expanding power generation infrastructure (ACBF, 2016). About 62.5% of the SSA region's population does not have access to electricity (World Bank, 2017). The SSA region requires about USD 20 billion each year for transport infrastructure, that is, maintaining and upgrading roads, railways, ports, and airports (ACBF, 2016). About USD 11 billion is needed for maintaining and expanding water and sanitation infrastructure to meet SDGs' targets for the SSA region. Information Communication Technologies in the SSA region require about USD 10 billion annually for maintaining and upgrading accessibility (ACBF, 2016).

Most SSA countries spend between 6% and 12% of their gross domestic product (GDP) on infrastructure investments, an amount that is not significant in absolute terms as the economies are relatively small (Briceño-Garmendia et al., 2009). The

SSA region, except South Africa, continually faces challenges attracting private investors into infrastructure (Osei-Kyei & Chan, 2016). There are policy and regulatory uncertainties, bureaucracy, perceived high corruption, and political uncertainties that deter private sector investments into infrastructure financing (OECD, 2019). Therefore, the SSA region has continually received negligible private infrastructure investments. Furthermore, the non-existence of sovereign credit ratings, incapacitation of domestic financial markets as well as higher risks attributed to political and regulatory uncertainties deter private sector financing of infrastructure (Sheppard et al., 2006).

Closing the infrastructure financing gap in the SSA region has been attempted using innovative financing mechanisms such as public-private partnerships (PPPs), local currency infrastructure bonds, and commodity-linked bonds, issued in the form of exchange-traded funds (Brixiova et al., 2011). However, Africa has attracted the lowest number and value of PPPs financing for infrastructure when compared to the rest of the developing world. In 2016, Africa concluded 17 PPP deals valued at about USD 4.18 billion, of which 11 deals financed power/energy infrastructure, two financed transport infrastructure, and one financed ICT infrastructure (AfDB, 2018). The SSA region attracted 11 of the 17 PPP deals valued at USD 3.3 billion (AfDB, 2018). PPPs have mainly been used in the transport sector in most developing countries after they had proven a successful innovative transport infrastructure financing mechanism in developed countries (Osei-Kyei & Chan, 2016). Success stories of PPPs in the SSA region include Nigeria's Lekki toll road concession; an N4 toll road project connecting South Africa and Mozambique as well as the Mozambican port of Maputo project (Osei-Kyei & Chan, 2016).

The leading recipients of private-sector infrastructure finance in the SSA region between 2009 and 2012 were South Africa, Nigeria, Ghana, Kenya, and Ethiopia (Gutman et al., 2015). In Ethiopia, the biggest source of infrastructure finance until 2013 was private resources, with China among the leading financiers. The China Exim Bank pledged loans amounting to about USD 6.3 billion between 2007 and 2013 to finance power, railway, and road infrastructure in Ethiopia (D'Orey & Prizzon,

2017). Infrastructure financing in Kenya by China has been increasing from USD 74 million in 2011 to about USD 157 million in 2015 in energy infrastructure (D'Orey & Prizzon, 2017). In Kenya and Ethiopia, there was minimal to no infrastructure financed through official development assistance, due to the decline in donor financing of infrastructure.

SSA governments' budget appropriations remain the main financiers of infrastructure. However, amounts spent by the public sector in the SSA are evasive, as most countries do not disclose information about their public expenditure including investments into public infrastructure, but the International Monetary Fund estimates this amount to be about USD 60 billion annually (Gutman et al., 2015). Amounts spent by countries annually differ, with South Africa leading, spending about USD 29 billion followed by Kenya spending about USD 3 billion (Gutman et al., 2015).

Financing of public infrastructure in developed countries, emerging markets, and developing countries is different. In developed and emerging markets, there is an almost equal amount financed by the private and public sectors. However, for developing countries, the public sector is the dominant financier of public infrastructure. There is an isolated public infrastructure in the SSA region financed by the private sector or through innovative finance. Consequently, most developing countries are failing to attract private sector financiers (Osei-Kyei & Chan, 2017). There has been a rise in China's financing of public infrastructure in the SSA region through initiatives such as the China-Africa Cooperation Forum (FOCAC) and the Belt Road Initiative (BRI) (Lisinge, 2020). It is therefore essential to assess the current infrastructure-financing scenario in Zimbabwe and recommend alternatives that can help to mitigate the infrastructure-financing gap. Lessons drawn from the study can help other developing countries inform their financing of public infrastructure.

2. METHODS

The study was qualitative inductive research using interviews and documentary analysis to describe the public infrastructure financing archi-

ture in Zimbabwe (Mohajan, 2018). Thereafter, the study recommends future public infrastructure financing alternatives to ensure adequate and quality infrastructure to meet SDG targets in Zimbabwe. Financing alternatives are established from extensive literature reviewed for developed countries, emerging economies, and SSA developing countries. A sample of 30 purposively selected interviewees was drawn from employees of government ministries, departments, and parastatals dealing with transport, power (electricity), Information Communication Technology (ICT) as well as water and sanitation infrastructure. The purposive selection of interviewees targeted information-rich and actively involved participants in infrastructure financing decision-making. Interviews were conducted until data saturation was achieved with 23 participants, which is critical for qualitative studies (Gentles et al., 2015). Documentary analysis was used for validation and triangulation of primary data.

Interview recordings were transcribed verbatim and coded thematically using R for Qualitative Data Analysis (RQDA) (Chandra & Shang, 2019). RQDA is an open-source computer-assisted qualitative data analysis software package for qualitative textual data analysis (Chandra & Shang, 2019). Data coding was done using a coding framework. Coded data highlighted public infrastructure financing sources. Data coding used open coding which decomposed the data analytically and conceptually by grouping text into similar data chunks (Vollstedt & Rezat, 2019). Thereafter, similar codes were grouped into similar themes (thematic coding).

3. RESULTS

This section presents results obtained from data collected through interviews and documentary analysis. Firstly, demographic data are presented in Table 1.

Most of the interviewees were male (16/23) and only 7/23 were females. 14/23 participants were undergraduates, whilst 6/23 were postgraduates and 3/23 were diploma holders. 9/23 participants were directors, 6/23 were managers, 5/23 were senior managers and 3/23 were deputy directors.

Table 1. Respondents' demographic information (n = 23)

Source: Authors' elaboration.

Gender	Male	Female		
Frequency	16	7		
Education	Diploma	Undergraduate degree	Postgraduate degree	
Frequency	3	14	6	
Position held	Director	Deputy Director	Senior Manager	Manager
Frequency	9	3	5	6

Educational achievements and positions held by interviewees were the purposive criteria for interviewee selection for ensuring reliable data was collected information-rich participants. The study aimed to assess the status of public sector infrastructure financing to recommend future financing alternatives for mitigating the public infrastructure-financing gap in Zimbabwe. Results are presented and discussed on the status of financing of the four economic infrastructure sectors, that is, power/electricity, transport, ICT, and water and sanitation.

Zimbabwe relied on the China Exim Bank loans for financing of most power/electricity infrastructure. Expansion of Kariba South was financed through a loan of USD 320 million from the China Exim Bank, supplemented by infrastructure development bonds (USD 38.8 million) issued by the Infrastructure Development Bank of Zimbabwe (IDBZ) and a loan of USD 150 million from Standard Bank (IDBZ, 2020). The Standard Bank loan was secured through a power purchase agreement between Zimbabwe Power Company (ZPC) and the Namibian Power Company (NamPower) (NewsDay, 2015). For the expansion of Hwange power station, the China Exim Bank provided a loan of about USD 1 billion, supplemented by loans from African Import Export Bank (USD 76 billion) and Standard Bank (USD 40 million) (IDBZ, 2020).

Repowering of Harare, Munyati, and Bulawayo thermal power stations was financed through a combination of bilateral loans, infrastructure development bonds, and treasury financing. Refurbishment of the Hwange power station was financed by development assistance grants of USD 35 million from the African Development Bank (AfDB) administered Zimbabwe Multi-donor Trust Fund (ZIMFUND) (AfDB, 2019). Prepaid

electricity metering infrastructure was financed through infrastructure development bonds (USD 45 million) issued by the IDBZ (IDBZ, 2020). The private sector projects were small, and sources of financing used include onshore and offshore loans.

Zimbabwe's dependence on the China Exim Bank is akin to other African countries such as Ethiopia and Kenya, which recorded significant growth in infrastructure financing commitments by China between 2007 and 2015 (D'Orey & Prizzon, 2017). Infrastructure development bonds represent private sector financing as highlighted by Chan et al. (2009). Overall financing of Kariba South and Hwange power stations expansion was through a hybrid of instruments, an arrangement classified as a form of innovative finance by Inderst (2013). The small private sector investments into public infrastructure in Zimbabwe are consistent with other developing countries that fail to attract significant private sector investments due to perceived high corruption and political risks (OECD, 2019). Therefore, most developing countries such as Zimbabwe rely on public sector financing and international multilateral/bilateral financiers due to weak macro-economic and business fundamentals (Carter & Tyson, 2015).

Transport infrastructure developed by the government of Zimbabwe between 2009 and 2018 and their sources of finance are summarized in Table 2.

As shown in Table 3, sources of transport infrastructure finance in Zimbabwe were China Exim Bank loans, treasury financing, and a loan from the Development Bank of Southern Africa (DBSA). Road infrastructure was mainly financed by the Government of Zimbabwe's treasury, except for refurbishment of the Plumtree-Harare-Mutare financed through a loan from the DBSA. Whilst airport infrastructure was mainly financed through China Exim

Table 2. Transport infrastructure projects undertaken

Source: IDBZ (2018).

Infrastructure project	Financing (USD million)	Source of finance
R. Mugabe International airport expansion (phase 1)	34.0	Treasury (Government of Zimbabwe)
R. Mugabe International airport expansion (phase 2)	153.0	China Exim Bank
Victoria Falls International airport expansion	150.0	China Exim Bank
J. Nkomo international airport expansion	36.6	Treasury (Government of Zimbabwe)
Plumtree-Harare-Mutare road	206.0	Loan from DBSA
Harare airport road dualization	68.0	Treasury
Harare-Masvingo-Beitbridge road (phase 1)	650.0	Treasury

Bank loans with treasury financing smaller projects (IDBZ, 2018). Maintenance of the roads is generally a responsibility of the road fund created by the Roads Act (Chapter 13:18) which established the Zimbabwe National Roads Administration (ZINARA) which funds its activities through a collection of road access fees and toll fees.

Financing road infrastructure by the public sector entities including the government is consistent with the literature (Chan et al., 2009; UNECE, 2017; Chotia & Rao, 2018). However, Zimbabwe's public sector faces limitations in fiscal space, a situation similar to other developing countries (Woetzel et al., 2016). Zimbabwe's situation is worsened by the inability to access finance from multilateral development financial institutions and official development assistance. For airport infrastructure, financing obtained from China Exim Bank is similar to financing arrangements in Kenya and Ethiopia where the China Exim Bank is a leading financier of transport infrastructure (D'Orey & Prizzon, 2017).

Water and sanitation infrastructure developed during the period under study include construction of dams, refurbishment, and expansion of water reticulation facilities, as well as refurbishment of sewerage treatment facilities. Notable projects undertaken are Harare City water and sewerage improvement (USD 144 million), Tugwi-Mukosi Dam (USD 300 million), Marovanyati Dam (USD 33 million), as well as Semwa and Causeway dams which are still under construction (IDBZ, 2018). Water and sanitation infrastructure was financed through treasury budget appropriations, China Exim Bank loans, and development assistance grants.

The Government of Zimbabwe's Public Sector Investment Programme (PSIP) through budget

appropriations financed dam construction. Infrastructure financed by treasury was however taking longer than planned to complete. For example, Tugwi-Mukosi dam expected to be completed in 2004 was only completed in 2016, 12 years after the expected completion date. City of Harare's water and sanitation improvement after a cholera outbreak in 2008 was financed through a loan from China Exim Bank, which however was not completed after a breach of loan conditions, led to the cancellation of loan disbursements (Zhangazha, 2018). The AfDB administered ZIMFUND, the Zimbabwe Reconstruction Fund (ZIMREF) from the World Bank and the UNICEF financed water and sanitation infrastructure in response to a cholera outbreak in 2008, in several cities, towns, growth points, and rural areas across Zimbabwe (AfDB, 2015; ZIMREF, 2019). These development partners are financing infrastructure off-the-budget as confirmed by interviewees.

Development and maintenance of water and sanitation infrastructure in Zimbabwe are affected by financial challenges as confirmed by one key informant interviewee who said, "we have about 60,000 boreholes/watering points throughout the country but only about 33% are working because of lack of resources for maintenance". This derails the country's ability to meet the SDG targets (ACBF, 2016). The financing challenges are a result of the government being the major financier and it cannot meet the financing requirements for both urban and rural water and sanitation requirements. The situation is worse in rural areas, a situation analogous to other developing countries (Grigg, 2019).

Information communication technologies (ICTs) are critical for economic activity and productivity in the 21st century. Most ICT infrastructure in Zimbabwe is provided and controlled by private

sector entities after the sector was commercialized. ICT infrastructure developed during the period under study include the e-government project, community information centers, high-performance computing centers, computerization of schools (ICT lab per school), and computerization of government ministries and departments. These were financed through budgetary appropriations amounting to USD 42.6 million. Other public sector ICT infrastructure developed by parastatal entities include expansion of NetOne Cellular's mobile network, of which USD 45 million was financed by the treasury and USD 218 million financed by the China Exim Bank; erection of a fiber optic cable backbone by TelOne Private Limited of which USD 98 million was financed by the China Exim Bank, USD 25.7 million was financed TelOne's resources and the treasury financed USD 17.9 million as well as the erection of mobile phone base stations in underserved areas by the Postal and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ) through a special fund, the Universal Services Fund, for USD 30 million.

Accordingly, ICT infrastructure was financed through China Exim Bank bilateral loans and the treasury, in addition to the investment of own resources by parastatal enterprises. China Exim Bank was the main financier after financing the TelOne fiber optic backbone and expansion of NetOne's mobile network (Karombo, 2019). Financing of infrastructure by China to Africa is not unique to Zimbabwe as the Infrastructure Consortium of Africa confirmed that China is the overall second-largest financier of infrastructure in Africa (ICA, 2018). Unlike other sectors, the ICT infrastructure sector has been able to leverage on private sector investments and the sector has the least financing gap (Osei-Kyei & Chan, 2017; White & Wahba, 2019).

For the four economic infrastructure sectors, the main sources of finance used in Zimbabwe are summarized in Table 3.

As shown in Table 3, total economic infrastructure finance of USD 3.7 billion over ten years falls short of the USD 2 billion annual financing requirement (AfDB, 2011). The financing period over the ten years is about USD 16 billion, confirming that the Government of Zimbabwe can finance about 20%, leaving an 80% financing gap. Therefore, it is imperative to consider alternative financing options.

4. DISCUSSION

Given the status of economic infrastructure financing in Zimbabwe, alternative financing mechanisms that can be considered to mitigate the infrastructure financing gap are presented hereunder. Literature has shown that innovative finance in the form of PPPs has been used extensively and successfully in financing infrastructure in developed countries, emerging markets, and other developing countries (Anguelov, 2020; Brixiova et al., 2011; Engel et al., 2010; Osei-Kyei & Chan, 2017). Successful implementation of PPPs requires the Government of Zimbabwe to develop a robust framework that attracts and effectively protects private sector investments. The framework must also minimize or eliminate controllable risks. With an apt framework, Zimbabwe can raise significant finance for economic infrastructure development from private sector investors and PPPs (Carbonara & Pellegrino, 2014). Other innovative financing mechanisms such as crowdfunding, diaspora bonds, other novel bonds such as green bonds and credit enhancement financing instruments should be considered in Zimbabwe (Mostafavi et al., 2014; Richter & Horsch, 2020).

Table 3. Main sources of public infrastructure finance estimates (10-year period)

Source: Authors' elaboration.

Financier	Estimated total infrastructure financing between 2009 and 2018	Economic infrastructure sub-sector financed
China Exim bank loans	USD 2.1 billion	Electricity, airports, water and sanitation
Treasury budget appropriations	USD 1 billion	Dams, roads, airports
Other loans/bonds (DBSA, IDBZ, Afrexim bank, Standard bank)	USD 400 million	Roads, electricity
Development partners	USD 200 million	Electricity, water and sanitation
Total	USD 3.7 billion	

In 2020, the Government of Zimbabwe enacted the Zimbabwe Investment and Development Agency Act (Chapter 14:37), meant to encourage private sector-led economic development through investments in the public sector, including into public infrastructure. This legislation replaced several laws such as the Joint Ventures Act (Chapter 22:22) that had been enacted in 2016 and replaced before implementation. Key requirements for operationalizing the legislation and attracting private sector investments into the public sector pertain to governance structures and transparency (Albalate et al., 2015). In addition to

the Act, there is a need to develop regulations for provincial and municipal government agencies dealing with private sector investments. Lessons can be drawn from South Africa on the governance framework and from Chile for transparency in attracting private sector investments (Osei-Kyei & Chan, 2016; Albalate et al., 2015). With proper governance structures, accountability, and transparent systems, Zimbabwe can attract a significant amount from the private sector to mitigate the public infrastructure financing challenges, but these are not a panacea to financing challenges.

CONCLUSION

The purpose of the study was to assess the extant infrastructure financing trends and to recommend alternatives that can be pursued to mitigate the public infrastructure financing gap in Zimbabwe. Based on the results, the paper concludes that power/energy infrastructure is mostly financed through bilateral loans from the China Exim Bank. Road transport is financed by the treasury whilst the China Exim Bank significantly financed airport infrastructure. For water and sanitation infrastructure, the treasury financed the construction of all dams whilst China Exim Bank financed urban water and sanitation with development partners also financing water and sanitation infrastructure in both urban and rural areas. Lastly, public sector of ICT infrastructure was financed by the treasury, China Exim Bank, and its own resources for parastatal enterprises.

Innovative financing mechanisms such as PPPs and private sector financing must be pursued in Zimbabwe to reduce the public infrastructure gap. This helps to improve Zimbabwe's global competitiveness, economic productivity, and ability to meet SDG targets. The study recommends the development of a framework for attracting and protecting private sector investments, which facilitates private sector financing and innovative financing of public infrastructure.

AUTHOR CONTRIBUTIONS

Conceptualization: Tonderai Kapesa.

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Formal analysis: Tonderai Kapesa, Gift Mugano.

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