ASSESSING THE EFFECTIVENESS OF INFRASTRUCTURE PUBLIC–PRIVATE PARTNERSHIPS USING A PPP EQUILIBRIUM FRAMEWORK

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ABSTRACT

The purpose of this study is to assess the effectiveness of public-private partnerships (PPPs) as infrastructure development strategies by using a novel PPP Equilibrium Framework, which evaluates PPPs based on their ability to generate outcomes that benefit the interests of society, the state, and private entities. The methodology followed a case study analysis using the PPP Equilibrium Framework. The case studies included the Gautrain Rapid Rail Link, Tanesco Power Purchasing Agreement, Dakar-Diamniadio Toll Road, and Maputo Port. The findings show that PPP effectiveness and long-term sustainability are strongest when projects maintain balanced outcomes that satisfy the interests of the state, private sector, and society, particularly across fiscal sustainability, service delivery performance, and socio-economic development objectives. The study faced limitations in sourcing data on PPP project outcomes, as most projects lack social and economic impact analyses, which reduced the number of usable case studies and constrained the analysis to only the available outcome-based data. Practical implications are provided for policymakers to use the framework as a guide for structuring PPP projects and as a tool for assessing their potential effectiveness. Importantly, the framework highlights the need for balanced governance arrangements, transparent accountability mechanisms, and robust monitoring systems to ensure that PPPs deliver sustainable value. This study therefore contributes to the broader discourse on infrastructure governance by offering a structured approach to evaluating PPPs and by emphasizing the importance of aligning project outcomes with long-term developmental priorities.

Keywords: Public-private partnerships, Equilibrium framework, Infrastructure development, Sustainability.

INTRODUCTION

A public-private partnership (PPP) is defined as a contract between a public sector institution and a private sector party, where the private party performs a function that is usually provided by the public sector and/or uses state property in terms of the PPP agreement (National Treasury, 2021). PPPs involve the private party delivering public goods and services for a fee paid for by the public sector, while most of the technical, financial, and operational risk is transferred to the private party. Key characteristics of a PPP include contracts that are typically 5 to 30 years in duration where the private sector is involved with design, construction, financing, and implementation. Payment to the private party occurs based on agreed outputs related to the provision of services and/or infrastructure (NBI, 2019). PPPs are not simply the outsourcing of functions, or a donation by a private party for a public good, or privatization of state assets and/or liabilities. They are a way to allow the public sector to spread payments for large projects over the project's lifetime by making annual or monthly payments to the private sector.

In the developed world, PPPs have been significant in the development and delivery of infrastructure. In the United Kingdom for instance, their private finance initiative which started in 1992 has facilitated the delivery of almost 800 projects ranging from car parks to tolled highways, power plants and schools which were valued at more than £56 billion (Garvin & Bosso, 2008). PPPs have become a key infrastructure delivery mechanism, particularly in developing economies where infrastructure financing gaps, fiscal constraints, and technical capacity limitations restrict traditional public procurement approaches. PPPs allow governments to crowd in private sector capital, technical expertise and operational efficiencies to support infrastructure development and service delivery. In South Africa, the PPP strategy for infrastructure delivery has faced several challenges over the years but has been relatively successful with 35 PPP projects having been completed from 1998 to 2022 with an overall value of R91.4 billion (National Treasury, 2022).

Despite the increasing adoption of PPPs globally and across Africa, PPP performance outcomes remain mixed across sectors and regions. Existing PPP evaluation approaches often focus on compliance with regulatory processes or financial value-for-money assessments, with limited focus on broader socio-economic and institutional performance outcomes. This study addresses this gap by applying an outcome-based PPP Equilibrium Framework that simultaneously assesses socio-economic outcomes of PPP infrastructure projects. Therefore, this study aims to assess the effectiveness of infrastructure PPPs using the PPP Equilibrium Framework through qualitative case study analysis. The study evaluates how balanced outcomes across the interests of the state, private sector and society influence overall PPP performance outcomes. The rest of this paper is divided into sections such as the literature review, methodology, analysis of the public-private partnership equilibrium framework, results of the case study, discussion of the results, conclusion, limitations and recommendations.

LITERATURE REVIEW

The National Treasury initiated a review of the PPP regulatory framework in 2019, which was completed in 2022, and made recommendations to the framework to improve its effectiveness and encourage private-sector participation. The review findings indicated that certain aspects of the PPP regulatory framework compare well with international benchmarks. Nonetheless, there are critical gaps and challenges that need to be addressed to improve the operational environment. The review recommended legislative changes to improve the selection, prioritization, planning, financing support mechanisms, procurement, implementation, and monitoring of PPPs. These changes will enhance application and practice to improve the reliability of results and raise confidence in the overall PPP framework (National Treasury, 2022). The recommendations can be found in Table 1.

Table 1: Recommendations of Public Private Partnership framework review

Finding	Recommendations on amendments to National Treasury Regulation 16
Policy	
• No overarching infrastructure policy framework that mainstreams PPPs as part of fiscally prudent planning processes	• Develop an integrated public investment management system and PPP policy • Define roles of key institutions
PPP legal and regulatory framework and guidelines	
• Multiple and time-consuming approvals • Lack of accountability for procuring institutions • Lack of clarity on the treatment of unsolicited proposals • Dwindling private-sector capacity and poor public engagement	• Exempt low-value projects (R1 billion and below) from procurement approvals • Set a clear time frame for approvals by regulator • Make it mandatory to continue PPP once feasibility study shows value for money, risk transfer and affordability • Provide guidance on treatment and incentives for unsolicited proposals • Clarify roles of different entities in managing fiscal commitments and contingent liabilities • Develop financing support mechanism to enhance bankability of PPP projects • Revise exemption clause to enable monitoring of exempt PPP projects • Adjust the BEE requirements for PPPs
Inadequate institutional arrangements	
• No centralised approach to identifying and screening PPPs • No capacitated PPP regulator and no defined guidelines to perform functions • Lack of capacity and skills in procuring institutions at provincial and national levels and PPP Unit • Dwindling private-sector capacity and poor public engagement	• Centralise the identification of PPP projects • Establish function to screen and prioritise all infrastructure proposals, including PPPs with a screening tool for public investments • Explore feasibility of provincial infrastructure funding agencies • Establish full-time capacitated PPP regulatory unit with operating guidelines • Develop guidelines, tools, and methodologies to monitor and report on fiscal commitments and contingent liabilities • Promote collaboration and coordination with private sector through PPP forums, policy, and public consultations as part of PPP project cycle

Shortcomings in the PPP project life cycle	
• Lengthy, rigid, and costly feasibility studies with some projects proving unfeasible after the process • Slow pace of implementation of PPP projects, in particular delays in the procurement process • Lack of sector focus and customized approach for key sectors • Poor contract management – prone to delays • Lack of preparedness at exit management stage	• Make pre-feasibility studies mandatory for high-value projects at inception • Review and calibrate requirements for value for money and public-sector comparator requirements based on project size, nature, and complexity • Require non-negotiable draft PPP agreement with request for proposals • Amend PPP manual to calibrate project preparation requirements according to size, sector, and complexity and define where a one-stage bidding process would be allowed • Engage transaction advisors throughout PPP project cycle

Source: National Treasury (2022)

While the National Treasury review primarily focuses on improving the legislative, regulatory, and institutional mechanisms to enhance the operational environment and private-sector participation in PPPs, it does not assess the actual socio-economic outcomes of PPP projects or whether these projects balance the interests of society, the state, and private entities. This study addresses this gap by introducing the PPP Equilibrium Framework, providing an outcome-based evaluation tool that measures the effectiveness of PPPs in achieving tangible benefits for all stakeholders, rather than only focusing on compliance with regulatory and procedural guidelines.

RESEARCH METHODOLOGY AND METHOD

Qualitative data were collected through case studies to utilise the Public-Private Partnership Equilibrium Framework in assessing the effectiveness of public-private partnerships as infrastructure development strategies. The framework uses an outcome-based indicator assessment approach across the three core pillars of the framework, namely the state, society and private sector. For each pillar, documented outcome indicators were analysed and the assessment was conducted using documented project outcome evidence available from institutional reports, economic impact studies, and sector performance assessments. This structured approach ensured consistency in the comparative analysis across the selected case studies and allowed for the identification of equilibrium or distortion across the stakeholder interests in the framework. Qualitative case study methodology is appropriate for PPP evaluation given the complexity of PPP structures, institutional arrangements and stakeholder relationships, and is preferred as an outcome-based approach; unlike the National Treasury review, which focuses on legislative, regulatory and institutional improvements and private-sector participation, this study addresses the gap in assessing actual socio-economic outcomes by introducing the PPP Equilibrium Framework to evaluate whether PPPs deliver balanced, tangible benefits to society, the state and private entities. While data availability was a necessary case selection criterion, cases were also selected to ensure sector diversity, geographic representation and PPP structural variation. Nonetheless, potential selection bias is acknowledged as a limitation of the study. The case studies included were the Gautrain Rapid Rail Link, the Tanesco Power Purchasing Agreement, the Dakar-Diamniadio Toll Road, and the Maputo Port. The assessment of each case study was based on their impact on society, the state, and the private sector.

Analysis of the public-private partnership equilibrium framework

Garvin and Bosso (2008) proposed a PPP Equilibrium framework that can be used to assess the effectiveness of PPPs and promote structured thinking about PPP arrangements (Figure 1). The PPP equilibrium framework is more focused on the outcomes of PPP projects and not the regulatory and legal framework of PPPs.

Garvin and Bosso (2008) stated that the objective of a PPP program is to develop and sustain the PPP market through establishing an equilibrium amongst the interests of the society, state, industry and market. The range of balance, which is a measure that assesses the effectiveness of PPPs through their ability to maintain the interests of the society, state, industry, and markets, can also be seen at the center of Figure 1.

The rationale behind the range of balance is that each PPP project should equally satisfy the interests of society, states, markets and industry. If one aspect (say the state) has its interests satisfied more than the other aspects (society, industry and markets) then the range will be out of balance (distorted) and skewed towards the state interest quadrant. In the PPP Equilibrium framework, the state is the elected body governing a jurisdiction. Society is the citizens employed and living within the jurisdiction. Industry is the business that provide services and goods to the state and society within the jurisdiction. The market is the financial system that allows investors to exchange wealth and risk over time (Garvin & Bosso, 2008). The PPP program must satisfy all the aspects of the equilibrium framework as otherwise the program will suffer from bias towards a particular quadrant or from instability if no interest is observed at all.

Performance measurement theorists believe that outcomes are more important than output as the output is not necessarily an indication of the effectiveness of the PPP program. As infrastructure is often a public good, the public has a right to expect satisfactory service at a reasonable price, where benefits are shared equally. The state and society demand more than an economic premium for granting the private sector the right to develop and operate public goods (Garvin & Bosso, 2008). The private sector has the expertise, agility and incentive to provide higher quality services at an affordable price, at a faster rate, which is also environmentally friendly. If the private entity is unable to meet these expectations, then the risks of transferring these responsibilities to the entity could be too great.

The PPP Equilibrium framework suggests that PPP projects should have improvements in areas such as quality of service, price/cost of service, time of service availability, level of environmental impacts and equitable distribution of social benefits in comparison to traditional infrastructure delivery methods. The review in this study takes a different approach to that of others as this review uses a revised PPP Equilibrium framework to assess the effectiveness of PPP projects. This provides a different perspective to assess PPP projects by analysing their ability to maintain the interests of the state, the private sector (markets and industry interests) and society.

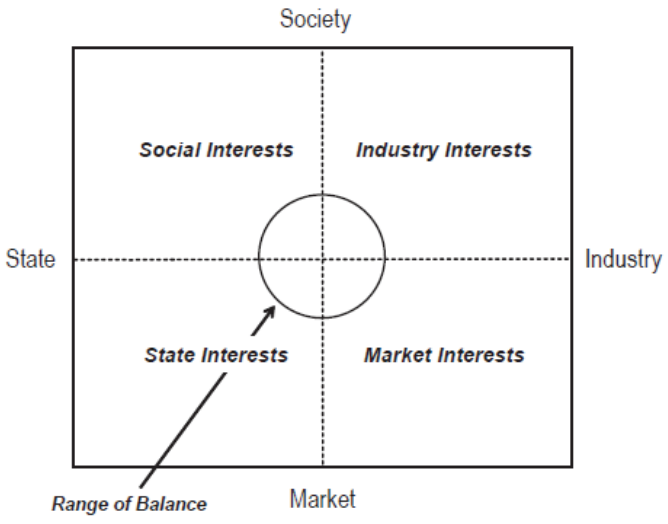

Figure 1: PPP Equilibrium Framework

Source: Garvin & Bosso (2008)

To measure the impact of the PPP projects on the interests of society, the state and the private sector, this study makes use of data for each of the following indicators listed in Table 2. It is worth noting that some of the measured indicators can serve the interests of more than one party (for example GDP benefits the interest of society, the state and the private sector).

For the purpose of this study, the impact is limited only to one party (for example the private sector). A major limitation to this approach is the lack of available data on indicators for the outcomes of PPP projects. To overcome this approach, only case studies with relevant data were selected. Each sector (state, private and society) has a varying number of measured indicators, due to data constraints. As such, only documented measurement indicators are included. It is worth noting that some indicators (such as GDP) can fall into all three sectors, as they have an impact on all three sectors. For purposes of this study, however, such indicators will be constrained to two sectors at most.

Table 2: Adopted Public Private Partnership Equilibrium Framework

PPP Equilibrium Framework	Measured Indicator
The State	• Fiscal Impact (contributions to Government Revenue) • Gross Fixed Capital Formation Impact
The Private Sector	• GDP (value added to the national or provincial economy) • Quality of service • Cost of Service
The Society	• Employment Creation (creation of new jobs for skilled, semi-skilled, and unskilled workers) - number of job opportunities • Impact on Household income • Climate change impact • Quality of service • Cost of Service

Source: Author's Compilation

RESEARCH RESULTS OF THE CASE STUDIES' ANALYSIS

Gautrain Rapid Rail Link in South Africa

Background

The Gautrain Rapid Rail Link project is an 80km rail project between Johannesburg and Pretoria, intended to ease traffic congestion and facilitate travel (GMA, 2019). This project included the construction of 15km of tunnelling and various viaducts, stations, parking bays and depots. In addition to the rail, the project company also provides bus links to the train stations to facilitate access to the rail network from people's residential areas. The procuring authority was the Gautrain Management Agency, and the private company was Bombela Concession Company (Pty) Ltd. This resulted in the Gautrain Management Agency providing financing in the form of a $3 billion grant while Bombela Concession Company raised $360 million in debt, and $70 million in equity (Global Infrastructure Hub, 2021). Government support was the main source of funding as it was agreed that the required capital was far greater than what the private sector could invest and recover from user fees. The procuring authority committed most of the funding for the PPP project and as such, much of the risk, including land acquisition risks, was retained by the Gautrain Management Agency. However, the cost of relocation of the utilities and road improvements around the stations was transferred to the private entity. The services provided by Bombela Concession Company and the operations contractor met and exceeded targets of availability and punctuality for all trips scheduled. Safety, security, and cleanliness targets have also met and exceeded, which resulted in customer confidence in the Gautrain.

PPP Equilibrium Framework Project Outcomes Analysis: Gautrain Rapid Rail Link

The Gautrain PPP has documented data on the outcomes of the PPP project. The Gautrain had a positive impact on rejuvenating several inner cities in Johannesburg and Tshwane. The Gautrain PPP project resulted in 34 000 direct jobs created during the construction phase and about 87 000 indirect jobs.

A further 245 000 jobs were created because of property development induced by the Gautrain. The PPP project also resulted in R20 billion total GDP impact added to the provincial economy during the construction phase and for each year of the Gautrain's operations R1.7 billion has been added to the provincial economy (GMA, 2019). The Gautrain improved the quality and reliability of public transport, which has always been widely available in South Africa, but has not always met the required standards. It resulted in the easing of traffic congestion within the Johannesburg-Tshwane corridor, which has allowed for efficient transportation and facilitated the movement of people. The use of the Gautrain has also had positive implications for the environment as carbon emissions from the Gautrain are considerably lower per passenger than for private vehicles. Energy use by rail is three to five times more efficient than cars per person per kilometer based on full capacity and as such, the Gautrain reduces the contribution to climate change. The use of the Gautrain also results in a significant reduction in the number of road accidents, fatalities, and injuries (GMA, 2019). With all its success, the Gautrain service has also attracted criticism from society, as the service is more expensive than other means of public transport, which creates inequality, as the services are now only available to members of society who can afford them.

Table 3: PPP Equilibrium Framework Project Outcomes Analysis: Gautrain Rapid Rail Link

	State	Society	Private Entities
GDP (value added to the provincial economy)			R20 billion
Employment Creation (creation of new jobs for skilled, semi-skilled, and unskilled workers) - number of job opportunities		366 000	
Climate change impact		Energy use by rail is 3 to 5 times more efficient than cars per person kilometer	
Capital formation Impact	R46 million (through property development)		
Cost of Service (How much does society pay for the services – either relatively affordable + or relatively expensive -)		- Relatively Expensive	
Impact on Household income		R3.2 billion	
Check for satisfying the interests of each criterion (✅ or ❌)	✅	✅	✅

*Blank cells can either mean the indicator is not measured for the sector or there is no available data for that indicator for the sector.

Source: Gautrain Management Agency (2019)

Maputo Port in Mozambique

Background

The Mozambican national ports and rail authority, CFM (Portos e Caminhos de Ferro de Moçambique) entered a joint venture with a private consortium led by the British Mersey Docks and Harbour Company to upgrade the port of Maputo (Porto De Maputo, 2019). The consortium took control of the port which included the Maputo cargo terminals and the Matola bulk terminals in April 2003. The consortium includes a Swedish construction company Skanska, a Portuguese terminal operator Lisont, and a Mozambican company Gestores. The agreement is for a 15-year concession to finance, reinstate, operate, and upgrade the port of Maputo (Farlam, 2005).

The consortium owned 51 percent of the Maputo Port Development Company (MPDC), while the Mozambican government and CFM owned the other 49 percent. The financiers of the project include Standard Corporate and Merchant Bank, the DBSA, the DFIs of the Netherlands and Sweden as well as the Nordic Development Fund and Finland's Finnfund. The PPP agreement stipulated that the MPDC provides all marine services within the Maputo Bay Port jurisdiction area. The concession includes the designated port areas for international shipping within Maputo and the coal terminal of Matola port. An investment of $70 million was made by the consortium to rehabilitate and develop the port by modernizing port equipment, quays and transport connections by road and rail to neighbouring countries. Due to difficulties during the protracted contract negotiations, which led to a strained relationship between CFM and Mersey Docks and Harbour Company, the 51 percent ownership changed to Gringrod and DP World (Fischer & Nhabinde, 2012).

PPP Equilibrium Framework Project Outcomes Analysis: Maputo Port

The upgrading and expansion of the port contributes annually to an average GDP of $345 million (in constant 2018 prices). The upgrading and expansion of the port generated 33 815 employment opportunities and led annually to further capital formation of $1.04 billion. These impacts include the construction effect, operational effect, and reinvestment effect of saving that are generated by the project. It is important to note that if the broader impact is considered (including the impact on international trade), the total impact of the upgrading and expanding of the port will be seven times bigger than that of the port only (Conningarth Economists, 2022). The Government revenue consists of $79 million from taxes related to the project (directly and indirectly) and the total fiscal impact (including the direct, indirect, and induced impact) amount to approximately $605 million in nominal values on average over the period of the project. The concession has increased efficiency and handling volumes at the Maputo harbour, while container movements per hour are improving and tending to international standards. Truck turnaround times have also improved as it has been reported that it was less than 25 minutes in April 2011, which was below the target time (Fischer & Nhabinde, 2012). Cargo through the port, such as sugar and coal has also increased. The rehabilitation work on this terminal had significantly increased fruit export volumes, with fresh produce terminals recording increases in the amount of first-class citrus passing through the port. It is estimated that 60 percent of all the freight traffic of the Maputo Logistics Corridor is destined to and generated by the Maputo Port. The Port of Maputo has also developed a training center, which provides training in several operational areas such as machine operators, tellers, and cargo storage (Porto De Maputo, 2019).

The improved services at the port have resulted in not only increased trade, but also increased productivity, competitiveness and reduction in delays, congestion, and logistical costs (Conningarth Economists, 2022). Reduced logistics costs result in reduced costs of production for businesses, which is in their best interest. The increased trade also affects the balance of payments for Mozambique, which then affects its foreign exchange market. The Maputo Port also has a fiscal impact, as government revenue consists of $79 million from taxes directly and indirectly related to the project, plus an additional $526 million which consists of government revenue from taxes related to the increase of economic activities due to the expansion of the port. This has allowed the state to invest in education and health, which increases the overall welfare of society (Conningarth Economists, 2022).

Table 4: PPP Equilibrium Framework Project Outcomes Analysis: Maputo Port

	State	Society	Private Entities
GDP (value added to the national economy)			$345 million
Employment Creation (creation of new jobs for skilled, semi-skilled, and unskilled workers) - number of job opportunities		33 815	
Capital formation Impact	$1,0 billion		
Fiscal Impact (contributions to Government Revenue)	$79 million		
Cost of Service (How much does society pay for the services – either relatively affordable + or relatively expensive)			+ Reduced logistics costs
Impact on Household income		$193 million	
Check for satisfying the interests of each criterion (✅ or ❌)	✅	✅	✅

*Blank cells can either mean the indicator is not measured for the sector or there is no available data for that indicator for the sector.

Source: Conningarth Economists (2022): The average per annum impact outcomes resulting from the upgrading and expansion of the Port.

Tanesco Power Purchasing Agreement in Tanzania

Background

The Tanzanian state-owned electricity entity, Tanzania Electric Supply Company Ltd (Tanesco) and a private company Independent Power Tanzania Limited (IPTL) entered into a power purchasing agreement to build and run a 100 megawatt slow-speed diesel power plant at Tegeta, Dar es Salaam at a cost of $163.5 million, including an Engineering Procurement and Construction contract price of $126.39, and with a 'reference tariff' of $4.2 million per month plus 3.25 US cents per kWh of electricity actually produced. The final tariff will depend on actual costs incurred (Cooksey, 2002). IPTL was a joint venture between a Malaysian company (Mechmar Corporation of Malaysia) and a local investor, VIP Engineering and Management Ltd (Farlam, 2005). The contract between Tanesco and IPTL was finalized in 1997, but was soon marred by allegations of impropriety, negligence, and corruption as it had not been an open tender (Eberhard & Kapika, 2013). Without consulting Tanesco, IPTL deviated from the agreement terms and built a cheaper medium-speed diesel plant. This resulted in Tanesco serving IPTL with a notice of default and an intention to terminate their agreement (Cooksey, 2002). The World Bank's International Centre for Settlement of Investment Disputes ruled that the agreement should not be terminated but the capacity charge (which are payments that IPTL received based on how many MW of electricity they make available whether they are used or not) should be lowered to reflect the actual costs (Eberhard & Kapika, 2013). The plant was commissioned in 2000, without actually reducing the capacity charge and it was found that the power from the IPTL plant was very expensive relative to other plants in Sub-Saharan Africa at the time (Gratwick, et al., 2007). IPTL started supplying power to the national grid in 2002 and in 2007, IPTL was embroiled in another dispute between its local and foreign sponsors due to allegations of misappropriation of the proceeds from power sales. Due to this conflict, the IPTL plant was hardly operational around 2007 and later sued Tanesco $70 million for unpaid capacity charges (Eberhard & Kapika, 2013).

PPP Equilibrium Framework Project Outcomes Analysis: Tanesco Power Purchasing Agreement

The Tanzanian government agreed to pay for the power capacity regardless of whether it was needed, which resulted in IPTL receiving $40 million in capacity payments in the first year, while operating at less than 10 percent capacity in that year (SAIIA, 2008).

In addition, IPTL charged Tanesco $3 million in statutory costs monthly and in 2007, IPTL also sued Tanesco $70 million for unpaid capacity charges (Eberhard & Kapika, 2013). A study by the World Bank estimated that the cost of power outages to the Tanzanian economy in 2005 – a single year – was 4 percent of GDP, or nearly $2 billion (Africa Research Institute, 2017). Due to the inability of IPTL to solve the power issues in Tanzania and actually adding more to the financial burden of the country, the $2 billion value is estimated as a negative impact of the project on GDP in Tanzania. The Africa Research Institute (2017) has reported that the availability and cost of electricity is a major constraint to doing business in Tanzania. Around 88 percent of firms in the country have reported inadequate electricity as a key hindrance to their operations, which has negative impacts on the country's economic growth (Africa Research Institute, 2017). The state company Tanesco purchased electricity from IPTL for over 12 US cents per unit.

This was significantly higher than the electricity which Tanesco produced itself, which was between 7 and 9 US cents per unit (Farlam, 2005). As such, society was paying more for electricity with IPTL than they would have paid with Tanesco alone. This led to society questioning the need for IPTL, and as such it was discovered that no feasibility study was conducted to justify the need for the Independent Power Producer. If the feasibility study had been conducted, it would have been determined that the problem in Tanesco was not insufficient generating capacity but rather a lack of gridlines (Farlam, 2005). This PPP project was evidently marred by corruption, as there was no proper bidding processes and the project was approved by a few government officials without consulting the necessary stakeholders.

Table 5: PPP Equilibrium Framework Project Outcomes Analysis: Tanesco Power Purchasing Agreement

	State	Society	Private Entities
GDP (value added to the national economy)			- $2 billion
Fiscal Impact (contributions to Government Revenue)	- $3.2 million Capacity payments per month (average)		
Cost of Service (How much does society pay for the services – either relatively affordable + or relatively expensive)		-12 US cents per unit (relatively expensive)	
Quality of service			< 10 % generation capacity
Impact on Household income		-5 US cents per unit (Households paying 5 US cents per unit more than usual for electricity)	
Check for satisfying the interests of each criterion (✅ or ❌)	✅	✅	✅

*Blank cells can either mean the indicator is not measured for the sector or there is no available data for that indicator for the sector.

Source: Farlam (2005); Africa Research Institute (2017); Ghanadan & Eberhard (2007)

Dakar-Diamniadio Toll Road in Senegal

Background

The Dakar Diamniadio Toll Highway project consists of the construction, servicing, and maintenance of a toll highway between Dakar and Diamniadio (34 km), also serving the new international airport located 42 km from Dakar (AfDB, 2023). The project was intended to improve mobility between Dakar and Diamniadio and provide communities affected by the construction of the highway access to basic social and economic services (World Bank, 2021).

The project was expected to expand the densely populated capital city and integrate it with the rest of the country and sub-region which will directly benefit the society, businesses, and the overall economy. The project was also expected to reduce congestion and travel time by more than half (Jonga, 2021). The PPP component of the road consisted of the 20.4 km Pikine–Diamniadio section, which was concessioned to Société Eiffage de la Nouvelle Autoroute Concédée (SENAC), which is a Senegalese special purpose company owned by the Eiffage Group (a leading construction group internationally) (World Bank, 2010). The Government of Senegal signed the concession contract with SENAC in 2009, and the preparation of the concession was facilitated by The National Agency for the Promotion of Investments (APIX). APIX was expected to consolidate the institutional framework and develop contractual arrangements for the Dakar–Diamniadio Toll Highway project and was supported by the Public-Private Infrastructure Advisory Facility. The Government of Senegal was highly committed to the project as the President was the first person to drive on the road and pay the toll fees. The Government also held stakeholder engagements with members of the society to discuss the structural options for the road and socio-economic drivers of the willingness to pay. The public sector component of the road which consisted of 20.4 km of the road segment Pikine-Patte d'Oie was financed by the Government together with the African Development Bank and the World Bank (Jonga, 2021).

PPP Equilibrium Framework Project Outcomes Analysis: Dakar-Diamniadio Toll Road

The Dakar-Diamniadio Toll Road resulted in the creation of 800 jobs during the construction phase and a further 130 jobs after the launch phase (Centre for Public Impact, 2018). This has created positive economic impacts for the local population. Human mobility has also increased by 1.34 percent, as a result more people have access to security, transport, administrative, health and education services in Dakar City Centre (Fetzer, 2015). It had been reported by the World Bank that Dakar's traffic troubles were costing Senegal at least 0.64 percent of their 2008 GDP which amounts to approximately $86 million per year (Gainer, 2016). Senegal's APIX reported that the losses were actually more than twice as large at approximately $205 million per year (Africa Research Institute, 2017). Therefore, the estimated positive impact of the Dakar-Diamniadio Toll Road on GDP in Senegal can amount to $205 million in savings due to the improved road infrastructure. As one result of the project, vehicle travel time has also sharply decreased from one and a half hours to between 15 to 30 minutes. Tolls revenue also generates approximately $100,000 per day for the Senegalese government. The lower travel time also results in less vehicle air pollution, a positive environmental impact.

Table 6: PPP Equilibrium Framework Project Outcomes Analysis: Dakar-Diamniadio Toll Road

	State	Society	Private Entities
GDP (value saved to the national economy)			~ $205 million (per year)
Employment Creation (creation of new jobs for skilled, semi-skilled, and unskilled workers) - number of job opportunities		930	
Climate change impact		+Less pollution due to reduced travel time	
Capital formation Impact	~ $448 million		
Quality of service		+Human mobility increased by 1.34 %	+Travel time reduced from 1.5 hours to between 15 – 30 minutes
Fiscal Impact (contributions to Government Revenue)	~$100,000 per day		
Cost of Service (How much does society pay for the services – either relatively affordable + or relatively expensive)			+Relatively Affordable Toll Fees Motorcycles (~$1.50) Cars (~$2.50) Lorries (~$5.00)
Check for satisfying the interests of each criterion (✅ or ❌)	✅	✅	✅

*Blank cells can either mean the indicator is not measured for the sector or there is no available data for that indicator for the sector.

Source: Centre for Public Impact (2018); Fetzer (2015)

DISCUSSION

Lessons Learnt on Outcome-based Assessment of Public-Private Partnerships

The success of PPP projects has historically been based on the number of PPP transactions and overall project value. Not enough data has been collected on the socio-economic outcomes of PPP projects. The case study analysis has shown that successful PPP projects have direct or indirect positive impacts on the society, the state, and the private sector. These were the Maputo Port, the Gautrain, and the Dakar-Diamniadio Toll Road. A failed PPP project was that which had negative direct or indirect impacts on the society, the state and the private sector. This was the Tanesco Power Purchasing Agreement project. Therefore, regardless of how much spending has been allocated to a PPP project, what should matter more is the impact which the PPP project has had on the interests of society, the state, and the private sector.

This was evident in the Tanesco Power Purchasing Agreement, where large sums of money were spent on the project, yet the services provided were poor and expensive. This study suggested the following measures regarding assessing the likely impact of a PPP project on society, the state and the private sector:

The State

- The fiscal impact of the PPP project, which entails increased revenue for the Government either from taxes or tolls fees.

- Capital formation as a direct result of the PPP project, which has been known to have positive impacts on economic growth (Pasara & Garidzirai, 2020).

The Society

- Employment Creation (creation of new jobs for skilled, semi-skilled, and unskilled workers) during the construction phase of the PPP and after.
- Following from employment creation, an analysis of the impact of the PPP on household income. Directly because of employment due to the PPP project, or indirectly through positive externalities of the PPP project.
- Climate change impacts on the PPP, through reduced greenhouse gas emissions, pollution, or energy usage.
- Improved quality of service being utilized by individuals due to the PPP project.
- Affordability of the services generated by the PPP, to avoid unintended inequalities in terms of access to the service.

The Private Sector

- Positive contribution to the gross domestic product due to the PPP project. Economic growth has been known to improve the ease of doing business in Sub-Saharan Africa, which subsequently creates private sector growth (Muhanika, 2021).
- Improved quality of service being utilized by businesses due to the PPP project.
- Affordability of the services generated by the PPP, to avoid unintended inequalities in terms of access to the service.

Public-Private Partnership Lessons Learnt Based on The Four Analysed Case Studies

- **Political Commitment**

Government commitment and support to a PPP project contributes to the overall success of the PPP project. This has been evident in the Maputo Port, Gautrain and Dakar-Diamniadio projects. The government provides support with regards to financial and technical assistance as well as oversight of the project. In the Tanesco and IPTL projects, disputes between the private entity and the state-owned entity contributed to the project's ultimate failure.

- **Stakeholder Engagement**

Stakeholder engagement is critical in ensuring that the PPP project meets the needs and expectations of the society and the private sector. This was evident in the Dakar-Diamniadio Toll Road project where the society was engaged, and their inputs taken into consideration especially regarding the relatively low toll fees which rendered the service affordable. Lack of consultation on the ground resulted in high service costs regarding the Gautrain and the Tanesco Power Purchasing Agreement which created unintended consequences of unequal access to the services.

- **Experienced, Ethical and Capable Concessionaire**

The private sector entity in the PPP agreement must have the necessary experience and capabilities to undertake the project. Otherwise, the services provided will be of sub-standard quality. Bombela Concession Company (Pty) Ltd, Gringrod and DP World and SENAC all had the necessary expertise and capabilities to deliver high quality services. IPTL, on the other hand, delivered very sub-standard quality and had unethical practices, due to its lack of capability and experience.

- **Strong involvement of development institutions in both public and private financing**

Projects like the Maputo Port and the Dakar-Diamniadio attracted financing from development finance institutions such as the DBSA, the African Development Bank, the Agence Francaise de Developpement and the World Bank. Development Finance Institution participation in PPP projects brings not only the much-needed finance but technical support as well as their vast knowledge and expertise in infrastructure delivery.

- **Clear and visible benefits**

  This goes back to the outcomes of PPP projects. Successful PPP projects have clearly identified benefits, whether it is improved and affordable services, employment creation or increased household income. Visible benefits ensure community participation, admiration, and support.

CONCLUSION

This comparative analysis demonstrates that the effectiveness of PPPs as infrastructure development strategies depends not only on the regulatory, legal, and financial frameworks but also on their ability to generate balanced outcomes for society, the state, and private entities. The application of the PPP Equilibrium Framework revealed that projects such as the Gautrain Rapid Rail Link, Maputo Port, and Dakar-Diamniadio Toll Road were successful because they delivered tangible socio-economic and environmental benefits across all stakeholder groups. Conversely, the Tanesco Power Purchasing Agreement illustrates that projects can fail despite significant financial investment if stakeholder interests are misaligned, feasibility studies are inadequate, and ethical and operational standards are not met. These findings underscore the need to shift the evaluation of PPPs from a compliance and transaction-focused approach to an outcome-based approach that prioritizes balanced benefits, transparency, and stakeholder engagement.

LIMITATIONS

The findings are analytically rather than statistically generalisable, as the case studies aim to support structured thinking on PPP outcome conditions rather than universal conclusions. Although the cases cover multiple sectors and African regions, PPP outcomes depend on country-specific institutional, regulatory and macroeconomic factors. The study was also limited by a lack of detailed social and economic impact data for many PPP projects, which reduced the number of usable case studies and constrained the analysis.

RECOMMENDATIONS

The study recommends that PPP projects should be assessed and implemented using an outcome-based approach, such as the PPP Equilibrium Framework, to ensure balanced benefits for society, the state, and private entities. Effective stakeholder engagement, rigorous feasibility studies, and transparent monitoring are critical to align projects with societal needs, avoid inequalities, and manage risks. Governments should ensure private partners have the necessary expertise, capacity, and ethical standards, while strong political commitment and the involvement of development finance institutions can enhance project financing, technical support, and overall success. Practical implementation mechanisms aligned to the PPP Equilibrium Framework can include PPP equilibrium scorecards for project appraisal and monitoring, strengthened PPP performance monitoring functions within PPP regulatory environments, and the incorporation of socio-economic outcome reporting requirements into PPP contracts.

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