

Sustainable Municipal Service Delivery Through a Real-Time Integrated Collaborative Model: A Case Study

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Abstract

The provision of basic municipal services, such as water, sanitation, housing, and electricity is mandated upon all municipalities by the constitution of the Republic of South Africa, with the aim of ensuring that all citizens are afforded a dignified quality of life. However, an increase in population growth and unemployment rate has spiked dependency and demand of these services to an extent that most communities have been protesting over the lack of service delivery. As a result, most municipalities are currently battling to provide sustainable services in terms of quantity and quality to their communities because of the following challenges: non-compliance with procurement processes and municipal finance legislation, complexity of projects, inability to generate sustainable revenue and lack of consequence management. As a strategy to enable municipalities to provide sustainable services and improve on their annual organizational performance, this study analysed qualitative data obtained from government documents, websites, legislative frameworks, and research papers to compare key critical success factors for sustainable service delivery namely: Institutional structures, Service delivery needs, financial viability, and technology models between a category A (City of Ekurhuleni) and category B (Emfuleni Local Municipality). The gaps identified were then tailored using The Open Group Architecture Framework (TOGAF) and Zachman Framework to recommend a system of systems (SoS) called the Real-Time Integrated Collaborative Model (RTICM). This RTICM is expected to enable municipalities to achieve a level of sustainability and enhance real-time intergovernmental relations between all spheres of government and external stakeholders.

Keywords

Sustainable Service Delivery, Real-Time Intergovernmental Relations, TOGAF and Zachman.

1. Introduction

According to chapter 7 of the constitution of the Republic of South Africa (1996) one of the objectives of all municipalities is to provide sustainable services to their communities to protect human dignity, these include water, sanitation, housing, and electricity. This constitutional mandate is achieved through various municipal processes such as the Integrated Development Plan (IDP), Service Delivery Budget Implementation Plan (SDBIP) and in compliance with legislative mandates such as, but not limited to, the Municipal Finance Management Act (MFMA, Act 56 of 2003), Preferential Procurement Policy Framework Act (PPPFA, Act 5 of 2000) and Division of Revenue Act (DoRA 4, 2020). Even though there has been significant progress made over the years in providing these services, increases in population growth and unemployment rate (Stats S.A 2016) have spiked the level of dependency and demand of services on municipalities such that most communities have been protesting over the lack of service delivery.

In addition, research conducted by (Van der Merscht and Van Jaarsveld 2012) indicated that the lack of consultation and cooperation between municipalities results to ineffective delivery of infrastructure services that is poor, costly, and unsustainable. Therefore, to improve the status quo of municipalities this study analysed qualitative data obtained from government documents, websites, legislative frameworks, and relevant research papers to compare key critical success factors of sustainable service delivery (Louis 2003) namely: Institutional structures, Service delivery needs, financial viability, and technology models between a category A (City of Ekurhuleni) and Category B (Emfuleni Local Municipality). The gaps identified were then tailored using The Open Group Architecture Framework (TOGAF) and Zachman Framework to develop and recommend a system of systems (SoS) called the Real-Time Integrated

Collaborative Model (RTICM). This RTICM is anticipated to provide real-time intergovernmental relations between all spheres of government, businesses, and communities.

1.1. Case study overview

The Constitution of the Republic of South Africa (Chapter 7 of 1996) and the municipal structures act, 117 of 1998 classifies municipalities into three categories namely:

- **Category A:** is a municipality that has full executive and legislative authority in its area.
- **Category B:** is a municipality that shares executive and legislative authority with a category C municipality in its area.
- **Category C:** is a municipality that has executive and legislative authority in an area that consists of more than one municipality.

Therefore, in relation to this study the two municipalities that were analysed are: the City of Ekurhuleni, situated in the eastern region of Gauteng. This is a category A municipality with a population of approximately 4 million at a growing rate of 1.9% (Community Survey 2021). The other municipality that was analyzed is Emfuleni Local Municipality, which is situated in the Sedibeng district also in Gauteng province. This is a category B municipality with a population of approximately 730,000 at a growing rate of 0.92% (Community survey 2016). These two study areas are approximately 50km apart with an estimated travel time of 1 hour via R59 freeway. In terms of economic activity, City of Ekurhuleni is an urban area that consists of multiple business activities such as manufacturing, hotels, and transport hubs like the O R Tambo International Airport. On the contrary, Emfuleni Local Municipality is a peri-urban area that is dominated by steel manufacturing companies, agriculture, and academic institutions. The difference in the classification of these two municipalities does not affect the proposed RTICM, however it needs to be noted that the decision to adopt this framework is mostly dependent on the national sphere of government, where they can introduce it as a pilot system to all categories of municipalities.

1.2 Objective

The main objective of this study was to identify the specific financial and non-financial constraints that contribute to lack of collaboration, poor performance, and instability within municipalities with the aim of developing a smart integrated system (RTICM), using enterprise architecture framework, that can be adopted as a standard operating system or tool that will enable municipalities to shift to technology advanced systems.

2. Literature review

2.1 Definition

Literature review is defined as a task of reading and writing with the aim of locating gaps in existing research and using these gaps to generate a new topic (Hart 2001). According to (Snyder 2019), literature review, if used as research methodology, can enable the integration of research findings to address research questions and highlight future research areas.

2.2 Approach for conducting literature review

The quality of a literature review depends on the type of literature that is included in the study and how it was selected (Tranfield et al. 2003). The most used approaches for conducting a literature review are qualitative, quantitative, and mixed design. Therefore, for this research a qualitative systematic literature review (QSLR) approach was deemed to be the most suitable method to address the research questions because it can compare findings from qualitative studies (Grant and Booth 2009).

2.3 Conducting the literature review

The articles that were used for reviewing literature during this research were screened and selected based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines in **Figure 1**, since it is developed for systematic literature reviews and meta-analyses (Liberati et al. 2009). This model allowed for inclusion or exclusion of articles that were screened in a form of reading full-text articles, research methods or findings and reading abstracts. The articles were categorized based on the following factors: similar research topic, type of study, effects, and findings. These factors made it feasible to abstract appropriate information that will show the progression of similar research topics, their research methodologies, impact of research findings and the perspective on future research. Therefore, in relation to this study the aim of using the PRISMA guideline was to show the progression of municipal service delivery and the categories of articles considered. These articles addressed the following aspects of

service delivery inception, the relevant applicable legislation, funding models, challenges within municipalities, interventions to challenges and emerging service delivery approaches, with the aim of establishing research conducted to date and gaps for future research.

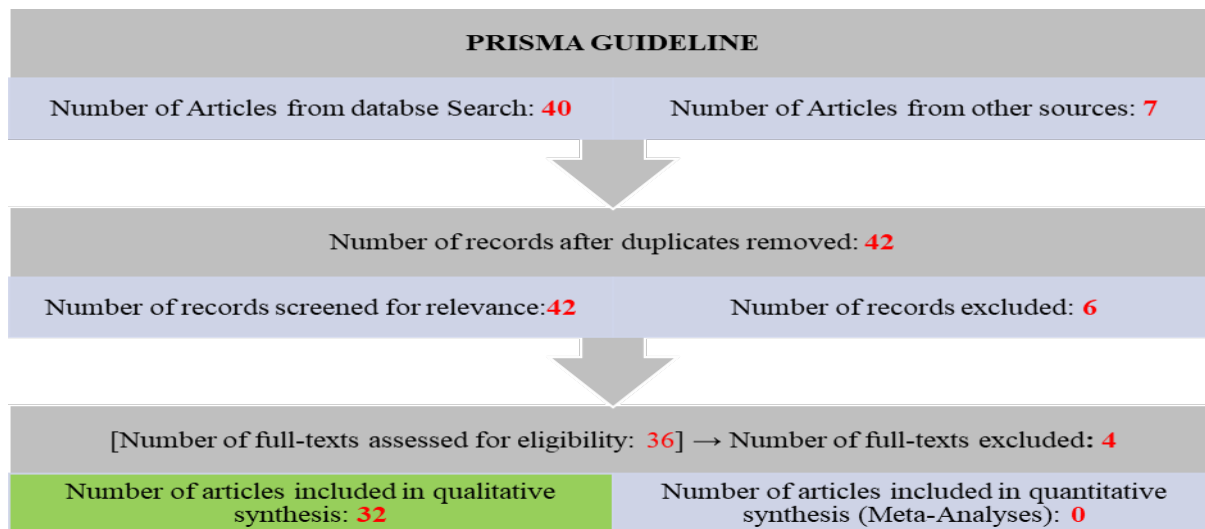


Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Liberati et al. 2019).

2.4 Research articles reviewed

(Leedy and Ormrod, 2016) outlined that extensive literature review can provide a holistic overview of a research topic, thereby creating room for new research ideas, perspectives, and approaches to be further investigated. It was also indicated that research data can be collected from various research tools such as library databases, books, internet, etc., if it is relevant to the topic of interest and is communicated effectively without deviating from the primary objective. Furthermore, it was recommended that the ideas generated or being pursued needs to be categorized in such a way that it will guide the readers throughout the literature. Therefore, in relation to this study, data was collected from the University of Johannesburg library database, government legislation and google scholar. This data was then categorized as per figure 2 and analyzed with the intention of showing the progression of municipal service delivery since inception to the current trends that are being used to keep up with demands of basic services, while promoting collaboration through information and communication technology (ICT).

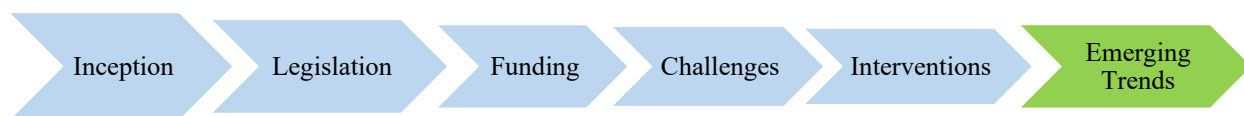


Figure 2. Categories of Research Topics Reviewed.

2.4.1 Inception

The constitution of the Republic of South Africa is the supreme law that was established since the inception of democracy in South Africa. This law mandated government institutions to improve the livelihoods of citizens in the country by providing basic sustainable services to all through the municipalities (Nkuna and Nemutanzhela 2012). Another factor that contributed to the high demand of basic services, was that of population growth and migration to urban areas for the purpose of work, school, health, and opportunities that are rarely available in rural areas of South Africa (Landau 2011) and (Mlambo 2018). Even though progress has been made in delivering these services, there are still challenges in keeping up with their demand. This increasing demand is presented in a form of frequent service delivery protests that vary in nature (Powell et al. 2015), thereby putting more pressure on municipalities to review their service delivery implementation plans.

2.4.2 Legislation

The composition, functioning and development of local government in South Africa is dependent on the constitution and governing legislation to provide essential services to underdeveloped and disadvantaged communities (Roux et al. 2005). The Municipal Structures Act 117 of 1998 provides for the establishment of municipalities according to their respective categories and the division of functions and powers between them. On the contrary, the Municipal Systems Act 32 of 2000, provides processes and techniques that municipalities must follow in uplifting communities socially and economically. Furthermore, this act provides a guideline on how to manage partnerships with political and administrative structures. In addition to these two legislative requirements, municipalities are expected to manage their finances in a manner that is sound and sustainable as per the Municipal Finance Management Act 56 of 2003, irrespective of the sources of funding as per the Division of Revenue Act 4 of 2020. This implies that both the careful planning and proper management of project costs are critical in alleviating wasteful expenditure. However, since the provision of services is implemented through professional service providers (PSPs) such as consultants and contractors, it is also a legislative requirement that these service providers are acquired by a transparent and fair process as stipulated on the Procurement Preferential Procurement Policy Framework Act 5 of 2000. In conclusion, municipal departments are required to adhere to these and other legislative frameworks that might be applicable in their daily operations and provision of services. However, there seems to be challenges for some municipalities to comply with these requirements and this non-compliance is evident through irregular procurement processes and mismanagement of municipal resources as outlined in audit reports of the Auditor General.

2.4.3 Funding models

After concluding the IDP process, municipalities are mandated to submit their five-year business plans to National Treasury and other funding departments. This enables the treasury to allocate funds for each municipality based on the Division of Revenue Act 4,2020: Frameworks for Conditional Grants to Municipalities, so that they can provide services to their communities. This framework clearly outlines the allocation criteria to be met, for a municipality to be allocated funds under each grant. Furthermore, the type of existing grants is as per Table 1 and the equitable share of each grant to municipalities is calculated according to the grant formula below (Balie & Horn 2021):

$$\text{Grant} = \text{BS} + \text{D} + \text{I} - \text{R} \pm \text{C} \text{ where,}$$

BS: basic service component, **D:** Development component, **I:** institutional support component, **R:** revenue-raising capacity correction and **C:** correction and stabilization factor.

Table 1. Frameworks for Conditional Grants to Municipalities (Government Gazette, 3 July 2020).

Grant Funding Department	Type of Grant	Strategic Purpose of Grants
1. Cooperative Governance Grants (COGTA)	- IUDG: Integrated Urban Development Grant. - MDRG: Municipal Disaster Relief Grant. - MIG: Municipal Infrastructure Grant. - MSIG: Municipal Systems Improvement Grant.	-To provide funding for public infrastructure investment, immediate relief after a disaster, eradicating basic municipal infrastructure backlogs and improving municipal operating systems.
2. Human Settlements	- MEHG: Municipal Emergency Housing Grant. - USDG: Urban Settlements Development Grant.	-To provide funding for emergency shelter after a disaster and for implementing infrastructure projects.
3. National Treasury	- LGFMG: Local Government Financial Management Grant - ICDG: Integrated City Development Grant. - ISDG: Infrastructure Skills Development Grant.	-To invest in strategic spatial locations and infrastructure programmes that will enhance the economy and to capacitate municipalities by recruiting unemployed graduates.

	-NDPG: Neighbourhood Development Partnership Grant.	
4. Mineral Resources & Energy	-EEDGMG: Energy Efficiency and Demand Side Management Grant. -INEPEG: Integrated National Electrification Programme (ESKOM) Grant. -INEPMG: Integrated National Electrification (Municipal) Grant.	-To provide subsidies to municipalities to implement energy efficient practices, demand side management initiatives and reducing the electrification backlogs.
5. Transport	-PTNG: Public Transport Network Grant. -RRAMSG: Rural Roads Asset Management Systems Grant.	-To provide funding for construction and improvement of public transport and assisting district municipalities to setup road asset management systems.
6. Water and Sanitation	-RBIG: Regional Bulk Infrastructure Grant. -WSIG: Water Services Infrastructure Grant.	-To construct new and repair ageing bulk water and sanitation infrastructure including eradicating backlogs.
7. Public Works & Infrastructure	-EPWPIG: Extended Public Works Programme Integrated Grant for Municipalities.	-To expand job creation opportunities through labour intensive methods.

2.4.4 Challenges

(Van der Merscht and Van Jaarsveld, 2012) conducted a study to find a short- and long-term sustainable solution in the Eastern Cape municipalities, that will ensure that best practices are applied in the operation and maintenance of municipal service infrastructure. The deficiencies that were identified within technical departments, were as follows:

- Non-compliance with Occupational Health and Safety (OHS) regulations
- Lack of routine and preventative maintenance
- Long turnaround time to respond to service emergencies (burst pipes, blocked sewer, etc.)
- Lack of capacity within Supply Chain Management (SCM) departments
- Outdated Asset Registers

The solutions that were recommended in this study are:

- Collaboration between private and public sectors.
- Development of asset capitalization models.
- Introducing Repair and Maintenance Programs (RAMP).

Another perspective regarding challenges within municipalities, was outlined during research conducted by (Van der Waldt, 2011), where the aim of the study was to explore the impact of Adaptive Project Management (APM) when integrated with the municipal project planning process called the IDP. This iterative approach of project management was influenced by the fact that municipal projects have a high level of uncertainty, as well as too many unpredictable components and diverse stakeholders. The following types of municipal planning levels were highlighted:

- **Strategic planning:** conducted by political heads of departments (such as Mayoral committees) to align the objectives of the organization with those of national sphere of government
- **Tactical planning:** conducted by middle management (HoDs and Divisional heads) to prepare SDBIP targets
- **Operational Planning:** conducted by lower-level management (project managers) to implement the SDBIP

To counteract these challenges the author emphasized that APM requires the investment of money, resources, time, and political support. This paper agrees with the main objective of this research since there is no existing standard mechanism to provide such an investment to low performing municipalities and on the contrary, the high performing municipalities are struggling to spend these investments every financial year. Therefore, it can be concluded that there

is a need for an integrated adaptive project management method that will enable both municipalities to assist each other in real time during the financial year period.

2.4.5 Interventions

Various spheres of government are delegated to address challenges that are being experienced by communities. However, local municipalities are at the forefront of providing basic services to their residents and resolving challenges associated with this obligation. Therefore, from a strategic point of view, provincial and national departments are mandated to support and strengthen the capacity of local municipalities in delivering services (Section 154 constitution of RSA 1996). The type of help offered by these higher spheres of government includes technical, financial, and social support and aims to improve project planning, implementation, infrastructure maintenance and refurbishments within municipalities. This intervention was achieved through the District Development Model (DDM) from the Municipal Infrastructure Support Agent (MISA), where 44 districts and 8 metropolitan municipalities were deemed to be needing assistance based on their annual performance reports. This model allows for joint planning, budgeting, implementation, monitoring, and evaluation of projects. Another form of intervention is that of the funding that is provided by Infrastructure South Africa (ISA) where they assist municipalities with financial and non-financial programme management services that is aimed at expediting the implementation of strategic projects, such as bulk water supply, that have a potential to increase the revenue of municipalities through payment of rates and taxes.

2.4.6 Emerging trends

(Larsson and Larsson 2020) conducted a study that aimed to expand the knowledge of how to integrate and apply collaboration to promote sustainable management in infrastructure maintenance projects. This was because the complexity of implementing construction and infrastructure projects has drastically increased over the years, therefore warranting a need for the adoption of new management practices. A case study of a contract between the Swedish Municipality and a major supplier was analyzed and the finding of this was that extensive collaboration can be encouraged between organizations to enhance sustainable project management practices.

The authors further highlighted that the five important dimensions of sustainable project management are the following:

- **Corporate policies and practices:** rules, processes and decisions that convert a strategy into a project
- **Resources Management:** responsible use of resources
- **Life-cycle orientation:** introducing sustainability in project requirements and the assessment of project success factors
- **Stakeholder engagement:** a need for a joint, open, flexible, and detailed negotiation to shape organizational processes
- **Organizational learning:** the extent to which organizations involved in a project learn from it

Therefore, it can be concluded that there is a need for municipalities to review their current project management approaches and establish a workable methodology that will broaden the scope and promote collaboration and sustainable development. Another emerging trend on the daily operations of municipalities and delivery of basic services to communities, is that of e-government systems. This trend is due to the rapid advancement in technology throughout the world, where many people are now more reliant on accessing and sharing information regarding transport, municipal services, shopping, etc., using their mobile phones and computers.

3. Research methods

3.1 Research methodology approach

Research is defined as the process of establishing innovative ways to understand the depth of an unknown and to reach a solution for a real-world problem (Soni et al. 2018). In relation to this study, the main common problem that municipalities are facing is the provision of sustainable services to their communities and the use of cyclic disintegrated project management methodologies, that result in low service delivery performance and low revenue generation (Lewis et al. 2010). According to (Thakur et al. 2012), efficient and accessible service delivery requires all spheres of government and end users to learn and adapt to e-government services. This implies that an integrated adaptive project management approach can be highly effective if municipalities start collaborating through the optimum use of shared Information and Communication Technology (ICT), hence this study is intending to develop a hybrid model that will allow for real-time integration and collaboration. The approach that was used to establish the gaps that will be tailored through systems engineering and adaptive project management, was based on the following

capacity factors for sustainable service delivery (Louis 2003): **Institutional Structures, Service delivery needs, Financial Viability and Technology.**

3.2 Methods

3.2.1 Method 1: Institutional and departmental structures

Approach: the executive senior management (mayoral committee) structure and the Roads and Stormwater departmental structure of both municipalities was analysed and compared to identify the type and extent of existing portfolios with the aim of establishing the level of capacity required.

3.2.2 Method 2: Service delivery needs

Approach: the integrated development plans of both municipalities were analysed to establish the type of community needs that each municipality has, determine the nature and complexity of projects and to determine the resources required to implement the prioritized projects.

3.2.3 Method 3: Financial viability

Approach: a budget analysis for the period of 2020-2024 was conducted to establish the sources of funding for each municipality and compare it against the available national grants using the Division of Revenue Bill: framework for conditional grants to municipalities, with the aim of identifying opportunities to expand the funding models.

3.2.4 Method 4: Technology

Approach: the approach taken in this section was to analyze and evaluate the status of e-government ecosystem (ICT hardware, warmware and software) in both municipalities, because the proposed real-time integration model depends on this ecosystem. An analysis was done on the websites of both municipalities including the documents that govern ICT within these institutions and the findings were as follows:

According to a study conducted by (Kedmenec et al. 2019) the role of ICT is divided into the following aspects, namely:

- **Administrative:** project stakeholders collaborate through different ICT tools.
- **Disseminative & Educational:** spreading of information regarding social innovation through ICT tools and social media.
- **Topical:** Information sharing regarding ICT innovate projects.
- **Community Interaction:** citizens can communicate with their government institution through websites and apps.

Using these three aspects as a guide, the Emfuleni Local Municipality website was analysed, with the aim of establishing the existing sections that contribute towards achieving the role of ICT and how this platform can be upgraded to a socially innovative website that will promote collaboration with other government departments or institutions. The four parts of ICT that were found to be more related to the objective of this study were the following: **Part 1:** e-Governance Structure, **Part 2:** e-Supply Chain Management, **Part 3:** Documents Center and **Part 4:** e-Community Interaction Platform.

4. Data Collection and findings

4.1.1 Method 1: Institutional and departmental structures

Data analysis Method: Comparative Observation

Findings: the institutional (mayoral committee) structures of both municipalities have the same portfolios, however there is a significant difference between departmental (Roads and Stormwater) structures in terms of the type, functions, and extent of each portfolio from both municipalities, thereby creating a room for uncertainty in terms of decision-making responsibilities and reducing the possibility for collaboration between the two institutions.

Gaps: there is a need for the Emfuleni Local Municipality (Category B) to consider expanding the number of divisions within their roads and stormwater department, as a strategy to capacitate this department in terms of the relevant expertise that will improve the quantity and quality of infrastructure projects implemented. The City of Ekurhuleni (Category A) needs to introduce a research and innovation division within the same department to ensure continuous improvement and compliance with updated construction methods.

Impact: according to (Alsene, 1998) the choice of management structure that is used by an organization that deals with cross-functional and complex projects has a serious impact on project success. (Zhuang, 2011) highlighted that the factors that need to be considered during the establishment of organizational structures are: specialized activities, department responsible for specialized activities, hierarchy of authorities, span of management and centralized separation of powers.

4.1.2 Method 2: Service delivery needs

Data analysis method: Comparative Observation

Findings: both municipalities have similar community needs that differ in terms of quantity. In addition, there was no record of strategic requests such as integrating the public transport services between the two municipalities, received from the received, which implies that there is a need for community education and piloting of such projects.

Gaps: the IDP processes of both municipalities is conducted in a physical manner where ward committees submit manual forms for the new project priorities and thereby eliminating previously prioritized projects that were not implemented. This implies that there is a need for municipalities to adopt a smart online system (RTICM) that will record all service delivery needs for ease of planning and monitoring the turnaround time for responding to these requests.

Impact: according to (Faeh, 2004) sustainable service delivery is dependent on the five dimensions of community development, namely: social, cultural, institutional, environmental, and economic. Therefore, the IDP process is a key factor in understanding the community needs and their extent. All spheres of government are affected by the challenges experienced by various communities in local municipalities, thereby emphasizing a need for a real-time collaboration model that will be used to address these common challenges.

4.1.3 Method 3: Financial viability

Data analysis method: Comparative Observation

Findings: Emfuleni local municipality (Category B) depends on only two sources of funding, namely: revenue generated from rates and taxes and the municipal infrastructure grant (MIG) from the national department of cooperative governance and traditional affairs (COGTA), whereas the City of Ekurhuleni is dependent on six government grants (Integrated City Development Grant, Neighbourhood Development Partnership Grant, Sports Recreation Arts and Culture Grant, Public Transport Network Grant, Urban Settlement Development Grant and Informal Settlements Upgrading Partnership Grant) and revenue generated from rates and taxes.

Gaps:

Category A: based on the magnitude of the organization and the complexity of service delivery needs, the city might need to consider establishing a Research and Development (R&D) department as way of strengthening and expediting their strategic objectives. In addition, The Integrated City Development Grant (ICDG) funding seemed to be less prioritized by the municipality hence there is no budget allocated in all financial years. This might be due to a lack of integrated plans that can support the municipality's need for funding or the requirements for the conditional grant frameworks were not fully complied with.

Category B: There is a need for this municipality to upgrade their accreditation status by improving their annual performance and financial management, so that they can access more government grants as a strategy to expanding their funding models based on the Division of Revenue Bill (2020): Frameworks for Conditional Grants to Municipalities. In addition, this municipality must consider reprioritizing its revenue funds in such a way that it is fairly distributed across all key basic services or infrastructure departments.

Impact:

Category A:

The extensiveness of the budget allocated and the availability of various government grants, might mean that there is very minimal room for delays in project planning and execution and that the municipality can address most of its service delivery needs, even though the community needs are continuously changing due to the population growth rate and high youth unemployment rate. Furthermore, the high budget allocation for ICT infrastructure implies that the organization is moving towards a full dependency of the e-government system.

Category B:

The lack of availability of other sources of funding creates a strain on the revenue of the municipality and thus making it difficult to sustain itself.

4.1.4 Method 4: Technology

Data analysis method: Comparative Visual Analysis

Findings: both municipalities are using a website that consists of similar categories of information, even though they have been labeled differently. These technology platforms seem to be acting as an information service rather than an interactive tool that will promote sustainable innovation and collaboration. In addition, the City of Ekurhuleni has three technology services that are currently operating, namely:

- **e-Siyakhokha:** for viewing municipal rates statements and processing payments online.
- **Wi-Fi:** there is a pilot project that is being undertaken of upgrading ICT infrastructure in all municipal building and community facilities such as libraries and clinics.
- **My Ekurhuleni App:** uses a digital road information system that allows citizens to report service delivery challenges like potholes and the exact geographic location of the reported problem.

Gaps: The websites are only serving the institutional objective and there is no link or tab for collaborating with other municipalities or spheres of government, instead there is legislative information that is available for reading under the document center.

Impact: (Westley et al., 2014) defined the aspect of social innovation as the process of developing and implanting new ideas in a form of products, services, and models with the aim of meeting social needs of communities. (Kedmenec et al., 2019) further conducted a study that explored the impact of ICT on the development and implementation of social innovation. With reference to this type of research, it is evident that ICT has become the key factor in achieving sustainability and as a result government departments need to start planning and testing the viability of introducing such systems.

5. Results and Discussion

5.1 Proposed graphical results

To simplify the process of achieving optimum municipal performance and collaboration, research conducted by (Al-Turkistani et al., 2021) indicated that enterprises such as government departments share a common goal (service delivery) and to enable them to sustain the provision of such services requires an Enterprise Architecture Framework (EAF), hence a real-time collaborative model (RTICM) framework was developed based on the gaps identified, the Open Group Architecture Framework (TOGAF) and the Zachman Framework for decision making functions within the RTICM. The process of developing the proposed model is as per **figure 3** and is envisaged to benefit the following stakeholders:

- **Municipal Departments:** for real-time collaboration and standardizing of internal operating procedures.
- **Business Forums:** online tendering for promoting transparent competition and submitting online applications for health and safety documents (work permits)
- **Citizens:** to provide online municipal services and online courses for qualifying citizens to capacitate those departments that have skills shortages, over and above the current e-payments for rates and taxes and online job applications.

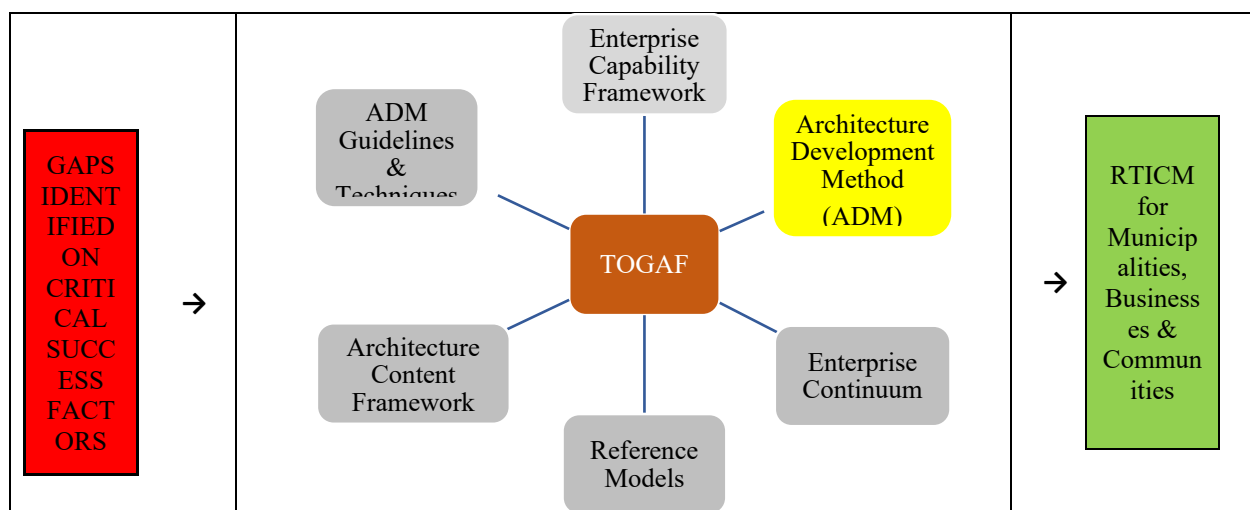


Figure 3. Proposed Real-Time Integrated Collaborative Model.

5.2 Proposed improvements

5.2.1 RTICM for municipalities

Figure 4 shows the improved model for municipalities, where they can enhance their performance by shifting from manual traditional processes to real-time online planning, budgeting, decision making, project implementation, performance monitoring and collaboration with other spheres.

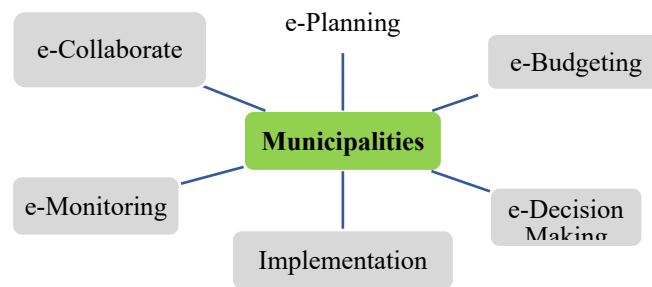


Figure 4. RTICM for Municipalities.

5.2.2 RTICM for municipal SCM and businesses

Figure 5 shows the improved RTICM that will enable the municipal supply chain departments to shift from a manual tender process to an online tender system, that will promote transparency, accountability, and a fair and competitive procurement process amongst businesses.

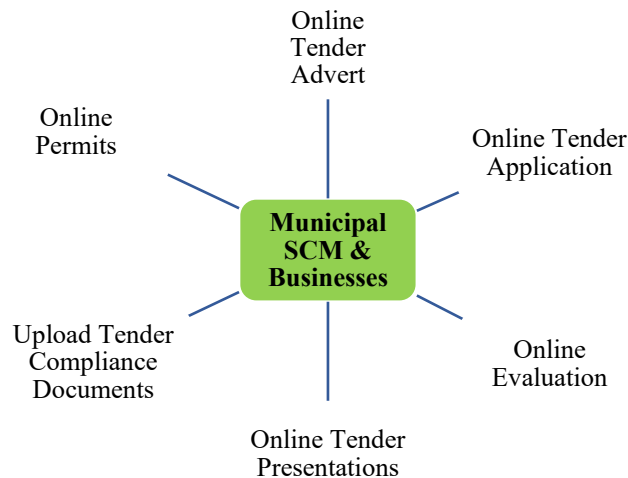


Figure 5. RTICM for Municipal SCM & Businesses.

5.2.3 RTICM for communities

Figure 6 shows the improved RTICM for communities where they can interact online with their respective municipalities in terms of vacancies, electronic payments for rates, taxes and fines and mobile service interruption complaints. In addition, the addition of online courses to the system can assist to expand skills and job creation opportunities.

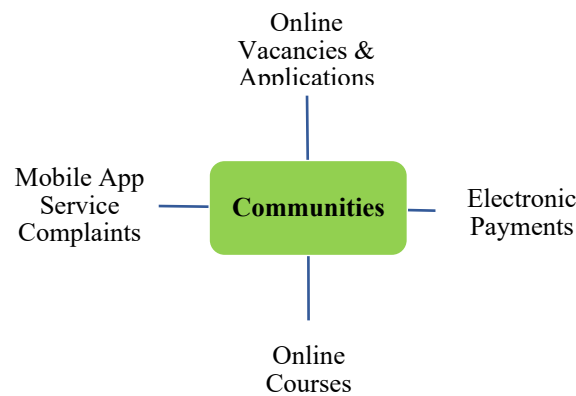


Figure 6. RTICM for Communities.

6. Conclusions

The main objective of conducting this research using such a methodology, was to outline how government institutions have progressed over the years in providing services and how they can improve their current project management approaches with the aim of providing sustainable services to their communities. In addition, the problem statement of this research was to establish the reasons why the operating procedures of various departments in most municipalities are still disintegrated and to understand the factors that contribute towards continuous non-compliance with the constitutional and government legislation, as both these guidelines are necessary for spheres of government to achieve optimum performance and clean audits while providing sustainable basic services to their respective communities without compromising job opportunities. As an emphasis, the data that was analyzed from both municipalities indicated that there is still a high dependance on manual processing of project documentation between various stakeholders, thereby indicating the lack of technology based standardized operating procedures (SOPs) and limiting the capabilities that are associated with the use of e-government systems. Furthermore, the latest municipal audit reports supported the need for a real-time collaboration model such as the proposed RTICM, to enable intergovernmental interaction that will speed up obtaining or sharing resources amongst municipalities and removing the stigma of spheres of government “competing” against each other.

6.1 Future Research

The proposed RTICM framework is a standard operating tool that is recommended for adoption by government institutions to enable them to shift from traditional manual operating procedures to real-time online systems that can assist municipalities to deliver sustainable services while improving their performance and collaboration. Therefore, there are still opportunities for future research on developing, testing, and operating the actual system.

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