

Bridging the Gap?

An analysis of Public-Private Partnerships as an instrument to establish sustainable models of Faecal Sludge Management in Dar es Salaam, Tanzania

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Bridging the Gap? An analysis of Public-Private Partnerships as an instrument
to establish sustainable models of Faecal Sludge Management in Dar es Salaam, Tanzania

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List of Abbreviations

AfDB African Development Bank	Development
AU African Union	O&M Operation and Maintenance
BOO Build-Operate-Own	OSS Onsite Sanitation
BOT Build-Operate-Transfer	PfPPP People-first Public-Private Partnership
BTI Bertelsmann Stiftung Index	PPCP Public-Private-Community Partnerships
CETA Civic Education Teachers' Association	PPI Private Participation in Infrastructure
CPI Corruption Perception Index	PPIAF Private Participation in Infrastructure Advisory Facility
DAWASA Dar es Salaam Water and Sewerage Authority	PPP Public-Private Partnership
DB Design-Build	PPRA Public Procurement Regulatory Authority
DBFMO Design-Build-Finance-Maintain-Operate	PRC People's Republic of China
DSK Dustha Shasthya Kendra	PSP Private Sector Participation
EISA Electoral Institute of Southern Africa	QCA Qualitative Comparative Analysis
EPI Environmental Performance Index	SDG Sustainable Development Goal
ET Emptying and Transport	SME Small and Medium-Sized Enterprise
FBO Faith-based Organization	SOE State-owned Enterprise
FS Faecal Sludge	SSA sub-Saharan Africa
FSM Faecal Sludge Management	T Treatment
GCR Global Competitiveness Report	TP Traditional Procurement
GII Global Innovation Index	UMAWA Uhai wa Mazingira na Watu
ICT Information and Communications Technology	UMIC Upper Middle Income Country
IFI International Finance Institution	UN United Nations
JMP Joint Monitoring Program	UNDP United Nations Development Programme
KAS Konrad Adenauer Stiftung	UN DESA United Nations Department of Economic and Social Affairs
LGA Local Government Authority	UNECA United Nations Economic Commission for Africa
LIC Low Income Country	UNECE United Nations Economic Commission for Europe
LIDC Lower Income Developing Country	UN IATF United Nations Inter-agency Task Force on Financing for Development
LMIC Lower Middle Income Country	VfM Value for Money
MC Municipal Council	WB World Bank
MDB Multi-lateral Development Bank	WDI World Development Indicators
MoEST Ministry of Education, Science and Technology	WEF World Economic Forum
MoW Ministry of Water	WSS Water Supply and Sanitation
MoWI Ministry of Water and Irrigation	
MSP Multi-Stakeholder Partnership	
NPM New Public Management	
NPG New Public Governance	
OECD Organization for Economic Co-operation and	

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Abstract

People are rapidly filling cities across Africa that are unequipped to provide sufficient infrastructure, especially in the water supply and sanitation (WSS) sector. In the last few decades public-private partnerships (PPPs) have been promoted as a means to bridge this gap in infrastructure and service provision, but the literature is mixed on their efficacy. This thesis analysed PPPs as an instrument to establish small-scale faecal sludge management (FSM), a promising alternative to traditional sewerage sanitation in complex urban environments. By building a framework for analysis based on a thorough literature review of critical success factors (CSFs) of PPPs in developing regions and in the WSS sector, this thesis was able to rate the readiness of Tanzania, and Dar es Salaam in particular, for their ability to adopt PPPs as an instrument to scale-up FSM. The findings showed a low readiness in Tanzania and Dar es Salaam for the adoption of PPPs. However, the private sector certainly has a role to play in providing sanitation services, of which they are already a part of, formally or not. A further gap analysis of three FSM private service providers identified key areas that can be improved, and a new partnership structure was proposed: Open Partnerships (OPs). These partnerships are community-led, flexible, less complex and open to all actors across the sanitation service chain in order to meet the growing need for adequate and safely-managed sanitation in quickly growing cities like Dar es Salaam.

Keywords: Public-private partnerships, PPPs, Faecal Sludge Management, FSM, SDG 6, SDG 6.2, SDG 17, On-Site Sanitation, OSS, infrastructure, developing regions, Open Partnerships

Part One: Setting the scene

A literature review



Construction of a new standard gauge rail line through Pugu Hills (Young, 2021)

Chapter 1: Introduction

Cities are filling and their infrastructure is struggling to keep pace. What were small towns dotted across Africa a half century ago are now on their way to becoming megacities, more dense than ever before. Over half of humanity currently lives in urban agglomerations, and the UN projects that by 2050 over two thirds of the world’s population will be relying on cities and the backbone of their infrastructure for their livelihood (UN DESA, 2018).

Nowhere is this more pressing than in Africa, which is home to all 15 of the world’s fastest growing cities, three of which are in Tanzania (UN DESA, 2018). This rapid growth poses a challenge for urban areas in Africa where there is already an increasingly large gap in the quality, quantity and accessibility of infrastructure, especially in electricity, water and transportation (Gurara et al., 2017). Despite the need for infrastructure and the availability of potential funding, 80 percent of Africa’s infrastructure projects fail to make it past the feasibility and business-plan stage (Lakmeharan et al., 2020). As more people move into cities, the need continues to grow and the gap is only widening.

Infrastructure development is widely viewed as a key pillar of economic development in Low-Income Developing Countries (LIDCs), and to help bridge this gap the UN General Assembly set forth the

Millenium Development Goals (MDGs) 2000-2015, and more recently, the Sustainable Development Goals (SDGs) 2015-2030 (Gurara et al., 2017; UN, 2015). These 17 interlinked goals were designed to create a ‘better and more sustainable future for all’. However, after failing to meet the first round of MDGs, meeting the SDGs to curb climate change and improve the lives of billions won’t be easy, and is perhaps the greatest challenge humanity faces.

Partnerships (SDG 17), and public-private partnerships (PPPs) in particular (SDG 17.17), are one of the instruments being used to meet this challenge. The World Bank, United Nations, OECD and International Monetary Fund, among others, have declared them the development tool of choice to streamline projects, better allocate risk and increase value for money (VfM) in infrastructure projects in all sectors (PPP Knowledge Lab, 2021). One sector that desperately needs attention is the water supply and sanitation (WSS) sector. Goal 6 of the SDGs, to

“Ensure availability and sustainable management of water and sanitation for all,”

so far remains a pipe dream - more than half of the world’s population, 4.2 billion people, lack safely managed sanitation (UN-Water, 2021).

In urban areas in Sub-Saharan Africa (SSA), access to “safely managed” sanitation as defined by WHO and UNICEF’s Joint Monitoring Program (JMP) (Table 01), didn’t increase at all between 1990-

Service level	Definition
Safely managed services	Private improved facility where faecal wastes are safely disposed on site or transported and treated off-site; plus a handwashing facility with soap and water
Basic service	Private improved facility which separates excreta from human contact
Limited service	Improved facility shared with other households
Unimproved service	Unimproved facility which does not separate excreta from human contact
No service	Open defecation

Table 01 WHO & UNICEF’s Joint Monitoring Program (JMP) Definitions of sanitation service levels (source: WHO & UNICEF, 2020)

2015 despite national gains (Satterthwaite et al., 2019). Furthermore, the “safely managed” category includes pit latrines and septic tanks, however this only includes the containment and fails to take into account the emptying, transport, treatment and disposal steps in the sanitation service chain. In Dar es Salaam only 7 percent of faecal sludge (FS) is properly treated (Eawag/Sandec, 2015). This lack of treatment stems not only from insufficient infrastructure, but the nature of densely built, unplanned urban areas in general that are marked by high poverty rates and increased flooding risks with limited municipal capacity for regulating, monitoring and enforcing existing laws (Satterthwaite et al., 2019).

Due in part to these challenges, as well as an ad-hoc response to the needs of the moment, a shift has occurred away from traditional sewer-based sanitation to decentralized sanitation and faecal sludge management (FSM) as a means to serve rapidly growing unplanned urban and peri-urban areas (Reymond et al., 2016). There is a growing urgency for affordable, resource-efficient systems that can meet demand, ensure public health, are resilient against flooding and preserve dwindling natural resources (Lüthi et al., 2011). But implementing properly managed sanitation requires a complex service chain with varying stakeholders and interests that often leave the poor behind in service provision (Satterthwaite et al., 2019; Tayler, 2018).

Bridging this gap in service provision requires new business models and robust enabling environments to properly ensure inclusive sanitation that meets the targets of SDG 6.2 and 6.3, to:

“... achieve access to adequate and equitable

sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations,” and to

“improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally” by 2030 (United Nations, 2015a).

While the percentage of those with at least basic sanitation is increasing, the current rate must quadruple to meet the targets by 2030 (UN-Water, 2021). Regarding SDG 6.3, the data to track it either doesn’t exist, or isn’t reported in most countries (UN-Water, 2021).

This is clearly evidenced in Dar es Salaam, where less than 10 percent of the 7 million inhabitants have a sewered connection, leaving over 6 million people with pit latrines and septic tanks that need to be occasionally emptied and treated (Fettback et al., 2021). With only 7 percent properly treated, the rest of the FS ends up in the environment, either through illegal dumping in nearby fields or streams, flooding out during the rainy season, or is simply left in the pit, which if unlined, leaches into the ground and contaminates the groundwater, which is a significant source of drinking water in Dar es Salaam (Fettback et al., 2021; Jenkins et al., 2015).

The ramifications of insufficient sanitation are staggering. The World Bank estimates that poor sanitation costs the world 260 billion USD, and contributes to 1.5 million child deaths from diarrhea annually (Strande, Ronteltap, Brdjanovic, 2014). Frequent flooding in Dar es Salaam made worse by climate change is exac-

erminating the issue, causing regular outbreaks of other diseases like cholera (Piccarelli et al., 2017). Not only is there a cost to health, but the time spent fetching water or finding a toilet has a social cost as well that limits productivity and access to education, falling disproportionately on women (Nizkorodov, 2017; World Bank, 2018).

According to the World Bank and other international agencies, PPPs offer an attractive way to meet this challenge. Simply defined, PPPs are a partnership between a public and private entity to provide a service or infrastructure that is generally a responsibility of the government (PPP Knowledge Lab, 2021). By accessing the expertise, experience and efficiency of the private sector, proponents argue, PPPs can offer better value for money (VfM) than traditional procurement (TP) and have lower life-cycle costs due to the bundling of responsibilities that incentivises quality design, construction and sufficient maintenance (PPP Knowledge Lab, 2021).

However, the evidence of PPP success over the last three decades is mixed, especially in LIDCs where the governmental

capacity for these complex and lengthy contracts is low (Morgues & Kingombe, 2017). According to the World Bank's Private Participation in Infrastructure (PPI) Database, only 3.32 percent of PPPs are from low-income countries. Furthermore, less than 1 percent of WSS PPPs are in low-income countries, and the WSS sector has the highest number of cancelled or distressed contracts, at almost a quarter of the total value of contracts (PPI Database, 2021).

This begs the question, are conventional PPPs suitable for bridging the gap in small-scale sanitation service delivery in Dar es Salaam, a low-income, rapidly growing city in sub-Saharan Africa (SSA)? As PPP laws, nodes, centres and consultants continue to crop up in Dar es Salaam and around the world, backed by the World Bank and other International Finance Institutions (IFIs), it is valuable to determine if they are fit for purpose.

This research aims to answer that question by analysing PPPs and the PPP enabling environment in Tanzania and Dar es Salaam in particular to determine the readiness for PPPs in the context of a low/lower-middle income SSA country. A framework for rating the readiness is



Figure 01 View of Dar es Salaam City Center from the Kigamboni Ferry (source: Author, 2021)

developed to further assess their suitability to increase infrastructure through the PPP model. After rating the readiness of Dar es Salaam’s PPP environment, I examine three private service providers (PSPs) involved in the FSM service chain to determine the barriers and opportunities for scaling up, and propose recommendations for an open partnership model that is context specific to Dar es Salaam, but broadly applicable to developing regions the world over. Through small-scale, flexible and open partnerships, cities could better involve all stakeholders to meet the challenges of this generation, ensuring a sustainable future for the next.

Around 93 percent of the urban population have access to improved drinking water sources*, however only 43 percent have access to improved sanitation facilities with most (93%) of the FS unsafely managed (World Bank, 2017; WHO/UNICEF, 2021). In Dar es Salaam’s informal settlements, which is home to three

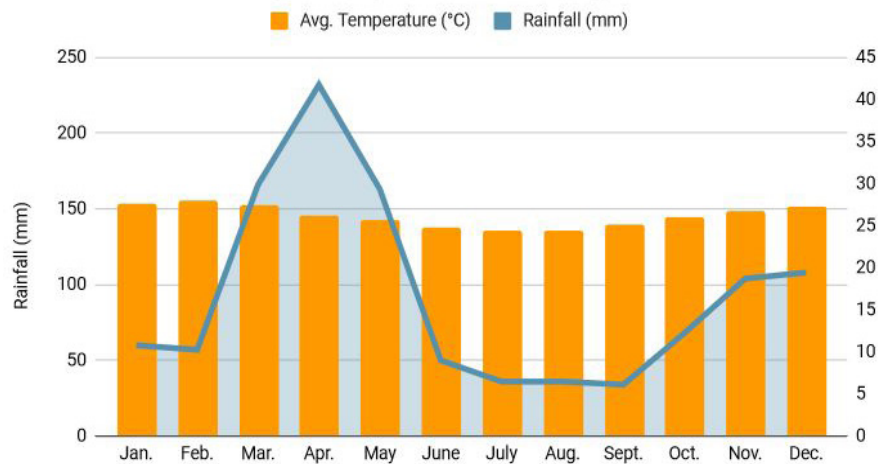


Figure 02 Average yearly rainfall and temperature (source: Author, Data: climate-data.org)

1.1 Background & Context

Dar es Salaam is the administrative capital and largest city of the United Republic of Tanzania with an estimated population of 7,046,892 million people in 2021 (UN DESA, 2018). It is projected to be the fastest growing megacity (over 10 million) in the world by 2035, doubling in size to 13.4 million (UN DESA, 2018). The rate at which it is projected to grow (4.9% from 2020-2025) adds an increased pressure on the already limited infrastructure and it is estimated that it will be the third largest city by population in the world by 2100, with over 73 million inhabitants (UN DESA, 2018; Hoornweg & Pope, 2014).

quarters of the city’s population, 92.4% did not have access to improved sanitation and the gap is widening between poor and nonpoor households (International Bank for Recovery & Development/The World Bank, 2017; Thomas et al., 2013).

Dar es Salaam has a tropical wet and dry savanna climate (Aw according to the Köppen-Geiger classification), with two rainy seasons, tropical monsoons and an average rainfall of 1089 mm (Figure 02). The heavy seasonal rains and high water table mean there is an increased potential for septic tanks and pit latrines to overflow or to be purposely “flooded out” during these seasons (Fettback et al., 2021). The

*Improved drinking water sources are those which, by nature of their design and construction, have the potential to deliver safe water and meets three criteria: 1) it should be accessible on premises, 2) water should be available when needed, and 3) the water supplied should be free from contamination (WHO/UNICEF, 2021).

average temperature is 25.9°C with a relative humidity between 75 and 84 percent throughout the year (climate-data.org, n.d.).

The following section will give a brief overview of the social, political and economic factors that are relevant to this research and the involvement of the private sector in FSM service provision.

1.2 Social, Political and Economic

Formed in 1964 after the joining of Tanganyika and Zanzibar, the United Republic of Tanzania shook off its German and British colonial past to become a Presidential Constitutional Republic under the leadership of President Julius K. Nyerere. A fervent believer in Pan-Africanism and self-reliance, Nyerere implemented a form of African socialism based on the Marxist-Leninist stance on social, political and economic principles, called ‘Ujaamaa’, or brotherhood, which frowned upon private wealth (Civic Education Teachers’ Association/Konrad-Adenauer-Stiftung, 2018).

Under this system over 400 banks, industries and other enterprises were state-owned and during this time the economy experienced only a 1.5 percent annual growth until the mid 1980s (CETA/KAS, 2018). In 1986 the World Bank and Inter-

national Monetary Fund (IMF) supported structural market reforms in Tanzania which were successful in increasing economic growth, investment and exports, however the return on foreign-financed investment (aid money) was low, according to a joint report from the WB and IMF (Agrawal et al., 1993). The low productivity of investment, wrote Agrawal et al. (1993), “can partly be attributed to the domination of the Tanzanian economy by a large and inefficient parastatal sector.” Accelerating the reform of the public sector and improving the enabling environment for private sector development, they argued, could increase the productivity of investment (Agrawal et al., 1993).

This policy recommendation set the stage for the introduction of one of Tanzania’s first PPPs in 1995 - the controversial Graft Taints Power Purchasing Agreement between state-owned TANESCO and Independent Power Tanzania Limited (IPTL) for a 100 MW diesel power purchasing agreement (Farlam, 2005). After years of legal battles and uproar from donors and consultants due to the choice of technology, cost, corruption allegations and demand projection, it was finally commissioned in 2002 and functioned at only 10% of its capacity, costing the government 40 million USD in capacity payments in the first year alone (Farlam, 2005; Mourgues & Kingombe, 2017).

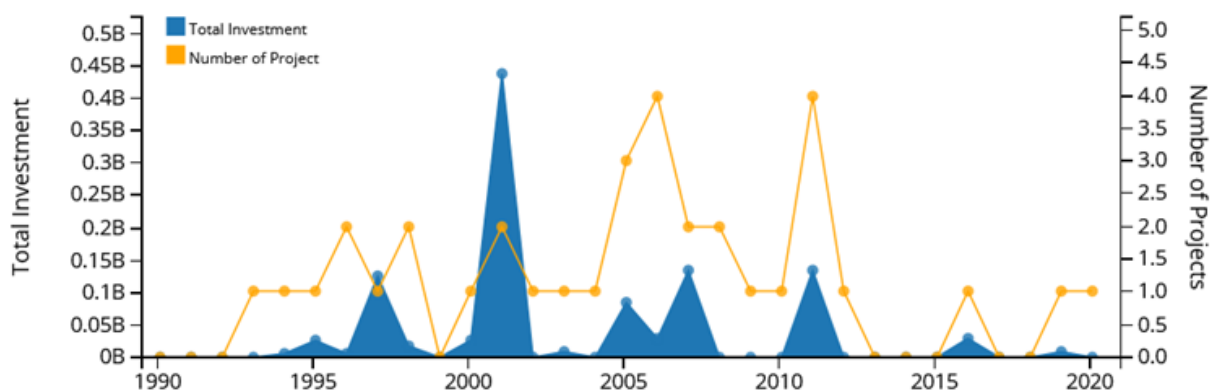


Figure 03 Total investment and number of PPP projects in Tanzania from 1990-2020 (source: PPI Database, 2021)

This first brush with PPPs was followed by another disastrous PPP in the WSS sector in 2003. Again, after years of a costly selection process beginning in 1997, the Dar es Salaam Water and Sewerage Authority (DAWASA) entered into a lease agreement with City Water Services (CWS), a private consortium including Biwater Gauff Tanzania Limited (BGT) – a joint venture between a British firm Biwater International and a German engineering firm, HP Gauff Ingenieure GmbH – and the local firm Super Doll Trailer Manufacture Company Limited (STM) (Triche, 2012). The lead professional company, Biwater, owned a 41% stake, while HP Gauff owned 10% and Super Doll – a company with no experience in the WSS sector - owned 49% (Triche, 2012). After two years of financial difficulties and poor performance, the contract collapsed and the foreign partners were dramatically expelled from the country, leading to two international tribunals and little, if any, improvement in service (Triche, 2012).

Despite these setbacks, Tanzania has had 25 PPP projects since 1993 in a variety of sectors including electricity (13), information and communications technology (ICT) (7), railways (2), WSS (1), airports (1) and ports (1) (PPI Database, 2021) (Figure 04). In total, three have been cancelled, 1 is in distress, four have been completed and the rest are still active. As can be seen in Figure 03, projects peaked between 2005 and 2011, and in the last decade only four PPPs have been implemented (PPI Database, 2021)

Tanzania’s legal framework for PPPs has also been steadily, and frequently, built up since 2009, beginning with the *National Public Private Partnership Policy 2009*. The following year, *The Public-Private Partnership Act, 2010* was passed, and

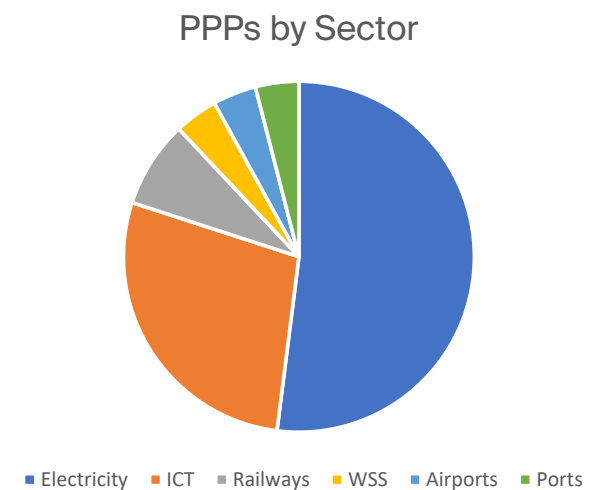


Figure 04 PPPs by sector in Tanzania (source: Author, 2021; Data: PPI Database, 2021)

a year after that *The Public-Private Partnership Act, Regulations, 2011*. There have been several amendments to both the Act (2014, 2018) and the Regulations (2015, 2020). The PPP Act and Regulations create the institutional framework for PPP agreements between the private and public sectors in Tanzania and set the “rules, guidelines and procedures governing procurement, development and implementation” of PPPs (Zervos, 2020).

The latest set of regulations (2020) creates an additional PPP desk that is to be set up within the respective Contracting Authority (Ministry, Government Department, Authority or Agency) and also puts more emphasis on local content, prioritising local service providers and manufactured goods, jobs for Tanzanians, and that Tanzanian citizens are given priority in any matter related to technology transfer, research, development or innovation (Government of the United Republic of Tanzania, 2020). The framework has been found to be robust, albeit lengthy and complicated (see Appendix C for an overview of the 16 step procurement and approval process for small-scale PPPs).

Beyond PPPs, Tanzania has been gradually improving its business environment, though it still ranks fairly low with an ease of doing business (DB) score of 54.5/100 and ranking 141/190 (World Bank, 2021a). While this number has stayed relatively level over the last 10 years (55.1/100 in 2011), the economy has been experiencing sustained growth and in July of 2020 under former President John Magafuli, Tanzania hit their milestones in the Tanzania Development Vision (TDV) 2025 and became a Lower Middle-Income Country (LMIC) (World Bank, 2021c).

The TDV 2025 outlines the following key strategic goals to achieve a strong and competitive economy in Tanzania, relying heavily on industrialisation and infrastructure to achieve their targets (CETA/KAS, 2018):

1. *Diversification and semi-industrialisation of the economy with a prominent industrial sector comparable to typical middle-income countries*
2. *Economic stability through low inflation and basic macroeconomic balances*
3. *Adequate levels of infrastructure to implement the vision in all sectors*
4. *Becoming an active and competitive player in regional and world markets with the capacity to articulate and promote national interests and to adjust quickly to regional and global market trends.*

Tanzania has also enacted a number of policies to improve education outcomes, including the TDV 2025, the National Five-Year Development Plan (FYDP) 2016-2021, the Education Sector Development Plan (2016-2021) and the Education and Training Policy of 2014 (Ministry for Education, Science and Technology [MoEST], 2019). These policies have positively affected the

basic education survival rate (percentage of students who are expected to finish basic education) in Dar es Salaam from 23.94% (2016) to 48.29% (2018), though the number of students who completed basic education decreased to 43.42% in 2019 (MoEST, 2019). Education is critical for governments not only to increase economic output and competitiveness, but also to have enough skilled workers to fill civil service positions (after taking into account many of the most skilled will prefer higher paid salaries at private firms).

Politically speaking, Tanzania has been under de facto one-party rule by the Chama Cha Mapinduzi (CCM) party since its inception in 1964. In 1992, the constitution was amended to allow for more parties, however the CCM has maintained its grip on power and is the longest serving ruling party in Africa (Campbell, 2020). While the CCM has remained relatively popular, there were allegations of voter “oppression” by the Electoral Institute of Southern Africa (EISA) in the last election, with President Magafuli winning in a landslide victory with 84% of the votes (Kombe, 2020).

Those I talked to in Dar es Salaam admired Magafuli for his tough stance on corruption and his commitment to increasing infrastructure, made visible by the large number of projects going on throughout the city. President Magafuli died from heart complications on March 17, 2021, just as I was leaving Tanzania, and his vice president Salia Suluhu Hassan took over as the first female president of Tanzania.

1.3 Problem Statement

By 2030, the UN projects that Dar es Salaam will join the ranks of 42 other Megacities with a population of 10 million or more - doubling in size in the space of 15 years (UN DESA, 2018). This will make a bad situation, even worse. The expansion of the sewerage system is slow and irregular, meeting less than 10 percent of the needs of the city (Ndibalema, Eng. L., H., personal communication, June, 2021). This means on-site sanitation (OSS) and decentralized treatment, with support from the private sector, will have to meet this challenge.

While the Government of Tanzania (GoT) has passed an increasing amount of legislation over the past several decades to create a framework for the introduction of PPPs as a means to meet these challenges, poor past experiences with private sector participation in WSS have put a damper on PPP uptake in the sector (Leigland, 2018; Triche, 2012). Currently, there are no official FSM-specific PPP guidelines, and the PPP arrangements that do exist in the water and sanitation sector are limited to a few instances with ad-hoc contractual arrangements or service contracts (Trade Waste Agreements (TWAs) with vacuum truck owners) that, while improving service provision, are insufficient to meet the increasing needs of the fast-growing population.

However, interest in improving FSM service provision is growing, and Tanzania's Ministry of Water (MoW) and the Energy and Water Utilities Regulatory Authority (EWURA) came out with onsite sanitation (OSS) and FSM guidelines in 2020 that mention several PPP or PSP arrangements as potential business models for provision of FSM, indicating a growing interest in FSM specific PPPs (EWURA, 2020).

1.4 Overall Objective

The objective of this research is to analyse the suitability of PPPs as a tool to bridge existing gaps in the sanitation infrastructure and service provision of FSM in Dar es Salaam. Through the use of Critical Success Factors (CSFs) and a PPP readiness radar, Tanzania's PPP readiness will be evaluated, and recommendations will be given for a partnership model suitable to the current conditions. By determining the most effective, efficient and realistic means of service delivery in Dar es Salaam, a suitable partnership model could leverage the strengths of both the private and public sectors to benefit all stakeholders and reduce the environmental and health risks associated with poor FSM.

1.5 Research Hypothesis

There is a clear gap in both the amount of existing infrastructure needed to adequately treat faecal sludge (FS), and in the implementation of service delivery in FSM. This gap can be identified, assessed, and given a framework to enable successful private sector participation and make FSM mutually beneficial to all stakeholders.

1.6 Research Questions

1. How suitable are PPPs for small-scale FSM service delivery in Dar es Salaam?
2. What kind of partnership framework would best suit the enabling environment in Dar es Salaam to help scale-up FSM?

1.7 Research Framework

Over the past several decades the canon of literature on PPPs has grown significantly as they have continued to increase in popularity as a tool to meet the world's infrastructure needs (Figure 05).

While the implementation of PPPs has increased, so too have the research frameworks that are used to analyse their efficacy. Weihe (2008) mentions four research lenses for PPPs, 1) the urban regeneration approach, 2) the policy approach, 3) the infrastructure approach, and 4) the development approach. Each with their own set of actors, objectives and analyses (Nizkorodov, 2017). Due to the different approaches, Weihe (2008) argues that PPPs exist in different contexts for different needs, and a single definition is both logically impossible for PPPs and could lead to false comparisons. This research recognises these different lenses, however due to the nature of PPPs operating on multiple levels as pointed out by Hodge & Greve (2016), I believe it is necessary to take a macro view of PPPs as a phenomenon in themselves that transcends one

single lens and encompasses a variety of elements including the project, organization and partnership structure/relationship, policy, institutional framework and the macro financial, environmental, and community level. By focusing only on one approach, we may miss the forest for the trees and lose the broader picture.

Hodge and Greve (2013) break down PPP research into three generations: the first generation beginning in the 70s that focused on individual projects, the second generation beginning in the 90s that focused on the policy environment surrounding PPP adoption, and the latest generation that concerns the exogenous pressure for the developing world to adopt PPPs as a means to bridge infrastructure and funding gaps. This can also be viewed as a micro, meso and macro level approach to PPPs, and the interaction of actors on and between these levels can influence the success or failure of a PPP.

Therefore this research will adopt a holistic, social-ecological model and systems theory* approach adapted to anal-

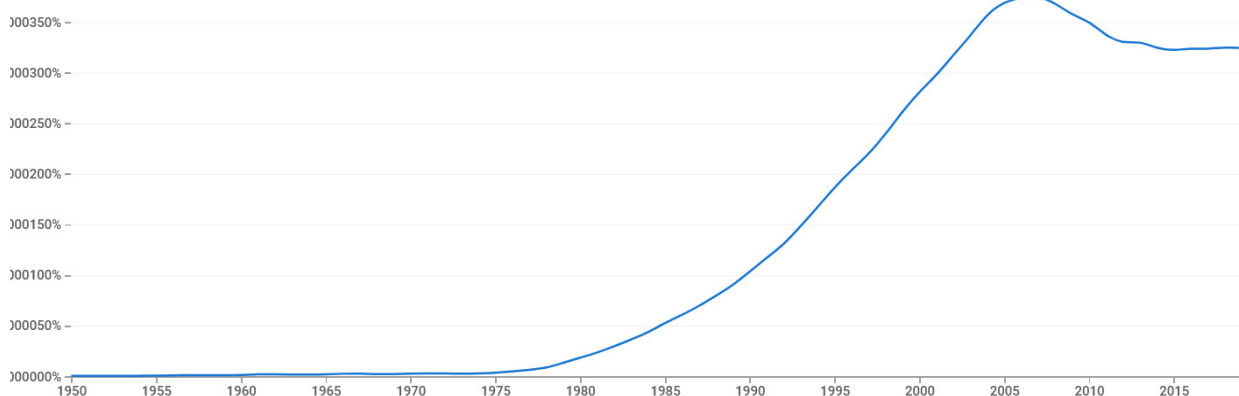


Figure 05 Frequency of appearances of the term “public-private partnership” in literature from 1950-2020 (source: Google ngram viewer, 2021)

*The social-ecological model, first introduced by Urie Bronfenbrenner, is a systems-based theory that aims to understand the dynamic interrelations between different actors in different settings. Simply put, one thing affects another, and nothing occurs in a vacuum. The individual is influenced by, and influences the environment in which it lives, and each micro, meso and macro level feedback on each other (Bronfenbrenner, 1977).

analyse PPPs and their critical success factors (CSFs) at each level using Hodge and Greve's (2016) framework, with a specific focus on the WSS sector in the developing world (Figure 06).

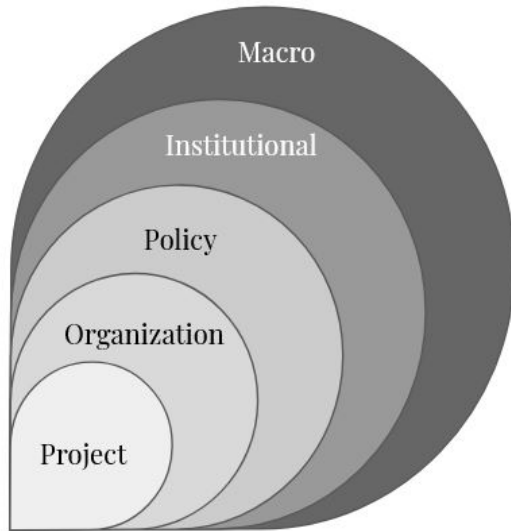


Figure 06 The multiple levels of PPP (source: Author, adapted from Hodge & Greve (2016))

As the international community rallies around the SDGs as put forth by the UN, it is valuable to assess the suitability of SDG 17 (creating partnerships) to achieve SDG 6 (water and sanitation). Partnerships in their broadest sense are undoubtedly necessary, but are PPPs (SDG 17.17) the right instrument to achieve the SDGs in developing regions?

There are two common types of conventional PPPs, those used in social services (prisons, hospitals, schools, etc.) and those used in infrastructure (Pessoa, 2010). This research will focus on conventional PPPs as defined by the World Bank and the United Republic of Tanzania, which are primarily used for infrastructure and/or service delivery of public goods (electricity, water, sanitation). It is important here to distinguish between conventional PPPs as defined by the World Bank and PPPs as a term in common usage. While many consider PPPs to be any

type of private sector involvement with the government, conventional PPPs are long-term, contractually complex and involve private sector involvement throughout the lifecycle of the project (design, build, operate, maintain). A short-term service agreement, or a design-build contract would not be considered PPPs by the World Bank's definition and thus are not the subject of this analysis, though they will be discussed.

The analysis includes a thorough literature review of CSFs in developing regions and the WSS sector to identify the most cited CSFs, which will then be used to create a "Readiness Radar" framework for assessment. Various sources from the World Bank, Economist Intelligence Unit (EIU), Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ; since 2010 a part of GIZ), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Tanzanian internal audit reports, international databases, literature review and interviews will be used to determine the degree (0-100) to which Dar es Salaam's enabling environment meets the "Readiness Radar" for PPP implementation. A detailed description of the methodology begins in Part II.

The research will cover the following steps:

1. Identifying the problem - insufficient FSM.
2. Analysing a potential solution - PPPs for FSM.
3. Gap analysis of private service providers in FSM in Dar es Salaam.
4. Proposal of a partnership model suitable to the current situation that would help to scale up FSM in Dar es Salaam.

Chapter 2: What is Faecal Sludge Management (FSM)?

Over 2.7 billion people use on-site sanitation (OSS) that is unconnected to sewer systems or treatment plants (Rao et al., 2016). OSS is especially prevalent in low- and middle-income countries, where the operational capacity of government utilities is not always sufficient to properly treat the faecal sludge and wastewater that is generated. This inability to properly manage FS has wide-ranging health, social, economic and environmental impacts that has long been overlooked in the face of other crises that get more attention and funding (Annamraju et al., 2001). However, with the Millennium Development Goals (MDGs) and subsequent Sustainable Development Goals (SDGs), proper sanitation has been increasingly put into focus and there have been great strides toward inclusive sanitation in the last decades (Narayan & Lüthi, 2020; Raymond et al., 2016).

This increasing attention in the sanitation sector has created a body of knowledge supported by real world successes and failures that has shifted the thinking from sewer-based systems to OSS, which is better suited for cities with a rapidly expanding population and unplanned settlements (Narayan & Lüthi, 2020; Raymond et al., 2016; Strande et al., 2014). Depending on local conditions, it has been shown that FSM technologies can be five times less expensive than sewer-based systems (Dodane et al., 2012).

The importance of effective FSM is especially evident in Dar es Salaam, where around 90% of the city's inhabitants use OSS, mostly characterised by pit latrines and septic tanks, and a treatment rate of only 7% (Eawag/Sandec, 2015). The Shit-Flow Diagram (Figure 09) below shows the flows of wastewater and FS in Dar es



Figure 07 Sludge drying bed at Kigamboni FSTP (source: Author, 2021)

Salaam. This illustrates the need for effective FSM that addresses the entire service chain, from toilet access to proper disposal. Currently, the private sector is stepping in to try to bridge this gap in service provision through the operation of emptying and transport (E&T) and faecal sludge treatment plants (FSTPs), however a significant gap, especially between poor and nonpoor households, still remains (Jenkins et al., 2015).

2.1 What is Faecal Sludge?

Faecal Sludge (FS) is the mixture of human excreta, water and solid waste (toilet paper, etc.) that accumulates in OSS like pit latrines and septic tanks and is not transported through a sewer (Strande et al., 2015). FS is highly variable in its consistency and depends on diet, length of maturation, and types of user interfaces as well as the collection, treatment and storage parameters (Tayler, 2018). Because it is generally collected at the source and not mixed with stormwater runoff and other pollutants common in sewage, FS has far more potential for secondary uses as fertilizer or energy recovery and with proper FSM, can be a valuable resource to recover costs, create jobs and add to the economy (Bhat et al., 2011; Dodane et al., 2012; Tayler, 2018).

2.2 The Need for Treatment

With the increasing number of OSS systems to make up for the lack of sewerage infrastructure in many low- and middle-income countries, the need for treatment of the resulting FS is only growing (Tayler, 2018). Where the management of FS is lacking throughout the entire service chain, the OSS systems often fill up to a dangerous level and the sludge is

then disposed of in an unsafe manner in nearby open spaces, waterways, storm-water drains or left to be diverted into the environment during the rainy season (Fettback et al., 2021; Strande et al., 2014). The pathogenic nature of FS then creates a threat to the health of both the environment and public health through diseases such as cholera and eutrophication in water bodies (Tayler, 2018).

Furthermore, when analysing the business case of the reuse of FS, it is imperative to have an end-product that is free, or acceptably free, of pathogens and contaminants that could pose a risk to farmers and consumers (Bhat et al., 2011).

The following chapter will elaborate on the characteristics of FS, its need for treatment, the sanitation service chain that involves a variety of stakeholders, as well as the institutional framework and enabling environment necessary to ensure that FS is properly treated and doesn't simply end up back in the environment. This will provide the necessary context to understand the challenges that PPPs are supposed to solve.



Figure 08 Faecal sludge in an unplanted drying bed (source: BORDA, 2021)

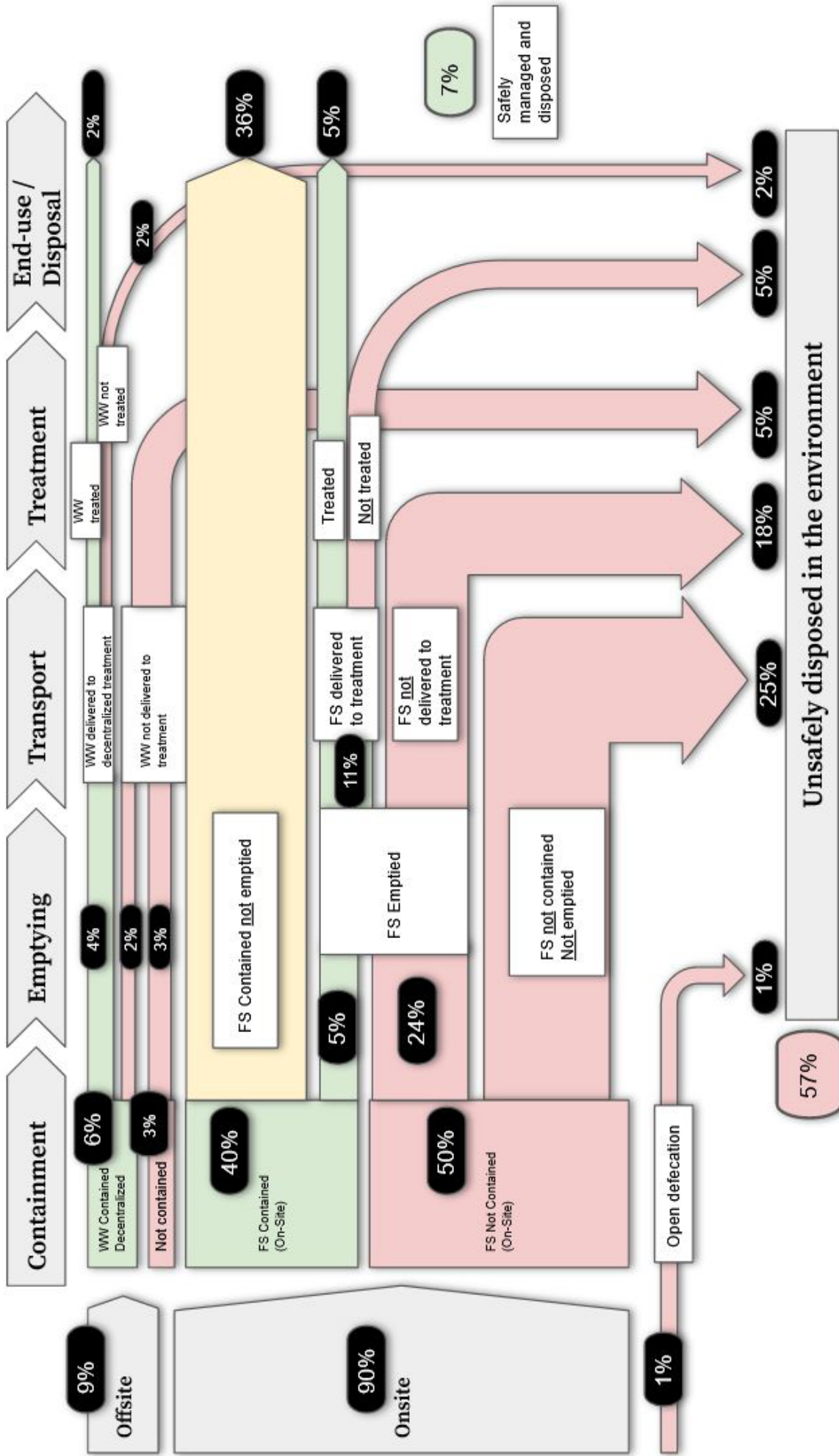


Figure 09 Shit-flow diagram (SFD) of Dar es Salaam, 2015 (source: Author, adapted from Eawag/Sandec (2015))

2.3 Sanitation Service Chain

The sanitation service chain can be seweraged or non-seweraged, and ensures that people are separated from contact with faecal material all the way from the capture to end-use or reuse (Blackett & Hawkins, 2017). Different organisations use slightly different steps in the chain. The World Bank (WB) identifies five links in the chain: user interface/containment, emptying/collection, conveyance, treatment, and end-use/disposal. The Bill & Melinda Gates Foundation (BMGF) “value” chain, which emphasises the resource potential of FS, includes: capture, storage, transport, treatment, and reuse.

Taylor (2018) points out that the BMGF chain is more suitable to OSS where there is generation of FS, and therefore proposes: Capture – Storage – Removal and transport – Treatment – End use/safe disposal. For the purposes of this research, the steps in the service chain that are of relevance are the emptying, transport and treatment (and to some degree reuse), which involve the actors that would be involved in a partnership model with the government. Those actors are the pit emptiers, who operate both formally and informally, vacuum truck owners/operators and the owners/operators of FSTPs.

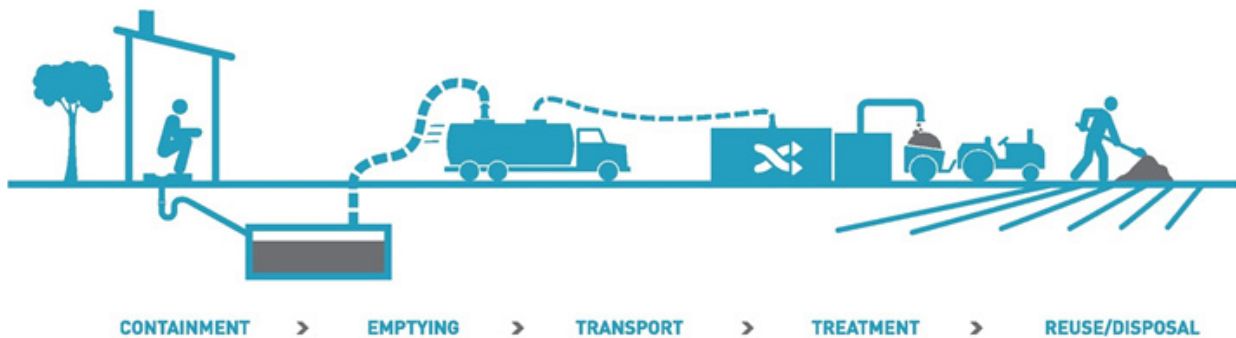


Figure 10 Sanitation service chain (source: Wikimedia Commons)



Figure 11 Vacuum truck servicing a septic tank (source: BORDA, 2021)

2.3.1 Containment

The vast majority of OSS in Dar es Salaam consists of Pit Latrines (58-75%) and Septic Tanks (15-41%), and in unplanned urban areas outside the city centre 97% of residents used pit latrines (Jenkins et al., 2015). Another 9-10% in the urban core is sewerred, but according to DAWASA's Director of Wastewater Management, the percentage is getting smaller all the time as the population continues to rapidly grow, especially in peri-urban areas (E. L. H. Ndibalema, personal communication, March 16, 2021). The final 1-2 percent practice open defecation (Brandes et al., 2015). The predominant user interfaces are squat toilets with direct drop (58%), pour flush (34%) and full flush (6%) (Fettback et al., 2021).

2.3.2 Emptying and Transport

In non-sewered areas with OSS, emptying is a crucial and often overlooked step in the service chain. Without regular emptying, pits can overflow or infiltrate into the groundwater contaminating local water supply and further the spread of disease (Strande et al., 2014). In rapidly growing cities with large, unplanned neighbourhoods, emptying septic tanks and pit latrines can be a challenge (Figure 12). Narrow, winding streets make it difficult or impossible for large vacuum trucks to access them, which creates the need for motorised tricycles equipped with portable vacuum tanks (usually 1m³), or for handheld technologies like the mud pump, trash pump or gulper (Figure 13) (Fettback et al., 2021). Because of the sandy characteristics of much of the soil in Dar es Salaam, many may opt to simply let their FS infiltrate from unlined pits.



Figure 12 Informal and unplanned neighbourhood in Dar es Salaam (source: BORDA, 2021)

Problems can also arise due to the irregular nature of FS, especially in public latrines, that are often mixed together with trash and other solid material that can block the vacuums and be costly to remove (Strande et al., 2014; Tayler, 2018).

Emptying services are provided by formal truck operators and manual emptiers, as well as through informal “frogmen” (Vyura) who usually operate at night and dispose of the FS in nearby pits, waterways or stormwater drains (Fettback et al., 2021). Other illegal methods of disposal include “flooding out” or pit diversion during heavy rains, which is the most commonly observed method followed by vacuum trucks according to Fettback et al. (2021).

There are around 120 vacuum trucks with an average 7.4 m³ capacity currently operating in Dar es Salaam (Fettback et al., 2021). On average, the vacuum trucks do one or two trips per day during the dry season, and three to four during the rainy season collecting between 1,800 m³ to 2,700 m³ of FS per day (Fettback et al., 2021).



Figure 13 Service with the Gulper technology (source: BORDA, 2021)



Figure 14 Service with the motorized “Toyo” tricycle (source: BORDA, 2021)

2.3.3 Treatment

The collected FS is then brought to either a FSTP (Figure 15), illegally emptied in the environment, or brought to a waste stabilisation pond (WSP). There are currently five operating FSTPs throughout the city (Tungi-Kigamboni, Mlalakuwa-Kinondoni, Mburahati-Ubungo, Miburani-Temeke, Temeke-Toangoma) which are designed with the Decentralised Wastewater Treatment System (DEWATS) and can handle between 5 and 10m³ of FS per day.

The ‘DEWATS approach’ was developed by BORDA to meet the need for treatment in areas where FSM is a challenge. Robust and relatively easy to implement, these systems have several advantages (Figure 16) (BORDA, 2017):

1. Can be built, operated and maintained by trained local capacities
2. Require no electrical energy
3. Lower operation and maintenance (O&M) costs relative to conventional wastewater treatment systems
4. Can be integrated into the urban context because of their small footprint and low nuisance (very little smell)

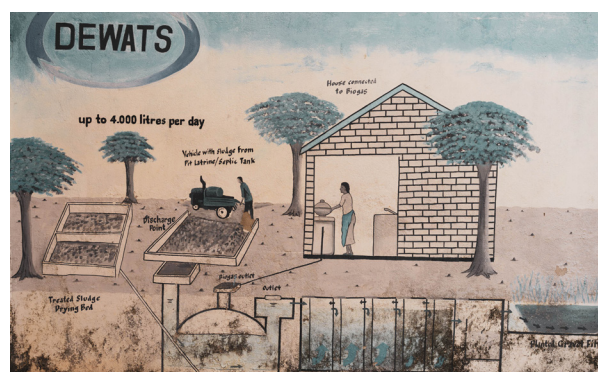


Figure 16 Drawn schematic of a DEWATS at BORDA HQ (source: Author, 2021)



Figure 15 Emptying a vacuum truck at a DEWATS FSTP (source: BORDA, 2021)

There are also a total of nine WSPs in Dar es Salaam that were built before 1990, though only two of them are in operation, Vingunguti and Kurasini, which receive 2,000 m³ and 135 m³ per day, respectively (Fettback et al., 2021). However, these WSPs were built between 1977 and 1979 and are poorly maintained. Originally designed for wastewater, due to a lack of FSTPs, they were also designated for the dumping of FS which allows the improperly treated FS to simply re-enter the environment through the river and into the ocean (Banda-Masanninga, 2020). Simply by looking at the amount collected (1,800-2,700 m³/day) and the amount that is properly treated at the five DEWATS (~40 m³/day), we can estimate that less than 2 percent of collected non-sewered FS is being properly treated.



Figure 17 Waste Stabilisation Pond (WSP) in Dar es Salaam (source: BORDA, 2021)

2.3.4 Disposal/Reuse

While we can see that much of the generated FS is discharged mostly or completely untreated directly to waterways through WSPs, the decentralised approach aims to utilise FS for its resource



Figure 18 Unplanted drying bed at Kigamboni FSTP (source: Author, 2021)



Figure 19 FS being dried for use as soil conditioner (source: Author, 2021)

potential. The by-products from FS can include biogas for cooking, soil conditioner, water for irrigating banana plantations or landscaping, and biochar as a replacement for wood (Bhat et al., 2011; Fettback et al., 2021; Strande et al., 2014). It is this potential for valorisation and the generation of useful resources, and thereby additional income on top of tipping fees for treating FS, that makes the treatment segment of decentralised FSM potentially attractive to the private sector.

2.4 Enabling Environment

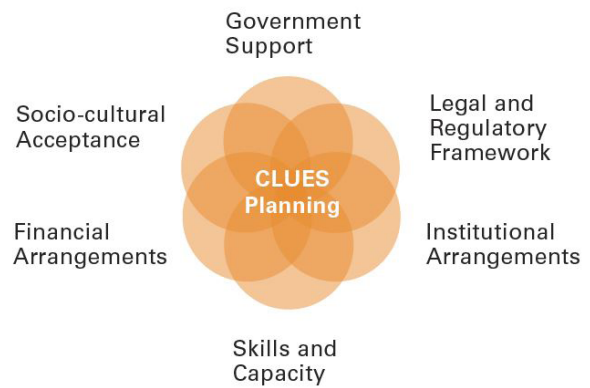
An effective enabling environment includes the interrelated conditions that impact the potential to bring about sustained and effective change (Lüthi et al., 2011). The lack of progress in increasing access to improved sanitation is due largely in part to a poor enabling environment and the failure to look past conventional systems (Reymond et al., 2016). The concept of Citywide Inclusive Sanitation (CWIS) aims to change this by creating a new “approach to urban sanitation, where all members of the city have equitable access to adequate and affordable improved sanitation services through appropriate systems of all scales (sewered and non-sewered), without any contamination to the environment along the entire sanitation value chain” (Narayan & Lüthi, 2020).



Figure 20 FS soil conditioner (source: Author, 2021)

Lüthi et al. (2011) structure the enabling environment in six categories:

1. Government support;
2. legal and regulatory framework;
3. institutional arrangements;
4. skills and capacity;
5. financial arrangements; and
6. socio-cultural acceptance.



Past failures in sanitation, as well as in PPPs, can be attributed to this lack of an integrated approach (Reymond et al., 2016). Therefore to ensure the long-term sustainability of any project that affects society, it is crucial to take all six dimensions into consideration.

Figure 21 Enabling environment for community-led urban sanitation (CLUES) (source: Lüthi et al., 2011)



Figure 22 Aerial view of Mburahati-Ubungo FSTP (source: BORDA, 2021)

Chapter 3: PPPs and their rise to prominence

In this chapter, I will discuss the varied definitions of PPPs, their core purpose and the range of types used for different purposes. I will then take a look at their history and their growing demand, with a look at the current arguments in literature for and against them. Finally, I will look closer at PPPs in the water supply and sanitation sector, their trends and sectoral and geographical distribution.

3.1 An ambiguous term. Defining Partnerships

“...there is often little precision in how ‘partnership’ is used, and belief that what it refers to is ‘a good thing’ seems much more a matter of faith than of science,” (Wettenhall, 2003).

To effectively address the global issue that is climate change, partnerships (despite the imprecision of their use) between societies, businesses, governments and institutions are essential. No one actor can solve the problem alone, and the SDGs won't be able to be met without them, which is reflected in SDG 17 “Partnerships for the goals” (Choi et al., 2020; UN, 2021). But what is meant by “partnerships”, and what kind will be the most effective in this fight?

The Oxford English Dictionary (2021) defines partnership as “a relationship between two people, organizations, etc.; the state of having this relationship.” While this definition captures the essential nature of a partnership, that of a relationship between parties, it limits the number of actors to two. Broadening the definition of partnership, the UN (2021) defines partnerships for sustainable development as “multi-stakeholder initiatives voluntarily undertaken by Governments, intergovernmental organiza-

tions, major groups and others stakeholders, which efforts are contributing to the implementation of inter-governmentally agreed development goals and commitments.”

These “Multi-Stakeholder” Partnerships (MSPs) are considered by the UN (2021) as “important vehicles for mobilizing and sharing knowledge, expertise, technologies and financial resources to support the achievement of the sustainable development goals in all countries, particularly developing countries.”

Goal 17 of the SDGs aims to

“Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development,”

and target 17.17 seeks to

“Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships.”

The indicator for reaching this goal is the “Amount of United States dollars committed to public-private and civil society partnerships” (UN, 2021).

Public-private partnerships are official policy of the UN. So if they are measuring this goal by the money being put into them, what are they exactly?

3.2 An impossible task: Defining Public-Private Partnerships

“... nobody seems to know precisely what they are, yet everyone is talking about them,” (Hodge and Greve, 2005).

Defining the term ‘Public-Private Partnership’, sometimes known as P3 or sim-

ply PPP, has the inherent problem found in defining any overly broad concept, the problem of perspective. Depending on where one stands PPPs can look quite different. PPPs can be made to suit almost any context in which more than one party is involved (Hodge & Greve, 2009). Some consider any partnership between a public and private entity as a PPP. This definition would include things like traditional procurement, where the public entity contracts a private entity to design, build or operate infrastructure. Others view them more rigorously, as contractually tight, bundled, long-term agreements to implement infrastructure (Hodge et al., 2018; Weihe, 2009).

This lack of a clear definition of what a PPP actually is makes them even harder to evaluate, creating an entire corpus of literature on how to define them in order to understand what it is that is being evaluated (Hodge & Greeves, 2005; Weihe, 2009; Haylar & Wettenhall 2010).

Weihe (2009) identified four different research strands in the extant literature in which the term PPP takes on different meanings: the urban regeneration ap-

proach, the policy approach, the infrastructure approach and the development approach. Within these strands the different qualitative meanings do not allow for a logical synthesis into a single authoritative and comprehensive meaning, therefore definitions of PPPs should be relegated to their respective research strands (Weihe, 2009). In other words, PPPs can't logically have a single definition.

Hodge & Greve (2013; 2016) take this beyond the different research strands in the quest for meaning by pointing out that defining PPPs has moved beyond just a way to implement a project, but rather as a phenomenon in itself with five levels of meanings (Figure 23):

1. project,
2. organizational / project delivery form,
3. policy / symbol of private sector role in economy,
4. governance tool or style, and
5. context and culture.

PPPs, they argue, need to be thought of in a more sophisticated way (i.e. the so-

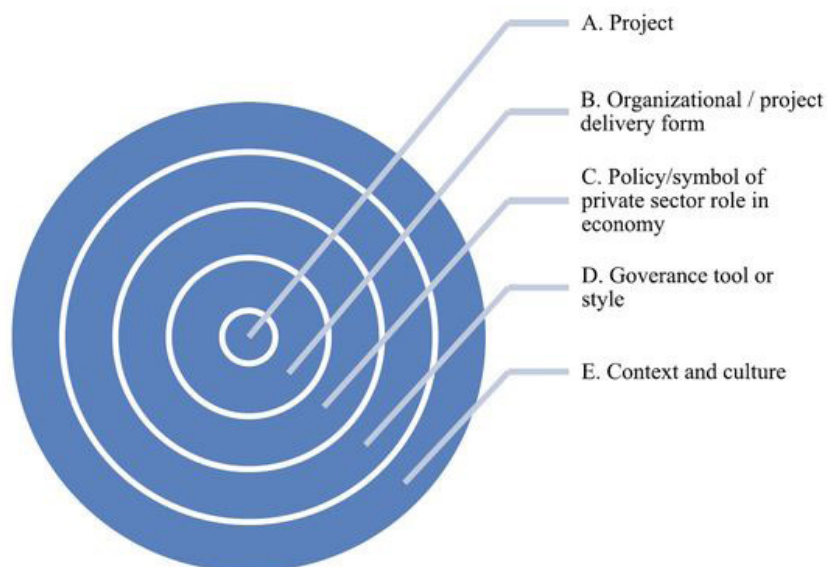


Figure 23 Hodge & Greve's five levels of meaning (source: Hodge & Greve, 2016))

cial-ecological model), with different meanings on multiple levels.

However, while definitions abound and their fundamental meaning is elusive, a review of the literature reveals a number of commonalities in conventional PPPs. These include:

1. A contractual partnership of some length between public and private partners,
2. a certain allocation of risks, and
3. a sharing of the costs, resources and rewards of mutual cooperation (van Ham & Koppenjan, 2001; Wettenhall, 2003; Hodge & Greve, 2007; Weihe, 2009).

Because this thesis concerns the Tanzanian context, the two definitions of primary interest are those from the World Bank, which is actively promoting PPPs in Tanzania, and the Tanzanian government itself. Because official development assistance (ODA) is often used to fund PPP projects (Ens, 2019; Mudde, 2017), it is logical to use the definitions given by the provider and recipient of that aid.

Tanzania's Public-Private Partnership Act (2015) defines PPPs as:

“A contractual arrangement between a contracting authority and a private party in which the private party:

- *(a) undertakes to perform a contracting authority's function on behalf of the contracting authority for a specified period;*
- *(b) assumes substantial financial, technical and operational risks in connection with the performance of the contracting authority's function or use of government property in accordance with agreed output specifications;*

- *(c) receives a benefit for performing the contracting authority's function or from utilizing the public property, either by way of:*
 - *(i) consideration to be paid by the contracting authority which derives from a revenue fund or where the contracting authority is a central government or local government authority, from the revenues of such authority;*
 - *(ii) charges or fees to be collected by the private party or an agent from users or customers; or*
 - *(iii) a combination of consideration and charges or fees.*

The World Bank (2021) defines them more simply as:

“a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility and remuneration is linked to performance” (World Bank PPP Knowledge Lab, 2021).

According to the World Bank (2021), “the term should always be long enough for the private party to have an incentive to integrate service delivery costs considerations into the design phase of the project.” This is to ensure that the trade-offs between the initial investments cost and future maintenance and operation costs are optimized, with an emphasis on the “whole-life” of the project. This should in theory maximize the efficiency of service delivery because the party responsible for delivering the service is also responsible for the quality of the infrastructure and has an inherent interest in keeping everything up and running.

Though legally defined, confusion remains in both the private and public sectors in Tanzania (and elsewhere) about what a PPP really is. A study by Bengesi (2016) looking at the perceptions of PPP projects in Tanzania identified this discrepancy, stating “Some view PPP as being applicable only when there is private investment, while others contend that PPP includes all forms of interactions between the public sector and private sector; from consultations or policy dialogues and collaborations to private provision of assets and services.” It is this broad, overlapping view of what PPPs are that contributes to much of the confusion surrounding them.

3.3 PPP types and classifications

Alongside the difficulty in defining PPPs, scholars have also had a hard time classifying them. Attempts have been made to sort PPP projects according to the partnership structure and the degree of interaction between private and public entities; ownership of assets; project purpose; policy objectives; and the degree of transaction costs (Nizkorodov, 2017). Though these classifications give flexibility, they can also lead to false comparisons and inaccurate generalizations – a fundamental issue with PPPs.

While there are many types of PPPs, this research will focus on infrastructure PPPs, that is, PPPs that are used to design, build, finance, operate and/or maintain the “basic physical and organizational structures” needed to make economic, social, and government activity possible (Oxford English Dictionary, 2021). Due to the focus of this thesis on the types of PPPs used in the WSS sector in low-income countries, the following definitions

are adapted from the World Bank’s PPP Knowledge Lab. The World Bank as one of the major proponents of PPPs, and their widely cited Private Participation in Infrastructure Advisory Facility (PPIAF) database that tracks PPP projects in low- and middle-income countries, helps to ensure at least a consistency of analysis of PPP types and subtypes, if not total accuracy (see chapter 4.4).

According to the World Bank’s PPP Knowledge Lab (2021):

PPP can be described in three broad parameters:

1. Asset type;
2. functions of the private party; and
3. how the private party is paid.

Asset Types: Can be divided into contracting a private entity to build new projects (greenfield), or the rehabilitation of already built public infrastructure (brownfield). Examples of greenfield projects include new FSTPs, hospitals, or wastewater treatment plants. Examples of brownfield projects include upgrading a sewerage network, or taking over a water distribution system and adding connections.

Functions of the private party: The functions of the private party can vary greatly, depending on the sector and current needs of the government. The typical functions include:

- Design - involves developing the project from initial concept and output requirements to construction-ready design specifications.
- Build, or Rehabilitate - when PPPs are used for new infrastructure assets, they typically require the private party to construct the asset and install all equipment. Where PPPs

involve existing assets, the private party may be responsible for rehabilitating or extending the asset.

- Finance - when a PPP includes building or rehabilitating the asset, the private party is typically also required to finance all or part of the necessary capital expenditure.
- Maintain - PPPs assign responsibility to the private party for maintaining an infrastructure asset to a specified standard over the life of the contract. This is a fundamental feature of PPP contracts.
- Operate - the operating responsibilities of the private party to a PPP can vary widely, depending on the nature of the underlying asset and associated service. For example, the private party could be responsible for:
 - » Technical operation of an asset, and providing a bulk service to a government off-taker – for example, a bulk water treatment plant
 - » Technical operation of an asset, and providing services directly to users – for example, a PPP for a water distribution system
 - » Providing support services, with the government agency remaining responsible for delivering the public service to users – for example, a PPP for a school building that includes janitorial service (PPP Knowledge Lab, 2021).

Payment: There are two types of common payment schemes in PPPs. The first is a “user-pays” system, in which the end-user pays a private service provider for the service, for example, a toll-road or for water provision. These types of schemes, especially in the water sector, are often supported by the government through subsidies, either to ensure enough profit for the private partner, or to increase service provision in poorer areas that would otherwise be ignored due to a lack of customers who can afford the service (PPP Knowledge Lab, 2021).

The second type is a “government-pays” system, in which the government is the sole source of income for the private service provider who meets contractually agreed upon standards for a service output. These can be in the form of “availability payments”, in which a PSP is paid for keeping the asset available and functioning (e.g. a free highway), or “volume-based payments”, in which a service is paid for by the amount produced (e.g. electricity or water) (PPP Knowledge Lab, 2021).

Both of these payments are performance-based to ensure that the PSP has an incentive to provide high-quality service and will incur heavy termination payments if the project is cancelled.

These contract types exist on a continuum of increasing private sector participation, in which increasing risks taken on by the private sector should lead to greater rewards (Figure 24).

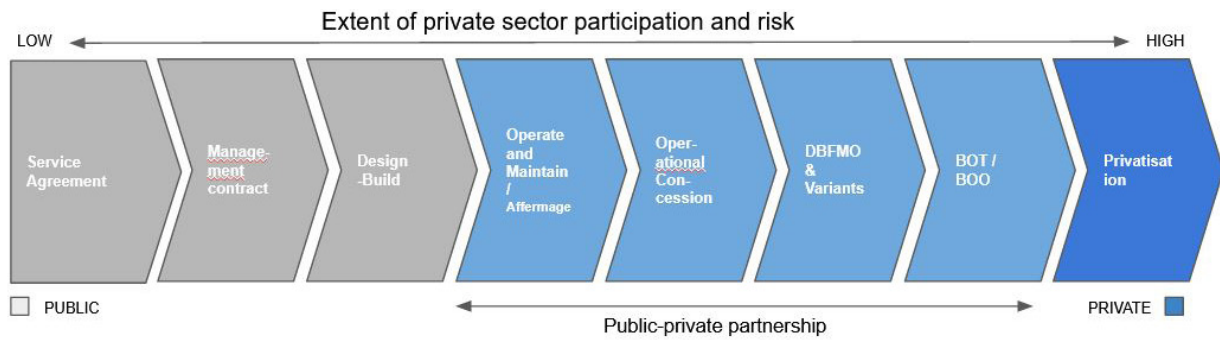


Figure 24 Continuum of private sector involvement and risk (adapted from World Bank, 2021)

There are a wide array of contractual arrangements that can be mixed and matched according to need (BOT, BTO, DBO, DBOM, DBOFM, etc.), therefore the following table mentions the most relevant types for the WSS sector (Table 02).

Partnership Type	Private Sector Duties	Contract length	Ownership of asset	Responsibility Finance Design/Build Maintain/Operate	Typical profit/payment mechanism for operator
Service Agreement	Perform emptying & transport of FS	0-2 years	Public	Public Public Public	Fee from user or contracting authority
Management Contract	Supplies management services to the utility in return for a fee	2-5 years	Public	Public Public Private	Fixed fee + bonus usually covers manager's salaries and related expenses
Design-Build	Design & build FSTP	0-5 years	Public	Public Public Public	Fee from contracting authority
Operation and Maintenance Agreements / Affermage	Operate and Maintain FSTP	5-15 years	Public	Public Public Private	Fee x volume of water sold/treated
Operational Concession	Runs the business, finances investment	10-15 years (and longer)	Public	Public Public Private	Revenue from users minus concession fee
DBFMO and variants	Designs, builds, finances, maintains and/or operates asset for the period of the contract	15-30 years (and longer)	Public (or private transferred to public at end of contract)	Private Private Private	Availability and volumetric payment from either Contracting Authority or end users
BOT	Builds, operates and transfers asset back to the government at the end of the contract	15-30 years (and longer)	Public (or private transferred to public at end of contract)	Private Private Private	Availability and volumetric payment from either Contracting Authority or end users
BOO	Builds, operates and owns the asset in perpetuity	15-30 years	Private	Private Private Private	Availability and volumetric payment from either Contracting Authority or end users
Privatisation	Full duties of running the business	unlimited	Private	Private Private Private	Availability and volumetric payment from either Contracting Authority or end users

Non-PPP	PPP	Full privatisation
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Table 02 Common contractual arrangements in the WSS sector (adapted from GTZ, 2010)

Now that we've taken a look at the breadth and variety of PPPs, let's take a step back and look at the theoretical context of PPPs in society from a public administration (PA) perspective.

3.4 PPPs in the Public Administration (PA) context

Public-Private Partnerships have had a remarkable rise in popularity over the last several decades. This rise has largely coincided with, and could even be considered a fundamental aspect of, the shift of governments and international financing institutions (IFIs) toward the neo-liberal theory of New Public Management (NPM) (Rakić & Rađenović, 2011). NPM is characterised by the transfer of business management and market principles from the private into the public sector, ranging from partial to full privatisation of public services (Drechsler, 2005). NPM functions under the assumption that all human behaviour is motivated by self-interest and in particular, profit maximization (Drechsler, 2005; Roberts, 2010).

NPM grew out of the same thinking that was outlined in the Washington Consensus, a term coined by economist John Williamson in 1989, that was a set of prescriptive views about effective development strategies associated with the Washington-based institutions: the IMF, the World Bank, and the US Treasury (Serra & Stiglitz, 2008). The main focus of the consensus was that privatisation, market liberalization and macroeconomic stability, in short "the market" can solve most, if not all, economic problems on its own (Serra & Stiglitz, 2008).

NPM and neoliberalism in general has been widely disputed since the mid-2000s

and subsequent crash of the world's financial markets in 2007/8 in favour of other forms of public administration (PA) such as New Public Governance (NPG) and Neo-Weberian State (NWS). These theories of governance put an increased importance on the role of regular, transparent government and bureaucratic due processes that typically eschew the notion that privatisation is a cure-all.

However, many of the ideologies that were inherent to NPM, such as low-cost, efficiency and speed, have remained embedded in the official policy of banks and governments (Drechsler, 2005; Flyvbjerg 2005). While the efficacy of NPM has been soundly challenged, its ideology, namely treating the government like a business, is still alive and well in the conventional PPP concept. So how did PPPs rise to prominence, survive multiple global financial crises and make their way into official UN policy?

3.5 PPPs, a brief history

Though today's PPPs are a modern capitalist phenomenon, partnerships between the private sector and governments have been in use for centuries in countries around the world (KS et al., 2016). Forms of PPPs were implemented in Egypt, France, the United States and elsewhere to build railroads, highways, ports and electric grids (Klein, 2015). The involvement of the private sector in public works can even be traced back to Roman toll roads, baths and markets (Forrer et al., 2010; KS et al., 2016).

However, the modern rebirth of PPPs first began in the 1970s as a critique of government inefficiency and the perceived poor performance of state-owned

enterprises (SOEs), and were seen as a means to downsize the role of the government (KS et al., 2016). In the 1980s the Netherlands began to implement a slate of PPP projects (Van Ham & Koppenjan, 2014), and by the 1990s modern PPPs that relied heavily on private finance came to fruition in the United Kingdom.

In 1992, the conservative government in the UK led by Prime Minister John Major launched the Private Finance Initiative (PFI), which aimed to reduce the budget deficit by promoting PPPs (Wettenhall, 2003). In this way, upfront investments in infrastructure were financed by the private rather than the public sector, with other future costs (such as transfer of assets or maintenance) not put on the books (Hall, 2015).

This type of creative accounting has later been condemned and even banned in some countries (Boardman et al., 2016). In 1997, Prime Minister Tony Blair and the New Labour Party continued the expansion of the PFI by creating a dedicated semi-independent PPP unit, Partnerships UK, which was instrumental in making PPPs both the preferred terminology and tool of choice in infrastructure projects in the UK (Wettenhall, 2003), accounting for around 12% of total capital expenditure throughout Blair's tenure (Burger & Hawkesworth, 2011).

Once the apparently successful PFI took off, other countries around the world followed suit, notably in Australia, South Korea, France and Germany (Burger & Hawkesworth, 2011). The simplicity of the name, evoking civil duty and the generally positive role of partnerships, was a PR success story, avoiding the connotation of cynical self-interest and profiteering inherent in 'Privatization' and shifting it to a

term that claims all of its advantages and none of its condemnations (Wettenhall, 2003; Klein, 2015).

This "success story" then began to gain steam not only in developed economies, but in the developing world as well. In 2015, in parallel with the UN SDGs, the Addis Ababa Action Agenda (AAAA) of the Third International Conference on Financing for Development was launched. This agenda promoted blended finance (a mix of public and private financing) and "provides a new global framework for financing sustainable development by aligning all financing flows and policies with economic, social and environmental priorities" (UN DESA, 2015).

This agenda, and SDG 17.17, solidified PPPs as official UN policy. Their promise to "build capacity to enter into public-private partnerships, including with regard to planning, contract negotiation, management, accounting and budgeting for contingent liabilities," has had a direct impact on the number of new PPP laws in developing countries around the world (United Nations, 2015b). Through this financing scheme, the UN hopes to bridge the massive funding gaps necessary to supply the infrastructure needed in developing countries.

Chapter 4: The Supply and Demand for PPPs and Infrastructure

The demand for infrastructure is enormous, especially in Africa. The current infrastructure investment gap in Africa is \$3.3 trillion USD, \$251 billion of which is the gap in water infrastructure (Global Infrastructure Hub, 2021)*. The funding gap is even larger when accounting for the costs associated with meeting the SDGs (Figure 25).

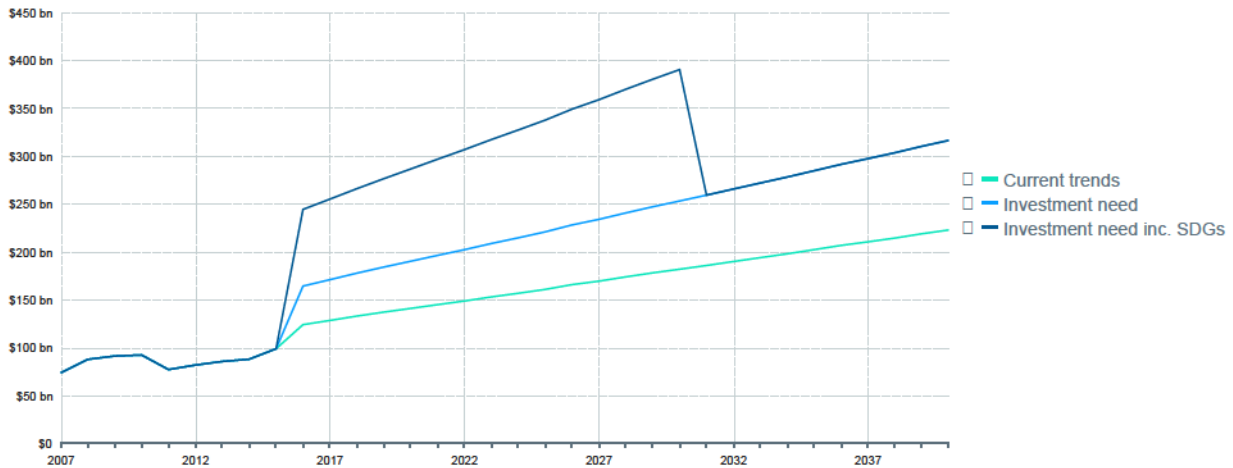


Figure 25 Infrastructure investment gap in Africa (source: GI Hub, 2021)

The lack of new and reliable infrastructure assets and services can hamper growth, especially in developing regions in Africa (Mourgues & Kingombe, 2017). According to the World Bank (2018a), poor performance of infrastructure is often the result of insufficient spending; poor planning, insufficient inter-ministerial policy coordination and weak analysis; corruption and the pursuit of political gain; and poor maintenance – all of which can be observed in Tanzania.

During my research in Dar es Salaam, I experienced an average of 4 power outages a week, ranging from 30 minutes to 5 hours. Getting work done, especially when so much of it has moved online, was a challenge. Tanzania experiences close to 60 hours of power outages per month which result in a loss of around 12 percent

of business sales (Rentschler et al., 2019). Furthermore, frequent urban flooding caused by a lack of effective drainage systems destroys both public and private assets and brings life to a standstill, increasing the risk of water-borne diseases from inadequate sanitation systems and forcing firms to invest in expensive coping measures like water tanks and diesel generators (Rentschler et al., 2019). According to Rentschler et al. (2019), “Overall, the lack of effective drainage systems and reliable transport and electricity systems is a defining factor of the urban economy, influencing the investment and risk-taking behaviors of all”.

Infrastructure development has long been seen as the means for addressing these challenges and achieving economic growth (Kodongo & Ojah, 2016). However,

*The Global Infrastructure Hub is a G20 Initiative that estimates the need for funding in 56 countries around the world. It is an estimate of the gap including all the years from now (2021) until 2040.

er, there have been critical challenges to this “myth”, and evidence is mixed if high levels of investment in infrastructure automatically lead to sustained economic growth (Ansar et al., 2016). Ansar et al. (2016) found that large-scale infrastructure projects typically don’t bring a positive risk-adjusted return and “overinvesting in unproductive projects results in the build-up of debt, monetary expansion, instability in financial markets, and economic fragility.”

Using evidence from several hundred projects in 20 countries, Flyvbjerg (2005) proposed that “in order to get an infrastructure project built a ‘Machiavellian’ formula is followed:

- (under-estimate costs)
- + (over-estimate revenues)
- + (under-value environmental and social impacts)
- + (over-value wider economic development effects, or spillover effects)
- = (win project approval).”

With these strategies resulting in a ‘survival of the unfittest’ by which the ‘worst infrastructure gets built’ (Ansar et al., 2016; Flyvbjerg, 2005).

The same pitfalls that occur in infrastructure projects in general are the same problems that can plague PPPs, which can go wrong in a number of different ways when they aren’t properly prepared (Boardman et al., 2016; Romero, 2018). These usually occur as a result of investors ‘miscalculations’, deceptive techniques of assessing VfM and manipulations of risk transfers (KS et al., 2016; Mourgues & Kingombe, 2017).

The need for infrastructure is real, and investment in it can have very positive ef-

fects on society. However, it is crucial that projects are targeted and necessary, with realistic cost/benefit assessments that are free from manipulation (Flyvbjerg, 2005; Wettenhall, 2003).

4.1 The difference between PPPs and traditional procurement

By now, one may wonder how PPPs are any different from traditional procurement (TP). After all, governments have been working with the private sector for centuries to build large infrastructure projects often through contracting out of construction and/or services. There are key differences, however.

PPPs are usually focused on outputs rather than inputs, which are often performance-based (amount of FS treated or water delivered rather than treatment capacity or length of pipe laid) (Sulser, 2018). They are also supposed to factor in the whole life of the project because of the lengthy nature of the contracts. If a firm in charge of designing and building a FSTP also has to maintain it, they have more incentive to build with better quality to reduce maintenance costs down the road. The fact that the private party is supposed to take on substantial financial risk, also gives an incentive to reduce cost overruns and ‘appraisal optimism’ – that is, underestimated costs and timeframe and overestimated benefits – which are a common problem in TP (Trebilcock & Rosenstock, 2015).

There also exists a fundamental difference in the relationship structure between the public (principle) and private (agent) parties in PPPs and TP. In traditional procurement, a vertical relationship takes place (Figure 26), in which the principle

contracts the agent(s) to typically design and/or build infrastructure and pays them for services rendered (Nizkorodov, 2017; Wettenhall, 2003). The ownership of the asset remains with the principal throughout the entire project life cycle and the public party can end the relationship with a private party at any time.

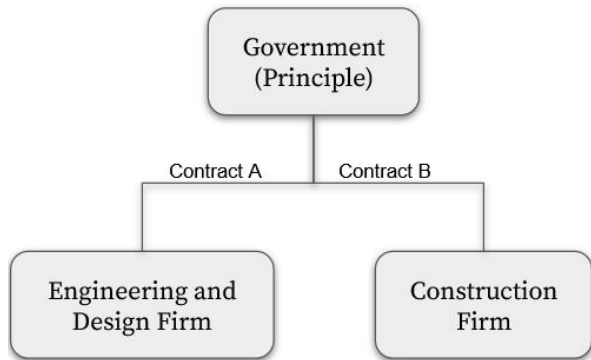


Figure 26 Vertical relationship typical in TP (Author, 2021)

In PPPs, however, the relationship is horizontal (Figure 27), with both parties involved in consensual decision making and no one party allowed to unilaterally end the relationship (Nizkorodov, 2017; Weihe, 2009; Wettenhall, 2003). In theory, this puts the partnership on an even footing, with decision-making power

spread out among the parties. However, the consequence of this distribution of powers has a notable downside. As the public entity is no longer free to make decisions that solely benefit the public, but also has to honour contractual obligations to the private party, this sometimes ends in years-long legal battles, international arbitration and/or the public entity being forced to pay for services that were forecasted with unrealistic demand, as was the case with the Tanesco Graft-Taints Power Purchasing Agreement and the City Water PPPs in Tanzania (Farlam, 2005; Triche, 2012).

These horizontal relationships also entail a shift toward more responsibilities for the private party. Hodge et al. (2010), points to increased preference for private finance arrangements, highly complex contractualisation and ‘bundling’ of multiple phases of infrastructure (design, build, operation) as well as altered governance and accountability assumptions as the main differences between TP and PPPs. The next section will further discuss some of these differences.

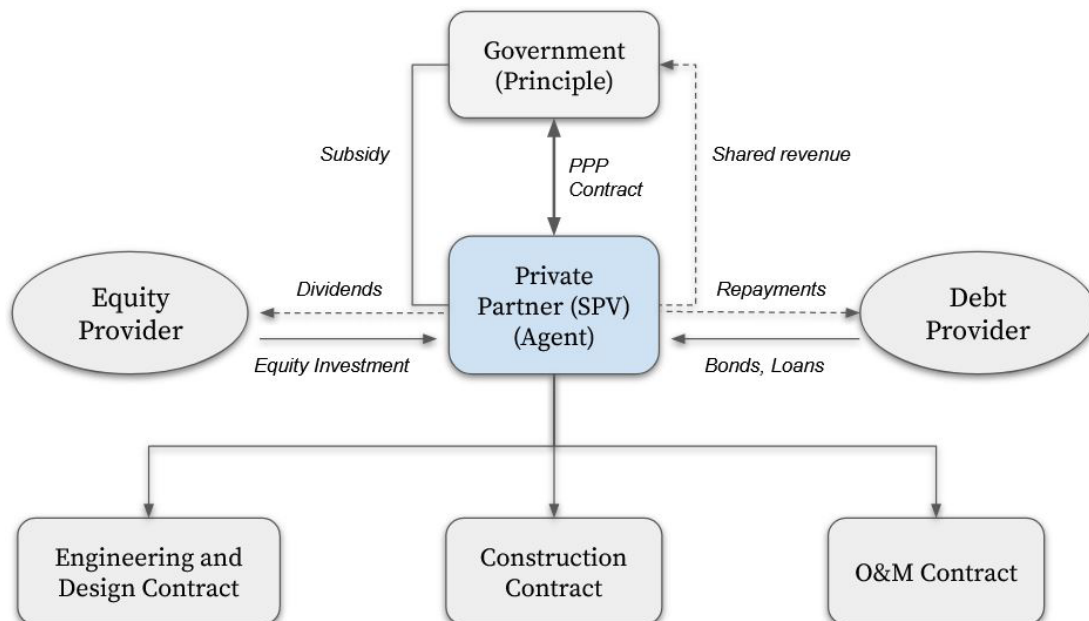


Figure 27 Horizontal relationship typical in PPPs (Adapted from Nizkorodov, 2017)

4.2 Financial Arrangements (PPP v. TP)

The funding for PPPs can come from a wide variety of sources and the fact that PPPs can attract private investment are one of their key attractions to governments (Hayllar & Wettenhall, 2010; Sulser, 2018; Yurdakul et al., 2021). While it is largely assumed that most of the upfront investment costs in PPPs come from the private sector, in reality, financing comes from a variety of sources of which private financing (sponsor equity, commercial bank debt and institutional investors) is only around 60 percent, with the remaining 40 percent funded by development banks and the public sector (Chao, 2016). This is especially true in the WSS sector, which due to its nature as both a social and economic good makes it more difficult to profit from (especially sanitation) and usually requires some form of government support or subsidy (Wu et al., 2016).

While it is not the only kind of partnership structure, Special Purpose Vehicles (SPVs) are the most common partnership arrangement and are formed by the private consortium as a shareholder's agreement solely for the purpose of a given project (Li et al., 2005; Sulser, 2018; Weihe, 2009). These newly created entities then handle the contracts and cash flow, acting as a buffer in case the project fails, protecting the individual partners from liabilities while allowing the public entity to maintain control of the assets (Trebilcock & Rosenstock, 2015; Nizkorodov, 2017).

The fact that both the private and public entities are somewhat shielded from the risk in case of project collapse, lenders often give greater scrutiny to PPPs than TP

and charge a higher risk premium (Trebilcock & Rosenstock, 2015). This greater scrutiny in turn should lead to sounder projects which promise better returns on investment.

But PPPs require a great deal of scrutiny not only from lenders. Due to the bundled nature of the project finance model, a typical SPV has over 40 contracts which require a significant and costly amount of monitoring – ranging between 3-5 percent of project costs for typical projects to 10-12 percent for pioneering projects (Sawant, 2010). Due to the relative inexperience with PPPs in developing regions and SSA, it is reasonable to expect the contract management costs in countries like Tanzania would be at the upper end of this range (Yescombe, 2007).

Due to developing countries relative inexperience with PPPs, private parties are often able to shift risk back on to the public party (Trebilcock & Rosenstock, 2015). Furthermore, because lenders interests are aligned with the private parties, they have an incentive for renegotiations that favour the private consortium (Yescombe, 2007).

These complicated financial arrangements can add years to the process of getting a project up and running, and while they have the potential to shift financial burdens to the private sector, what ends up happening in developing countries with a greater degree of information asymmetry can be quite different, and quite costly in terms of money and time (Pessoa, 2010).

4.3 The VfM of PPPs vs. Traditional Procurement

When governments are faced with the decision to use PPP or traditional procurement, a popular decision making method is to compare it with a risk-adjusted private sector comparator (PSC) to determine the value for money (VfM) of each method (Burger & Hawkesworth, 2011; Leigland, 2018). The VfM of PPPs is often the main rationale for implementing them - the promise that they provide greater value for money, i.e. increased optimisation of whole-of-life costs and quality of goods or services as compared to traditional means of service delivery (Burger & Hawkesworth, 2011; Leigland, 2018; Weihe, 2009). According to a survey of 22 OECD and non-OECD middle-income countries by Burger & Hawkesworth (2011), 17 out of 22 used PSCs to assess the VfM of PPPs.

However VfM can be a nebulous concept that is measured differently by different governments, either through using varying formulas for determining discount rates or risk adjustment factors (Hodge & Greve, 2016). By adjusting for risk, some critics say that PSCs are subject to inaccuracy and manipulation and act more as an expensive way to validate the “pre-selected choice of private participation” (Leigland, 2018). The consultants and experts who run the comparisons are often employed at multinational consultancy companies like PriceWaterhouseCoopers or McKinsey, who have a vested interest in promoting more private sector involvement (Desgrees Lou, 2012; Hall, 2015; Nizkorodov, 2017).

While there can be room for vested parties to put their thumbs on the scale in favour of PPPs, running cost benefit anal-

yses of large infrastructure projects, PPP or not, are notoriously difficult. However, the estimations often seem to work out in the favour of those who want to implement the project. According to Flyvbjerg (2005), a survey of 58 large rail projects (a mix of private and public projects) costs were underestimated by an average of 45 percent, and demand was overestimated by 51 percent. Whether this is due to ‘Optimism Bias’, ‘Strategic Misrepresentation’, a mixture of faulty techniques, or a lack of sufficient data, the story is the same – comprehensive cost benefit analyses are difficult and prone to error (Flyvbjerg, 2005).

This is even more pronounced in developing regions where sufficient long-term data is sometimes non-existent. Without this data, “calculating with any accuracy how much a project will cost over 25 to 30 years of operation is almost impossible,” (Leigland, 2018).

In any case, clear policies as well as a legal framework and technical capacity to evaluate the VfM of PPPs are necessary to avoid the most consequential mistakes, the cost of which are usually felt years later (Loxley, 2013). Loxley (2013) goes on to caution governments to be wary of “international institutions, such as the AfDB, AU, UNECA etc., which uncritically promote PPPs...” and that a healthy scepticism of PPPs would help to “resist further encroachment of private capital on public sector activities,” and that they should focus “first on improving public sector efficiency and on raising local tax capacity.”

4.4 The role of PPPs in the water supply and sanitation sector

While PPPs have become an important tool in the infrastructure development toolbox, they account for a relatively small proportion (15-20 percent) of overall spending on PPP and non-PPP infrastructure (Leigland, 2018). Within the world of PPPs, the number of WSS PPPs is even smaller, at around 13.4 percent, though it is the third largest PPP sector by number of projects, following electricity (46.8 percent) and roads (14.5 percent) (PPI Database, 2021) (Figure 28).

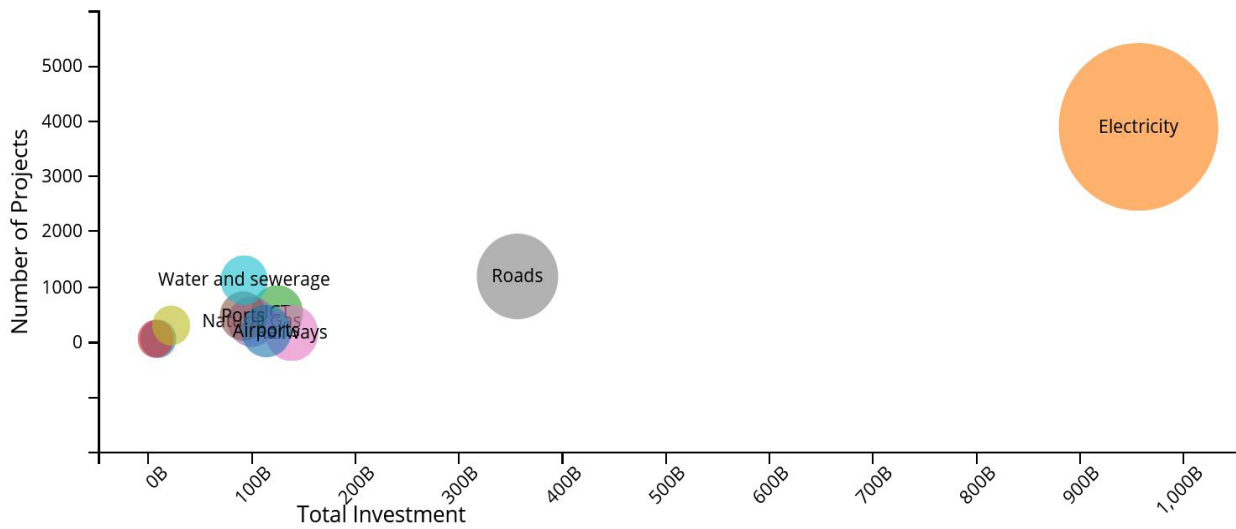


Figure 28 Distribution of PPP projects in low, lower-middle, and upper-middle income countries by investment and number, all sectors, worldwide (source: PPI Database, 2021)

There are a number of reasons that make the WSS sector a challenging environment for PPPs. The most obvious, perhaps, is that companies are less interested in WSS PPPs due to smaller profit margins than can be found in other large infrastructure projects (Jensen, 2017; Menard, 2011). This is due to large fixed-costs for expanding the water network with returns that only accrue over long periods of time, in addition to large percentages of non-revenue water (NRW) – water lost

through leakages, lack of monitoring, illegal connections etc. – which are a common occurrence in developing countries (Wu et al., 2016). This was a major factor in the failure of Dar es Salaam’s sole WSS PPP which was unable to effectively reduce the amount of NRW that exceeded 50 percent in 2010 (Triche, 2012).

Increasing pushback from the public against the privatisation of water and sanitation is another important factor (Menard, 2011). The fact that water is both an economic resource and a fundamental human need, any attempt to treat it solely

as a source of profit for private companies is bound to attract social and political criticism (Wu et al., 2016). Because water is essential for life, and can’t be substituted for anything else, water provision is also a natural monopoly – and thus requires significant amount of regulation if it is to be in the hands of the private sector (Finizola e Silva et al., 2020; Wu et al., 2016).

The inherent tensions between the flexibility required to meet the challenges of a changing environment and the reg-

ulation necessary for an essential public service have caused many projects to fail or never come to fruition in the first place (Jensen, 2017).

Furthermore, when attempting to calculate the VfM at the initial stages of a project, assessing the condition and value of existing subterranean assets is difficult, adding another element of uncertainty in the calculations that can lead to a higher risk assessment, and thus demand for higher returns from the private partner (Finizola e Silva et al., 2020; Wu et al., 2016)

The following sections will take a closer look at the distribution and trends of PPPs, with a narrowing focus on PPPs in the WSS sector and those from developing regions. But first, a note about the databases used to catalogue them.

4.5 PPP Databases

There are a handful of databases that collect information about PPPs for reasons of research, transparency and/or to promote private investment in infrastructure financing (Prats et al., 2018). These include World Bank's Private Participation in Infrastructure Project Database, the Global Infrastructure Hub Project Pipeline, IJ Global PPP Projects Database, and InfraPPP Database of PPP Projects, with the latter two having data available only behind a paywall.

The Global Infrastructure Hub Project Pipeline, a G20 initiative headquartered in Australia, has detailed information on individual projects though it has far fewer projects in general compared to other databases. The World Bank's PPI Database's purpose is "to identify and disseminate information on private participation in

infrastructure projects in low- and middle-income countries" (PPI Database, 2021). The data is publicly available and contains information dating from 1984 on 8316 projects worth \$1,987.903 billion USD.

This database is one of the most commonly cited and accessible databases on PPPs available, however it is not without its limitations. According to the World Bank's PPI Database (2021) website, "the database relies on public sources which in most cases provide a good picture of contracts but in some cases may not be accurate or contain all the required information." Furthermore, many local or small-scale projects are omitted because they are not publicly reported (PPI Database, 2021). And while the World Bank doesn't include management and lease contracts in their definition of PPP, they are included in the database regardless and make up 12.8% of the number of contracts and almost 15% of total investment (PPI Database, 2021). Perhaps they are included as a point of comparison, or because many view these as "light" PPPs, this should nonetheless be noted when looking at the larger picture of investment and distribution.

However, even with these limitations the database offers the most comprehensive overview of PPPs in the developing world that is free and publicly available. It is also important to note that while Tanzania has recently moved up to lower middle-income country (LMIC) status, the PPI database still considers Tanzania a low-income country (LIC) (PPI Database, 2021; World Bank, 2021d). The following sections will give an overview of the trends and distribution of PPPs by sector and region, with an emphasis on WSS and low-income countries.

4.6 Distribution and Trends in the PPP market

According to the PPI database (2021), a total of 8316* (7248 not including Management and Lease Contracts) projects worth almost 2 trillion USD have been implemented as some form of PPP since 1984. The popularity of PPPs as infrastructure delivery has waxed and waned over the years, peaking in 1996 and 2012, and is currently on a downward trend (Figure 29).

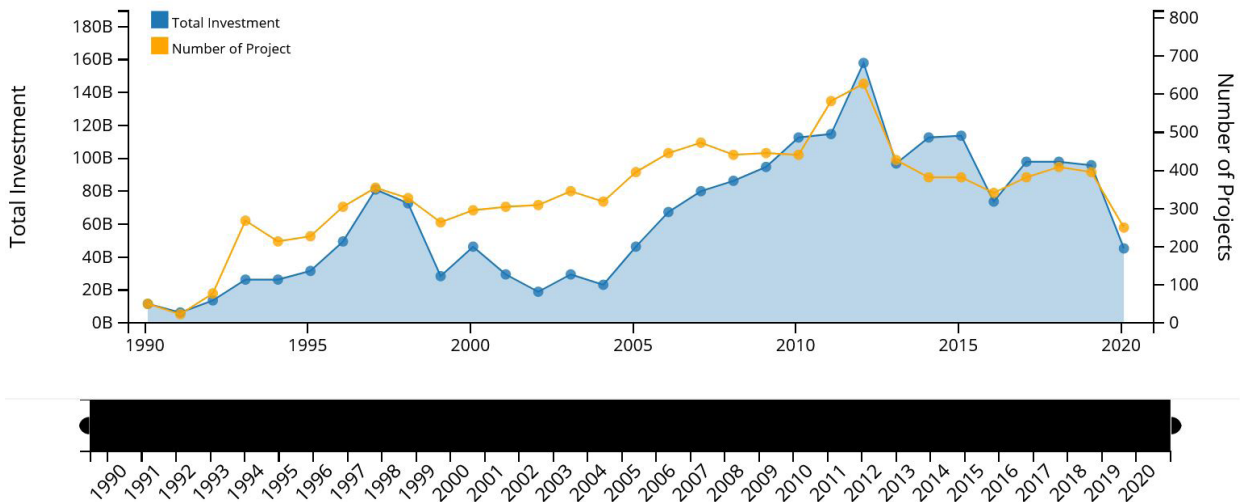


Figure 29 Distribution of PPP projects by investment and number of projects over time (source: PPI Database, 2021)

4.6.1 Distribution by sector

The biggest sector by number and value is the electricity sector (46.8 percent), followed by roads (14.5 percent) with WSS the third largest sector by number of projects (1117 out of 8316 or 13.4 percent) (Figure 30) (PPI Database, 2021).

In terms of value, the electricity sector has garnered the most investment (\$956,569.172 M USD), with roads attracting the second highest (\$356,561.670 M USD), followed by railways (\$138,576.540 M USD), Information and Communications Technology (ICT) (124,523.472 M USD), Airports (\$113,969.840 M USD), WSS (\$92,537.424 M USD) and Ports (\$91,666.410 M USD).

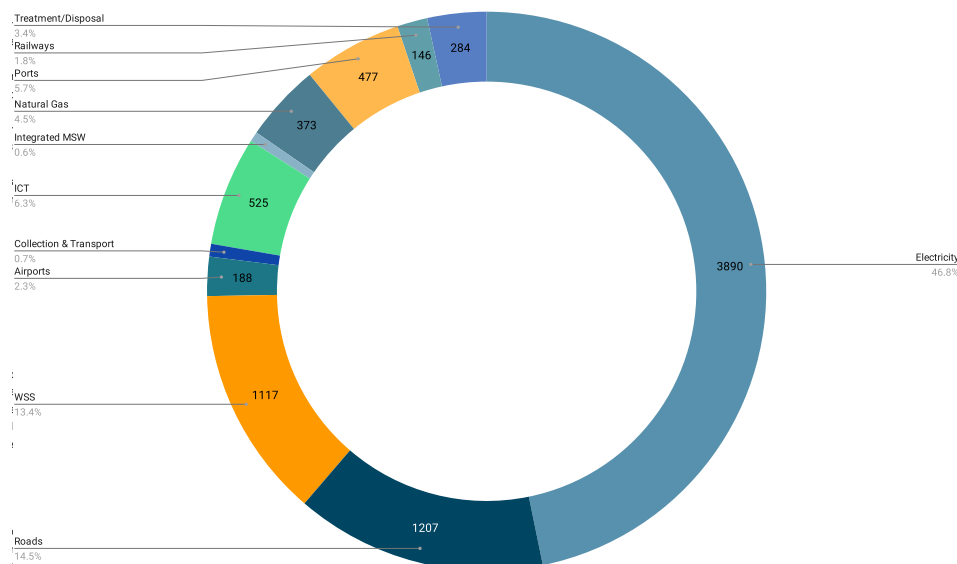


Figure 30 Distribution of PPPs by sector, worldwide (source: Author, 2021; Data: PPI Database, 2021)

4.6.2 Distribution by income group

When looking at the utilisation of PPPs by income level, it is evident that they remain a mostly upper-middle income (UMIC) phenomenon, with only 2.5 percent of PPPs coming from low-income (LIC) countries (Figure 31). Furthermore, only 5 percent of PPPs come from the SSA region, and 22 percent of those are from South Africa, an upper middle-income country (PPI Database, 2021). When looking at the number of WSS PPPs in low-income countries the number is even smaller, at less than 1 percent.

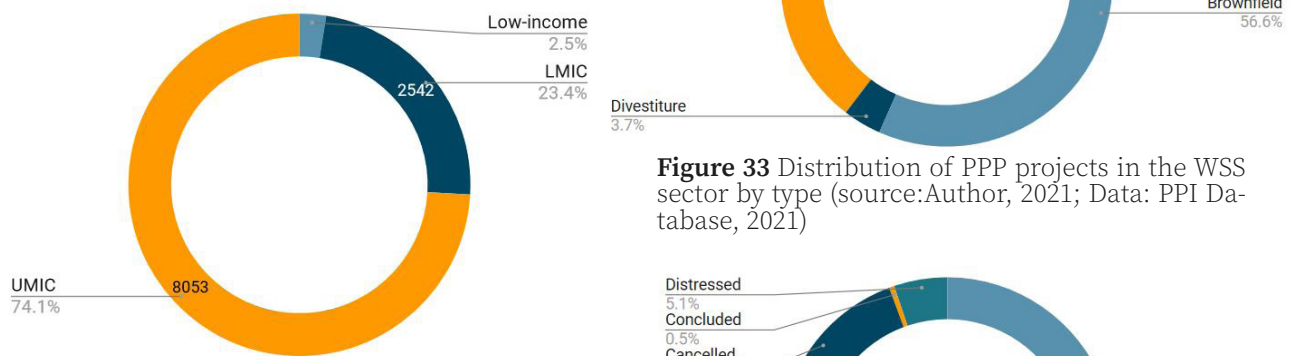


Figure 31 Distribution of PPP projects by income level (source:Author, 2021; Data: PPI Database, 2021)

From this data we can see clearly that PPPs are very rare in LICs, especially in SSA, and a vast majority of PPPs in the WSS sector (99%) are utilised in middle- or upper-income countries.

4.6.3 Distribution of types of PPPs in WSS

Only 33 projects out of the 1117 PPPs (3%) in the WSS sector were implemented in SSA (Figure 32) (PPI Database, 2021). These can be further broken down by type. A majority of PPPs are brownfield (existing assets) at around 57 percent, followed by greenfield (new assets) proj-

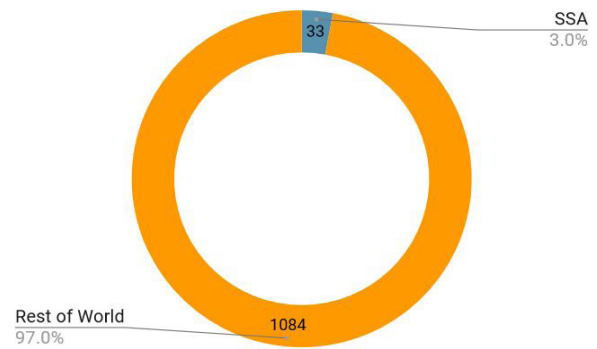


Figure 32 Distribution of PPP projects in the WSS sector in SSA vs. the rest of the world (source:Author, 2021; Data: PPI Database, 2021)

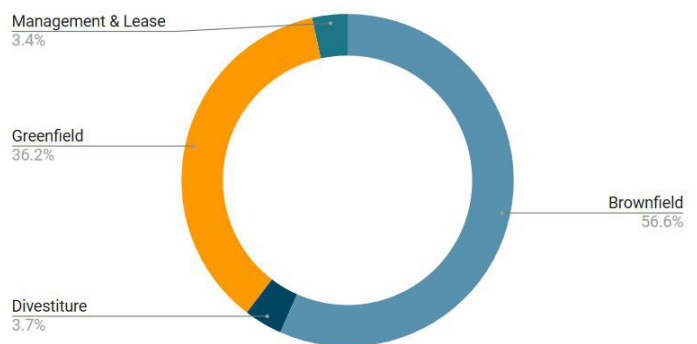


Figure 33 Distribution of PPP projects in the WSS sector by type (source:Author, 2021; Data: PPI Database, 2021)

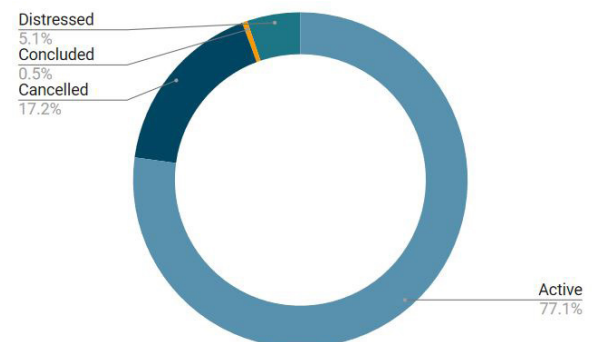


Figure 34 Distribution of PPP projects in the WSS sector in SSA vs. the rest of the world (source:Author, 2021; Data: PPI Database, 2021)

ects at 36 percent, divestitures at 3.7 percent and the remaining 3.3 percent are management and lease contracts (Figure 33)(PPI Database, 2021). Almost a quarter (23.3%) of WSS PPPs are cancelled or distressed, the highest of any sector (Figure 34). While brownfield projects are the most common, they are also the most cancelled and distressed, with over a third (36.5 percent) not reaching completion. This could be due to the difficul-

ty in assessing existing WSS networks, as previously mentioned. Only 10 percent of greenfield projects, on the other hand, are cancelled or distressed. Management and Lease contracts seem to be the most stable, with less than 1 percent cancelled or distressed. Important to note, however, is that less than 5 percent (4.92%) have reached completion. This can easily be attributed to the long-term nature of WSS PPP contracts, usually 20-30 years, however this leaves plenty of time for emerging issues such as climate change, political instability, changing demographics or a combination of all of them to further increase the share of cancelled or distressed projects.

PPPs in LICs are rare. WSS PPPs in Sub-Saharan Africa are even rarer. Conclusions that can be reasonably drawn from this are that:

1. The WSS sector in LICs are less profitable and more risky, and are therefore less attractive than other sectors, such as those in the Electricity, Ports or ICT sector that make up the bulk of PPPs in LICs.
2. PPPs are seen as a more viable option in middle- and high-income economies with more robust enabling environments and legal frameworks.
3. SSA in particular is perceived by the private sector as a risky and unattractive environment for investment, attracting less than 5 percent of total investment in PPPs, with only the Middle East and North Africa (MENA) region attracting less (3.24 percent). Furthermore, a quarter of the investment comes from multi-lateral development banks (MDBs) rather than the private sector.

4.7 PPPs in developing countries

PPPs have played a far smaller role than originally expected by the World Bank and other lending institutions in delivering infrastructure to low-income countries, amounting to somewhere in the range of 15 to 20 percent of total infrastructure (Leigland, 2018). In the countries where the need for infrastructure is greatest, private involvement is lowest. Why is this?

There are a number of key obstacles to PPP promulgation, especially in Africa, where a growing amount of evidence points to the importance of a favourable regulatory environment and a robust legal framework to ensure sustainable and efficient PPPs (The Economist Intelligence Unit [EIU], 2015). Given their complex nature, high costs and sizeable risks, a number of criteria need to be met before enough investors, firms, IFIs and governments feel comfortable enough to launch PPPs in developing countries where the legal and political environment is often quite tenuous (Mourgues & Kingombe, 2017).

According to Kociemska (2019), Leigland (2018), Mourgues & Kingombe (2017) and others, obstacles to PPP implementation in developing regions include:

- Lack of enabling environment
- Lack of capacity in central and local government and public administrations
- False perception of the potential of PPPs and how they can be used
- Ideological resistance to privatisation
- Lack of commitment by governments

- Weak or non-existent legal frameworks
- Lack of attractiveness in the financial and economic environment
- Corruption and lack of transparency in tenders and procurement

These obstacles can be overcome only when a proper enabling environment is in place, one that is capable of meeting the basic needs of its citizens and is committed to improving their lives. An enabling environment that is conducive to proper FSM is one that is also conducive to starting a business venture, as everything is interrelated and dependent on factors like peace and stability, rule of law, good governance with accountability, transparency and clear rights. A study by Mourgues & Kingombe (2017) found that decreasing corruption by 10 points can increase private participation in infrastructure (PPI) by 15% and having one more project going to court can decrease investment by 4%. Measurable effects influenced by the stability of political and economic conditions.

The global financial crises of the last two decades have also left their mark on the economies of SSA, with their share of global trade falling from 4% in 1970 to 2% in 2007, with only a slight improvement to 3% since (Kociemska, 2019). However, Africa's abundance of natural resources and rapidly growing populations make it an attractive investment opportunity nonetheless. According to the global consulting firm McKinsey, the appetite for investment in Africa's infrastructure is considerable, estimating as much as \$550 billion in assets from government agencies, private-sector pension funds and investment companies (Lakmeharan et al., 2021). The current pipeline of in-

frastructure projects to be completed by 2025 is worth \$2.5 trillion, and includes both greenfield and brownfield projects – a number of which will almost certainly be structured as PPPs (Lakmeharan et al., 2020).

This appetite is especially true for the People's Republic of China (PRC), which is investing heavily in the infrastructure of Africa, often with far fewer conditions on policy reform or good governance than those imposed by multilateral institutions like the World Bank (Head, 2008). How these condition-less loans will affect the future of Africa are outside the scope of this thesis, but it is clear that nothing occurs in a vacuum and a broad range of geopolitical forces are at play here.

In its 2015 Infrascopes Report, the Economist Intelligence Unit (EIU) rated the PPP enabling environments of 15 African countries and only one, South Africa, was rated as "developed" with a score of 70.7 out of a 100. The remaining 14 countries ranged from 51.8 (Morocco) to 20.6 (Democratic Republic of the Congo), with common challenges including: a need for harmonisation within the governments; dependence on foreign financing; lack of stakeholder engagement; and slow PPP processes that deter investors and government officials alike (EIU, 2015).

It is no wonder then that SSA experiences some of the lowest amount of PPP investment in the world.

4.8 Summing up the arguments for and against PPPs

It is clear that whether PPPs work is highly dependent on their context and enabling environment. When confronted with the choice of using PPPs or TP, it is then helpful to address the associated advantages and disadvantages to determine if the rewards outweigh the risks. The following tables list the main advantages and disadvantages of PPPs (Table 03 and Table 04).

Advantages of PPPs	
Value for Money	By utilizing private sector skills and technology to deliver projects in a more efficient manner, resulting in either lower costs or a superior product for the same investment.
Optimization of design/operation	Using outputs based specification allows room for and promotes innovative solutions from the private sector on the design, operation and maintenance aspects of the project, with the intention of improving effectiveness whilst reducing costs over the whole life cycle.
Quicker delivery of project	Private sector capacity and flexibility are seen to be superior to the public sector, and PPPs therefore allow projects to be finished more quickly and on schedule than those attributed to public sector provision.
Risk transfer	Project risks (e.g., finance, timeframe, planning permits, community consultations) are transferred to the party best equipped to deal with it, both in terms of expertise and costs, to the stability and benefit of the project.
Increased investment in public infrastructure	Governments are able to implement projects more frequently and on a larger scale because the private sector finance element reduces its need to raise or budget additional funds, as is the case in standard procurement.
Increased budget/financing certainty	The transfer of responsibility (and risk) to the private sector for some of the project elements shields governments from unforeseen financial liabilities following cost overruns, delays, or operational difficulties that would otherwise impact the budget's bottom line.
Improved service delivery	<ul style="list-style-type: none"> - Allows both sectors to operate within their sphere of expertise, the government in policy and governance, the private sector in the technical aspects of design, construction, operation, and management. - Payments that are linked to performance targets or requirements provide an incentive to perform that is too often absent in public provision of services.
Whole of life cycle approach	<ul style="list-style-type: none"> - Because the design, construction and operation are often undertaken by one consortium there is a greater integration of the different elements and more coherence to the final product, unlike standard procurement options which may see several different subcontractors operating in loose cooperation. - Motivated by the desire to preserve long-term value of assets and to minimize costs, whole of life cycle responsibilities encourage the private sector to choose the most appropriate technology for the long term and adequately maintain it. This may be in contrast to decisions by governments that are often guided more by short-term financial pressures and think in much shorter cycles according to political terms and budget constraints
Access to additional capital/off-balance sheet financing	Because a large percentage of finance in PPP is provided by the private sector, the government is not responsible for raising funds from within its own coffers or adjusting budgets to allow for large infrastructure spending. This is particularly advantageous during times of fiscal crisis where the government is already short of funds or where the government may have a poor credit rating and is not able to raise the necessary finance. International and national accounting standards do provide some guidance as to what and how PPPs are recorded on balance sheets, but the issue is far from secure.
Private sector growth and stability	PPPs provide the private sector with access to reduced risk, secure, long-term investment opportunities that are underwritten by government contracts. Such agreements ensure private capital flows, provide investment opportunities, and stimulate local industry and job markets.

Table 03 Advantages of PPP over TP (adapted from Colverson & Perera, 2012)

Disadvantages of PPPs	
Higher cost	<ul style="list-style-type: none"> - The borrowing rates given to the private sector are usually higher than those typically available to governments. - An expensive tender and negotiation process, including higher contract transaction costs paid to legal and accounting firms, can neutralize any savings made in design and construction phases. - Transferring risk from one party to another has its price, and the private sector will expect guarantees of income proportionate to its risk burden
Reduced competitiveness	<ul style="list-style-type: none"> - High tender and transaction costs, along with complicated and long-term contracts reduce the pool of private sector companies with the capacity to apply for certain projects, reducing the government's choice and competitive tender processes. - Exclusivity agreements awarded to winning companies lock them into guaranteed profits and, in reality, creates monopoly markets, reducing competitive pressure to reduce costs and enhance services.
Complicated and lengthy tender process	PPP contract and negotiation periods are often more complex and protracted due to the nature of the multi-party, financially intricate, and long agreement terms inherent in the relationship.
Lack of capacity	<ul style="list-style-type: none"> - It is necessary for both the public and private sectors to possess PPP-specific capacity for an agreement to be signed and administered successfully. Such capacity is absent from many jurisdictions, both at a national and regional level, and it takes both time and experience to establish it. - An over-reliance on external consultants also leads to an expertise flight, where any knowledge gathered throughout projects is not retained by public bodies or private companies, but rather lost to external sources, making it difficult to build knowledge and lessons for the future.
Rigid and inflexible, long contracts	<ul style="list-style-type: none"> - In order to provide stability and security over time, long contracts can become rigid and inflexible, reflecting point-in-time circumstances and then locking them in over the contract period. - It remains difficult for governments to adequately structure contracts that take into account future unforeseen events or circumstances, and it is often difficult to adapt and change contractual responsibilities as the context changes. - Future generations cannot respond to their individual circumstances but must adhere to outdated operations from previous decades. - Building flexibility into contracts is an expensive proposition because as the investment become less secure it may become necessary to further incentivize the private sector.
Delays and holdups	<ul style="list-style-type: none"> -The private sector is not impervious to project stoppages, and the complicated nature of the agreements between PPP partners can increase delays, as disputes take longer to be settled and any unforeseen eventualities that takes place in future years involve a lengthy renegotiation of the contract. - The start of projects is also delayed by complex partner negotiations, sometimes further exacerbated by the political debate and public opposition that can surround PPP projects.
Higher consumer prices	<ul style="list-style-type: none"> - Driven by a need to cover high levels of cost plus make a return on investment, market-driven pricing can see services cost the consumer more than if delivered by the public sector. - The issues of competitiveness and monopolies also mean there is potential for abuse in regards to user fees.
"Double taxation"	- The general public may perceive user fees as a form of "double taxation" whereby they are paying for services they feel their taxes should be providing or already have paid for. This will be noticeable in the case of toll ways, for example, where tolls have not existed under previous public sector provision and where there was no tangible cost to the user.
Less accountability/transparency	<ul style="list-style-type: none"> - Project transparency is weakened under the PPP model because of the difficulty in accessing private sector information, now considered of commercial value or commercial-in-confidence by the consortium. - Whole of project evaluation becomes problematic for similar reasons, as data is spread over numerous sources, compiled differently, and not always available for public scrutiny
Lack of Community Involvement	Because contracts are negotiated between the public and private partners behind closed doors, the community is often left out of the process completely, or only partly consulted in community meetings. Little to no decision making power is in their hands.
Government is always the residual risk holder	There is always the risk that the firms involved in the consortium go bankrupt, or that the project fails. In this case, it is the government that is still responsible for service provision, and they will have to use the resources to do so.

4.9 Conclusion

There is little question that PPPs can, and sometimes do, perform better than TP. A common refrain when combing through the literature, especially that of the World Bank, UNECE, OECD and other IFIs, is this: “When designed well and implemented in a balanced regulatory environment, PPPs can bring greater efficiency and sustainability to the provision of public services such as energy, transport, telecommunications, water, healthcare, and education” (World Bank, 2021c).

The important caveat here is the first qualifying part of the sentence – “When *designed well* and implemented in a *balanced* regulatory environment.” This one sentence encapsulates the greatest challenge when implementing PPPs in developing regions with little expertise in PPP design, and often a regulatory environment that is far from balanced (Tshombe & Molokwane, 2016).

Due to a local lack of experience (conventional, contractually complex PPPs are a relatively modern invention), foreign firms (usually just a few major players) are often called in to do the project or contract “design” (Kirkpatrick et al., 2006). This small pool of bidders leads to adverse selection, which takes the form of sub-optimal contracts from the beginning, resulting from opportunistic behaviour to arrange favourable terms for the private party (Kirkpatrick et al., 2006). Furthermore, when one party has an incentive to increase its exposure to risk because it won’t have to face the full consequences, such as in the case of government guarantees, moral hazard can arise (Flyvbjerg et al., 2009).

Moral hazards result from information asymmetry and differing objectives. Examples of moral hazards often arise in the case of insurance, where knowing one is insured may lead to taking more risks (e.g. taking a rented car for a joy ride). In the previously mentioned example in Tanzania of the Graft Taints Power Purchasing Agreement, moral hazard was present in the overforecasting of demand that wasn’t met, and didn’t need to be met, because of the guaranteed capacity payments from the government (Farlam, 2005).

This type of moral hazard is known as the principal-agent problem (agency problem). Because the agent (private partner) has more information (asymmetrical information), the principal (government) cannot ensure that the agent is acting in their best interest. In fact, the interests are fundamentally different in PPPs, because the private sector wants to maximise their profit, while the public sector wants to provide a service (or further their political agenda).

The only major interest that is aligned is the successful implementation of the project itself, however, how this interest is realised can vary greatly at different costs to the community. When the private partner fails to make a profit, lengthy and costly renegotiations typically follow (Farlam, 2005; Loxley, 2013; Marin, 2009). If the project is successful and the private partner gets profits, there is little to ensure that the profits are reinvested to provide better service, and instead, PPPs could encourage rent-seeking behaviour, acting as “extractive” financial instruments that funnel money into the SPV and out of the country in which they operate (Hildyard, 2014).

To those in favour of PPPs, they promise increased performance and efficiency, access to finance and expertise, better risk allocation and more opportunities for profit maximization. For others, writes Haylarr & Wettenhall (2010), the promises of PPPs appear to be exaggerated, downright false and at worst, potentially damaging to the public interest. In the right environment, with balanced information and strong and competent partners, PPPs can perform well. But is Tanzania the right environment for PPPs? Part two will attempt to answer this question.

Part Two: Methodological Analysis and Proposal

Development of a methodology to rate the readiness of Dar es Salaam's PPP environment, a gap analysis of three PSPs and a proposal for Open Partnerships.



Figure 35 Dog taking a nap in the sludge drying bed of Kigamboni FSTP (source: Author, 2021)

Chapter 5: What makes projects successful?

The literature is mixed on whether PPPs work better than traditional means of procurement (Flyvbjerg, 2005; Hall, 2015; G. A. Hodge & Greve, 2017; Menard, 2011). Furthermore, it is not always clear what criteria should be used to define the 'success' of a PPP – as they are often oriented just as much toward political and governance aspects as they are toward the traditional utilitarian view of project delivery or VfM (G. A. Hodge & Greve, 2017). What is clear, is that certain factors are considered essential to achieving the project's goal, and these are known as critical success factors (CSFs) (Ameyaw & Chan, 2016; G. Hodge et al., 2018; Meng et al., 2011; Zhang, 2005).

5.1 Critical Success Factors of PPPs

CSFs originally came out of management literature in the late 1970s and have been used in a variety of fields to attempt to make explicit the key areas that require attention for successful project implementation (Li et al., 2005).

CSFs operate on multiple levels and can be internal or external political, economic, social or project-related characteristics that are required in order to maximise the likelihood of project success (Nizkorodov, 2017). A wide-range of CSFs in PPPs have been identified by scholars, usually through surveys of PPP stakeholders in the public and private sectors, with some scholars focusing on the procurement stage (Zhang, 2005) and others taking a broader, project life-cycle view of CSFs (Li et al., 2005; Meng et al., 2011).

Success, however, is in the eye of the beholder, and a successful project from

the view of one party may not be deemed a success by the other, therefore success criteria should be properly defined (Meng et al., 2011). Because success can be viewed through the lens of three main parties – the private and public parties and the community that is served – there are both individual and collective goals (Ameyaw & Chan, 2016). The private party is interested in achieving a profitable venture, the public is interested in providing an efficient and effective public service at reduced cost and the community is interested in a reliable, safe and affordable service – and all three parties meet their goals through successful implementation and completion of the project (Ameyaw & Chan, 2016).

Completing the project, properly accounting for it, doing it on-time and on budget, with maximum efficiency and good governance are all measures of success, however they can often fundamentally conflict (G. Hodge et al., 2018). Furthermore, success can be viewed narrowly (achievement of outputs as outlined in the partnership agreement), or more broadly as the continuation of the relationship between the public and private entities and the wider benefits the project has for its users and the community at large (Jeffares et al., 2013).

A growing number of studies are also showing that variations in PPP success and uptake is often due both to the political and institutional context of different countries as well as non-institutional elements not directly under the control of government (Soeipto & Verhoest, 2018). A qualitative comparative analysis (QCA) performed by Verhoest et al. (2015), com-

pared the institutional framework of 20 European countries and found that institutional support could be a necessary, but not sufficient, factor in PPP success and a complex interaction of factors all play a role in PPP success (Soeipto & Verhoest, 2018; Verhoest et al., 2015).

Because of the multi-level, multi-stakeholder nature of PPPs this research will use this broad view of interplaying factors of success, and furthermore, due to the unique characteristics of the WSS sector, will underscore the need for projects to go beyond narrow conceptions of success (profit or project completion) to achieve the ultimate goal of public health and social, economic and ecological sustainability.

The following chapter will discuss CSFs in the developing world and the WSS sector, and attempt to incorporate the hundreds of CSFs identified in the literature into a framework suitable for assessing the readiness of developing countries to implement PPPs in the WSS sector.

5.2 Building the framework: Synthesis of Critical Success Factors in WSS in Developing Regions

There have been a number of studies looking at the CSFs of developing countries (Babatunde et al., 2012; Chileshe et al., 2020; Chileshe & Kavishe, 2020; Debelala, 2019; Ismail, 2013; Tshombe & Molokwane, 2016), and a number looking into the CSFs of the water sector (Keremane & McKay, 2009; Meng et al., 2011; Tariq & Zhang, 2020, Tshombe), but fewer look into both (Ameyaw & Chan, 2016; Finizola e Silva et al., 2020; Wu et al., 2016).

This research will contribute to the literature by conducting an extensive liter-

ature survey to synthesise the most commonly cited CSFs specific to developing regions and the WSS sector.

In order to determine if traditional PPPs are fit for purpose in small-scale FSM, I first performed a comprehensive literature review to examine the current research on PPPs, especially those in

- developing economies / regions, and
- the water supply and sanitation (WSS) sector.

Twenty three studies were selected that are either specific to WSS, developing regions, or were commonly cited and thus foundational to a broad range of PPPs (Figure 36). From these 23 studies, 85 CSFs were indicated by the authors. Some of the CSFs identified in the studies were similar enough to combine into one CSF, therefore the actual number of unique CSFs was higher. While some studies rank



Figure 36 Combining the CSFs (source: Author)

the CSFs in order of importance using methods such as the fuzzy synthetic evaluation (FSE) method (Ameyaw & Chan, 2016) or significance indexes (Zhang, 2005), due to the comprehensive nature of this study as a broad overview of CSFs without primary survey data, the most important CSFs for developing regions and WSS were determined by the number of times they were mentioned in the selected literature as was done in studies such as Osei-Kyei & Chan (2015). The identified CSFs, excluding those that only appeared once, are in the table below (Table 05, for full list see Appendix A).

CSF Level	CSF	Ng et al. (2012)	Wibowo & Allen (2014)	Dulaimi et al. (2010)	Nizkorodov (2017)	Jacobson & Choi (2008)	Meng et al. (2011)	Tsitsifli & Kanakoudis (2008)	Tam (1999)	Jamali (2004)	Nguyen et al. (2020)	IOB Study (2013)	Zhang et al. (2005)	Amovic et al. (2020)	Keremane et al. (2009)	Kulshreshtha et al. (2017)	Debela (2019)	Ismail (2013)	Chileshe et al. (2020)	Babatunde et al. (2012)	Ameyaw & Chan (2014)	Li et al. (2005)	Osei-Kyei et al. (2015)	Chan et al. (2010)	Total CSFs	
Project	Profitable water supply projects	x				x															12				3	
Project	Thorough cost/benefit assessment	x	x								12					x	7	16	12	6		5		13	10	
Project	Project technical feasibility/capacity	x	x		x						16				x	x	10	10	10	7		6	13	16	13	
Project	Technology innovation/sharing/transfer	x		x						x	22		13				24			11			12		8	
Project	Selecting the right project				x						6									10			18		4	
Project	Clear project brief and design development									x													20		2	
Project	Project economic/financial viability/feasibility	x			x					x	5		15			x				8	6				8	
Project	Value for Money	x		x																					2	
Organization	Strong and competent private partner	x		x	x				x	x	2		9			x	21		16	13	4	1	2	6	15	
Organization	Strong and competent public partner		x						x	x		x			x	x	2	14	17	10	6	7		15	13	
Organization	Strong commitment from project partners					x	x	x		x	7	x			x	x		7		7	8	4	9		13	
Organization	Capacity building for local utility staff														x				4		9				3	
Organization	Quality water asset and workforce						x								x						10				3	
Organization	Flexible contracts	x			x				x	x	21											13			6	
Organization	Appropriate risk allocation and risk sharing	x	x	x	x	x	x				8	x	18			x	6	6	1	4			2	1	2	17
Organization	Clear roles and responsibilities	x				x	x			x		x	12			x	22	11	13	14			10	17	13	
Organization	Open and constant communication			x		x				x		x				x							14		6	
Organization	Trust					x	x		x	x		x											17		6	
Organization	Financial accountability											x	16										27		3	
Organization	Resource allocation and management									x		x							6						3	
Organization	Employment of professional advisers					x	x																		2	
Organization	Stakeholder consultation		x		x	x		x								x									5	
Organization	Effective project management		x								3														2	
Organization	Suitable subcontractors								x		13														2	
Policy	National PPP policy and implementation unit				x												1			9	7	11			6	
Policy	Competitive tendering/procurement		x				x				14					x	8	15	15	3	11	12	8	11	12	
Policy	Transparency in the procurement process		x		x					x	14			x		x		17	5	13		10	5	9	12	
Policy	Political support		x			x		x				x				x	15		2	2			3		9	
Policy	Streamline approval process																20						24		2	
Policy	Sound economic policy		x										8				16	3		2				7	6	
Governance	Government/Political commitment	x	x	x			x	x	x		x	4			x	x	14	12	2	8	1	x	16	3	18	
Governance	Effective regulatory and legal framework	x	x	x	x			x	x	x	4	x			x		x	4	2	7	9	5	8	6	1	19
Governance	Independent auditor						x	x																	2	
Governance	Internal coordination within government		x				x														14			14	4	
Governance	Political stability	x			x						18	x	1				3						21		7	
Governance	Consistent monitoring of project																9						28		2	
Governance	Government guarantee																			1				12	2	
Governance	Good governance		x				x	x	x		15					x	5	9	x	2					10	
Governance	Adequate skills and knowledge of PPP																7								2	
Governance	Lack of corruption		x						x																2	
Macro	Adequate financing/available financial market									x	11	x	3			x	17	4	11	5	2	3	11	5	13	
Macro	Mature and available financial market									x		x	2										22	5	5	
Macro	Public acceptance/support	x			x			x			19		5		x	x	23	13	3	13	3	x	4	8	15	
Macro	Stable macroeconomic condition	x		x							17	x	6			x	11	1	14	5		13	7	4	13	
Macro	Long-term demand for the project	x			x							x	7										19		5	
Macro	Acceptable level of tariff	x	x					x			20		17		x								23		7	
Macro	Environmental impact of project									x													30		2	
Macro	Benefit Sharing/Multi-benefit objectives									x		x				x	18	5		16				10	7	
Macro	Presence of pro-investment culture										10						25								2	
Macro	Environmental compliance												14		x										2	

Table 05 List of CSFs with more than one mention gathered from 23 studies. Numbers indicate authors ranked the CSFs (source: Author)

These were then grouped into five levels based on the social-ecological framework and systems theory, drawing from Hodge & Greve’s (2016) five meanings of PPPs and Soecipto & Verhoest (2018) micro- meso- and macro-level factors in order to create a framework appropriate to the unique nature of PPPs and the different (nested) levels in which they operate and affect. No level exists on its own and each contains a variety of interactions with other levels that can have an effect on both the project itself as well as on the broader environment in which it operates. From this framework, the readiness of a country to implement PPPs can be measured holistically and at each level.

Each level includes the CSFs that are subject to the most influence from the actors and institutions on that level. The 85 CSFs were narrowed down to those with five or more mentions in the selected literature (Table 06).

These CSFs were further synthesised into a framework for rating the readiness of Tanzania to implement PPPs, and therefore some were combined (strong and competent public/private partners, mature/available financial markets), some were omitted due to lack of available data or rating method on the CSF (trust, communication, acceptable level of tariff, long-term demand) and one CSF that only

CSF Group	CSF	Ng et al. (2012)	Wibowo & Alfien (2014)	Dulaimi et al. (2010)	Nizkorodov (2017)	Jacobson & Choi (2008)	Meng et al. (2011)	Tsitsifli & Kanakouridis (2008)	Tam (1999)	Jamali (2004)	Nguyen et al. (2020)	IOB Study (2013)	Zhang et al. (2005)	Anovic et al. (2020)	Keremane et al. (2009)	Kulshreshtha et al. (2017)	Debeia (2019)	Ismail (2013)	Chileshe et al. (2020)	Babatunde et al. (2012)	Ameiyaw & Chan (2014)	Li et al. (2005)	Osei-Kyei et al. (2015)	Chan et al. (2010)	Total CSFs
Project	Project technical feasibility	x	x		x						16				x	x	10	10	10	7		6	13	16	13
Project	Thorough and realistic cost/benefit assessment	x		x							12					x	7	16	12	6		5		13	10
Project	Financial viability	x			x					x	5	15				x			8	6					8
Project	Technology innovation/sharing/transfer	x		x						x	22	13					24			11			12		8
Organization	Appropriate risk allocation and risk sharing	x	x	x	x	x	x				8	x	18			x	6	6	1	4		2	1	2	17
Organization	Strong and competent private partner	x		x	x				x	x	2	9				x	21		16	13	4	1	2	6	15
Organization	Strong and competent public partner		x						x	x		x			x	x	2	14	17	10	6	7		15	13
Organization	Strong commitment from project partners					x	x	x		x	7	x			x	x		7		7	8	4	9		13
Organization	Clear roles and responsibilities	x				x	x			x		x	12			x	22	11	13	14			10	17	13
Organization	Flexible contracts	x			x				x	x	21										13				6
Organization	Open and constant communication			x		x				x		x				x							14		6
Organization	Trust					x	x		x	x		x											17		6
Organization	Stakeholder consultation		x		x	x		x								x									5
Policy	Competitive tendering		x				x				14					x	8	15	15	3	11	12	8	11	12
Policy	Transparency in the procurement process		x		x					x	14			x		x		17	5	13		10	5	9	12
Policy	Political support		x			x		x				x				x	15		2	2			3		9
Policy	National PPP policy and implementation unit				x									x			1			9	7	11			6
Policy	Sound economic policy	x											8				16	3		2				7	6
Governance	Effective regulatory and legal framework	x	x	x	x			x	x	x	4	x		x		x	4	2	7	9	5	8	6	1	19
Governance	Political support/guarantees	x	x	x				x	x	x		x	4		x	x	14	12	2	8	1	x	16	3	18
Governance	Good governance		x				x	x	x		15					x	5	9	x	2					10
Governance	Political stability	x			x						18	x	1				3						21		7
Macro	Public acceptance/support	x			x			x			19		5		x	x	23	13	3	13	3	x	4	8	15
Macro	Adequate financing/available financial market									x	11	x	3			x	17	4	11	5	2	3	11	5	13
Macro	Stable macro-economic condition	x		x							17	x	6			x	11	1	14	5		13	7	4	13
Macro	Acceptable level of tariff	x	x					x			20		17		x								23		7
Macro	Benefit sharing/Multi-benefit objectives									x		x				x	18	5		16				10	7
Macro	Mature financial market									x		x	2										22	5	5
Macro	Long-term demand for the project	x			x								7										19		5

Table 06 List of CSFs with five or more mentions gathered from 23 studies. Numbers indicate authors ranked the CSFs (source: Author)

appeared twice (lack of corruption) was added to the readiness framework due to its importance determined by literature and expert interviews, as well as the availability of data regarding corruption from both international and local agencies (Table 07).

Important to note, and perhaps an indication of the lack of importance normally given to the environment in infrastructure projects, CSFs related to environmental sustainability were only mentioned in three of the 23 papers. However, without considering the environmental impact of a PPP in its planning stages, its long-term success comes into question, especially

in the WSS sector where untreated water and FS could greatly impact the health of the community and environment which could also lead to the project's failure.

By identifying the most cited CSFs in developing countries and the WSS sector, a framework for how to successfully implement a PPP in these environments begins to appear. While not every CSF needs to be fully met, these factors appeared often in the literature and are worthy of consideration before choosing a PPP over other forms of infrastructure delivery. So let's take a look at these 21 CSFs and the level in which they can be influenced.

Level	#	CSF	Definition
Project	1	Technical feasibility	Project is technically possible, with available materials and skills
	2	Financial viability	Project has adequate financing and can make a profit
	3	Thorough cost/benefit evaluation	A prefeasibility, VfM, or cost/benefit analysis has been performed
	4	Technology transfer	Transfer of technology or knowledge to meet the needs of the local conditions
Organization	5	Strong and competent partners	Both the private and public partners are able to competently represent their interests
	6	Strong commitment and clear roles	Both the private and public partners are committed to the project and have clearly defined their roles and responsibilities throughout the different stages of the contract (Design, Build, Finance, Operate, Maintain)
	7	Appropriate risk sharing	Risk has been properly assessed and each partner has taken on their fair share of risk
	8	Contract management	Contract agreements are flexible, efficiently managed, executed and monitored throughout the duration of the partnership
Policy	9	Political support	Politicians understand and support PPPs and/or PSP in providing infrastructure or services
	10	Transparent procurement	The procurement process is transparent and open to public scrutiny
	11	Competitive bidding	Multiple parties are involved in the bidding process to ensure reasonable prices
	12	PPP Unit and policy	A dedicated PPP unit exists with supportive PPP policy
Institutional	13	Strong legal framework	A strong legal framework exists to reduce risks and ensure the enforcement of contracts
	14	Political stability	Political stability to ensure continuity of projects
	15	Regulatory quality	Regulations are in place and effectively enforced
	16	Lack of corruption	No corruption is present that favours certain parties or prioritises private gain over the public good
	17	Good governance	The government is effective and fair, ensuring the well-being of all stakeholders
Macro	18	Stable macroeconomic conditions	The macroeconomic environment is stable and conducive to investment and a market economy
	19	Adequate financial market	Financing for projects is available
	20	Public acceptance/involvement	The public approves of the project and is involved or consulted in the project design
	21	Benefits all stakeholders	The project benefits all stakeholders

Table 07 Final list and definitions of CSFs organised by level (source: Author)



Figure 36 Micro, Meso and Macro levels of the CSF Framework (source: Author)

5.2.1 Project Level

This level includes project specific CSFs, including technical feasibility, financial viability, thorough cost/benefit evaluation and technology transfer.

A PPP at its narrowest conception is the project itself (Hodge & Greve, 2016). On this level, the public sector generally identifies the need for infrastructure and begins the search for a private partner to assist in implementing the infrastructure. When the private partner initiates a proposal for a project, this is called an unsolicited proposal (Yescombe, 2007). A wide array of tasks need to be performed before the project is realized, and selecting the right project is essential to later success (Ismail, 2013).

In order to attract a private partner, a project must fulfill a basic goal of the private sector, it needs to be profitable (financial viability). Whether a WSS project will be profitable or not depends on a variety of conditions, such as the market size and demand, the amount of water or

FS to be treated or delivered and the technological capabilities of the local market (technical feasibility). Here, a thorough cost/benefit evaluation, or a VfM analysis, is important in deciding if the project is worthwhile. In developing countries in particular, technology transfer is an important aspect of project success. Technologies like the DEWATS approach are good examples of this, and without suitable technology, the project has a smaller chance of success.

5.2.2 Organization Level

This level includes CSFs of the public, private and/or community levels. These include strong and competent partners, strong commitment, appropriate risk sharing and appropriate contract management.

The CSFs in this level operate through the interactions between the private and public partners and community stakeholders. Here it is critical to have strong and competent partners who are equally

committed to the project's success (Nguyen et al., 2020). Without this, a power or information asymmetry would risk leaving one partner at a disadvantage, and the mutual goals would not be met. Instead, especially in developing countries, a strong private partner could take advantage of their greater experience by negotiating a more favourable contract for themselves that doesn't appropriately share the risk (Soeipto & Verhoest, 2018). It is essential for all stakeholders and their interests to be equally represented in the contract, with agreed upon provisions that are flexible enough for technological changes, market fluctuations or force majeure (Sawant, 2010).

5.2.3 Policy Level

The policy level includes the CSFs that can be influenced by the current political actors. This includes political support, transparent and competitive tendering and procurement, and a dedicated PPP unit.

PPPs can live or die by the amount of political support they receive (Li et al., 2005). This level has a significant multi-level effect, in that politicians can affect both the project level by approving new PPPs, all the way up to the macro level where they can influence public acceptance through creating PPP units that promote PPPs, and implementing policy to ensure that PPPs are transparent and competitive to benefit all stakeholders. However, due to the generally frequent turnover of politicians and their parties, this level poses a lot of risk for PPPs that can take years to get off the ground.

5.2.4 Institutional Level

This level includes a strong legal framework, political stability, regulatory quality, a lack of corruption and good governance. These CSFs, while similar to the policy level, are more deeply rooted in a long-term institutional setting and usually cannot be quickly changed.

Just as political support is a necessary prerequisite for PPPs, a strong legal framework and political stability are also essential, and are some of the most distinguishing differences between the developed and developing world, where all too often new leaders immediately discontinue the programs of their predecessors as their first act in office (Otairu et al., 2014).

It is one thing to implement laws and create a favourable environment for PPPs, but without regulation to protect the interests of all parties and to ensure that the project is performing as promised, PPPs are prone to failure. And in order to effectively regulate, there must be an absence of corruption, which can sabotage any efforts toward properly functioning PPPs. A study by Pusok (2016), tested the influence of corruption on the provision of water and sanitation in developing countries using a cross-sectional time series of fifty-six non-OECD countries from 1991 to 2012. She found that when corruption is high, private actors pursue profit maximization over public needs, leading them to provide water but not adequate sanitation. In effect, corruption crowds out investments in the less profitable sanitation sector (Pusok, 2016).

5.2.5 Macro Level

The macro level includes macroeconomic stability and strong financial markets, public acceptance and aims to ensure that PPPs benefit all stakeholders.

In order for countries to attract investment, macroeconomic stability and strong financial markets are crucial, not only for foreign companies, but also for local firms looking to find financing. Because FSM has few proven business cases, it is often difficult to get loans from private banks, with much of the funding reliant on MDBs, NGOs or faith-based organisations (FBOs).

In developing countries, macroeconomic environments are often unstable, with currencies that fluctuate wildly making it difficult for foreign financing (Yurdakul et al., 2021). In order to address this challenge, it is even more important to properly account for risk.

Finally, public acceptance of specific projects can make or break the PPP, especially when it is related to water or sanitation, services that are deemed a human right (Tsitsifli & Kanakoudis, 2008). If the project doesn't benefit all stakeholders, including the community (and the environment), public outcry can delay or ultimately end projects.

5.3 Populating the framework: Developing a readiness radar

To determine if the selected 21 CSFs could be met in the context of Tanzania and Dar es Salaam, several tools were used to rate their readiness. Reports directly related to PPP readiness were the Economist Infrascopes Report (2015), GIZ Framework Gap Analysis Report and

Recommendations (2017), GTZ Partnership Landscape (2010), and the World Bank's Benchmarking Infrastructure Report (2020). The ratings from these reports ranked the readiness of Tanzania to implement PPPs. Each report had a slightly different rating system, with the Economist Infrascopes report and World Bank report rating from 0-100, and the GTZ and GIZ report rating it qualitatively from low to high. Information on each of these reports, their rating methodology and scores will be detailed in the next sections. I adapted the scores to fit the different levels by extracting the ratings most relevant to a corresponding CSF. Not all CSFs were addressed by these reports, therefore I also factored in values derived from the World Bank databases, the Global Innovation Index, World Economic Forum (WEF), Bertelsmann Stiftung (BTI), Environmental Performance Index (EPI), Transparency International, internal audits by the Tanzanian Public Procurement Regulatory Authority (PPRA), other literature sources, semi-structured interviews and on the ground observations. Each readiness rating for the different CSFs were then averaged and the value was added to the Readiness Radar.

A note on scoring

Scoring was given on a scale of 0-100. Some data sources were normalised to this scale, such as the World Economic Forum (1-7) and World Development Index (WDI) data, which was on a scale of 1-6. Other sources rated Tanzania's PPP readiness qualitatively using low, poor, lack of, etc. These scores were converted into points (the average of the ranges of 0-20, 21-40, 41-60, 61-80, 81-100) accordingly:

Very low/ very poor / complete lack of = 10

Low / poor / lack of = 30

Adequate / sufficient = 50

High = 70

Very high = 90

While there is room for interpretation in the intent and meaning of the original authors, a greater number of data sources reduces the risk and effect of misinterpretation and gives a more robust picture than a single source.

For normalising the data to the scale of 0-100, the following formula was used:

r_{\min} - denotes the minimum range

r_{\max} - denotes the maximum range

t_{\min} - denotes the minimum of the range of desired scale

t_{\max} - denotes the maximum of the range of desired scale

$m \in$ - denotes measurement to be scaled

$$m \mapsto \frac{m - r_{\min}}{r_{\max} - r_{\min}} \times (t_{\max} - t_{\min}) + t_{\min}$$

5.3.1 Limitations of this method

While there were a relatively large number (12) of studies, reports, audits and data sources used to determine the readiness rating that fed into the Readiness Radar, there are some limitations. One such limitation is the nature of PPP laws and regulations which are in a near constant state of flux, with five iterations of PPP policies (2009), acts (2010) regulations (2011, 2020) and amendments (2013,2014, 2018) passed since 2009 (PPP Knowledge Lab, 2021). This makes it difficult to effectively assess the overall quality, and instead, gives a picture of only a moment in time. However, this was partially overcome with the addition of recent (2020) reports that assessed PPP readiness and found many of the same problems identified in earlier reports, leading one to gen-

eralize that there hasn't been a significant degree of change.

Another limitation is the long history of inaccurate and missing data from Tanzania and their National Bureau of Statistics (Edwards, 2014). While organizations such as the World Bank have various methods of comparison and analysis to try to mitigate the effect of poor data quality, the effect remains and any conclusions drawn from such data require an asterisk.

Additionally, while I looked into the methodology and specific indicators for each report and rating, there is inevitably some amount of overlap between the CSFs which required judgement calls on which data point fit best into which category. For data points that pertained to several CSFs, the same data point was used. In summary, a "perfectly" accurate readiness rating is unlikely due to the different methodologies used for each report and index. However, by averaging the values across the 12 reports, audits, indices and ratings an overall picture emerges that is both generally accurate and suitable for the task at hand. Furthermore, the purpose of this analysis was to rate the readiness of Tanzania and Dar es Salaam to implement PPPs, not to analyse and equate various sources of data. I believe it has accomplished that purpose.

5.3.2 Economist Infrascopes Report

The Economist Intelligence Unit, the research arm of The Economist Group (publisher of The Economist), is a key player in the world of country intelligence (EIU, 2015). Partnering with and funded by The World Bank Group and Private Participation in Infrastructure Advisory Facility (PPIAF), the EIU publishes a

regular report measuring and ranking the enabling environment of governments to “implement sustainable and efficient” public-private partnerships with the aim to “unlock the power of PPPs” to further the development agenda (EIU, 2015). The EIU measures PPP readiness by indexing 19 indicators grouped into six categories that are both qualitative and quantitative, drawing their data from a range of primary sources (legal texts, government websites, press reports and interviews) as well as secondary reports and data sources (EIU, 2015). They rate the following categories:

1. Legal and regulatory framework (weighted 25%)

This category evaluates a country’s legal and regulatory framework for private participation in infrastructure (EIU, 2015). The indicators are:

- 1.1 Consistency and quality of PPP regulations
- 1.2 Effective PPP selection and decision-making
- 1.3 Fairness/openness of bids, contract changes
- 1.4 Dispute-resolution mechanisms

2. Institutional framework (weighted 20%)

This category measures the design and responsibilities of institutions that prepare, award and oversee projects (EIU, 2015). The indicators are:

- 2.1 Quality of institutional design
- 2.2 PPP contract, hold-up and expropriation risk

3. Operational maturity (weighted 15%)

This category measures the govern-

ment’s ability to uphold laws and regulations for concessions, as well as the number and success rate of past projects (EIU, 2015). The indicators are:

- 3.1 Public capacity to plan and oversee PPPs
- 3.2 Methods and criteria for awarding projects
- 3.3 Regulators’ risk-allocation record
- 3.4 Experience in transport, water and electricity concessions
- 3.5 Quality of transport, water and electricity concessions

4. Investment climate (weighted 15%)

This category measures the business, political and social environment for investment (EIU, 2015). The indicators are:

- 4.1 Political distortion
- 4.2 Business environment
- 4.3 Political will

5. Financial facilities (weighted 15%)

This category measures the financial facilities for funding infrastructure (EIU, 2015). The indicators are:

- 5.1 Government payment risk
- 5.2 Capital market: private infrastructure finance
- 5.3 Marketable debt
- 5.4 Government support and affordability for low-income users

6. Subnational adjustment factor (weighted 10%)

This category measures the quality of sub-national frameworks and experiences in PPPs (EIU, 2015). This category is no longer a part of the newer Infrascopes, and it is also irrelevant to this research

and the rating will not be used. The indicator is:

6.1 Subnational adjustment

The 2015 Infrascope report breaks down the categories of PPP readiness into Nascent (0-29.9), Emerging (30-59.9), Mature (60-79.9) and Developed (80-100), and both in the naming of the categories and their ranges, one could infer their pro-PPP stance. A nascent or emerging readiness sounds a lot more optimistic than a very low or low readiness, perhaps giving an indication of the type of audience this report is aimed at (investors, firms and governments). From the 15 African countries rated in this report, 13 out of 15 fall into the “Emerging” category, with only South Africa considered a “Mature” enabling environment (70.7), and the Democratic Republic of Congo considered a “Nascent” environment (20.6) – with Tanzania “Emerging” into fifth at 48.6 (Table 08) (EIU, 2015).

The report commends Tanzania for passing legislation to create a singular PPP Centre that will “provide a more efficient and centralised system for investors to interact with” (EIU, 2015). It also gives Tanzania high marks for their integration of unsolicited proposals into a legal framework and requiring the implementation of a bidding process to ensure competitive bidding. Key challenges that the report identifies include the “lack of capacity and experience in government,” inadequate risk-sharing mechanisms and the “paucity of long-term local financing instruments” such as guarantees and performance bonds (EIU, 2015).

While the report gives a fairly comprehensive overview of the enabling environment on the political, financial and project levels pertaining to PPPs, other important macro, meso and micro factors such as public perception, technical feasibility and acceptable tariffs are ignored. To get a more complete picture of the en-

MATURE (80–100)		DEVELOPED (60–79.9)		EMERGING (30–59.9)		NASCENT (0–29.9)	
OVERALL SCORE							
Rank				Score			
1	South Africa						70.7
2	Morocco						51.8
3	Kenya						51.4
4	Egypt						51.0
5	Tanzania						48.6
6	Côte d’Ivoire						45.5
7	Tunisia						45.4
8	Uganda						45.1
9	Rwanda						43.5
10	Ghana						43.0
11	Cameroon						38.2
12	Nigeria						36.8
13	Zambia						34.2
14	Angola						31.4
15	Democratic Republic of the Congo						20.6

Table 08 Economist Intelligence Unit’s (EIU) ranking of African economies according to PPP readiness (source: EIU, 2015)

abling environment and the ability of Dar es Salaam to meet the CSFs, the following reports and data were also gathered to build a more robust framework for analysis.

5.3.3 World Bank Benchmarking Infrastructure Report

The World Bank Group’s Benchmarking Infrastructure Development 2020 “assesses the quality of regulatory frameworks worldwide to develop large infrastructure projects, benchmarking them with internationally recognized good practices” (World Bank, 2021a; World Bank 2020b). The areas of focus in the World Bank’s report are the key characteristics of the regulatory environment throughout the lifecycle of a PPP – from preparation to contract management (Table 09).

The World Bank gathered the information for this assessment by using standardised questionnaires of close to 20,000 contributors - including lawyers,

public officials, chambers of commerce, academics and consultants (World Bank, 2021a). Regulatory and practice-based questions are used to determine both the enabling framework and how PPPs are implemented in the real world.

Two key limitations of this report are:

1. That it is survey-based, meaning the results come from the opinions of a pool of respondents that might not always be representative, and
2. the regulatory-based questions do not consider the “capacity of implementing agencies as demonstrated by staffing numbers, staff competence levels, professionalism, and experience, and macroeconomic stability or the prevalence of the corruption in each economy” (World Bank, 2021a).

Needless to say, these are important factors in any country.

Regulatory Framework and Institutional Arrangements for PPPs	Overall assessment of the regulatory and institutional framework governing PPPs: existence of the specific PPP laws and regulations, role of the PPP units and the Ministry of Finance, etc.
Preparation of PPPs	Assessment of the preparatory activities taking place prior to launching procurement of a PPP project
Procurement of PPPs	Assessment of activities and requirements for the selection of a private partner
PPP Contract Management	Assessment of activities and contractual provisions that have an impact on implementation of a PPP project after contract award
Unsolicited Proposals	Assessment of the specific regulatory issues when dealing with unsolicited proposals for PPPs

Table 09 Thematic areas surveyed in the World Banks Benchmarking Infrastructure Report (source: World Bank, 2020b)

5.3.4 GTZ Partnership Landscape

This report was commissioned by GTZ (merged with GIZ since 2010) to assess the “potential for PPPs in Tanzania with a specific focus on the areas of Health, Water and Local Governance” (Gesellschaft für Technische Zusammenarbeit [GTZ], 2010). The report was commissioned by GTZ to assess the macro challenges that need to be addressed and debated by the government, private sector and civil society in order to meet development goals (GTZ, 2010).

The report found that Tanzania has put into place “adequate policies and regulatory framework to guide the water sector, however, more has to be done in terms of sector coordination and simplification of conflicting laws which hinder the performance of the sector” (GTZ, 2010). They also stressed the need for capacity building at the local level in the water and sanitation authorities to ensure better performance; a need for more accurate data (especially in projections) when conducting feasibility studies; the need for more policy clarity and contract specifications; greater transparency; and the need for economies of scale for commercial viability in water and sanitation businesses (GTZ, 2010).

Other challenges that the report identified include contract enforcement, which they called “highly bureaucratic and process rather than results driven, often without a real understanding of what the laws are designed to achieve” (GTZ, 2010). They go on to report that the judicial processes “are not as transparent as they should be” and are “therefore open to corruption and bureaucracy” (GTZ, 2010).

While thorough in its analysis, a major

limitation is the age of the report, which is over ten years old. They also make a distinction between “classical PPPs” and cross-sector partnerships, however in their analysis they often lump the two together, which makes comparisons of performance and the challenges they face difficult to separate.

5.3.5 GIZ Gap Analysis

The GIZ Public-Private Partnership Operational Guidelines for the Water Supply and Sanitation Sector: Framework Gap Analysis Report and Recommendations (2017), was a collaboration between GIZ, Rebelgroup International and local consultant and World Bank PPP expert, Caroline Chema Eric, who was also interviewed in the research stages of this thesis. The purpose of this report was to analyse the 2015 PPP Regulations, find the gaps and make recommendations to address them.

They found “the main obstacles to the implementation of PPPs in the water supply and sanitation sector do not derive from gaps in the regulatory framework, but from a lack of capacity of contracting authorities and potential private contractors” (GIZ, 2017). Furthermore,

“...the procedure for the preparation and approval of a PPP project set out in the PPP Regulations 2015 is too complex for small-scale projects. The costs of undertaking all study and assessment activities required by the regulations are disproportionately large compared to the contract value of small-scale projects, and substantially increase the price for the consumer of water supply and sanitation services. Consequently, the procedural framework discourages the use

of PPP in the case of small-scale projects, which represent the majority of projects in the water sector” (GIZ, 2017).

They also identified the “weak” technical and financial capacity of the private sector to undertake PPPs in the water sector, and a lack of experience of domestic banks with project financing. Adding that high interest rates for private investors (10% p.a. real) also make the costs of long-term financing “not feasible” (GIZ, 2017). This report was quite thorough and some of the recommendations, such as lowering the benchmark for “small-scale” PPPs, were partly followed in subsequent legislation (e.g. defining small-scale PPPs as anything under \$20 million USD, rather than \$100 million USD, though for small-scale FSM this is still a much larger scale than typical costs).

5.3.6 Filling in the gaps – Assessments of PPP readiness in other literature

While the aforementioned reports are the most comprehensive reports I found specific to PPPs in Tanzania, other sources were used to fill in the gaps, some related to PPPs in Tanzania/Dar es Salaam and some rating macro level indicators in Tanzania that match the selected CSFs for the Readiness Radar. The sources and their most relevant findings will be mentioned below, and a table with other important information is at the end of this chapter (Table 10).

A recent study performed by Chileshe & Kavishe (2020), examined the readiness of developing countries to adopt PPPs, using the case study of Tanzania. Focusing on PPPs in the housing sector, the

study surveyed PPP practitioners within the sector and relevant governing bodies through semi-structured interviews. They found a “lack of awareness and usage of PPPs framework models during the feasibility and subsequent implementation process,” which is supported by similar findings in the GTZ (2010) and GIZ (2017) reports (Chileshe & Kavishe, 2020). Furthermore, they found the main factors influencing the readiness of Tanzania to implement PPPs were the “limited knowledge and skills required for PPP practitioners”; “Poor capacity building”; “Lack of engagement of experts during the viability and assessment process”; and “Poor selection process of private partners giving rising (sic) to unsolicited proposals” (Chileshe & Kavishe, 2020).

In order to strengthen and optimise the PPP environment in Dar es Salaam, Chileshe & Kavishe (2020) point out four areas in need of strengthening:

1. procurement processes
2. enabling environment (regulations and policies),
3. in organizations (i.e. PPP structure, policies and procedures),
4. and within individuals (i.e. skills, experience and knowledge).

In his assessment of PPP’s in the transportation sector in Tanzania, Bengesi (2016) further confirmed corruption and nepotism as contributing factors inhibiting PPP uptake. Through interviews with the private sector and public officials, focus group discussions and surveys, they found that not only was there a lack of understanding of what PPPs were, but also “issues of economic viability of projects in question, good governance and adherence to the code of conduct by the govern-

ment, and an unsupportive environment especially cited in weak local capital markets” (Bengesi, 2016).

During my research attempts were made to contact the PPP node/centre in Tanzania, which is the central PPP authority, however the email addresses did not work and the website (www.pppnode.go.tz) was only partially built (at the time of writing - May, 2021). However, the more established (since 2005) private sector authority, the Public Procurement Regulatory Authority (PPRA), did have a functioning website and had published an audit of procurements in 2018/2019 (the latest report available). *The Annual Performance Evaluation Report for Financial Year 2018/19* measures the performance of the procurement sector through compliance audits and VfM assessments, and is a legal mandate of the Public Procurement Act (2001, replaced 2011).

This report was used to assess corruption within the procurement sector at a greater degree of granularity than those found in other international corruption indices. The PPRA uses a “red flag” checklist to establish the presence of corruption symptoms in audited tenders. When red flags rise above 20 percent, a deeper pattern of corruption may exist. The assessment conducted 104 audits on public enterprises (PEs) and found 39 PEs (and a total of 131 contracts) to have a “higher corruption red flags in either one of its phases or on its overall assessment” (Public Procurement Regulatory Authority [PPRA], 2019). Of those having high red flags, two PEs were assessed to have the overall red flags of 20 and 21 – Kigamboni

Municipal Council (MC) and the Ministry of Water and Irrigation (MoWI), respectively.*

Other sources used to determine the value of the readiness rating include: The Corruption Perception Index (CPI) from Transparency International; the World Development Indicators (WDI) from The World Bank Group; The Global Innovation Index (GII) from Cornell University, Institut Européen d’Administration des Affaires (INSEAD), and the World Intellectual Property Organization (WIPO); The Global Competitiveness Report from the World Economic Forum; the Transformation Index (BTI) from Bertelsmann Stiftung; and the Environmental Performance Index (EPI) from Yale University. Detailed information on these and the other reports can be found in **Table 10**.

The values gathered from these readiness assessments and databases were then tabulated and averaged (**Table 11**). The following section will present the findings from this analysis.

*To normalise the corruption rate here for use in the readiness radar, the ratio of audits performed to those with corruption present (104/39) was used in the Readiness Rating.

Report	Author/Organization	Year	Funding / Supported by	Target Audience	Methodology	Focus	Scoring
2015 Africa Infrascope	Economist Intelligence Unit	2015	The World Bank Group, PPIAF	Private Firms, Investors, Public	Qualitative and Quantitative	Macro Enabling Environment	PPP readiness (0-100)
Benchmarking Infrastructure Report	The World Bank	2020	The World Bank Group	Private firms, researchers, governments	Surveys	Regulating environment of PPP life cycle	PPP readiness (0-100)
Partnership Landscape	GTZ	2010	GTZ	Policy-makers	Country Expert Assessment	PPP enabling environment	Qualitative
Framework Gap Analysis Report and Recommendations	GIZ, Rebelgroup International, Caroline Chema Eric	2017	GIZ	EWURA, MoWI and other policy-makers	Gap analysis of legal text	PPP regulations for the water and sanitation sector	Qualitative
Readiness assessment of public-private partnerships (PPPs) adoption in developing countries: the case of Tanzania	Kavishe, Nicholas; Chileshe, Neema	2020	University of South Australia; Ardhi University	Researchers and Policy-makers	Semi-structured interviews with PPP practitioners in Tanzania	PPP enabling environment and the housing sector	Qualitative
Corruption Perception Index (CPI)	Transparency International	2020	government agencies, multilateral institutions, foundations, the private sector and individuals	Public and Policy-makers	Data aggregation from perceptions of business people and country experts about corruption	Corruption	Level of perceived corruption (0-100), 0 is most corrupt, 100 is least corrupt
ANNUAL PERFORMANCE EVALUATION REPORT FOR FINANCIAL YEAR 2018/19	Tanzania Public Procurement Regulatory Authority (PPRA)	2017/18	Government of Tanzania	Public and Policy-makers	Audits	Corruption and Performance	Percentage of audited firms with higher red flags of corruption (39 PEs with higher red flags out of 104 = 37.5/100)
World Development Indicators	The World Bank Group	2019	The World Bank Group	Public and Policy-makers	Analysis of data compiled from international and government agencies	Macro factors influencing development	(1-6) low to high
Global Innovation Index	Soumitra Dutta, Bruno Lanvin, and Sacha Wunsch-Vincent	2020	Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO)	Public and Policy-makers	Data ranking	Measuring innovation in the economy	Score (0-100) and ranking (1-131)
Global Competitiveness Report	World Economic Forum	2017/18/19	Industries, businesses, individuals	Businesses	analysis of statistics from international organizations and surveys of executives	Competitiveness of economy at a national level	Score (1-7)
Transformation Index (BTI)	Bertelsmann Stiftung	2020	Bertelsmann Stiftung - Donors	Public and Policy-makers	Expert assessment of indicators through surveys	Transformation toward democracy and market economy and quality of governance	Score (1-10)
Environmental Performance Index (EPI)	Wendling, Z. A.; Emerson, J. W.; de Sherbinin, A.; Esty, D. C.; et al.	2020	The McCall MacBain Foundation	Public and Policy-makers	Correlation analysis of data from various sources (WB, IMF, Heritage Foundation, etc.)	Environmental Performance	Score (0-100) and ranking (1-180)

Table 10 Detailed information on the reports and databases used to determine the values of the readiness assessment (source: Author)

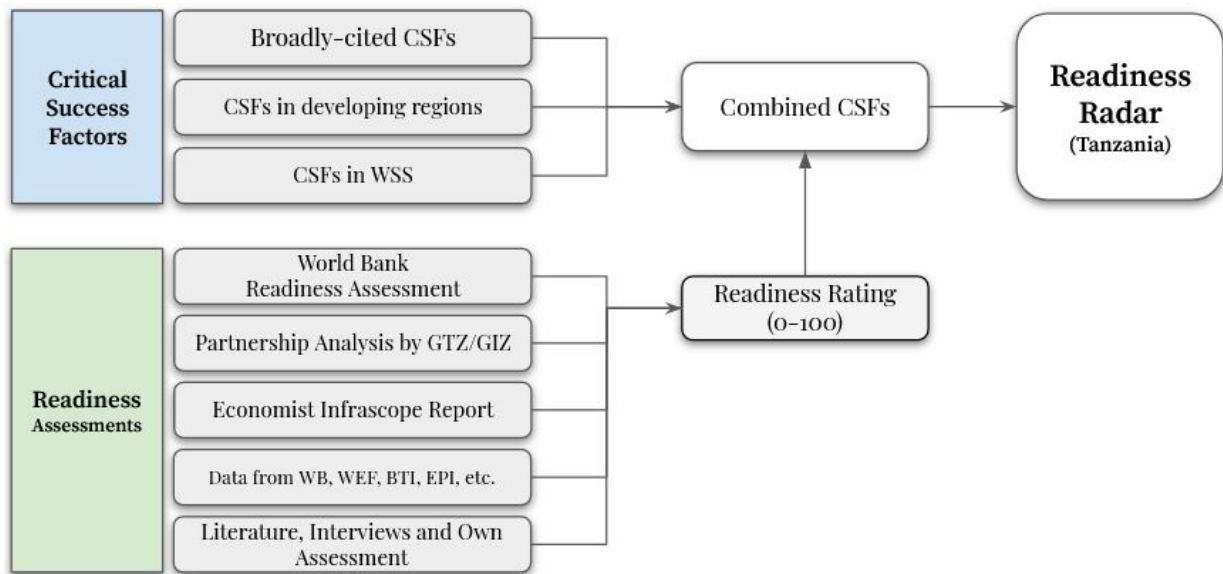


Figure 37 Populating the CSF framework with a readiness rating to produce a readiness radar (source: Author)

5.4 The Readiness Radar - Results

Now that we have a “Combined CSF” framework for assessment (based on a thorough analysis of the literature on developing regions, the WSS sector and commonly cited CSFs) and the values to populate it (based on various readiness assessments), an analysis of Tanzania’s PPP readiness can be performed.

The scores based on matching rating factors were entered into the framework from each report and database, and the average was calculated to give it a final score in each category. The framework and Readiness Radar on the next page display the results. Using the ranges:

0-20 = Very Low Readiness

21-40 = Low Readiness

41-60 = Adequate Readiness

61-80 = High Readiness

81-100 = Very High Readiness

Tanzania was found to have an average of 39.3, and therefore a “Low Readiness” for PPPs. Due to its proximity to the “Adequate” range, Tanzania could be said to be an environment that is almost adequate for PPPs, however only if notable improvement is made across the entire project level, competency and commitment of partners, risk sharing, transparency in the procurement process, regulatory quality, corruption, financial markets, public acceptance and involvement, and efforts to benefit all stakeholders and not just the project partners. For sake of comparison, the same framework was used to rate South Africa’s PPP readiness, a “Developed” PPP market (Figure 39).

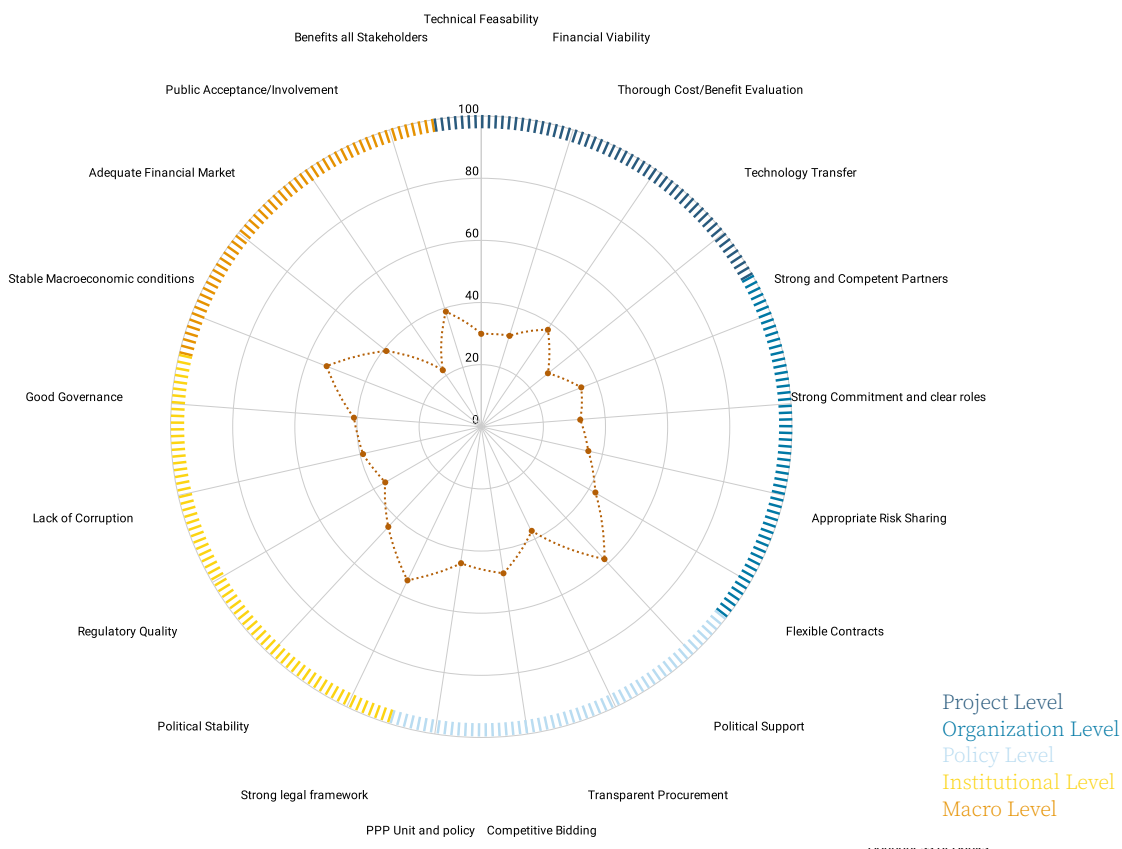


Figure 38 Readiness Radar (source: Author)

Level	CSF	Sources												Score	
		EIU (2015)	WB BID (2020)	GTZ (2010)	GTZ (2017)	Chileshe & Kavisho (2020)	Transparency Intl. (2021)	PPRA Report (2019)	WDI - World Bank (2019)	GH (2020)	WEF (2017/18/19)	EITI (2020)	EPI (2020)		
Project	Technical Feasibility			30	30	30									30.0
	Financial Viability		32		30	30									30.7
	Thorough Cost/Benefit Evaluation	43.8	32												37.9
	Technology Transfer									12.1	42.9				27.5
Organization	Strong and Competent Partners	43.8			30	30									34.6
	Strong Commitment and clear roles		32												32.0
	Appropriate Risk Sharing	43.8	32	30											35.3
	Flexible Contracts	43.8	53	30											42.3
Policy	Political Support	58.1													58.1
	Transparent Procurement	50	32	30											37.3
	Competitive Bidding	50	71	30						40					47.8
	PPP Unit and policy	50	53	30											44.3
Institutional	Strong legal framework	50	71	50	70				40		48.3				54.9
	Political Stability	43.8							40	53.6	40	55.6	31.1		44.0
	Regulatory Quality								40				31.1		35.6
	Lack of Corruption						38	37.5	40		36	44.4			39.2
	Good Governance								52	33.2	40	38.6			41.0
Macro	Stable Macroeconomic conditions	58.1							70	43.6	74.3	43.7	31.1		53.5
	Adequate Financial Market	38.9			30				40	43.6	35.70	55.60	31.10		39.3
	Public Acceptance/Involvement												22.2		22.2
	Benefits all Stakeholders	38.9													38.9
Total Average														39.3	

Table 11 Averaged ratings from various sources to determine Tanzania’s PPP readiness (Source: Author)

Tanzania's PPP Readiness



South Africa's PPP Readiness



Figure 39 Comparison of Tanzania and South Africa's PPP Readiness. South Africa's Scores can be found in Appedix E (source: Author)

Chapter 6: Analysis of the PPP enabling environment in Dar es Salaam

While the last chapter combined a mix of sources that analysed both Tanzania and Dar es Salaam in broad strokes, this chapter will give excerpts from expert interviews and a PESTLE analysis of the challenges specific to Dar es Salaam’s PPP environment.

6.1 Expert Interviews

From January to May, 2021, several interviews were held with various experts related to PPPs and the WSS sector in Dar es Salaam and elsewhere. Excerpts from these interviews are in the following sections. For the full summaries, see **Appendix B**.

6.1.1 Caroline Chema Eric

Caroline Chema Eric is a PPP operations officer at the World Bank, who, in collaboration with GIZ and Rebelgroup International in 2017, performed a gap analysis report on the PPP legislation in Tanzania. The report, titled *Framework Gap Analysis Report and Recommendations* was a key resource in my research.

Key points and excerpts from the interview:

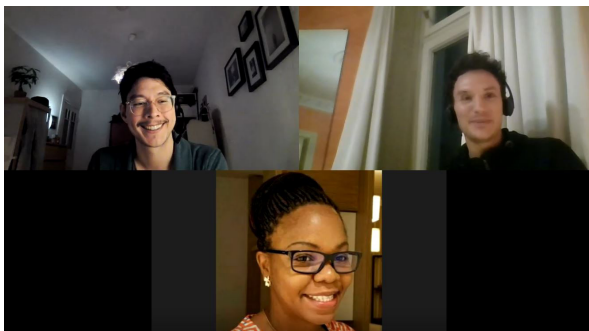


Figure 40 Zoom interview with Tim Fettback and Caroline Chema Eric (source: Zoom/Author, 2021)

- The process for starting a PPP begins with a concept note that must be approved by the management of DAWASA, then approved by MoW, then sent to the PPP Centre (the full process as outlined in the 2020 PPP Regulations can be found in **Appendix C**). “You see how it is procedurally heavy. And another problem that we see, is that there is no marrying of the technical aspects of the WSS sector and the technical aspects of PPPs, so you find you have people sitting at DAWASA with no knowledge of PPPs, and people at the MoW with no knowledge of sanitation.” To address this, they are introducing joint committees with representatives from each sector to address these knowledge gaps and facilitate the process.
- She mentioned the appeal of a standardised contract that would ease the process and attract foreign investors, who are generally not interested in a short-term (5-10 year) contract in small-scale community based sanitation.
- Regarding DAWASA’s position on PPPs, she mentioned that because of DAWASAs poor past experience with the Citywater PPP, they are more interested in Design Build Transfer projects (same as Design Build - asset ownership and service provision never leaves the hands of DAWASA – not technically a PPP according to WB). “To them, service provision is about collecting revenue, they don’t want the private sec-

tor to get rich on public projects.”

- In terms of financing, she mentioned that all money paid for government services goes through a centralized government payment system, with little ring-fencing or earmarking of funds. This makes it difficult for DAWASA to use the funds that it collects to expand or provide better service. “At the moment this money sits in one pot,” she said, “and the government is at liberty to invest in education, or something else. It is difficult to ring-fence, so ringfencing is key to attract financing.”
- She is hopeful that this can be solved through a pilot program they are trialling for the Rural Water Supply and Sanitation Authority (RUWASA), where they will have internal accounts within the treasury that use invoice numbers to separate the funds and make the financial arrangements for PPPs more feasible (C. Chema Eric, personal communication, January 27, 2021).

6.2.2 Eng. Romanus A. Mwang’ingo and Eng. Mutaekulwa Mutegeki

Eng. Mwang’ingo was the acting CEO of DAWASA until 2018, and currently serves as a consultant and advisor. Together with Eng. Mutegeki, they wrote the *Guidelines for Onsite Sanitation and Faecal Sludge Management for Water and Sanitation Authorities, 2020*. This publication is the latest step in providing guidance for the integration and regulation of the private sector in FSM.

Key points and excerpts from the Interview:

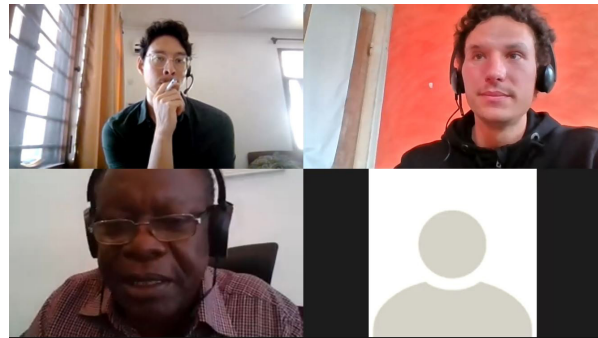


Figure 41 Zoom interview with Tim Fettback and Eng. Romanus A. Mwang’ingo and Eng. Mutaekulwa Mutegeki (source: Zoom/Author, 2021)

- According to Eng. Mutegeki, Tanzania does not have a structured PPP for the sanitation sector because the PPP process is “lengthy and cumbersome”, making the private sector reluctant to pursue (E. M. Mutegeki, personal communication, March 16, 2021). He mentioned that the Toangoma FSTP is a PPP-like scheme, where the land was provided by the operator and the CAPEX by DAWASA and Wateraid. However there is no formal PPP contract for this arrangement.
- Regarding the financing of sanitation, Eng. Mwang’ingo recommended a property tax collected through local government authorities (LGAs). Though adding, “there is experience of misappropriation or misuse of these funds. You might find the funds are collected but they are used for other services with the LGAs” (E. R. A. Mwang’ingo, personal communication, March 16, 2021).
- In regards to setting tariffs, they mentioned that different tariffs in different parts of the cities are not allowed, which makes it a challenge for private operators to recover costs when serving difficult to access parts of the city. They go

on to recommend scheduled emptying and a sanitation levy with ring-fenced funds to finance the sanitation service provision.

6.2.3 Peter Hawkins

Peter Hawkins is part of the World Bank's global urban sanitation team, specifically focusing on project support in Africa. He has worked in Mozambique, Tanzania, Ghana and various Latin American countries, Sri Lanka and Indonesia. From 2007 to 2016, he headed the WSP team in Mozambique, and he is currently serving in a global consultant role for the World Bank and other organizations, based in the UK. He has written many articles and books on FSM and sanitation, including *FSM Innovation Case Studies - Case Studies on the Business, Policy and Technology of Faecal Sludge Management* (second edition). Mr. Hawkins was kind enough to validate the methodology and findings of this thesis, stating, "It seems like you're doing a pretty sensible piece of work.



Figure 42 Zoom interview with Tim Fettback and Peter Hawkins (source: Zoom/Author, 2021)

Key points and excerpts from the interview:

- Regarding scheduled emptying: "Scheduled emptying model has a lot going for it. But it's challenging.

You get to the house and no one's there. The whole thing has to be reliable and well organized. The idea of paying a regular fee, especially for poor people, is attractive. Paying a few dollars a month is more feasible for them. It's a blunt tool, but it's less worse than the other ones" (P. Hawkins, personal communication, May 21, 2021).

- Regarding Private Sector Participation: "It's almost conventional wisdom now that we need the private sector there" (P. Hawkins, personal communication, May 21, 2021).
- Regarding conventional PPPs: "We had an incident in Mozambique where they passed some very heavy handed PPP legislation, where it was basically to deal with somebody building hydropower or a major minerals project, and suddenly it turned out that under this legislation that some little water company in a small town serving 10,000 people had to hire a battery of lawyers. It was clearly nonsense, it actually caused a lot of problems" (P. Hawkins, personal communication, May 21, 2021).
- Regarding the importance of regulation: "Regulation is an important part of it. You're dealing with informal businesses or micro-enterprises that are just about formal, maybe have a business license from the city council, and particularly in the FS business they're not quite sure what is legal or not because of the public health legislation. It's a bit of a minefield for them. A number of operators I spoke to are actually quite in favour of legislation. Then

they know what the goalposts are, and have an environment in which they are willing to invest. They're not prepared to invest their money now because they don't know what's going to be illegal" (P. Hawkins, personal communication, May 21, 2021).

- Regarding working with the local financial sector: "The mom and pop operator may have a perfectly viable business proposition but they don't know how to go to the bank. Just giving them some business skills, and informing the finance people about what sort of business this is, looking at appropriate financial instruments - ways of securitizing the business. So that banks have more willingness to lend... Then these small businesses have the means to get beyond the one truck kind of enterprise" (P. Hawkins, personal communication, May 21, 2021).
- Regarding tariff setting: "If it's a monopoly situation, tariff capping is of course necessary, but if you have 30-40 different businesses, you can rely on competition to keep the prices reasonable" (P. Hawkins, personal communication, May 21, 2021).

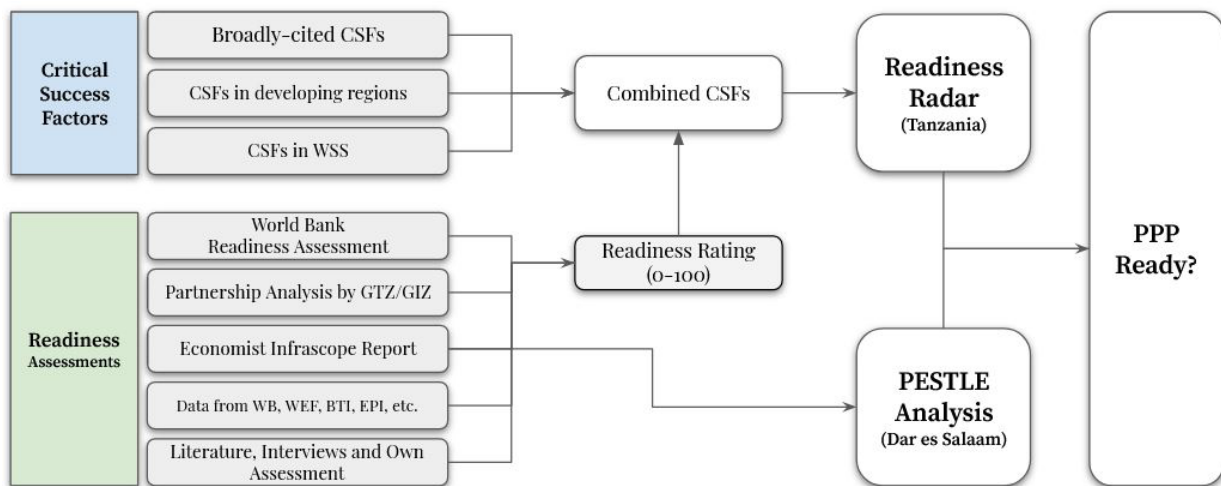


Figure 43 Research framework for analysis of both Tanzania and Dar es Salaam's PPP readiness (source: Author, 2021)

6.3 A PESTLE Analysis

The PESTLE framework is a comprehensive strategic analysis that analyses the Political, Economic, Social, Technical, Legal and Environmental external factors that can impact, in this case, a PPP project (Visconti, 2016). Used to get an overview of the macro forces at play in a given environment, a PESTLE can be a useful tool to get a holistic view of the risks and challenges present in the specific context of Dar es Salaam (Table 12).

<p>P political</p>	<ul style="list-style-type: none"> • Changing political regimes and instability lead to project uncertainty and avoidance • Long-term nature of PPPs sometimes fare poorly across different administrations with different priorities • Corruption, as assessed both internally by the PPRA and by international agencies is a real issue and major risk in the procurement of new projects which could be based on backroom deals or personal relationships • A lack of understanding among politicians of the complicated PPP process • Lack of transparency (data, unpublished agreements, procurement, bidding)
<p>E economic</p>	<ul style="list-style-type: none"> • Lack of financial markets • Limited ability of private sector to provide financing • Currency fluctuations make deals with foreign partners more challenging and creates more risk • PPPs require costly pre-feasibility studies – PSPs in the sanitation sector generally have little starting capital to purchase equipment, let alone studies and contract preparation • WSS and FSM in particular are not very profitable and the business case is still shaky
<p>S social</p>	<ul style="list-style-type: none"> • Water and sanitation are both a social and economic good, which makes it particularly vulnerable to shifting public opinions on privatisation • Public pushback against private participation in general • There is a negative perception of pit emptying and FS businesses that needs to be overcome to promote legal and trustworthy service • There is a lack of education on the importance of FSM and the effects it can have on health and the environment
<p>T technical</p>	<ul style="list-style-type: none"> • There is a limited supply of locally manufactured trucks and equipment for FSM, creating a dependence on foreign markets and expensive supply chains • DEWATS, while fairly easy to operate, require skilled engineers to build in order to ensure proper function • PPP contracts are highly technical and require significant expertise in order to ensure proper risk allocation and contract management
<p>L legal</p>	<ul style="list-style-type: none"> • The written legal framework for PPPs in Tanzania is robust, however there is little on the ground experience in resolving conflicts • Past legal battles regarding PPPs (in the case of Graft-Taints, Citywater) have left a bad taste in the mouth and resulted in expensive international arbitration • Dispute mechanisms for PPPs are in their infancy, which adds uncertainty to the process for investors who will avoid taking undue risks • Previous governments have been heavy-handed and arbitrary in their decisions, leaving less faith in a fair judicial process
<p>E environmental</p>	<ul style="list-style-type: none"> • There is inadequate enforcement of discharge standards • A lack of enforcement allows the informal sector to provide illegal service that undercuts legitimate business models and poses risks to the environment (eutrophication, cholera, diarrhea, water pollution etc.) • The soil characteristics in Dar es Salaam are sandy, which when combined with unlined pits leads to infiltration of contaminated water into the high water table. • The two rainy seasons create a spike in demand when toilets and septic tanks are overflowing that makes it difficult to service everyone when they call, leading the community to form negative opinions of the industry

Table 12 A PESTLE Analysis of the PPP and FSM enabling environment in Dar es Salaam (source: Author, 2021)

6.4 Tanzania: An unconvincing environment for PPPs in FSM

The environment in Dar es Salaam in general and in the small-scale FSM sector more broadly, is not suitable for conventional PPPs as defined by the World Bank and Tanzania’s PPP regulations. Despite the promises of PPPs – private financing, greater efficiency and the transfer of risk – the record of these achievements is few and far between in the developing world.

The hope that private financing would bridge the gaps in funding were largely misplaced, due to the high capital costs for repairing and expanding networks, the variability in service demand for FSM and lower profit margins (Marin, 2009). Many private financiers see this sector (FSM and WSS in general) as too high of a risk, especially in SSA, as evidenced by the tiny total share of the world’s PPP market that exists in SSA low-income countries (2.2%) and the high percentage of Multilateral Development Bank (MDB) funding (48%) in these countries as compared to funding for PPPs worldwide (18.6% MDB funded) (Marin, 2009; PPI Database, 2021).

While some reports find gains in efficiency in water sector PPPs (Estache & Philippe, 2012; Marin, 2009), due to the nature of SPVs that reduce the risk for each member of the consortium, the real risk when PPPs fail most often lies with the communities that suffer from poor service provision and the government that needs to pick up the pieces after a failed project. If the water sector, which has a captive and stable demand, is deemed too risky by investors, FSM – with its unstable demand, small-scale and unproved business model – is even riskier.

In summary, the current enabling environment in Dar es Salaam is not conducive for conventional PPPs. So what is? The following chapters will discuss three case studies of FSM arrangements in Dar es Salaam, identify the opportunities for scaling up, and propose an “open partnership” (OP) structure more suitable for small-scale FSM.

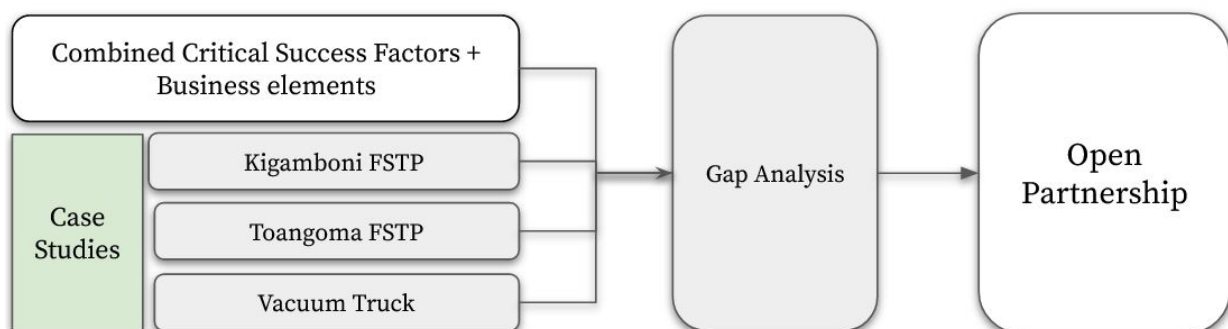


Figure 44 Research framework for analysis of case studies and the development of Open Partnerships in Chapter 7 and 8 (source: Author, 2021)

Chapter 7: Case Studies and business gap analysis

In order to get a better understanding of the on the ground situation in Dar es Salaam, I spent six weeks in February and March, 2021, interviewing various stakeholders, FSTP operators, vacuum truck owners, government officials and regulators, NGO employees, legal experts and others. Five small-scale FSTPs were visited, two of which, along with one entrepreneur vacuum truck owner, will be discussed in the following sections.

As the research trip occurred within the context of the SARS-CoV-2 novel coronavirus pandemic, some difficulties arose in terms of personal interviews, and many were performed online via Zoom, some of which occurred outside of this six week time frame. However, each of these case studies was personally visited and the owner/operators were personally interviewed. The following information came directly from these semi-structured interviews unless otherwise cited. Factsheet data and an analysis of each case study's project and organization level CSFs can be found in **Appendix D**.

7.1 Overview of two FSTPs and an E&T business in Dar es Salaam

The following sub-sections will give a brief overview of the background, issues raised during the interviews, and the challenges they personally mention in running their businesses. After these sub-sections, I will perform a gap analysis on these case studies to determine what areas could improve to increase their ability to scale-up. The income streams are a rough estimate based on data collected in the interviews, and may not be fully accurate as I was unable to examine receipts and profit/loss statements.



Figure 45 Mr. Milinga sitting in his office (source: Author, 2021)

7.1.1 Kigamboni FSTP/ UMAWA Waste Management Site

“It’s a good business, but you need to be tough” (Mr. Milinga, 2021)

Constructed in 2012/13, the Tungi-Kigamboni FSTP was a partnership between BORDA and Mathias Milinga. The first of its kind in Tanzania, the FSTP was designed and funded by BORDA with DEWATS technology that treats raw FS, producing biogas (for personal cooking), treated effluent (used for a banana plantation and fish pond) and dried FS used for soil conditioner.



Figure 46 Mr. Milinga and Ireneo Shinga standing in front of the Sludge-Go (source: Author, 2021)

Prior to owning and operating the FSTP, Mr. Milinga was involved in solid waste collection and operated a small transfer station for FS (Bremen Overseas Research and Development Agency [BORDA], 2018). BORDA partnered with Mr. Milinga by constructing an FSTP on his private land, thus enabling him to treat the FS directly and increase his profit. Beginning with just a gulper and a wheelbarrow, Mr. Milinga began his own business “Uhai wa Mazingira na Watu” UMAWA and also owns several pieces of equipment, which include a 1m³ sludge tractor (Sludge-Go, developed by BORDA), two motorised tri-cycles (3m³ each) and a recently acquired used vacuum truck (6m³). In addition to the FSTP, a training centre was also established in 2016. Mr. Milinga employs six full-time operators and four part-time operators for the busy rainy seasons.

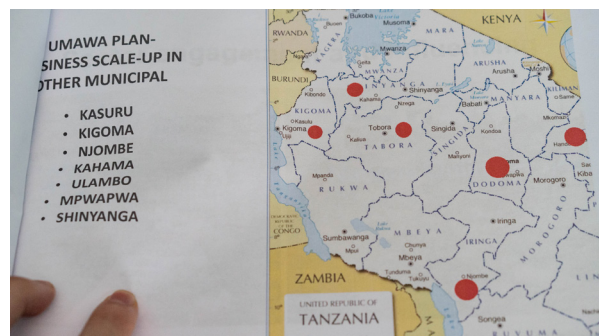


Figure 47 UMAWA scale-up plan (source: Author, 2021)

Business Model and Partnership Structure

Mr. Milinga has an agreement with DAWASA to serve his community in Kigamboni (40,000 people) and he mentioned that DAWASA has given him permission to start similar businesses in other cities throughout Tanzania (Figure 47). However, start-up capital is a limiting factor. DAWASA also serves as the monitoring regulator and tests the effluent every three months.

Mr. Milinga has several income streams and cost avoidance mechanisms.



Figure 48 Sanitation Training Center (source: Author, 2021)

His primary business is that of emptying, transporting and treating FS, from which he charges 30,000 TZS (10.50€) for 2m³, 40,000 TZS (14€) for 3m³, and up to 100,000 TZS (35€) for sites further away. From these services he has an estimated income of 2.5 million TZS/month (890€/month), with associated costs of 1.2 million TZS/month (423€/month).

While his primary business is the emptying, transport and treatment of FS, his



Figure 49 Unplanted sludge drying bed and drying FS soil conditioner (source: Author, 2021)



Figure 50 Effluent fish pond (source: Author, 2021)

major income stream seems to come from the Kigamboni Training Centre (Figure 48), from which he normally trains 50 to 60 people per year, though 140 people were trained there last year alone (2020). Charges for training vary, depending on where they are from and their ability to pay, ranging from 300,000 to 600,000 TZS (105-210€) per person.

Other income streams include selling the dried FS as soil conditioner, though prices are quite low for this (Figure 49) (around 1,000 TZS per 50kg bag). He also collects fees from other trucks that occasionally dump FS at his FSTP. Furthermore, as his operation is a well-known pilot he receives 100s of visitors per year, and donations from these visits are likely to be a considerable side income. I was originally asked to donate 300,000 TZS (105€) for my visit, though ended up donating 100,000 TZS (35€). If this is a stan-



Figure 51 Banana and Papaya trees fed water from effluent (source: Author, 2021)

dard donation, at least another 3,500€ is made through donations.

Lastly, costs for cooking fuel are offset by the biogas that is produced in the FSTP, in addition to the bananas, papayas (Figure 51) and fish (Figure 50) that are fed from the effluent.

The following is a rough estimate of his yearly income:

- Net income/year from E, T, T: 5,500€
- Gross income from training centre in 2020: 14,700€ - 29,400€
- Income from soil conditioner per year: 200 50kg bags/year at 1k each = 70€
- Fees from other trucks: ?
- Donations: 3,500€ / year ?
- Cost avoidance: ?
- Net Income: 23,770€ - 38,470€ / year



Figure 52 Tractor and tricycle for accessing unplanned areas (source: Author, 2021)



Figure 53 Sludge-Go vacuum tank (source: Author, 2021)



Figure 54 Mr. Milinga showing us his “floating” compost heap in a nearby field (source: Author, 2021)



Figure 55 UMAWA vacuum truck (source: Author, 2021)

As can be seen, these estimates vary widely and this is only a rough estimate, however the income is many times the average income in Dar es Salaam (Tanzania National Bureau of Statistics, 2021).

Stated key challenges:

- Pits full of mixed and solid waste
- System incompatibilities with the truck or machines that are sent there and are unable to empty pit
- Behaviour change is necessary for the community to recognise the need for proper treatment rather than illegal emptying
- The facility was built 10 years ago, and since then the community has grown too large for this one small FSTP to treat all the FS
- Tank emptying takes time, and during the busy seasons it is difficult to service everyone on demand, but community doesn't always understand when they need the service immediately because their tank is overflowing
- Frogmen and illegal emptying undercut prices
- There is not enough capital investments to start these businesses

- Banks aren't familiar with the business model and don't offer loans

7.1.2 Toangoma FSTP

“What we need is more education, to provide more jobs and lower the price of pit emptying for the local community” (Ms. Mhando, 2021).

Implemented by Wateraid and the People's Development Forum (PDF) in collaboration with DAWASA and Temeke Municipality in 2018 on land owned by Mwanahamia Mhando (Figure 56), the Toangoma FSTP lies on top of a hill overlooking the outer district of Temeke in Dar es Salaam (Figure 57). One hour from the Msasani district where I was staying, and non-existent on Google Maps, we reached our destination through a series of phone calls with Ms. Mhando that led us to a gas station from which an orange-vested boda-borda motorbike driver guided us the rest of the way up the windy, potholed lanes.



Figure 56 Ms. Mhando (source: Author, 2021)



Figure 57 Ms. Mhando overlooking Toangoma from her hilltop FSTP (source: Author, 2021)

Ms. Mhando, who used to live in Chicago for ten years, moved back to care for her family estate and operate the FSTP that became operational in 2018. She has a 50/50 partnership with DAWASA, whereby they split equally the dumping fees (1,000 TZS per m³). From this income she receives an estimated 150,000 TZS (53€) per month, on average. Her only other source of income is selling the dried FS as soil conditioner, from which she sells around 200 50kg bags per year at 1,000 TZS (0.35€) each. In terms of cost avoidance, the treated effluent is used to water the banana plantation and (when functioning) she uses the biogas for cooking.

When I arrived, the plant was not in operation for the last several months and she said they were performing yearly maintenance, which DAWASA is responsible for. She is responsible for all day to day and minor maintenance. She has an

individual contract with DAWASA but is still waiting for a license.

In normal years she receives around 100 visitors per year, from which she also collects donations. The donation requested of me was 30,000 TZS (10.60€). However, due to the coronavirus, she had received very few visitors this past year. She has no other paid employees, though she had a young man who assisted her in showing me around and she hoped to be able to one day provide him and others a



Figure 58 Toangoma FSTP partnership with Wateraid (source: Author, 2021)

job. Currently, however, the FSTP is not profitable. She was optimistic about the future, though, and believes if they acquire a holding tank to expand their capacity, they could get more dumping fees and produce more soil conditioner. She would also like to implement a training centre in order to increase her income and help educate the local community.

Stated key challenges:

- Sludge that is dumped there is often very watery and doesn't produce a lot of biogas and soil conditioner
- Capacity is too low to meet demand
- Location is difficult to access
- Many unplanned settlements in the area
- Not profitable enough to hire additional workers



Figure 60 Expansion chamber with plastic waste (source: Author, 2021)



Figure 61 Planted Gravel Filters (PGF) (source: Author, 2021)



Figure 59 Sludge drying beds (source: Author, 2021)



Figure 62 Biogas settler (source: Author, 2021)

7.1.3 Vacuum Truck Business

Godlove Ngoda is an entrepreneur and engineer at BORDA who, in his spare time, started an emptying and transport business with a partner. Mr. Ngoda and his partner bought a used vacuum truck in 2019 for 32,000,000 (13,800 USD). After making some minor repairs and purchasing new tires, they decided to expand the volume of the tank from 3m³ to 4.7m³ in order to service the more lucrative commercial contracts that have larger tanks (Figure 63-64).

According to Mr. Ngoda, the process for acquiring the license only took 1-2 weeks and was relatively straightforward. While Mr. Ngoda and his partner own the truck, they hire a driver and operator to perform the emptying and transport of the FS. The driver then pays Mr. Ngoda a flat fee of 70,000 TZS (25€) per day (6 days a week). If the driver and operator empty more than



Figure 63 Used vacuum truck (source: Godlove Ngoda, 2019)



Figure 64 Vacuum truck with expanded capacity (source: Godlove Ngoda, 2019)



Figure 65 Godlove Ngoda standing outside the BORDA HQ (source: Author, 2021)



Figure 66 Expanded and repainted vacuum truck (source: Godlove Ngoda, 2019)

two pits, they generally earn a profit.

The process for getting a TWA license is as follows:

- a) pay statutory payments including, business license fees, TRA income tax payment, LATRA and NEMC fees;
- b) provide necessary staff, material and equipment for effective service delivery;
- c) comply with the tariff as approved by EWURA;
- d) comply with the service quality standards as issued by the EWURA from time to time;
- e) operate in accordance with existing, standards, laws, Standard Operating Procedures (SOP) and regulations related to the services to be provided;
- f) subject to regulation 24 (1) of the

of the Water Supply and Sanitation (Provision and Management of Sewage and Wastewater Services) Regulations, 2019, the Operator shall not discharge gaseous, liquid and solid waste which contains any fat, grease, oil, petroleum spirits, abattoir waste, hospital waste, sand, detritus, chemicals from mining or similar matter into the treatment plant;

g) keep a record of its services in a form specified by a WSSA and submit the report to the WSSA at intervals as specified by the WSSA; and

h) pay dumping fees. permit from the LGA after ensuring that the vessel meets the following conditions:

- a) has a containment mechanism to conceal the contents except during loading and unloading;
- b) is water and air tight manufactured to prevent leakage through cleaning;

c) has self-sucking and offloading mechanisms; and

d) has been visibly marked as strictly carrying and transporting wastewater and sewage only (EWURA, 2020)

Mr. Ngoda hopes to expand his business once he gathers more data on average trips per day and fee structures and he is in the process of adding a tracking device to the truck to gather logistical data.

Stated key challenges

- Start-up costs and CapEx for trucks and equipment are in general quite high, averaging around 30,000 USD per used truck (Dodane et al., 2012)
- Used trucks come from the European market and there is a limited local market for parts and supplies, making repairs quite costly
- The truck owners have very little data on how many trips the driver is doing per day and therefore don't know if they are charging an appropriate fee
- As there are only a limited number of FSTPs with small capacity, most trips must be made to one of the two operating WSPs, which increases travel time and distance, thus increasing fuel costs
- Traffic in Dar es Salaam is quite time consuming
- The exact nature and location of the pit that needs to be emptied is often unknown before showing up, and if it is inaccessible to the vacuum truck no transaction can be made and time is wasted

7.2 Analysis of PSPs with the project and organization level CSFs

Continuing in the same vein of analysis through critical success factors, I will now compare the three case studies present above using the readiness radar and the relevant CSFs that are within the control of the case studies (political, regulatory and most macro factors are outside of their control). While these CSFs tell part of the story of their success (or lack of it), other factors, such as entrepreneurship skills, business plans, community engagement and financial accounting also play a role in any business venture. Therefore I will add the following elements gathered through interviews, literature review and business principles that are crucial to running a profitable business to the readiness radar alongside the CSFs:

Business Elements

1. Market knowledge - The size of the market, who are your competitors, how in demand is your service, what benefits do you offer.
2. Entrepreneurial knowledge - General business acumen, ability to see the need and meet it, ability to network and form relationships with key persons.
3. Specific market niche or solution - The service being offered is in demand with limited competition, focused service.
4. Equipment - Sufficient and functional equipment to meet demand is owned or can be utilised.
5. Prices - Prices are affordable but profitable.
6. Results - Performance goals are set and met, with the use of metrics to

gauge results.

7. Business Model - A business plan was created that makes the case for a functional business model.
8. Financial Information (planned and actual) - Data is used to generate projected supply/demand, and data is collected to track performance and adjust to changes in the market.
9. Capable and knowledgeable staff - Staff are well-trained and capable of carrying out day-to-day tasks.

+ selected applicable CSFs:

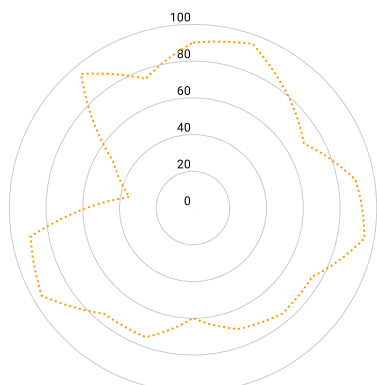
1. CSF1: Technical Feasibility
2. CSF2: Financial Viability
3. CSF3: Thorough Cost/Benefit (VfM) Evaluation
4. CSF4: Technology Transfer
5. CSF5: Strong & Competent Partners
6. CSF6: Strong Commitment and Clear Roles
7. CSF7: Appropriate Risk Sharing
8. CSF8: Competent Contract Management
9. CSF20: Public Acceptance/Involvement

From this list of combined business elements and CSFs, I then grouped them according to the typical departments any small and medium-sized enterprise (SME) would typically have:

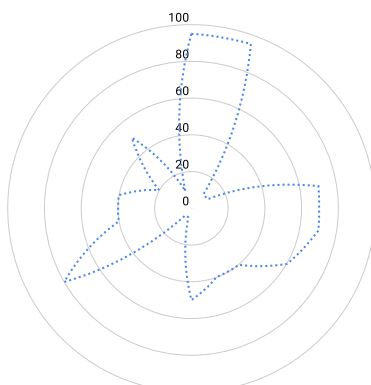
1. Operational
2. Sales & Marketing
3. Finance & Accounting
4. Human Resources
5. Organizational

Finally, I assessed each case study based on the case study interviews, expert interviews and information gathered from BORDA to determine the gaps that need the most attention to properly scale up their businesses. The table and ratings are on the following page.

Kigamboni FSTP



Toangoma FSTP



Vacuum Truck

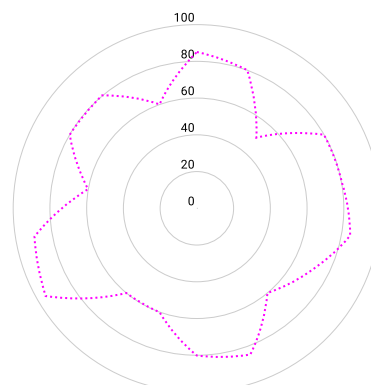


Figure 67 Gap analysis of the Kigamboni FSTP, Toangoma FSTP and Vacuum Truck business (source: Author, 2021)

	CSF	Description	Kigamboni	Toangoma	Vacuum Truck
Operational	Technical Feasibility	Project is technically possible, with available materials and skills	90	95	85
	Technology Transfer	Transfer of technology or knowledge to meet the needs of the local conditions	95	95	80
	Equipment	Sufficient and functional equipment to meet demand is owned or can be utilised.	80	10	50
	Results	Performance goals are set and met, with the use of metrics to gauge results.	70	10	80
Sales & Marketing	Public Acceptance/Involvement	The public approves of the project and is involved or consulted in the project design with an acceptable level of tariff for the services	90	70	80
	Market Knowledge	The size of the market, who are your competitors, how in demand is your service, what benefits do you offer.	95	70	85
	Specific Market Niche or Solution	The service being offered is in demand with a focused and valuable service without an excessive amount of competition.	75	60	70
	Prices	Prices are affordable but profitable.	75	40	60
Finance & Accounting	Financial Viability	Project has adequate financing and can make a profit	70	40	85
	Cost/Benefit Evaluation	A thorough prefeasibility, VfM, or cost/benefit analysis has been performed	60	50	80
	Financial Information	Data is used to generate projected supply/demand, and data is collected to track performance and adjust to changes in the market.	75	5	60
Human Resources	Capable and Knowledgeable Staff	Staff are well-trained and knowledgeable in sufficient number to carry out day to day tasks	75	5	60
	Strong Commitment and Clear Roles	Both the private and public partners are committed to the project and have clearly defined their roles and responsibilities throughout the different stages of the contract (Design, Build, Finance, Operate, Maintain)	95	80	95
Organizational	Strong and Competent Partners	Both the private and public partners are able to competently represent their interests	90	40	90
	Appropriate Risk Sharing	Risk has been properly assessed and each partner has taken on their fair share of risk	35	40	60
	Contract Management	Contract agreements are flexible, efficiently managed, executed and monitored throughout the duration of the partnership	50	20	80
	Entrepreneurial Knowledge	General business acumen, ability to see the need and meet it, ability to network and form relationships with key persons.	95	50	80
	Business Model	A business plan was created that makes the case for a functional business model.	75	10	60

Table 13 Selected applicable CSFs + business elements framework for rating and gap analysis (source: Author, 2021)

From this assessment, the following gaps were identified:

Kigamboni FSTP

Risk Sharing: Due to significant financial support from BORDA for the initial start-up costs, ongoing maintenance and zero-interest loans to purchase equipment, the private party takes on very little risk. While this benefits the private operator in this case, this model cannot be implemented on a broader scale, falling into the trap of “Pilots never fail, pilots never scale”.

Contract Management: The contracts are not standardised and from the interviews, contracts with DAWASA seem to be arranged on an ad-hoc basis that relies on the working relationship between the parties. While the limited government involvement and bureaucracy works well in some regards in this case, it makes it difficult to plan for scaling up and for others to formally enter the market due to a lack of certainty.

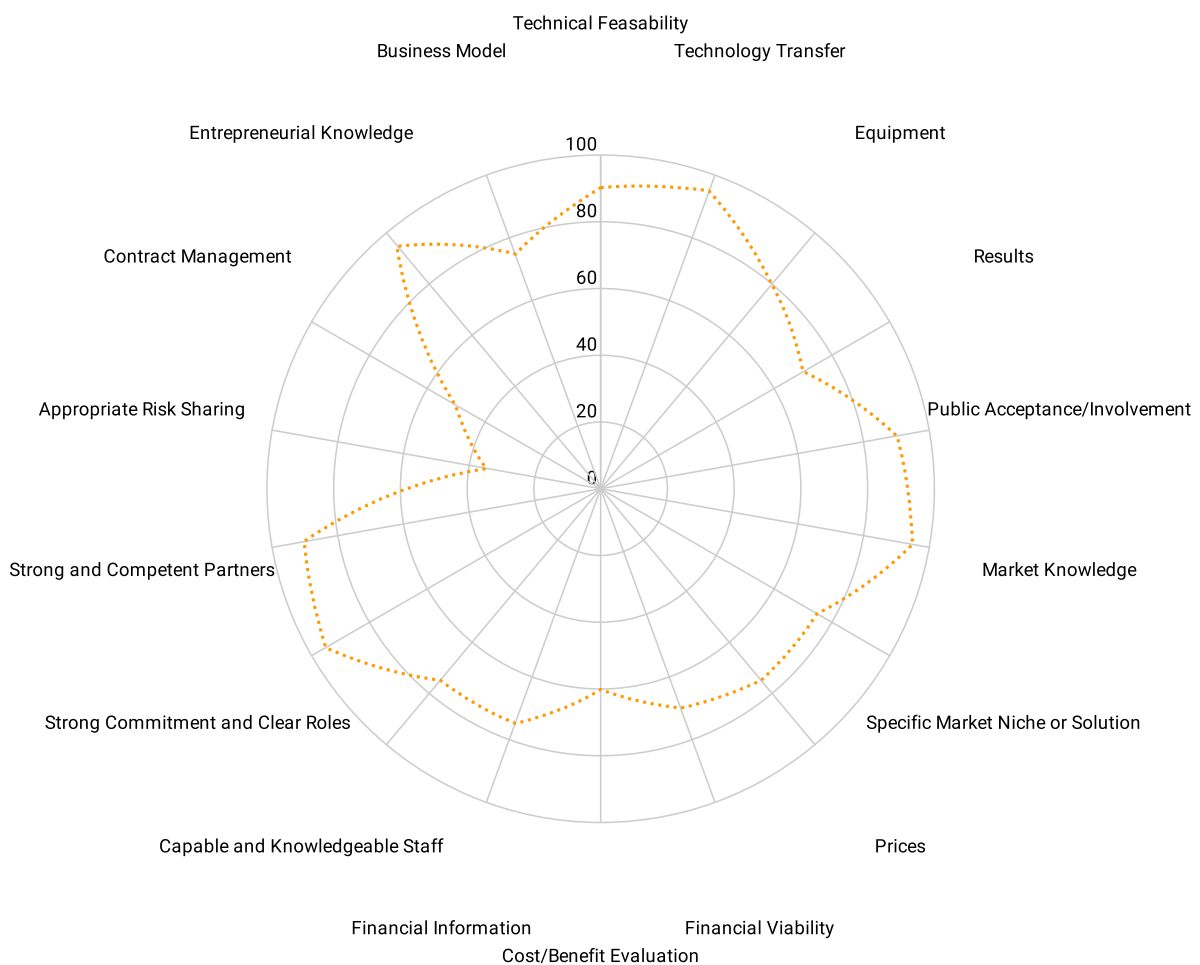


Figure 68 Gap analysis of the Kigamboni FSTP (source: Author, 2021)

Toangoma FSTP

Operational: The operational challenges faced by the Toangoma FSTP include a lack of equipment to provide emptying and transport services beyond just treatment. Relying solely on the treatment aspect of FSM does not provide sufficient cash flow and profits to become a sustainable business model.

The results are also poorly rated because the plant is completely dependent on emptiers using their FSTP, and because the FSTP is not vertically integrated – that is, they aren’t involved in the emptying and transport stages of the service chain – they have little to no control over the amount and quality of the sludge that they receive. This is further compounded by a complete lack of metrics.

Sales & Marketing: While the tariffs are set by EWURA/DAWASA, the prices for the generated FS soil conditioner are market driven. However, the current price of 1,000 TZS (0.35€) per 50 kg bag is simply too low to make a profit with the given volume. Here, marketing of the product might go a long way toward creating a demand for the “nutrient rich” characteristics of the soil conditioner.

Finance & Accounting: The owner/operator does not keep any records of financial transactions, sludge volumes or expenditures for day-to-day maintenance. This lack of data makes creating an operable business plan extremely difficult.

Human Resources: The owner/operator Ms. Mhando is very committed to the success of the FSTP also because she resides on the property. However the cur-

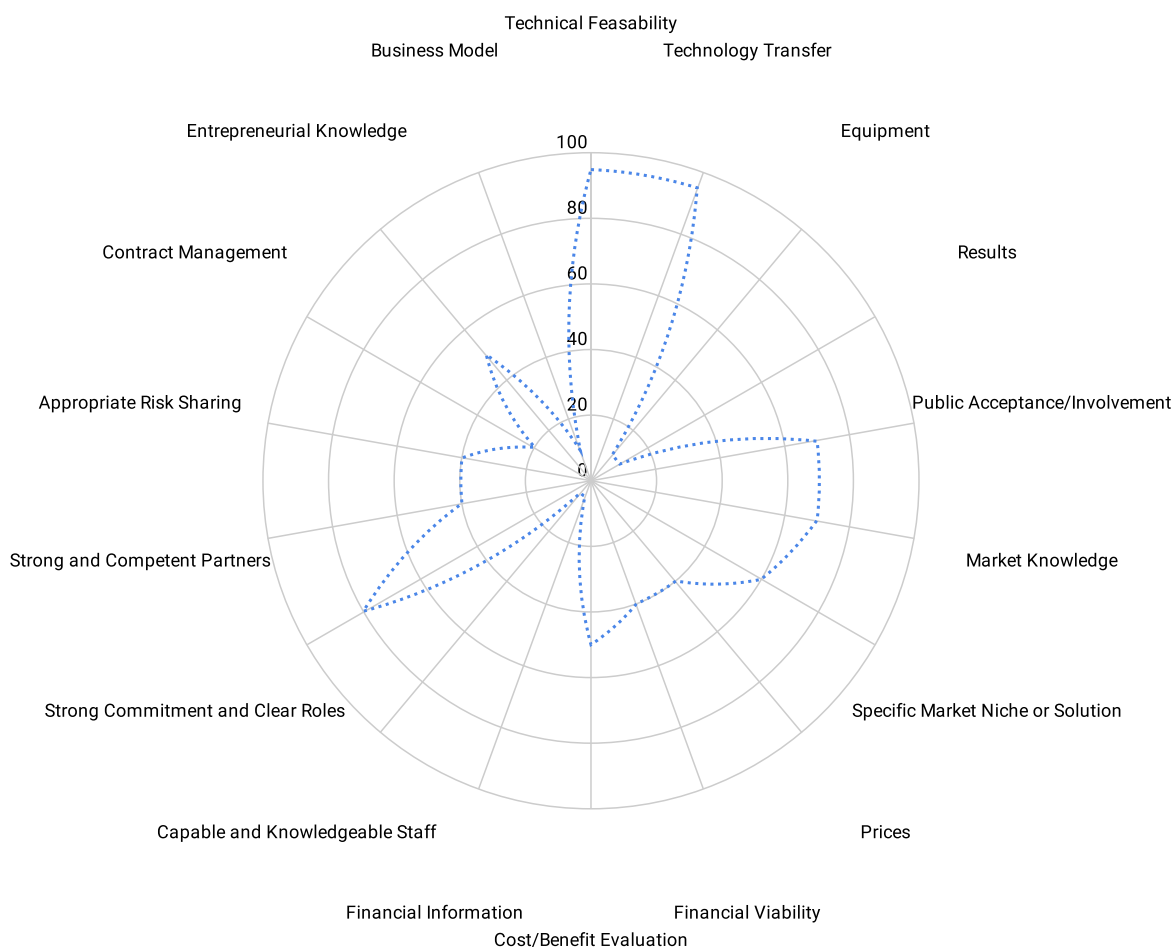


Figure 69 Gap analysis of the Toangoma FSTP (source: Author, 2021)

rent income does not allow her to hire any employees to assist in operations or to expand her business. This lack of capital (both physical and monetary) does not allow her the necessary time to perform other business related tasks that could help to build her business.

Organisational: While Ms. Mhando is partnered with DAWASA, she has yet to receive a license and I was unable to find out the actual contractual status of the operation. If she were to form a business plan by gathering data and analysing where the profits lie (usually in the emptying and transport), she could perhaps attract financing to expand. However without support and capacity building, expanding the business seems unlikely.

Vacuum Truck business

Operational: The biggest operational challenge faced by Mr. Ngoda is the limitation of having only one vacuum truck. By only having one tank size, many jobs will be either too small, thereby earning less than could have been possible, or too big, thereby making his truck unable to service larger commercial contracts that are more lucrative. Time might also be lost when the truck goes to service a pit that turns out to be inaccessible, thus losing time, money and fuel in traffic.

Finance & Accounting: Though Mr. Ngoda has a business plan and profit/loss calculations, this is limited by a lack of data due to the driver/operator not reporting how many trips they make. With-

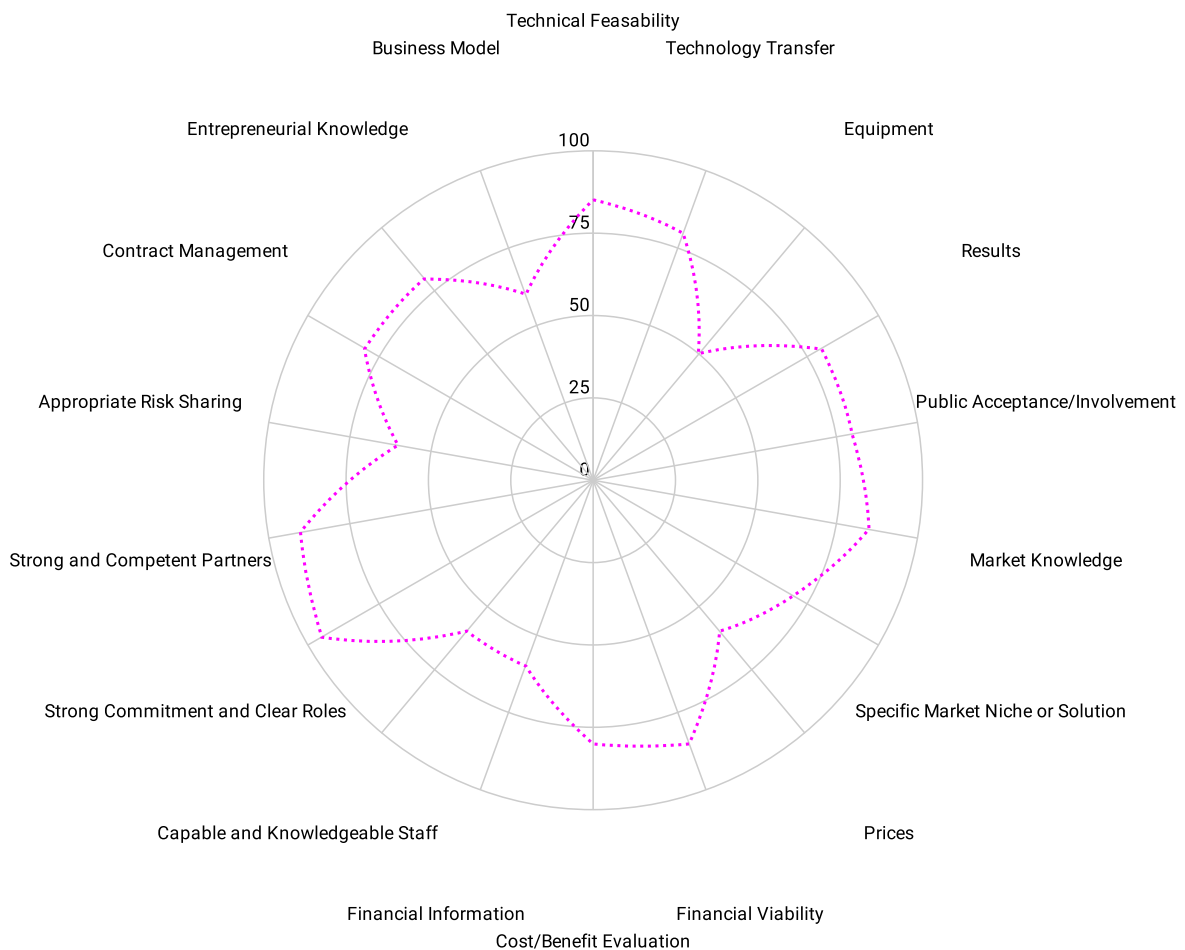


Figure 70 Gap analysis of the Vacuum Truck business (source: Author, 2021)

out this information it is difficult to tell if the business could be more profitable by charging higher fees to the driver/operator.

Human Resources: The reliance on hiring out the truck to a driver and operator not directly employed by Mr. Ngoda, makes it difficult to gauge the full picture of the business. Because the driver and operator are not responsible for maintenance, they also have little incentive to take care of the truck and may make riskier decisions in trying to reach difficult pits, thereby causing more wear and tear on the truck that will be paid for by Mr. Ngoda.

Organisational: The service level contracts (Trade Waste Agreements (TWA)) between DAWASA and Mr. Ngoda and partner are clearly defined. However, the risk of owning a vacuum truck falls mostly on the private partner, as DAWASA can simply rely on their own fleet of trucks or other vacuum truck operators.

7.3 Lessons Learnt

The business case for formalised FSM is very much in its infancy, with pilot projects around the world sharing their experiences that have rarely scaled up to meet the needs of an entire city. Most cases have been heavily supported by NGOs, governments or aid agencies and are therefore difficult to assess in the “wild” of the open market. Looking at the previously mentioned case studies, a few lessons from the Dar es Salaam context have emerged.

Vertical Integration – While profits can be made when an owner/operator utilises vertical integration through the emptying, transport, treatment and reuse

segments of the service chain, very little profit can be made solely from owning and operating a single FSTP. By emptying pits and transporting it directly to the FSTP, the owner can ensure the sludge is of a high enough quality (not just the wet supernatant layer) for valorisation into soil conditioner.

Data Matters – Two types of data are critical in the FSM business. Data on customers, which includes the size and location of the tank, time of last emptying, accessibility etc., and financial data that is crucial for generating profit/loss statements and making a clear business plan that could attract financing. Scaling up will be extremely difficult in developing regions without affordable loans from banks. Zero interest loans from aid agencies, while helpful, are not feasible beyond the pilot stage, and without the incentive to pay back loans on time, borrowers may become complacent and lack incentive to increase their customer base and associated profits.

More can make it work – Once a business case is made and financing is secured, operating more than one truck can turn a business that is just getting by into one that is making a sizable profit. One study, by Kone & Chowdhry (2012), analysed data from 30 cities in Africa and Asia, finding that businesses with only one truck were the least profitable by far, and medium (2-4 trucks) and large (5+) made a far greater profit (**Figure 71**). This could be due to less susceptibility to downtime of a single truck, and the previously mentioned ability to capture commercial contracts that have larger tanks and require more trucks with greater capacity. The study showed that medium sized businesses gained 22% of their rev-

enue from commercial contracts whereas single-truck operators only received 7% from commercial contracts (Koné & Chowdhry, 2012).

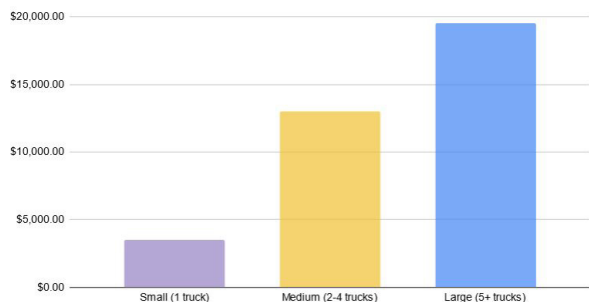


Figure 71 Profitability of vacuum truck businesses based on size of business (source: adapted from Kone & Chowdhry, 2012)

Distance makes a difference – In very large cities like Dar es Salaam, distance to the site and time spent in traffic is crucial to profitability. The same study by Kone & Chowdhry (2012), found that 40% of operating costs in Africa were from fuel due to longer distances and the older age of the trucks which consume more fuel. Here, decentralised treatment and/or transfer stations could help reduce distances and time spent per trip.

Community Involvement is crucial – The trust of the community is crucial in providing a service that has traditionally been relegated to illegal operators work-

ing at night. By gaining the trust of the community, the view of the business can become more positive, with the benefits of the service easily visible.

Regulation is necessary – Proper regulation goes hand in hand with providing a service that is trusted and demanded by the community, balancing the interests of all stakeholders (WSUP & ESAWAS, 2020). One key output of the session “How can we ensure that the sludge reaches the treatment plant?” at the global FSM conference, FSM6 session 4 (2021), was a brainstorming session to determine the most important aspects of this topic, and regulation was the most cited (Figure 72). To improve the image of the sector, regulation is essential to curtail illegal emptying and its adverse effects on health and the environment through formalisation, and the private sector must be incentivised to provide pro-poor service. If the private sector is left without regulation, they would have little incentive to serve difficult to reach informal neighbourhoods. Furthermore, Key Performance Indicators (KPIs) could be used to monitor for performance and ensure quality standards are being met (AMCOW, 2021a).

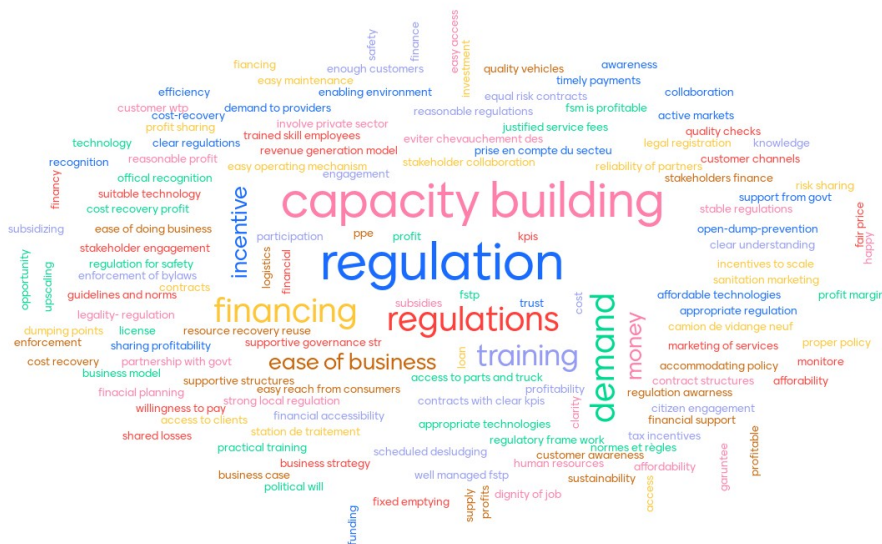


Figure 72 Word cloud from FSM6 session 4 - How do we ensure that the sludge reaches the treatment plant? (Fettback et al., 2021)

Chapter 8: PPPs by any other name: A proposal for Open Partnerships

Creating a successful FSM business is difficult, and the conclusion of this analysis is that conventional PPPs will only make it more so. Not only are PPP contracts much too complicated for the average person to understand, they are lengthy and exclusionary. Properly functioning and comprehensive FSM requires partnerships from all corners – from informal frogmen, to entrepreneurs, community leaders and the government. An open network of actors achieving a mutually beneficial goal.

So if partnerships are what's needed, why not just call them PPPs? They are partnerships between the public and private sectors, right?

8.1 The need for a rebranding

Broadly speaking, PPPs are used to describe a wide range of partnerships between the private and public sectors. It's in the name. But the problem is, to those with the money and power to affect governments (The World Bank, OECD, AfDB etc.), PPPs are not simply a partnership between the public and private sectors. PPPs are long-term, contractual agreements between a private party or consortium, with a dash of risk transfer and a slight (legally necessary) lack of transparency (to protect business interests). They are a vehicle for firms and investors to make returns on developing markets. And these are what IFIs and MDBs like the World Bank and AfDB are promoting to governments, providing funding to the establishment of enabling environments for these types of PPPs, complete with PPP units and all (Ens, 2019).

These PPPs are what are used as an indicator for SDG 17.17. Therefore it is important to draw a distinction between these PPPs and private sector involvement in general.

That's not to say these PPPs are always a bad idea (even though there is scarce data on their performance over TP). Many countries have had a number of great experiences with PPPs where they lived up to their promises of maximizing efficiency and minimizing the financial burden on the government, but these have generally been countries with strong enabling environments and robust legal frameworks like the UK, Australia, Germany, France, the Netherlands and the USA. In countries with inexperienced governments and a propensity for corruption, the information asymmetry in PPP contract negotiation and lack of transparency make PPPs a risky venture indeed.

So while the success of many small-scale "PPP"-like arrangements get lumped in with PPPs as defined by the World Bank, there is a muddying of the waters. Do PPPs work for FSM (or WSS) or don't they? How could we know when we don't know what we're measuring.

8.2 A look at non-conventional PPPs

The narrow "World Bank" lens of viewing PPPs as long-term with significant risk borne by the private sector has its uses, especially in terms of large-scale, contractually rigid infrastructure projects that often cost hundreds of millions of dollars. But this lens is unsuitable for small-

scale FSM service provision that is often informally arranged, with service-based agreements on an ad-hoc basis (Water & Sanitation for the Urban Poor [WSUP], 2017). These flexible partnerships between public and private partners, NGOs and the community, often inaccurately put under the “PPP” label, are essential for the development of successful urban FSM services (Brinkerhoff & Brinkerhoff, 2011).

Non-conventional “PPPs” include public-private-community partnerships (PPCPs), Administration-Business-Civil society (ABC) Partnerships (this term never seemed to take off) and people-first public-private partnerships (PfPPPs), among others. These partnerships can vary greatly, but generally aim to represent the interests of the community as well as the public and private partners (Adnyana et al., 2015; Koppenjan, 2015; Mourgues & Kingombe, 2017).

According to the UNECE’s (2021) International PPP Centre of Excellence (ICoE) People-first PPPs

“ensure that out of all stakeholders, ‘people’ are on the top. Its focus is on improving the quality of life of the communities, particularly those that are fighting poverty, by creating local and sustainable jobs, those that fight hunger and promote well-being, promote gender equality, access to water, energy, transport, and education for all, and that promote social cohesion, justice and disavow all forms of discrimination based on race, ethnicity, creed and culture.”

How PfPPPs “ensure” that people are on top is through stakeholder engagement, though it is unclear what form this takes. These types of PPPs, while rightly expanding the definition of success from a purely profitable one to improving lives

and protecting the environment, seem to be hardly different from typical PPPs in that decision-making power remains with the public and private partners (UNECE, 2021). In Arnstein’s seminal work, *A Ladder of Citizen Participation* (1969), this type of stakeholder engagement would be in the middle of the ladder, on the consultation rung, and “if consulting them is not combined with other modes of participation, this rung of the ladder is still a sham since it offers no assurance that citizen concerns and ideas will be taken into account” (Arnstein, 1969). She adds

“participation without redistribution of power is an empty and frustrating process for the powerless. It allows the power-holders to claim that all sides were considered, but makes it possible for only some of those sides to benefit. It maintains the status quo.”

PPCPs on the other hand, while also considering the benefits to the wider community as a primary definition of success, also include the community as a partner in the planning/design of the project (Koppenjan, 2015). According to the Penabulu Foundation (2015), an Indonesian-based non-profit, the PPCP approach

“is a synergistically operational model that is used to achieve sustainable development in which the three parties jointly develop a business unit/service of mutual benefit and provide maximum benefit to the wider community.”

In this arrangement, the benefits of a long-term financial relationship go to the private partner, the public sector gains additional resources and retains ownership of the assets and the community benefits from the skills, knowledge, services and new technologies (Penabulu Foundation,

2015). These types of PPPs can be tailored to FSM and often work well by formalizing the informal sector while giving governmental support to ensure pro-poor service and regulations to protect public health and the environment.

Examples of these kind of partnerships are often seen in the non-profit sector, where an NGO (such as BORDA in Tanzania and elsewhere) acts as intermediary between the government and small-scale PSPs.

One good example of a non-conventional PPP can be seen in Dhaka, Bangladesh. There, the national NGO Dustha Shasthya Kendra (DSK) partnered with Dhaka Water Supply and Sewerage Authority (DWA-SA) and community-based organizations (CBOs) that represented informal slum areas to expand access to the water supply system (Hossain & Ahmed, 2015).

DSK set up water point connections under their name while facilitating the legitimization of the CBOs in the eyes of DWASA through capacity building, eventually handing over the water points to be managed and paid for by the CBOs. To legitimize the relationship, CBOs signed tripartite “Waterpoint Handover Agreements” with DWASA and ensure that their members pay the fees. The involvement of the community in the planning, operation and maintenance of the water points was a key factor of their success, providing a sense of ownership over the infrastructure that was in turn better maintained and a higher percentage of water fees were collected (Hossain & Ahmed, 2015). This PPCP was able to scale-up to serve 200 slums and provide over 100,000 slum dwellers legal access to water.

8.3 OPUS: Open Partnerships for Urban Sanitation

PPPs that involve the community as an equal partner are essential for long-term sustainability of FSM infrastructure. The previously mentioned case study is a good example of this, and can serve as a model for partnerships in developing regions. However, it is my opinion that PPCPs suffer from trying to build off a model of PPPs that is fundamentally unsuitable for small-scale FSM in developing regions, and that a new term would better serve both the nature and perception of partnerships between the private and public sectors: Open Partnerships (OP).

OPs invoke an open handed approach that is available to partners and stakeholders on all levels, educated or uneducated, with or without resources. Where PPPs are the handshake deal between a public and private entity, OPs are an open hand that is available to anyone willing to be a part of the solution. Some key recommendations for the characteristics of an OP are:

1. Simple, flexible and short-term contracts

Contracts for PPPs are much too complicated for an average small-scale entrepreneur or sanitation service provider to be able to handle without assistance. Currently, Trade Waste Agreements (TWA) are in place in Tanzania that meet this need for simplicity, while still ensuring certain standard operating procedures (SOPs), service quality, standards, tariffs, records etc. are kept and maintained (EWURA, 2020). These TWAs however are for the emptying and transport steps in the service chain, and could also be extended to small-scale FSTPs and the treatment and

disposal/reuse steps in the chain as well. Furthermore, flexible contracts could take advantage of multi-sectoral efficiencies, such as combining solid waste service with the emptying and transport of FS.

2. Transparent

Transparent contracts, data collection and service agreements would ease access into the market, increase competition and ultimately facilitate better service provision.

3. Community led

Open partnerships are designed to facilitate bottom-up participation in the FSM market, through community outreach, opportunities for jobs could be advertised to locals who know and are known by the neighbourhood. This could create a sense of trust and destigmatize the market, while increasing living standards and creating wealth. When the community is a part of the effort, ownership of the infrastructure and services creates more incentive to sustain them.

4. Equal power

In order to balance the power between the WSSA (DAWASA) and service provider, it is recommended to create a CBO, or worker's union to represent the collective interests and needs of sanitation workers.

5. Financing

Local banks and finance institutions need to be involved and informed of the business case for FSM. The worker's union or CBO could facilitate loan applications and creating business plans to attract financing. If profitable business cases cannot be made due to logistics or a lack of market demand, the government must reallocate resources to provide

subsidies to less profitable sectors such as FSM through free dumping, maintenance, tax credits, subsidised CapEx (Trucks, FSTPs), etc.

6. Regulation

Proper regulation is essential for balancing the interests of all the stakeholders. Regulation and enforcement is necessary to curtail illegal emptying and its adverse effects on health, environment and legal business models. This can be done through formalising the informal sector through capacity building, assistance through CBOs, NGOs or workers' unions. Furthermore, regulation is necessary to ensure standards and KPIs are being met that are vital to sustainable FSM.

8.4 Further Research

The purpose of this thesis was to determine how suitable PPPs were for FSM in Dar es Salaam, and subsequently to propose a partnership structure that would be more suitable than PPPs were found to be. This has been accomplished, however there are several areas that could receive further research.

1. The readiness radar could be further developed through interviews with stakeholders with experience in PPPs in Dar es Salaam, to determine a weighted CSF framework that is perhaps more accurate for assessing PPPs in their particular context.

2. The contractual framework and partnership structure of an OP could be further developed to account for specificities regarding risk-sharing, obligations, payment structures, dispute resolutions, and the like.

3. Financial arrangements within the

government regarding ringfencing could be further explored, as financing from the government to subsidize FSM will almost certainly be necessary. There is one government payment system, does money that is collected by DAWASA go into the same account as the university, or do they have separate accounts based on their control number. How do we ensure the public and private partners receive the money from service provision?

8.5 Conclusion

“The private sector has much to offer, and in many forms. To tackle the immense challenges facing the urban water sector in developing countries, policy makers need all the help they can get. It might just be time for a broader concept of partnership, one that includes all and excludes none” (Marin, 2009).

So far, the role of the private sector in FSM service provision has been to meet demand that is not being met by the public sector – but it is far from bridging the gap. Human and environmental health, in the form of waterborne diseases like cholera, and environmental threats like eutrophication are the consequences of this failure to properly treat FS. Tap water that must be boiled, and plastic bottles filling landfills – women walking long distances to fetch clean water and girls dropping out of school. And as cities continue to fill, the problem is only getting worse.

Part one of this thesis discussed this gap in FSM and if PPPs were a suitable instrument for bridging it. The literature is mixed on PPPs, and while this research found that they are unsuitable for small-scale FSM, PPPs surely have their uses in contexts with a strong enabling environ-

ment and in large-scale projects that justify the transaction costs associated with PPPs (Estache & Philippe, 2012). Another key finding of this research was the confusion surrounding them, and a lack of a clear definition which has several effects:

first, those who believe PPPs can include a wide spectrum of partnerships with the private sector end up seeing PPPs as obviously necessary to address gaps in infrastructure and service delivery, especially in developing regions with governments that are struggling to provide these services themselves.

The question isn't if they are suitable, goes their line of reasoning, but which kind is suitable.

The problem with this view, is that while PPPs do involve a wide spectrum of arrangements, the spectrum is smaller than most think, and according to the World Bank and other IFIs, only includes long-term partnerships that include the operations, financing and/or maintaining of assets to ensure attention is paid to whole-of-life costs. By mistakenly lumping in PPPs with service level agreements or management contracts, holders of this view may be more prone to promote PPP legislation and PPP as a cure-all, which is simply over-kill in most cases that involve small-scale projects and can add increasing costs of time and money which are already in short supply

The second effect of a clear definition, is that just like there are proponents of private sector participation, there are opponents, who view PPPs as privatisation, and privatisation as the corporate takeover of the public sphere and the death-knell of democracy. This attitude equally lumps a variety of partnership structures into the same category and can create a

negative public attitude toward private participation which is counterproductive to solving problems that can't be solved by the public sector alone. Without community support, promising projects can fail.

The third effect due to a lack of a clear definition, is that it is increasingly difficult to compare their efficacy. How can one compare a \$500 million hydropower project with a small-scale FSTP that cost around \$50,000? This inability to analyse their efficacy is certainly effective in keeping scholars busy categorising them, but it muddies the waters of sensible public policy.

This takes us to part two of this thesis, which analysed the PPP readiness of Tanzania, with a specific look at Dar es Salaam. The findings from the analysis were that there is a low readiness for PPPs due to several reasons:

1. Lack of knowledge and capacity concerning PPPs
2. Lack of financial markets
3. Presence of corruption and a lack of transparency in many stages of the PPP process (bidding, procurement, negotiations, contractual obligations, technology)
4. Procedural heavy PPP process that discourages private-sector participation (especially small-scale)
5. Uncertain legal and regulatory environment

After looking at the PPP readiness, I took a closer look at three case studies of PSP in the FSM service chain – emptying, transport and treatment (and reuse potential). The gap analysis of these PSPs identified several areas that need attention in order to scale-up services to fully bridge that gap in service provision in Dar es Salaam. These included:

1. Capacity building for financial planning and attracting loans
2. Data keeping and collection is necessary for businesses to grow
3. Vertical integration between multiple steps of the service chain has clear advantages
4. Profitability requires a minimum scale
5. Regulation and enforcement of standards and KPIs is necessary to protect the interests of all stakeholders

Finally, due to the unsuitability of PPPs to bridge this gap in service provision, I proposed an open partnership structure that is more suitable for the wide range of actors involved in service provision. Open Partnerships are community-led, flexible, less complex and open to all actors across the sanitation service chain in order to meet the growing needs of quickly growing cities like Dar es Salaam.

It is clear that listing what is needed for sustainable FSM is not enough, and that putting these provisions into place is where the hard work lies. A first step toward this process, however, is simply engaging with the private sector, both formal and informal, that are already involved in FSM service provision and instead of competing with them and limiting their involvement with unnecessary legal hurdles, giving them space and opportunities to build their businesses, provide jobs and wealth, and serve their own communities. As Julius Nyerere put it, "If real development is to take place, the people have to be involved." The people, it seems, are the missing 'P' in public-private partnerships.

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Appendix A - Full list of CSFs mentioned in the selected literature

CSF Group	CSF	Ng et al. (2012)	Wibowo & A'fen (2014)	Dulami et al. (2010)	Nizkorodov (2017)	Jacobson & Choi (2008)	Meng et al. (2011)	Tsiftoglou & Kanakoudis (2008)	Tom (1998)	Jamali (2004)	Nguyen et al. (2020)	IOB	Zhang et al. (2005)	Amovic et al. (2020)	Korenane (2008)	Kulshrestha (2017)	Debelja (2019)	Jamali (2013)	Chleste et al. (2020)	Babatunde et al. (2012)	Ameyaw & Chan (2014)	Li et al. (2005)	Osei-Kyei et al. (2015)	Chan et al. (2010)	Total CSFs
1 Project	Profitable water supply projects	x					x														12				3
1 Project	Limited Competition	x																							1
1 Project	Thorough and realistic cost/benefit assessment	x	x								12					x	7	16	12	6		5		13	10
1 Project	Project can be substantially self-funded	x																							1
1 Project	Project value large enough to avoid disproportion	x																							1
1 Project	Project technical feasibility/capacity	x	x		x						16				x	x	10	10	10	7		6	13	16	13
1 Project	Project isn't politically sensitive	x																							1
1 Project	Project can attract foreign investment																								1
1 Project	Technology innovation/sharing/transfer	x		x						x	22		13				24			11					8
1 Project	Detailed project planning																						15		1
1 Project	Delivery of services is reliable	x																							1
1 Project	Selecting the right project				x					6										10					4
1 Project	Project not susceptible to fast-paced change	x																							1
1 Project	Clear project brief and design development									x													20		2
1 Project	Project Economic/financial Viability/feasibility	x			x					x	5		15			x				8	6				8
1 Project	Value for Money	x		x																					2
1 Project	Service quality can be defined and measured	x																							1
2 Organization	Strong and competent private partner	x		x	x				x	x	2		9			x	21		16	13	4	1	2	6	15
2 Organization	Strong and competent public partner		x						x	x		x			x	x	2	14	17	10	6	7		15	13
2 Organization	Strong commitment from project partners					x	x	x			7	x			x	x		7		7	8	4	9		13
2 Organization	Capacity building for local utility staff															x			4						3
2 Organization	Quality water asset and workforce						x																		3
2 Organization	Enforcement to meet contracts		x																						1
2 Organization	Flexible contracts	x			x				x	x	21														6
2 Organization	Clear Conflict Resolution process		x																						1
2 Organization	Appropriate risk allocation and risk sharing	x	x	x	x	x	x				8	x	18			x	6	6	1	4		2	1	2	17
2 Organization	Clear roles and responsibilities/Shared authority	x				x	x			x		x	12			x	22	11	13	14					13
2 Organization	Open and constant communication			x	x				x		x					x									6
2 Organization	Transaction Cost Minimization				x																				1
2 Organization	Respect					x																			1
2 Organization	Willingness to compromise/collaborate					x																			1
2 Organization	Trust					x	x		x	x			x												6
2 Organization	Choosing the right partner																								1
2 Organization	Financial accountability											x	16												3
2 Organization	Reliable service delivery																								1
2 Organization	Resource allocation and management									x		x							6						3
2 Organization	Project integration with National/Local Plans	x																							1
2 Organization	Employment of Professional Advisers					x	x																		2
2 Organization	Stakeholder consultation		x		x	x		x								x									5
2 Organization	Safety Measures														x										1
2 Organization	Timely land acquisition and compensation										1														1
2 Organization	Effective Project Management		x								3														2
2 Organization	Suitable subcontractors							x			13														2
2 Organization	Unified specific vision					x																			1
2 Organization	converging work cultures									x															1
2 Organization	relationship enables goals of both partners									x															1
2 Organization	Interdependence									x															1
3 Policy	Agreed on Definition of PPP					x																			1
3 Policy	Continuous Training for Public Sector		x																						1
3 Policy	National PPP policy and implementation unit					x								x							9	7	11		6
3 Policy	Competitive tendering/procurement		x				x				14					x	8	15	15	3	11	12	8	11	12
3 Policy	Transparency in the procurement process		x		x					x	14					x	x	17	5	13					12
3 Policy	Political Support		x			x	x					x				x	15		2	2					9
3 Policy	Streamline approval process																20								2
3 Policy	Sound economic policy		x										8				16	3		2					6
3 Policy	Time for registration and permission																		9						1
4 Governance	Government/Political commitment		x	x	x			x	x	x		x	4		x	x	14	12	2	8	1	x	16	3	18
4 Governance	Effective regulatory and legal framework		x	x	x	x		x	x	x	4	x		x		x	4	2	7	9	5	8	6	1	19
4 Governance	Independent Auditor						x	x																	2
4 Governance	Internal coordination within government		x				x																		4
4 Governance	Fair treatment of unsolicited proposals		x																						1
4 Governance	Government provides subsidies						x																		1
4 Governance	Political Stability		x		x						18	x	1				3								7
4 Governance	Past Experience with similar PPP		x																						1
4 Governance	Consistent monitoring of project																9								2
4 Governance	Government Guarantee																				1				2
4 Governance	Good Governance		x				x	x	x		15					x	5	9	x	2					10
4 Governance	Adequate skills and knowledge of PPP																7								2
4 Governance	Devolution of Authority						x																		1
4 Governance	Monitoring of water quality and soil															x									1
4 Governance	Lack of Corruption		x						x																2
5 Context & Culture	Adequate financing /available financial market									x	11	x	3			x	17	4	11	5	2	3	11	5	13
5 Context & Culture	Mature and available Financial market									x		x	2												5
5 Context & Culture	Public acceptance/support		x		x						19	5	x	x		x	23	13	3	13	3	x	4	8	15
5 Context & Culture	Stable Macro-Economic condition		x		x						17	x	6			x	11	1	14	5					13
5 Context & Culture	Long Term demand for the project		x			x						x	7												5
5 Context & Culture	Acceptable level of tariff		x	x																					

Appendix B - Interview Summaries

Caroline Chema Eric Personal Interview - Summary Report

Date: 27.01.2021

Time: 1 hr. 15 min.

Place: Online via Zoom

Caroline Chema Eric is a PPP operations officer at the World Bank, who, in collaboration with GIZ and Rebelgroup International in 2017, performed a gap analysis report on the PPP legislation in Tanzania. The report, titled Framework Gap Analysis Report and Recommendations was a key resource in my research. Ms. Eric agreed to hold a semi-structured interview with Tim Fettback and I on the 27th of January, 2021.

Excerpts and key points:

- Ministry of Finance and the PPP Centre are the custodians of all PPPs, regardless of what sector
- To start a PPP, must be approved by Dawasa, then approved by MOWI, then sent to the PPP Centre
- “You see how it is procedurally heavy. And another problem that we see, is that there is no marrying of technical (water) and technical (PPPs) so you find you have people sitting at Dawasa with knowledge of PPP, and no people at MOW with knowledge of sanitation.”
- “Now for every project there is a project management committee, whereby there will be reps from both contracting authority (DAWASA), MOW and PPP Centre, that joint committee is meant to inform each other of the technical aspects of the water sector and PPPs.”
- “All these decentralized systems developed in the peripherals of Dar es Salaam, that are not connected to the main system.”
- “A driver for private sector participation would be, they need support for these new technologies, which are more sustainable and scalable. Another driver is the financing side. These decentralized systems are efficient but they don't have budgets. These are the two main drivers.”
- “DAWASA prefers DBT and would prefer that operations are done by the water utility and not by a private company” and doesn't like private operators due to past experiences with City Water and later DAWASCO.
- Another challenge that you see in particular in the water sector, it is difficult to bring in an international investor, especially for these small scale community based projects. So we need to work out a mechanism for preparing these projects, 5-10 years is just too short a time for a company to get all the information and ex-

Appendix B - Interview Summaries cont.

pertise for managing these DEWATS.

- Can we standardize service agreements? So we always get the same processes, clauses, same provisions. There is potential and MoW is looking for models that are more sustainable, environmentally friendly, and can increase access to planned and unplanned settlements.
- IGA - centralized government payment system
- All the money goes into one government account, with perhaps sub accounts for different departments. Little ringfencing or earmarking of funds.
- Can they ensure that the money from a PPP goes back to it?
- How guaranteed is the private operator that he will get the money back?
- “At the moment this money sits in one pot, and the government is at liberty to invest in education, or you know. It is difficult to ringfence, so ringfencing is key to attract financing.”
- This affects all SOEs
- “There is still hope, they are trying to open an account within the accounts of the treasury, to be for the whole rural sector. If this goes through, we have discovered an institutional arrangement for financial arrangements for PPPs. So we will try to pilot this and see how it goes.”
- “To them, service provision is about collecting revenue, they don’t want the private sector to get rich on public projects, so let’s see how it goes. They need to get on one or two PPP projects or involvement with the private sector to see for sure if they still want to operate.”

Appendix B - Interview Summaries cont.

Eng. Romanus A. Mwang'ingo and Eng. Mutaekulwa Mutegeki Personal Interview - Summary Report

Date: 16.03.2021

Time: 1 hr. 3 min.

Place: Online via Zoom

Eng. Mwang'ingo was the acting CEO of DAWASA until 2018, and currently serves as a consultant and advisor. Together with Eng. Mutegeki, they wrote the Guidelines for Onsite Sanitation and Faecal Sludge Management for Water and Sanitation Authorities, 2020. This publication is the latest step in providing guidance for the integration and regulation of the private sector in FSM.

Excerpts and key points:

- Mutegeki: “We don't have a structured PPP for sanitation in Tanzania, which is structured according to the PPP guideline as given by the ministry. There are some PPP interventions which are somehow managed, but we didn't go far into how these people are working.”
- “They seem to be very complex, that is why EWURA is preparing one specifically for utilities for water supply and sanitation. But yet, to implement it no one has tried, because the procedures - concept note, prefeasibility, feasibility, approved, then MoW and treasury - so procedures seem to be lengthy and cumbersome, so they are reluctant to pursue”
- Regarding Toangoma FSTP:
- “The PPP model which they opted for, I think it worked, because when we interviewed the operator, she said the project is profitable, and there is demand. But what happened in that scheme, DAWASA provided the assets, the operator provided the land. DAWASA is not recovering any costs. The operator was complaining not enough capacity.”
- Financing - Romanus was for property tax collected through LGAs, “We need also to see how they manage these funds. Sometimes there is experience of misappropriation or misuse of these funds. You might find the funds are collected but they are used for other services within the LGAs.
- Mutegeki is in favour of a sanitation levy - both are optimistic that it is feasible and has advantages.
- Only about 50% of DAR are connected to water supply (800,000 properties and 400,000 connections) so it might not be very fair.
- Data: NSMIS - LGA for WASH, more focused on superstructure, not containment, annual Audit reports should be available, but not including much data, most/all

Appendix B - Interview Summaries cont.

other data collection is not yet implemented for FSM.

- Scheduled emptying is appreciated for providing a consistent revenue stream to service operators.
- DAWASA mainly keeps record of dumping fees, because whoever wants to dump in ponds has to pay. So this information is available, but the details on the trucks, they have just started. They just procured them last year. All the ponds also receive sewage from the network, so it's hard to separate FSM.
- How best to integrate the private sector?
- Romanus - "The investment cost is on the high side, so private sector is not keen to invest in this because they can't set their own tariff to recover cost. So you see most of the time the investment is done by the government... In Dar es Salaam you cannot have different tariffs for different part of the cities, so this is a challenge. For operations this might be possible because investments are not too much and they can recover costs.
- "No private operator has a brand new truck, new trucks are quite expensive. As of now the rates for emptying are not regulated, especially the emptying. so the people with cheap trucks, they can offer a low rate, so if you have private trucks you need to compete. This a challenge. The investment cost is less, so they can survive."
- Mutegeki - introduction of sanitation levy. If they can introduce this in Dar es Salaam and scheduled emptying, this would ensure income for the utility and they can as well pay the private sector. Then they don't have to worry if facility gets full or tank is overflowing. I think this could work for Dar es Salaam if EWURA could introduce the sanitation levy. The plan of EWURA is to ringfence that levy, and used just for sanitation, because sanitation has been neglected and people would like to see improvement.
- The levy Mutegeki promotes would be one bill for the water supply and sanitation. For those not connected to the water supply, levy's would be collected at water kiosks (indirectly also over the water bill, as the water kiosk pays for the water supply)
- Zambia is an example which can be followed. Ring - fencing of funds from levy is possible, and acceptable, as sanitation has been a much neglected sector and needs more attention.
- "Make it one bill, these things belong together, that is the way we can take this forward."
- Household Income Survey could be used to estimate cost of levy - around 5-6 per cent

Appendix B - Interview Summaries cont.

Peter Hawkins Interview Summary Report

Date: 21.05.2021

Time: 1 hr. 3 min.

Location: Online Via Zoom

Peter Hawkins is part of the World Bank's global urban sanitation team, specifically focusing on project support in Africa. He has worked in Mozambique, Tanzania, Ghana and various Latin American countries, Sri Lanka and Indonesia. From 2007 to 2016, he headed the WSP team in Mozambique, and he is currently serving in a global consultant role for the World Bank and other organizations, based in the UK. He has written many articles and books on FSM and sanitation, including FSM Innovation Case Studies - Case Studies on the Business, Policy and Technology of Faecal Sludge Management (second edition).

Excerpts and key points:

- “Over the years the urban development has made things much worse. Where you could once reach places with vacuum trucks, that's no longer the case.”
- “The private sector is making a profit, that's why they're there, but it's not a very lucrative business. You don't see too many truck operators driving around in fancy cars.”
- DAWASA is getting their own trucks and now competing with the private sector.
- “Scheduled emptying model has a lot going for it. But it's challenging. You get to the house and no one's there. The whole thing has to be reliable and well organized. The idea of paying a regular fee, especially for poor people, is attractive. Paying a few dollars a month is more feasible for them. It's a blunt tool, but it's less worse than the other ones.”
- “South Africa is interesting because it's about the only country in Africa where the government has the commitment to provide free basic services to everybody, where in some ways they least need the private sector.”
- “It's not so much if PPPs are suitable, but what kind of PPP is suitable. It's almost conventional wisdom now that we need the private sector there.”
- “We had an incident in Mozambique where they passed some very heavy handed PPP legislation, where it was basically to deal with somebody building hydropower or a major minerals project, and suddenly it turned out that under this legislation that some little water company in a small town serving a town of 10,000 people had to hire a battery of lawyers. It was clearly nonsense, it actually caused a lot of problems.”
- Regarding the size, complexity and scale of PPP contracts: “Something that is suit-

Appendix B - Interview Summaries cont.

able for 100 million is clearly not suitable for a guy with a couple of gulpers and a motorcycle.”

- “Regulation is an important part of it. You’re dealing with informal businesses or micro-enterprises that are just about formal, maybe have a business license from the city council, and particularly in the FS business they’re not quite sure what is legal or not because of the public health legislation. It’s a bit of a minefield for them. A number of operators I spoke to are actually quite in favour of legislation. They know what the goalposts are, and have an environment in which they are willing to invest. We’re not prepared to invest our money now because we don’t know what’s going to be illegal.”
- “You see the same thing in this massive large scale PPP legislation. They can be doing something perfectly good and innocent and suddenly find that its illegal. So having clear legislation about what is supposed to be done and not done is useful to both sides.”
- If properly managed, regulation that is not too heavy can be a useful tool in that environment.
- Recommended for us to talk to Felix Ngamgosi, the old head of EWURA concerning regulation.
- Working with the local financial sector - “They may have a perfectly viable business proposition but they don’t know how to go to the bank.. Just giving some business skills to these guys, and informing the finance people about what sort of business this is, looking at appropriate financial instruments - ways of securitizing the business. So that banks have more willingness to lend. Perhaps a guarantee fund that leverages the financial system. Then these small businesses have the means to get beyond the one truck kind of enterprise.”
- Mentioned the importance of reuse - looking at local markets
- “Sometimes there's a lot of romantic thinking about reuse that needs to be thoroughly examined.”
- Mentioned the importance of scalability
- Regarding regulation - tariff setting: “If it’s a monopoly situation, tariff capping is of course necessary, but if you have 30-40 different businesses, you can rely on competition to keep the prices reasonable.”
- Where should the private sector be involved? (E&T & T, or just E&T)
- “It could be either way. There are technical advantages of combining it. One advantage of having vertically integrated systems, they’re not going to allow that (chemical dumping) to happen.”
- The sensible way to do it is to work with the service providers. They’re the guys that know what’s feasible and what isn’t.
- Where does the financing come from? “Sanitation levy is a good way forward.”
- Regarding the analysis I presented to him. “It seems like you’re doing a pretty sensible piece of work.”

Appendix B - Interview Summaries cont.

Kigamboni FSTP site visit and Mr. Milinga Interview Summary Report

Date: 15.02.2021

Time: 12-3 PM

Location: Kigamboni

Took the ferry and hopped on a back of a motorbike taxi to get to the site. They were surprised to see me by myself without a BORDA vehicle.

Facts and Figures:

- Mr. Milinga owns the site and the equipment. He got a new 60 m³ vacuum truck. Also has two tricycles (3 m³) and a sludge tractor (1m³).
- Serves 40,000 people - said his was the only site in Kigamboni.
- Charges 30,000 for 2 m³, 40,000 for 3m³ - 100,000 for sites that are further away.
- Has a contract with Dawasa who test the effluent every three months. DAWASA also gave him permission to start business in other cities throughout Tanzania.
- Trained 140 operators last year - fees vary depending on where they are from - 300,000-600,000.
- Has six full-time employees and 4 part time.
- Income: 2.5 million/month (890 Euro) for emptying business, excluding income from reuse, training, donations etc.
- Costs: 1.2 million/month
- Other income streams: training center, fertilizer and compost, fruit and fish, floating garden, solid waste management, other trucks dumping there
- "It's a good business. I started with the gulper, took loans and paid back no problem."

CHALLENGES:

- Pits full of mixed and solid waste. System incompatibilities with the truck or machines that are sent there and are unable to empty pit. Behavior change is necessary.
- The facility was built by researchers 10 years ago, the communication and people included in number is too low for number of people that are now living in the ward.
- As a business model - tanke is expensive, but community doesn't always understand. Oh is it full now why don't you come...
- Frogmen and illegal emptying
- Problem with funding. Not enough capital investments to start these businesses although there is a clear business case for them.
- Banks aren't familiar with the business model and don't offer loans.

Appendix B - Interview Summaries cont.

CCBRT, Mburahati, Kigamboni FSTP site visits and Godlove Ngoda Interview Summary Report

Date: 17.02.2021

Time: 08:00 - 2 PM

Location: Dar es Salaam

- First site at the CCBCR Hospital - The DEWATs was in good condition - owned and operated by the hospital.
- Currently they burn the gas because the cooks don't like it. Not hot enough/comes from faeces.
- They had a large DEWAT and a smaller one that led to the same treatment pond and PGF.
- Mburahati: DEWATs for DAR, now owned and operated by DAWASA. Freshly painted, very clean, not so busy. Several guards were sitting around, but no one to operate the tricycle.
- One truck, which was gone.
- Godlove: 'Do you think tricycle would be sitting here if it were privately operated? This is subsidized, they get paid no matter what by the government.'
- Little incentive to get more business.

Challenges according to Godlove:

- Now we have the infrastructure but still 90% isn't being treated. It must not be the funding or the infrastructure then.
- Could be the willingness to pay
- Some places are too hard to reach
- He believes behavior change is one of the biggest challenges.
- Trucks don't illegally dump because of big fine (250\$ he estimated). Enforcement of this is widespread and drivers could lose their license. Just takes someone taking a picture and sending it in of them illegally dumping.
- However, some hard to reach places have no other option than to illegally empty their septic. No one can reach them and they have no money.
- DAWASA didn't take new drivers because of bureaucracy, not degree.
- There is a lack of experience and desire from plant managers at DAWASA to work in FSM.
- there is enough legislation, but enforcing the average poor person or frogman is rare. This is where a majority of the waste flow goes.
- on Magafuli: No one's perfect, he's a human being. But you see results with all this new infrastructure.

Appendix B - Interview Summaries cont.

Toangoma FSTP site visit and Ms. Mhando Interview Summary Report

Date: 17.03.2021

Time: 2-4 PM

Location: Toangoma

Founded in 2018 - now a 50/50 partnership with DAWASA - splitting the earnings from the dumping fees collected. Mwanahama keeps the profits from fruits and vegetables, fertilizer and uses the biogas. DAWASA pays for the large maintenance costs - such as cleaning and equipment breakage (estimated 1 million TZS/Year), she pays for minor things (500k/year).

They have a contract - but not a formal PPP. Currently waiting for a license.

The site was clean, but currently out of commission because of a broken mixer? in the holding tank. Had a big clean a few months ago with desludging, now empty except for water.

Specs:

- 20,000 L Holding tank
- 50,000 L Biogas fixed dome

Can treat up to 20,000 L/day, but better 10,000 L. So about 1 tanker per day. (large one).

200 50kg bags of fertilizer per year. Sold at 1k each. 200k profit. Not properly tested or post treated. Sludge is shoveled right into bag. DAWASA checks quality of water effluent though once a month, also the bananas.

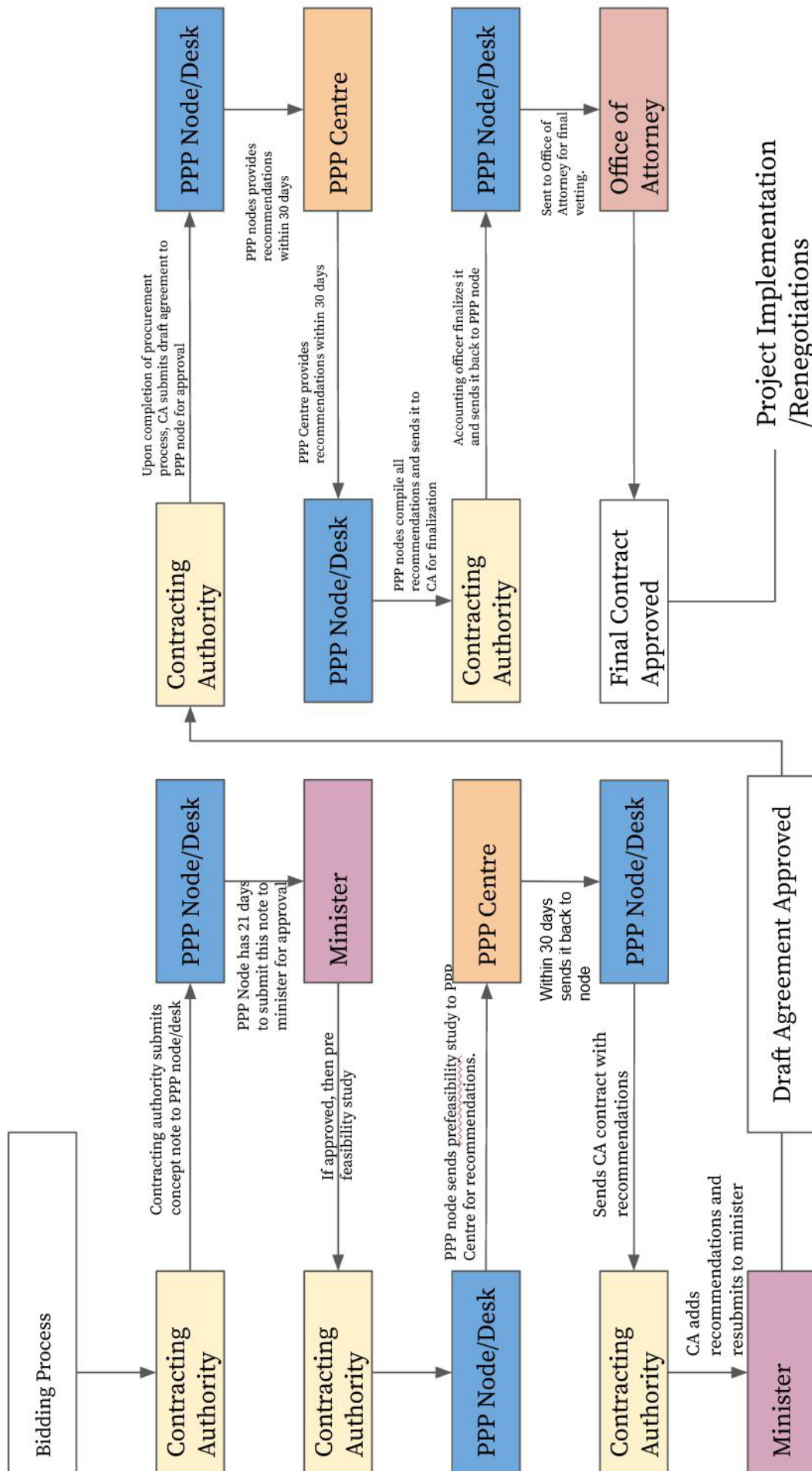
300k per month income, 150k each to DAWASA and her.

She is satisfied with the partnership, but would like a bigger holding tank (30,000 L tank is in discussion with DAWASA). She has a lot of demand but not the capacity to meet it or turn a profit. The FSTP is not profitable. She is the only employee. Would like to acquire toyo truck to get proper sludge, and not the mostly water that the trucks dump there. Would like to hire employees and provide work and service to the community. She is optimistic for the future and believes this could be a profitable business. Believes education is required to inform people about the importance of DEWATS. She would like to also have a training center like Mr. Milinga to supplement the income and provide more jobs.

Biggest challenges:

- not enough capacity
- too much water in trucks, not enough sludge
- no equipment (toyo or emptying trucks)
- unplanned nature of neighborhoods

Appendix C - PPP procurement and approval process according to 2020 Regulations



Appendix D - Factsheet data from FSTPs

Project	Owner/Operator	Location	Technology	Purpose	Funded/Implemented by	Constructed	Cost	Capacity
Kigamboni FSTP	Mr. Milinga	Kigamboni, Dar es Salaam	DEWATS	Sludge disposal/Training center	BORDA	Dec 2012 - May 2013	14,864€	4 m ³ /day
Toangoma FSTP	Mwanahania Mhando/DAWASA	Toangoma, Dar es Salaam	DEWATS	Sludge disposal	Wateraid / People's Development Forum (PDF)	2018	176,000€	10 m ³ /day
Vacuum Truck Business	Godlove Ngoda and partner	Dar es Salaam	Used Vacuum Truck	Pit emptying	Self-funded	purchased 2019	11,570	4.7m ³

Appendix D - Factsheet data from FSTPs cont.

Private Sector Provider	Partnership Structure	Service Chain Segment	Technical Feasibility	Financial Viability	Thorough Cost/Benefit Evaluation	Technology Transfer	Strong and Competent Partners	Strong Commitment and clear roles	Appropriate Risk Sharing	Contract Management
Kigamboni FSTP (E&T, T)	Design, Build: BORDA Operate, Maintain, Own: Mr. Milinga Regulate: DAWASA	Emptying and Transport	The gulper, Sludge-go, motorised tricycle, and vacuum truck are all technically feasible	The Sludge-go is not financially viable, however the other equipment is.	Performed by BORDA	A high level of technology and knowledge transfer (DEWATS, Sludge-Go, O&M Training)	Yes	Yes, due to Mr. Milinga both owning and living on the property where the FSTP is implemented, he is committed to its success and maintenance. DAWASA's role as licensor and regulator is also clear, with minimal interference in the business. DAWASA visits every three months to monitor effluent quality.	BORDA, by providing interest free loans took on more risk, however the project has turned out to be successful.	?
		Treatment	DEWATS is technically feasible, however the lack of a buffering tank means the treatment system is susceptible to shock loads	Yes						
		Training Centre	NA	Yes, implemented by BORDA and funded by BMZ, CAPEX costs were covered. Mr. Milinga and his employees perform the training and recover the minimal costs through fees of 300,000-600,000 per trainee.	Yes. Once trained by BORDA, Mr. Milinga and his employees now transfer knowledge to trainees.					
Toangoma FSTP	Design, Build: PDF Finance: Wateraid Operate: Ms. Mhando Maintain: DAWASA / Ms. Mhando Own: 50/50 DAWASA/ Ms. Mhando	Treatment	DEWATS is technically feasible	The owner/operator, Ms. Mhando, has a 50/50 partnership with DAWASA and splits the revenue from the tipping fees. Meanwhile she avoids costs by using the effluent to water the banana plantation and sells the dried FS as soil conditioner. She said it is currently not profitable and more capacity is needed to meet the demand of the area.	?	Yes, the DEWATS approach as well as training to operate and maintain the system.	Ms. Mhando was satisfied with the partnership with DAWASA.	Yes, Ms. Mhando also lives and owns the land on which the FSTP was constructed, giving her the incentive to keep it operating. However the system was not functioning when I visited due to maintenance. Ms. Mhando performs daily tasks and	Yes	She is currently waiting for a license and no formal contract exists
Vacuum Truck Business	Own, Operate: Mr. Ngoda and partner (Service Contract with DAWASA)	Emptying and Transport	Yes	Yes. Projected payback period is two years. However, the estimates for demand and collection volume may be optimistic	A simplified cost/benefit analysis was performed by the owner.	Yes. The vacuum truck was bought used and modified to expand collection volume from 3m ³ to 4.7m ³	Yes	Yes. The truck owner and his partner are committed to making a return on their investment. Truck owner reported that getting started with the licensing was straightforward. Illegal dumping regulated by	Yes	?

Appendix E - South Africa's Readiness Radar values

Source		Econ	WB	GTZ		Kavishre	Transparency Intl.	PPRA Report	WB Data	Global Innovation Index	WEF	BTI	EPI	Average Score
Project Level	Technical Feasibility													#DIV/0!
	Financial Viability		76											76.0
	Thorough Cost/Benefit Evaluation	70	76											73.0
	Technology Transfer								32.67	48.6				40.6
Organization	Strong and Competent Partners	70												70.0
	Strong Commitment and clear roles		76											76.0
	Appropriate Risk Sharing	75	76											75.5
	Contract Management	70	82											76.0
Policy	Political Support	46.1												46.1
	Transparent	75	76											75.5
	Competitive	70	62											66.0
	PPP Unit and policy	70	82											76.0
Institutional	Strong legal framework	70	62											66.0
	Political Stability	70										75		72.5
	Regulatory Quality							61.54						61.5
	Lack of Corruption							63.46						63.5
	Good Governance							58				74.5		66.3
Macro	Stable Macroeconomic conditions	46.4										61.4		53.9
	Adequate Financial Market	91.7										80.00		85.9
	Public Acceptance/Involvement											76		76.0
	Benefits all Stakeholders	91.7												91.7

