A REVIEW OF HOW MUNICIPAL INFRASTRUCTURE DELIVERY MANAGEMENT FLAWS HAMSTRING GROWTH AND DEVELOPMENT IN SOUTH AFRICA

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ABSTRACT

Planning, budgeting, coordinating, managing the lifetime of a project, evaluating it, being transparent and accountable, and adhering to rules on the public availability of infrastructure services are all part of infrastructure delivery management. However, there is a declining local government infrastructure budget in South Africa. Hence, this study evaluates local governments' management and infrastructure delivery chain to pinpoint the obstacles preventing the creation of an efficient, sustainable, and successful infrastructure delivery program through a review approach. The study's findings reveal the institutional and regulatory framework for infrastructure delivery, infrastructure delivery chain, municipal infrastructure delivery performance, and local government infrastructure delivery challenges, such as poorly managed consultations, weak multi-government coordination, political-administrative interface, and monitoring and evaluation. The study concludes that municipal infrastructure has no proper planning or life-cycle management. Therefore, the study recommends a stronger focus on peer learning across municipalities and the complete life-cycle management of municipal infrastructure rather than introducing new infrastructure. The secret to sustainable infrastructure delivery management is to plan for appropriate infrastructure that adapts to local conditions, maintains existing infrastructure, and renovates infrastructure that has outlived its intended use.

Keywords: Infrastructure delivery, Management, Review, South Africa

INTRODUCTION

Developing the infrastructure required to supply utility services to the corporate sector and basic services to homes is a significant obligation placed on South African municipalities. Municipalities spend approximately R45 billion a year on infrastructure. Despite this, the programme to deliver infrastructure is plagued by

frequent instances of poor governance and delivery management (AGSA, 2022). The municipal infrastructure-built programme is part of the broader national goals to drive infrastructure-led economic growth as articulated in the Economic Reconstruction and Recovery Plan (ERRP), the National Development Plan (NDP), and the National Infrastructure Plan (NIP). The conversation around infrastructure delivery often ignores the larger management or governance aspects to concentrate on the lack of funding for new projects. Research indicates that improved public infrastructure investment management may provide significant advantages for the investment and that greater economic growth outcomes are correlated with better infrastructure delivery management (OECD, 2015). Though it is generally acknowledged that capital investments are essential for economic growth and development, local government infrastructure delivery performance is falling (Kumo, 2012).

Most municipalities face significant infrastructure delivery and maintenance backlogs within an environment of limited resources and fragile economic growth. External and internal constraints mar the infrastructure delivery programme. Municipalities face challenges from the outside world, including population expansion, rising input costs, years of neglected renovations and maintenance, and a general lack of resources, which have put increasing strain on the infrastructure already in place. Internal technical capacity deficiencies, particularly in planning, contracting, and quality assurance, limit the infrastructure delivery programme (DPME, 2014). Despite these obstacles to infrastructure delivery, there has been a general improvement in the growth of enabling infrastructure between 2001 and 2021 to support the provision of fundamental municipal services. The biggest gains are seen nationally in the areas of piped water to homes and electrical connections, with over 90% (69.7%) and 88% (84.4%) access rates in 2021 (Statistics SA, 2001), respectively. During the same period, there has been a noticeable improvement in the availability of better sanitation facilities (pit and waterborne with ventilation) and weekly waste pickup services, with rates of 84.1% (61.7%) and 60.3% (56.1%), respectively, increasing (Statistics SA, 2021).

Improvements in infrastructure delivery have been made possible by several measures, such as coordinated financial allocations and capacity assistance from several national and local government agencies. Over the past 22 years, municipalities have been granted at least R 1 trillion, mostly to fund the construction of infrastructure for essential services (National Treasury, 2022). Around the same time, several capacity-building initiatives were launched to solve technical shortcomings related to allocating funds and guaranteeing efficient project management and execution of infrastructure. Municipalities continue to exhibit a worrisome incapacity to allocate capital funds, manage infrastructure projects, operate and maintain current infrastructure, and construct high-quality infrastructure, even years after waves of interventions. Delays in completion, poor workmanship, and cost overruns are characteristics of projects (AGSA, 2022). As a result, there are never-ending cycles of budgetary allotments for project completion and correction, while assets rapidly deteriorate owing to poor craftsmanship and maintenance failures, “white elephants,” and eventually extended disruptions in service delivery.

The efficiency of infrastructure delivery management and the governance and accountability frameworks for managing the municipal infrastructure investment function are called into question by the persistent issues in infrastructure delivery.

Planning, budgeting, coordinating, managing the lifetime of a project, evaluating it, being transparent and accountable, and adhering to rules on making infrastructure services publicly available are all part of infrastructure delivery management (OECD, 2015). It is about ensuring that the appropriate infrastructure is implemented in an economical, timely, budget-conscious, high-quality manner, and properly maintained and managed. Thus, a clear and regulatory institutional framework, cost-effective and affordable decision-making processes, an open and transparent prioritisation mechanism, efficient coordination amongst governmental levels, and assessment mechanisms that track performance over the asset lifecycle are all necessary for successful infrastructure governance (OECD, 2017).

In light of these circumstances and the fact that local government infrastructure budgets are decreasing, this study evaluates local governments' management and infrastructure delivery chains to pinpoint the obstacles preventing the creation of an efficient, sustainable, and successful infrastructure delivery programme. To obtain insight into the infrastructure delivery management procedures within municipalities and other government domains accountable for local government infrastructure, the study uses a review approach that includes a policy review of the local government infrastructure delivery architecture, a budget analysis of infrastructure programmes, and case studies.

INTERNATIONAL STANDARDS FOR MANAGING THE SUPPLY OF INFRASTRUCTURE

An increasing number of people worldwide realise that it is unsustainable to concentrate on building new infrastructure projects without considering the long-term life cycle obligations related to the upkeep, renewal, and operation of the capital stock. Large-scale public investments have been made over a long period to promote sustainable contemporary livelihoods through local government infrastructure networks for roads, water, power, and community facilities. Enhancing economic growth, raising living standards, guaranteeing environmental sustainability, and using limited resources most efficiently are just some advantages of better infrastructure management. Therefore, municipalities must employ the best infrastructure management skills and practices to gain the full benefits of infrastructure investment (Association of Local Government Engineering, 2006).

Local government infrastructure comprises a set of stationary systems or networks intended to serve a defined community with a specified level of services. The infrastructure asset base may consist of solid waste facilities, parks and recreation centres, educational institutions, water utilities (water supply, wastewater, and stormwater), transportation networks (road, rail, and ports), and electrical reticulation systems. The interdependence and interconnectedness of the local government infrastructure are acknowledged both inside and between various types of networks and within a single asset network. It is essential to manage these interdependencies properly since the optimal operation of other network components is impacted when one component fails. For instance, the electricity supply component failure may affect both the supply of water and traffic control, compromising the overall network. Infrastructure management aims to provide the bare minimum of services efficiently and economically while managing the assets for the duration of their useful lives.

Determining service levels and tracking performance, implementing long-term economic management techniques, comprehending and addressing the effects of expansion through demand management, controlling risks related to infrastructure networks, and ongoing infrastructure stock improvement are all essential components of efficient infrastructure management. Improved risk management, increased customer satisfaction and service management, greater governance and accountability, and improved financial performance are all advantages of infrastructure delivery management (Association of Local Government Engineering, 2006).

Framework for Infrastructure Delivery Management

Regardless of the delivery mode, a generalised framework must be followed while managing infrastructure delivery. However, there is no set pattern. The framework provides decision-makers with a method for analysing problems, outlining potential solutions, and assisting them in reaching conclusions. The governance framework comprises two parts: (a) a list of preconditions for governance that address the general enabling governance environment for infrastructure, and (b) a decision tree that directs institutions in making decisions about individual sectors and infrastructure. A robust ability about one prerequisite can partially offset a feeble ability regarding another. Nonetheless, research and application indicate they are complementary and should be addressed as a whole (OECD, 2015). The infrastructure delivery management best practices are outlined in the following guidelines (OECD, 2015):

- A long-term, national strategic vision should guide infrastructure development and utilisation considering the problems' complexity.
- Cost-effective and sustainable frameworks, concepts, and procedures should facilitate infrastructure creation, management, and renewal.
- A user-centric approach should be taken to manage infrastructure projects over their entire life cycle. It should be based on extensive discussions, organised participation, information availability, and primary attention to the demands of the users.
- Open communication, regularity, and performance-based coordination are essential across governmental levels and jurisdictions. Sectorial and overall government perspectives should be balanced in coordination across government levels.
- Having the right personnel and processes to provide strict project assurance, affordability, value for money, and transparency is important.
- Evaluations of projects ought to be grounded in facts and a fair value-for-money process.
- Systems should be in place to focus on the asset's performance throughout its life.
- Potential entrance points for corruption should be identified at every step of the public infrastructure project and the anti-corruption and integrity controls should be strengthened.
- Political, sectoral, and strategic considerations should all be considered when selecting the best delivery method.

REGULATORY AND INSTITUTIONAL FRAMEWORK FOR INFRASTRUCTURE DELIVERY

Established by the Municipal Systems Act (MSA), the Integrated Development Plan (IDP) serves as the overarching strategic framework that directs and informs the implementation of infrastructure and general development within the local government sector. The IDP offers a five-year framework for organising all municipal short- and medium-term objectives into a unified strategic plan. It is also crucial to figure out how much money and manpower are needed to carry out these plans. It takes a team to compile the IDP, with contributions from corporate services, community service, infrastructure, and financial planning, among other municipal administration departments. According to legislation, the IDP must include several elements, such as backlogs in service delivery, municipal development goals, how municipal development plans correspond with national and provincial sector plans, land use development patterns, and a financial plan (DPLG, 2006).

In particular, the MSA (2000) sets down the guidelines municipalities must adhere to while implementing their infrastructure plans in sections 78 and 79. Municipalities must, above all, evaluate their internal and external capacity to deliver infrastructure projects, paying close attention to the advantages and disadvantages of each delivery method, the municipality's potential for internal project delivery in the future, various options for service delivery, and the opinions of the local community. In addition, municipalities must undertake a feasibility analysis on any infrastructure projects they choose, considering factors including affordability, value for money, the needs of the underprivileged, and larger organisational and financial ramifications.

The legislative mandates of the various sector departments in charge of managing the various municipal activities (e.g., water, electricity, roads) serve as the basis for the infrastructure sector plans needed to create an index of displacement. Every sector department must contribute to each municipality's corresponding Integrated Development Plans (IDPs) via the Consolidated Municipal Infrastructure Plan. The Capital Works Programme (CMIP) describes the capital works (new construction, renovation, and upgrading), operations and management plans, goals and risks, financing sources, budgets, and tariff implications for the current and next years. The Health and Safety Act, 83, of 1993, which addresses construction rules, is the main law in the infrastructure delivery chains. Since municipalities own infrastructure, including highways, waterworks, reservoirs, bridges, and buildings, they must keep strict safety regulations and inspection records. The lifespan costs of these infrastructure standards and legislation delivery affect municipal budgets.

Municipalities must adhere to specific technical rules and standards besides the legal mandate for the coordinated infrastructure supply. For example, the Water Services Act governs water flow, metering, and drinkable water quality, all necessitating investments in supporting infrastructure. The South Africa National Systems (SANS) Code of Good Practices must be followed throughout construction. Municipalities must use specific designs and technology to develop infrastructure in the human settlement sector. In addition, there are general recommendations provided by the Municipal Infrastructure Grant for providing infrastructure for a minimal basic level of

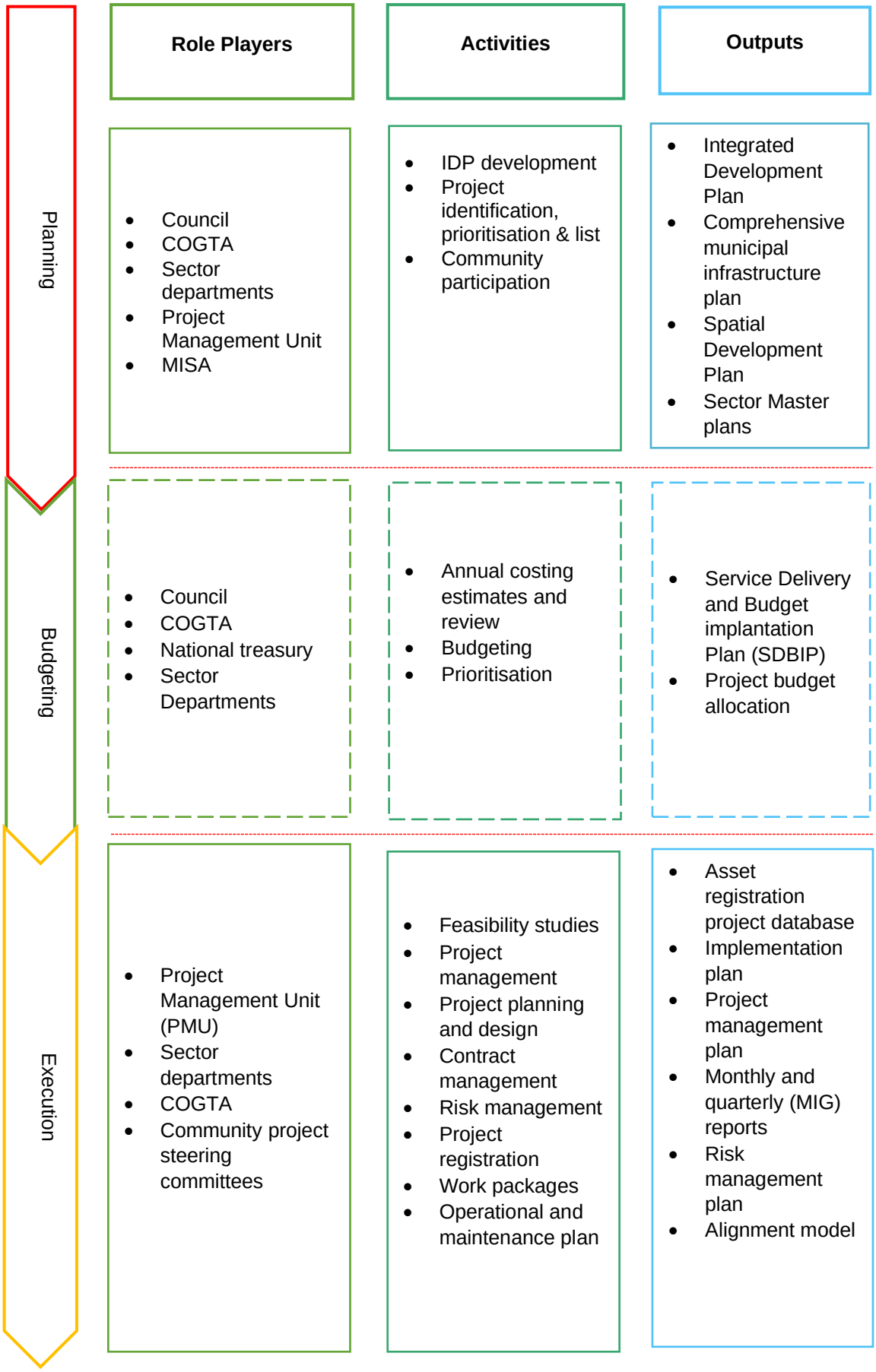
services, such as one streetlight per four dwellings. The previous conversation has made it clear that local government infrastructure delivery management must comply with several regulations, some of which may be quite onerous and expensive.

Infrastructure Delivery Chain

Building capacity for integrated planning, budgeting, procurement, and infrastructure administration is the goal of the National Treasury-managed Infrastructure Delivery Improvement Programme (IDIP). The IDIP was enhanced after six years of piloting with the Standards for Infrastructure Procurement and Delivery Management (SIPDM), a guideline implementation tool that creates control frameworks for the planning, designing, and executing infrastructure projects and infrastructure procurement. As a result of these efforts, the Infrastructure Delivery Management System (IDMS), a best practice model for managing and delivering infrastructure that all branches of government can utilise, was created. These tools aim to create a uniform and transparent method for managing public investment at all levels of government and across its “life cycle” (SAICE, 2016).

The IDMS, supervised by the National Treasury, lays out the delivery chain for local government infrastructure, and the Municipal Infrastructure Support Agency (MISA) established Project Portfolio Management (PPM) methodology in its implementation. With an emphasis on life-cycle management, procurement management systems required to buy, operate, and maintain infrastructure, skills development, and legal compliance, the IDMS is a guiding tool that describes best practices in infrastructure delivery management. A general overview of the supply chain is given in Figure 1, which shows the many roles played, the tasks involved, and the work results. The process starts with planning and ends with execution.

Figure 1 illustrates how infrastructure delivery management involves a complex planning, budgeting, and project execution process. Municipal councils work with the community, sector departments, and other stakeholders to select and rank projects based on resource availability and requirements throughout the planning process. The CMIP is compiled at the end of the consultation procedures and is incorporated into the IDP. Following the completion of the planning phase, funds are distributed following council priorities, project cost estimates, and the Medium Term Expenditure Framework (MTEF) in the second part of the process. Municipalities frequently bear a heavy financial burden during the final execution phase of the infrastructure delivery process, which consists of many operations. For example, all municipalities must set up a fully-staffed project administration unit under the direction of a licensed engineer. This unit will handle MIG funding, project identification, feasibility studies, coordination, and administration. In addition, municipalities must form a community project steering committee for each infrastructure project to work with the project management unit to oversee contractors. (CIDB, 2010; DPLG, 2006).


Role Players
Activities
Outputs
Planning
Budgeting
Execution
Council
COGTA
Sector departments
Project Management Unit
MISA
IDP development
Project identification, prioritisation & list
Community participation
Integrated Development Plan
Comprehensive municipal infrastructure plan
Spatial Development Plan
Sector Master plans
Council
COGTA
National treasury
Sector Departments
Annual costing estimates and review
Budgeting
Prioritisation
Service Delivery and Budget implantation Plan (SDBIP)
Project budget allocation
Project Management Unit (PMU)
Sector departments
COGTA
Community project steering committees
Feasibility studies
Project management
Project planning and design
Contract management
Risk management
Project registration
Work packages
Operational and maintenance plan
Asset registration project database
Implementation plan
Project management plan
Monthly and quarterly (MIG) reports
Risk management plan
Alignment model

SDBIP (Service Delivery and Budget Implementation and not Implantation Plan)

Figure 1: Local government infrastructure delivery chain

Source: Author (2023) compilation based on CIDB (2010) and MISA (2017)

The infrastructure delivery process is broken down into three crucial phases: project portfolio, project management, operations, and maintenance, according to the IDMS toolkit. The toolkit recognises that certain infrastructure projects might have a common purpose and scope. As such, they should be combined into a single portfolio to facilitate resource sharing and optimise cost-effectiveness. Groups of work can be delivered under a single contract or as a "work package," as they are frequently called. The Construction Industry Development Board (CIDB) recommends project management practices, and municipalities are urged to implement the Gateway System as part of this. A well-informed choice is necessary throughout the entire infrastructure life cycle. Projects will probably stay within the scope of financial constraints and align with the goals for which they were designed in this fashion. It is important to note that municipalities apply various project management methods and techniques, such as management contracting, design and construct, development and contract, and employer-driven design. Municipalities must establish an operations and management plan when the project is finished, which outlines how the asset will be integrated into the portfolio of assets already in place, maintained throughout its life, and ultimately demobilised (CIDB, 2010).

The aforementioned explanation makes it abundantly evident that a solid institutional, legislative, and administrative framework is in place for providing local government infrastructure. There are enough rules outlining what laws municipalities need to follow and what steps they need to follow to acquire infrastructure and manage it over its life. However, what is necessary in theory might not always be possible in practice. Some towns might not have the means to put the required structures in place or follow the required procedures, resulting in subpar infrastructure delivery. Furthermore, some communities may find the several levels of standards, laws, controls, and activities unduly expensive and oppressive. For example, every infrastructure project requires towns to create project steering committees and carry out feasibility assessments, which depletes a significant portion of the construction budget. Studies of viability are essential to managing infrastructure delivery, though some towns might not have the resources to carry them out.

The State of Local Government Infrastructure Delivery Management

In South Africa, 89% of households have access to electricity, 84% to water, and 80% to sanitation services in 2021. However, the dependability of these services is low. The percentage of provinces with water supply disruptions is as high as 50%, especially in provinces such as Limpopo, the quality rating of which is slightly below 50% (Stats SA, 2018). Partially deficient municipal infrastructure is indicated by poor water quality and supply disruptions. A total of 56% of 1150 wastewater and 44% of 964 water treatment facilities are in a poor to critical state, according to the Department of Water and Sanitation (2017), and both need immediate restoration. When municipal water reticulation networks malfunction, a significant volume of water

is lost via leaks. According to Stats SA (2016) and CoGTA (2010), there are similar subpar infrastructure problems concerning stormwater drainage, roads, and electrical reticulation. The extent to which the municipality has maintained the quality of its water infrastructure is seen in Figure 2. Municipalities in rural provinces tend to have the lowest infrastructure quality scores, as may be observed. The National Treasury (2011) notes that although significant progress has been made in ensuring accessible services, more funding is necessary to maintain aging municipal infrastructure. Alternative infrastructure options should be investigated in rural communities where the cost of expanding infrastructure is either unaffordable or unsustainable.

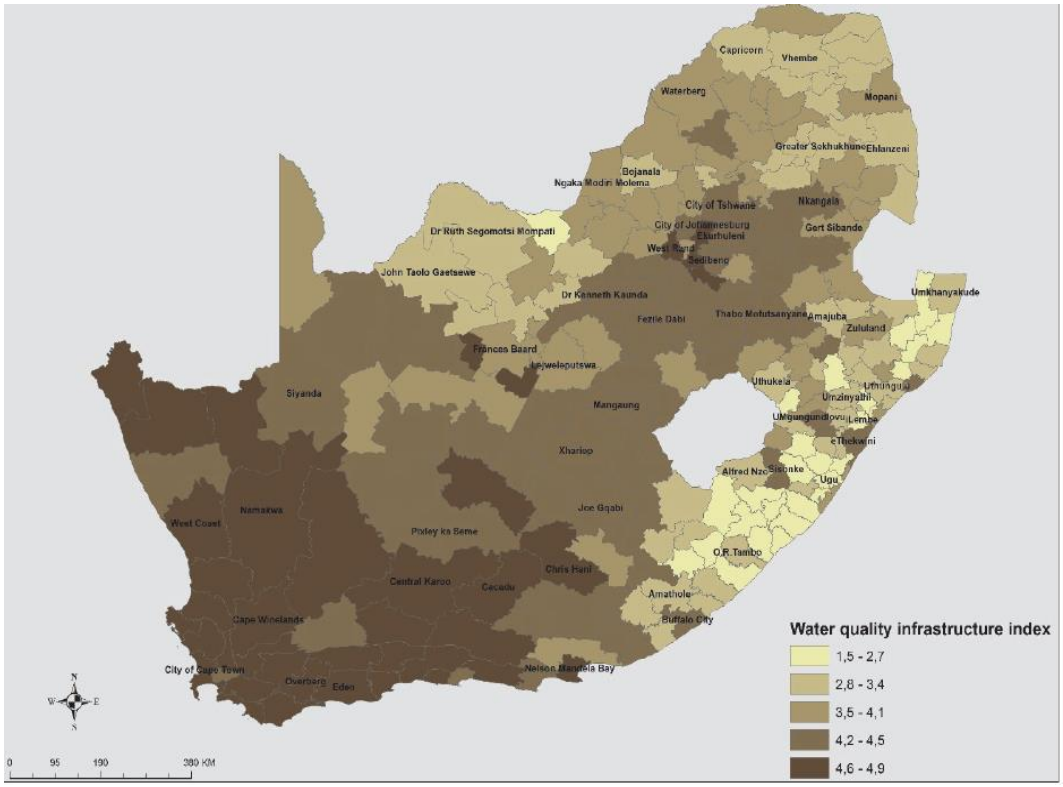


Figure 2: Municipality-level water infrastructure quality index, 2016
Source: Stats SA (2016)

Table 1 shows the performance of local government infrastructure delivery in a sample of six municipalities that were supported by the Municipal Infrastructure Grant (MIG) in 2017–18. The MIG appears to provide municipalities some latitude in choosing infrastructure projects that meet the requirements of their communities. Infrastructure improvements of roads and stormwater are typically given priority over other forms of infrastructure by municipalities. It is also clear that the municipality ignores the upkeep of the current infrastructure in favour of concentrating only on implementing new infrastructure. The majority of municipalities likewise struggle with project completion timelines. Despite having long missed their intended completion date, many of the sampled projects indicated as being under construction or finished are still listed as MIG-funded projects for 2018.

Table 1: Municipal infrastructure delivery performance

		No of projects by sector					Delivery status		Project status		
Municipality	Total sampled projects 2017/18	Roads & stormwater	Sports	Water and sanitation	Community facilities	PMU	New	Rehabilitation	Design & tender	Construction	Completed
Matatiele	30	23	4	-	-	2	29	0	5	15	7
Mbizana	31	18	1	1	11	1	27	4	7	11	12
Umzinyathi	15	-	-	15	-	-	14	1	1	13	1
Endumeni	4	2	-	-	2	-	4	-	1	2	1
Makhado	7	-	-	-	-	-	7	-	-	7	-
Collins Chabane	5	5	-	-	-	-	5	-	1	4	-

Source: CoGTA (2023)

The current condition of inadequate local government infrastructure delivery management is highlighted in further depth in the 2016–17 Auditor General (MFMA) report, along with its negative effects on service delivery, budget sustainability, and wider community stability and health concerns. The report highlights several issues related to the creation and upkeep of infrastructure, including late completion of projects, subpar workmanship, inadequate contractor oversight, excessively escalated budgets, noncompliance with supply chain procedures, and non-application of project management techniques (Auditor General, 2016).

Table 2: Principal audit conclusions on the supply of infrastructure

Infrastructure type	Audit findings	Audit findings	Audit findings
Road infrastructure	A maintenance plan or priority list for normal maintenance and renewal was absent from 55% of the municipalities.	Not all of the municipalities' roads had their conditions evaluated, making up 27%.	The completion dates were not met in 26% of the municipalities in charge of road improvements.
Water infrastructure	27% of the municipalities did not use the allotted project money.	Supply chain management policies were broken by 21% of municipalities.	26% of municipalities finished their projects later than expected.
Water infrastructure maintenance	22% of towns did not have a maintenance budget, while 46% of municipalities lacked a maintenance plan.	24% of the objectives for routine infrastructure maintenance were not reached.	More than 30% of municipalities experienced water losses.

Source: Auditor General (2018)

These results imply that the infrastructure supply chain contains flaws. For instance, lacking a project priority list or maintenance plan suggests poor planning. Careful planning is essential for the next stages of infrastructure delivery to proceed without interruption. Incapacity to evaluate the community's demands causes severe financial losses for dysfunctional councils that cannot supply infrastructure effectively. The Auditor General (2018) notes a case where a municipality installed two toilets in every home in a neighbourhood despite a 15,000-household sanitation backlog overall. A few instances of the financial effects of inadequate infrastructure delivery management are shown in Table 3.

Table 3: Financial implications of poor infrastructure delivery management

Municipality	Project type	Financial implications
Mangaung	Airport development node	Since 2013–15, the municipality has incurred R141 million in planning and setup expenditures; township planning has not received permission.
City of Johannesburg	Housing	After barely five months, the contractor abandoned an R221 million house project that was supposed to be finished in March 2016. Because there is no proof or consent for the extra work scope, the contractor was paid R22 million more than the original contract amount.
Alfred Duma and Umngeni	Roads	Contractor paid for partially completed roads
Govan Mbeki	Sewer reticulation network	A R25 million project was left unfinished for two years, and the municipality neglected to cancel the contract and assign a new contractor to address the issues. Sewage from these flaws seeped into the dwellings and onto the street.
Ngaka Modiri Molema	Water treatment plant	A project that began in 2011–12 and was scheduled to be completed by May 2014 was still unfinished as of June 2017, even though the budget had increased from R68 million to R104 million.
Rustenburg	Rapid transport system	Only 40% of the R3 billion project's Phase 1 was finished in 2017 and the remaining expenses were not recorded. Phase 1 had started in 2012 and was supposed to be finished by 2016.

Source: Auditor General (2018)

Financial losses brought on by subpar infrastructure delivery management merely reflect the fundamental inadequacy of that management. Several project-level errors lead to and aggravated financial losses. Table 4 presents the deficiencies in local government project management, ranked by significance, based on a study by the Construction Industry Development Board in 2014. The biggest project management problem identified by municipalities is inadequate contractor and site management, which is followed by corruption. These outcomes support the Auditor General's conclusions, which are listed in Table 2.

Table 4: Project management shortcomings in local government ranked by significance

Situations/ Interventions	Rank
Poor site management	1
Lack of contractor quality expertise	2
Corruption	3
Inadequate resourcing by contractors	4
Lack of understanding of quality	5
Level of subcontracting	6
Inadequate information	7
Detail	8
Focus on cost by contractors	9
Poor constructability	10

Source: CIDB (2014)

Implications of Ineffective Infrastructure Delivery Management that go beyond Money

Recognising that inadequate infrastructure delivery management has consequences beyond just monetary losses is important. Inadequate delivery management can have detrimental impacts on the environment and human health. Several critical infrastructure delivery management elements, such as inadequate planning resulting in subpar plant designs and insufficient plant capacity, haphazard connections to new settlements, malfunctioning pump stations due to a lack of maintenance and skill shortages, limited financial resources, and high maintenance costs, have been linked to the declining state of wastewater and sewage treatment infrastructure in South Africa, according to numerous water quality studies. A confluence of these obstacles causes untreated or inadequately treated sewage to leak into ponds, rivers, streams, and groundwater—the primary water supply for both humans and wildlife—resulting in the spread of illnesses carried by the water. There were 380 cases of diarrhoea, 30 probable cases of typhoid fever, and nine confirmed cases of cholera in Delmas, Mpumalanga Province, according to reports published in The Mail and Guardian in 2004. Several South African provinces have also reported typhoid fever outbreaks, including KwaZulu-Natal, Limpopo, and the Eastern Cape. The most recent outbreaks were reported in Delmas, Mpumalanga. Numerous research studies linked defective machinery and equipment in sewage treatment facilities and municipal wastewater to overcrowding, design flaws, and water resource pollution (Memo, n.d.).

Continuous effluent dumping into the Vaal River system puts millions of people in the provinces of Gauteng and Northwest in danger of developing waterborne illnesses. This kind of catastrophe will likely ruin the healthcare system and result in massive financial obligations from lawsuits for both the federal and local governments. Every individual has the constitutional right to clean drinking water, and any violation of this requirement may be brought up in court.

Financing Arrangements and their Consequences for the Management of Infrastructure Delivery

Municipalities' infrastructure delivery management systems are significantly influenced by the makeup and organisation of their local government infrastructure. The primary funding source for local government infrastructure is conditional grants, with national sector departments managing to carry out sector-specific initiatives. Ten grants comprise the majority of municipal infrastructure financing, further divided into direct and indirect funding and money for rural and urban areas. A breakdown of these funds is shown in Table 5. As seen below, in 2022–2023–19, non-urban municipalities received almost R58 billion in financing for infrastructure, with 75% of the grants being given directly to the municipalities. A larger percentage (67%) of all transfers of non-urban infrastructure are made up of the MIG. On the other hand, because of its ability to generate money, infrastructure financing for metropolitan municipalities—where issues with infrastructure delivery and administration are less—is relatively modest and is mostly provided through direct transfers.

Table 5: Infrastructure grants to local government

	Allocations Rural 2022/23				
R million	**Custodian**	**Direct**	**%**	**Indirect**	**%**
Municipal infrastructure	CoGTA	17545	67%		-
Regional bulk infrastructure	CoGTA	3 496	8%	3 607	37%
Water service infrastructure	DWS	3 864	15%	805	11%
Integrated national electrification	Energy	2 212	9%	3 821	51%
Rural roads asset management	DoT	115	0%		-
Municipal disaster recovery	CoGTA	321	0%		-
Total rural allocations		**22 850**		**7 472**	
Urban municipalities	**Custodian**	**Direct**	**%**	**Indirect**	**%**
Urban settlement development	DHS	8 149	62%		-
Public transport network	DoT	6 794	33%		-
Neighbourhood development partnership	NT	1 475	4%	101	100%
Informal settlement upgrading	NT	4 365	-		-
Total urban allocations		**18 499**		**29**	

Source: National Treasury (2023)

Delivery management and governance are affected by the makeup and structure of municipal infrastructure financing for several reasons. As mentioned, infrastructure funds are intended to support projects identified and authorised through the IDP processes. However, national grant administrators or custodians frequently attempt to control municipalities' investment preferences, undermining the legislation and guidelines established delivery management system. When implemented without accounting for life-cycle operations and maintenance expenses, indirect infrastructure conditional grants have a high degree of interference that can be disastrous. Furthermore, as municipalities try to prevent underspending, administrators' strict requirements linked to grant funds can delay project implementation or subpar craftsmanship (average spending on infrastructure conditional grants is typically below 90%). Owing to municipalities' insufficient capacity to carry out projects efficiently and quickly, the national sector department promotes indirect transfers.

Accountability between governmental levels and local project execution is further complicated by the grant framework's design. Function and responsibility ambiguities further lead to needless grant and procedure duplication and clog the infrastructure delivery management system. This can best be seen in the water sector, where the multi-sectoral Municipal Infrastructure Grant (which finances roads, sports facilities, and water) coexists with the Bulk Water Infrastructure Grant and the Municipal Water Infrastructure Grant. CoGTA is responsible for managing MIG and following expenditure criteria, sector agencies, including water, energy, and sports, must assist, oversee, and even identify municipal project execution. Such funding arrangements typically result in conflict between governments and delays in the delivery of projects. First, given their autonomy, municipalities will likely reject or give up on initiatives which are not part of the local IDP prioritisation procedures. Secondly, it defies logic to expect sector departments to take on responsibility for a role for which CoGTA administers money while also supporting the infrastructure initiatives of 253 municipalities. The money-follows feature appears to be broken by MIG. Figure 3 demonstrates that the cost of water and sanitation accounts for more than 50% of MIG spending, rising to 80% when roads are taken into account.

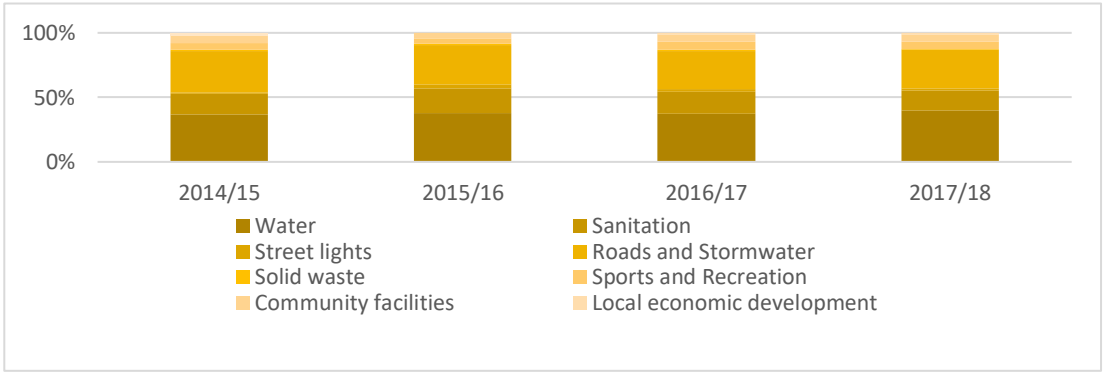


Figure 3: Spending on municipal infrastructure by industry
Source: CoGTA database – own compilation

Interventions to Assist Infrastructure Delivery by Local Government

Local governments' management issues in delivering infrastructure are not new and should not be unduly criticised. The local government planning system for infrastructure delivery is a relatively recent government area, having been in effect for less than 15 years (Presidency, 2004). This is in comparison to the national and provincial governments. Local government changes have required municipalities to adjust swiftly. This includes developing the capacity to take in budgetary transfers and design, construct, and oversee infrastructure projects. In many cases, poor planning, project management, and asset care have compromised delivery efficiency when municipalities have invested heavily in new infrastructure, despite the good intentions behind the emphasis on redress and the large backlogs of historic infrastructure (National Treasury et al., 2014). Lack of governance and accountability and skilled labour, as well as insufficient financing are the key causes of delivery issues.

Acknowledging the perpetual obstacles local governments face in delivering infrastructure, the federal government has allocated significant funds to facilitate, optimise, and enhance municipal infrastructure delivery initiatives. There have been many introductions and experiments with various initiatives aimed at improving infrastructure delivery, such as those that fund skills, aim to enhance governance (from planning to project management), and include the direct deployment of technical experts in municipalities. Many measures to help local government infrastructure delivery management are seen in Table 6. In light of the abundance of available assistance programmes, this raises the issue of why the infrastructure delivery programme is still marked by wasteful spending, delays in project completion, and cost overruns—all indicators of subpar delivery management.

Table 6: Infrastructure support programme by category

Intervention type	Program
Management/ Governance	IDIP/IDMS
	Asset management standards for local governments by MFMA
	Local government guidelines for managing infrastructure assets
	Guidelines for creating a project management division
	Contracts for infrastructure frameworks and support from regional management
	An overview of unit costs and service delivery levels for infrastructure
	Performance strategies for the built environment
	Facilities for infrastructure funding
	Coordination committee for presidential infrastructure.
Funding	Conditional awards reserved
	Grant for the development of infrastructure skills
Direct technical assistance	Siyenza manje (DBSA)
	Municipal Infrastructure Support Agency

	Government Technical Assistance Centre

Source: Author (2023)

ISSUES WITH LG INFRASTRUCTURE DELIVERY FROM THE STANDPOINT OF THE NATIONAL GOVERNMENT

Projects Falter because of Poorly Managed Consultations

Involving stakeholders, including communities and other infrastructure users, is essential to enhancing planning quality and making long-term asset use productive. However, it is said that municipalities are holding cursory community meetings in which the community's needs and goals are not always considered. Since these towns deal with dispersed communities with disparate interests, their consultation procedures may be rather burdensome. Several issues arise when balancing the interests of the general public with the limited resources available to the municipality, including the timely completion of infrastructure projects and the sustainability of finished projects in the face of community demonstrations and property destruction. When locals are not involved in the project, access to the site may occasionally be restricted to contractors.

Inadequate Cooperation across Governments

Procedures for managing infrastructure delivery become very complicated when a public investment includes a shared financial or policy responsibility across several governmental levels. The national sector ministries and municipalities involved in the infrastructure supply chain have long struggled with ambiguous mandates. Participation in municipal IDP procedures is appropriate for sector departments such as water, which may help municipalities with project evaluation, designs, and execution, as well as preparing plans for the supply of water infrastructure. However, the intricacy of IGFR connections in infrastructure delivery results in minimal or non-existent engagement. The first is that the Department of Cooperative Governance (CoGTA) and other sector departments do not clearly distinguish their tasks in terms of delivery and accountability. A different body mandates infrastructure delivery, and CoGTA is in charge of managing money for local infrastructure. Sector departments cannot provide planning, project execution, and supervision support to every municipality. A greater number of sector departments have been developing the ability to manage conditional grants rather than developing the technical ability to execute, oversee, and address project failures. Moreover, lastly, and perhaps most significantly, sector departments find it challenging to meddle in internal infrastructure delivery management activities owing to the autonomous character of municipalities or IGFR protections. The desire of sector departments to select contractors through conditional funds for infrastructure from the local government that are not direct has grown in the last several years.

Small-Scale Initiatives with a High Degree of Administrative Instability

The municipal infrastructure delivery programme consists of many modest projects spread over 257 municipalities, with an average of 2500 every year. Poor service delivery and reduced returns on public investment are common consequences of infrastructure delivery fragmentation. In addition to placing enormous administrative and financial strain on the oversight organisations, many projects need towns to carry out many feasibility studies that never go past the project conceptualisation stage. For municipalities to be accountable and responsible for carrying out different activities throughout the infrastructure life-cycle, they must hire and maintain a sufficient number of trained and experienced workers. However, owing to a lack of funding, organisational shortcomings within the municipality, and other structural issues, most municipalities find it difficult to develop, recruit, and retain the necessary talents. For example, inappropriate individuals are assigned to inappropriate roles. Furthermore, owing to legal obligations for competitive recruiting procedures, municipalities cannot retain some important staff members or execute succession planning. Towns depend on outside contractors when they lack competent staff members, and these contractors frequently suggest intricate project ideas that are inappropriate for the towns' goals and available resources.

Administrative and Political Interaction

Project risks and the degree to which politicians meddle in the processes are exacerbated by the stability of the organisations managing infrastructure delivery and the arbitrary decisions made by developers and project managers. Council members must be involved in the planning and prioritising of local government infrastructure as part of the evaluation and consultation of community needs. Tensions can occur between political pledges and what is practically viable when responding to the voters' expectations. Politicians frequently prefer new infrastructure over capital asset upkeep or renovation. When political and technical interests are not balanced, bad judgments are made on infrastructure, work packages are not finalised on time, contract management skills are diminished, and corruption potential is raised.

Evaluation and Monitoring

Creating enough capability to manage the infrastructure delivery programme's overall performance is significant for local government. Determining value for money, managing infrastructure investment across its lifespan, and making investment decisions depend on the availability of data on infrastructure performance. Monitoring is done solely for reporting expenditures in local government. The standard of the infrastructure being built is not closely examined. Even more concerning is that towns know very little about the state of the current infrastructure. It is required of municipalities to self-evaluate and self-report on the calibre of the infrastructure they provide. Without effective infrastructure units or project management, “new roads are often washed away a few months after completion.”

MUNICIPALITY-BASED APPROACH TO MANAGING INFRASTRUCTURE DELIVERY IN LOCAL GOVERNMENT

Roles and Duties in Infrastructure Delivery and Issues in Coordinating

According to interviews conducted with the sampled towns, local administrators thoroughly understand infrastructure delivery's roles, responsibilities, and value chain. The primary infrastructure responsibilities of local governments are building access roads and bridges, little electrical reticulation, community halls, sports and hawking facilities, and landfills. On the other hand, district municipalities are mostly in charge of the water supply infrastructure that covers the whole district. Every municipality's infrastructure delivery programme is guided by a complex IDP planning process, including a scenario analysis, community engagement, and a list of projects prioritised based on wards. The yearly IDP review requirements undermine project plan execution and continuity, making projects appear abandoned. Local governments lament the effects of inadequate money on the legitimacy of their plans and project objectives, given that communities are frequently split apart to accommodate service requirements within the constraints of available funds. However, none of the towns surveyed have a long-term, reliable, and budgeted infrastructure plan. The lack of funding for the plans is the cause of this error.

Municipalities see a major barrier to efficient infrastructure delivery management as the absence or lack of intergovernmental collaboration related to the more general questions of roles and duties. Owing to the provincial department of roads' slowness in creating connected provincial highways, certain municipalities are now in charge of developing these roads and transferring ownership to them once they are finished. Road construction occurs in stages, often at a glacial rate of one kilometre per year, leading to expensive bidding procedures and unorganised wear and tear. Municipalities are occasionally required to construct income-generating reticulation networks for electricity via the Integrated National Electrification Grant (INEP), after which the networks are turned over to ESKOM for operation. A reticulation network for power and water can occasionally be constructed without enough bulk supply capacity, just as bridges can occasionally be constructed without accompanying roadways. As a result, there was severe conflict in the neighbourhood, and protesters destroyed the infrastructure.

Similar difficulties with intergovernmental coordination have arisen when building sports facilities and landfill sites. In these cases, national departments directly control project implementation, ignoring social risks that could arise from project failure and the municipalities' role in managing the infrastructure lifecycle. The consequences of inadequate intergovernmental cooperation between districts and local municipalities are equally clear and severe. Local municipalities mostly complain about the lack of communication during the district IDP-approved projects' discontinuation and the district's implementation of water projects, which disregards local rules (application for leeway).
Due to the functional structures for water services authority and provision, there are negative effects on the planning and efficient operation of linked sanitary infrastructure.

Budgeting

The sampled municipalities show enough capacity to meet legal requirements regarding budgeting, an essential part of managing the infrastructure supply. Following grant criteria, projects are prioritised, given indicative budgets, registered on the MIG projects list, and Service Delivery and Budget Implementation Plans (SDBIPs) are created. However, all municipalities face a similar costing issue when projects are under-budgeted or under-cost, which causes project cancellation or completion delays. A community hall that was granted R100 million over three years but could only afford R5 million in the first year was the example provided by one municipality. Municipalities attribute the anomaly to using outdated costing rules, insufficient costing expertise, and the persistent decrease of MIG forward allocations.

Capabilities for project management

Even though every municipality in the sample has a Project Management Unit (PMU), the most difficult part of managing infrastructure delivery appears to be project execution. The PMUs are most notable for being either understaffed or staffed by individuals lacking the necessary technological expertise. Particularly, rural communities draw attention to the widespread problem of having trouble finding qualified engineers. Fixed-term human resource contractual agreements protecting engineers can lead to cyclical staff turnover patterns as workers look for employment security, compromising project continuity. Municipalities entrust their project design, execution, and quality control to outside service providers. There is a chance of fraud (over-design, over-scoping) and project completion failures because of possible collusive agreements between contractors and consulting engineers if there is no internal capability to evaluate the adequacy of designs and the quality assurance reports. Litigation disputes between consulting engineers and contractors led to the abandonment of a reservoir project in one of the tested communities.

In particular, the PMUs and other municipalities are overrun by dishonest contractors who cannot complete some projects. When the PMU is effective, projects may be halted, and contracts may be terminated for many reasons, most commonly related to contractors' incapacity to finish work on schedule rather than their ability to provide high-quality work. Penalties for poor craftsmanship and late completion are infrequent, partly due to PMUs' subpar performance. Municipalities seem to think cancelling the contracts of failing contractors is a sufficient penalty because the project may still be completed with the remaining funds. Through the National Treasury database, contractors are only placed on a blacklist under specific circumstances.

The protracted process of considering numerous tender applications within the allotted 90-day tender validity period and the increasing reluctance of local officials to serve on bid evaluation committees are among the issues impeding efficient infrastructure delivery management. Weather and terrain have also come to light as significant factors influencing project completion delays and cost overruns. Municipal roads being built, for instance, are primarily made of gravel and are consequently vulnerable to wet weather. Similarly, to combat tight budgets and rising infrastructure needs, municipalities are experimenting increasingly with less expensive alternative

building materials that degrade quickly. Social factors typically precede technical judgments made by PMUs, even if these decisions are free from political influence. In one case, the engineers recommended against the town moving the community hall building from one location to another after financing had been committed. A common trend throughout the towns in the sample is underfunding, which has been identified as a significant barrier to timely and high-quality project completion and appropriate asset lifecycle management.

Inactive infrastructure

Although there is much anecdotal evidence on the common occurrence of abandoned municipal buildings, or so-called “white elephants," in the public debate and media (see Matlala, 2018; Nketo, 2017), very few examples were found during the case studies. Municipalities stated that, to the best of their knowledge, every finished infrastructure project is included in the asset registry and is being used to its maximum potential. Nevertheless, more conversations with local experts indicated that underutilised infrastructure exists. Figure 4 shows an abandoned taxi rank and a municipal office building that has been under construction for numerous years because of subpar contractor performance.

Unused taxi rank

Delayed completion of municipal offices

Figure 4: Examples that demonstrate ineffective management of infrastructure delivery Source: Author (2023)

Support and Monitoring

An essential part of municipal infrastructure delivery management is external assistance monitoring and evaluation for the built infrastructure programme. Municipalities cannot plan, carry out, and supervise infrastructure projects; if they do, the consequences will be detrimental to society and the economy. The national and local governments have implemented various interventions and programmes in addition to being tasked with monitoring and support duties. These strategies' effects on municipalities show a range of outcomes. While some towns claim to have

received nothing from the MISA after making many requests, others have received and are still receiving short-term technical help from the organisation. The Department of CoGTA primarily oversees expenditures and appears strict about meeting spending goals while disregarding the fundamental difficulties in delivering infrastructure. Municipalities generally think that the interventions in infrastructure delivery that are made public are invisible.

CONCLUSIONS

This study focuses on the expenditure efficiency and infrastructure delivery management systems used by local governments to find bottlenecks that prevent the creation of sustainable, effective, and efficient infrastructure life-cycle management. The study found that the municipal infrastructure delivery programme is characterised by poor management and expenditure, including underutilisation, budget overruns, fast asset deterioration, and project completion delays. Scholarly works attribute these difficulties to a lack of foundational knowledge in infrastructure delivery management; that is, inadequate project management skills, stricter laws, and less effective intergovernmental collaboration. In other words, lapses in planning and prioritisation procedures. Despite the comprehensive delivery management system, municipalities still exhibit grave deficiencies in infrastructure development upkeep and cost-effectiveness. Specifically, several issues include late completion of projects, subpar workmanship, inadequate contractor oversight, excessively escalating budgets, noncompliance with supply chain procedures, and improper project management techniques. The study recommends that beyond only implementing new infrastructure, there is a need for increased focus on peer learning across municipalities and the whole life-cycle management of municipal infrastructure. The secret to managing the delivery of sustainable infrastructure is to plan for suitable infrastructure that adapts to local conditions, maintains existing infrastructure, and renovates infrastructure that has outlived its original design. Without addressing the underlying structural intergovernmental delivery arrangements, tinkering with the grant structures and stepping up technical assistance interventions alone are unlikely to have a significant impact.

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