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EXPLORING THE EFFECTIVENESS OF THE JOHANNESBURG ROADS AGENCY'S RESULTS-BASED M&E SYSTEM

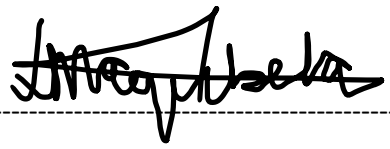
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A research report submitted to the Faculty of Management, University of the Witwatersrand, constituting 50% of the requirement for the degree of Master of Management (in the field of Governance, Development, and Public Sector Monitoring and Evaluation)

January 2024

Declaration

I declare that this research report titled 'Exploring the effectiveness of the Johannesburg Roads Agency results-based M&E system' is my own, original work. It is submitted for the degree of Master of Management (Governance, Development, and Public Sector Monitoring and Evaluation), at the University of the Witwatersrand (School of Governance) Johannesburg. It has not been submitted for any other degree at another university.



Lindiwe Amelia Maqubela (940640)

28 January 2024

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I thank God for providing me with this opportunity to expand my knowledge and understanding of M&E within the public sector. I am thankful and blessed to be on this journey of impacting and changing the way the public sector operates, and in expanding the body of knowledge that currently exits. I have only come this far by the grace, love, and faithfulness of God.

I would also like to thank both my parents who have inculcated in me the value of hard work and education. To my late father, who will not be able to share this with me, thank you for being a great example of integrity and selflessness; your example will always be what I strive towards. I am grateful for all your guidance and many sacrifices.

To Dr Angelita Kithathu-Kiwekete, thank you for your much-needed guidance and support during this process. Finally, I thank the Johannesburg Roads Agency (JRA) for granting me the opportunity to conduct the research into aspects of your organisation. I hope that this research provides insight and opportunity for improvement of your current M&E systems and processes.

ABSTRACT

Monitoring and Evaluation is a multidisciplinary practice that seeks to ensure that predetermined objectives are achieved. For the purpose of this study, it is important to note that these predetermined objectives are set forth in government sector policy plans. These policy imperatives filter down and find expression in the various government institutions. All government agencies have five-year strategic plans that are an expression of government policy.

The Department of Planning M&E (DPME) is the custodian of Planning, Monitoring, and Evaluation in government, it collaborates with the various departments and entities at the different spheres (national, provincial, and local) of government to drive government performance through M&E. The National Evaluation Policy framework 2019 has explicitly mandated that local government has a responsibility of conducting evaluations. Results-based M&E was adopted by the South African government in 2007, its adoption compels all state institutions to implement it in the management of programmes.

The JRA has the responsibility of achieving its strategic objectives as set out in its Integrated Development Plan (IDP). M&E plays an oversight function that determines progress in the achievement of these objectives. The deterioration of the road condition index, according to the engineering standards of the City of Johannesburg, has led to the formulation of this study. Results-based M&E was identified as an important management measure that government adopted to improve service delivery. As a result, the research conducted explores the effectiveness of the JRA results-based M&E system. The study also identifies the strengths and the weaknesses of the results-based M&E system of the JRA.

The study determined that more work needs to be done to improve the results-based M&E system of the JRA. The Evaluation function of the agency needs to be expanded upon and strengthened, and the scope of performance indicators needs to be expanded. In conclusion, proper planning processes and effective use of the existing M&E tools, favourably place organisations in a position to achieve its goals.

List of Abbreviations

Abbreviation	Full terminology
COJ	City of Johannesburg
CSIR	Council for Scientific and Industrial Research
DPME	Department of Planning Monitoring and Evaluation
EAT	Efficiency Assessment Tools
EBP	Evidence-Based Policy
EFA	Education for All
GDP	Gross Domestic Product
GDS	Gauteng Development Strategy
HRS	High Risk Sites
IDP	Integrated Development Plan
JRA	Johannesburg Roads Agency
KPA	Key Performance Area
KPI	Key Performance Indicator
M&E	Monitoring and Evaluation
MTSF	Medium-Term Strategic Framework
NEPF	National Evaluation Policy Framework
NES	National Evaluation System
NO	Network Operation
NSR	Network Safety Ranking
RAP	Road Assessment Programmes
RIA	Road Safety Impact Assessment
RISFSA	Road Infrastructure Strategic Framework for South Africa
RSA	Road Safety Audit
RSDF	Regional Spatial Development Framework
RSI	Road Safety Inspection

SDA	Service Delivery Agreement
SDBIP	Service Delivery Budget and Implementation Plan
SP	Strategic Plan
SPI	Safety Performance Indicators
SPTN	Strategic Public Transport Network
TOC	Theory of Change

Contents

ABSTRACT 4
CHAPTER 1 10
1.1 Introduction 10
1.2 Problem statement 12
1.3 Research purpose 13
1.4 Structure of report 14
CHAPTER 2 15
2.1 Literature review 15
2.1.1 Monitoring and Evaluation practice 15
2.1.2 Monitoring systems 17
2.1.3 Evaluations 17
2.1.4 Road Infrastructure Management 22
2.1.5 Management key performance indicators for roads 24
2.2 Theoretical framework 26
2.2.1 Introduction 26
2.2.2 Theoretical and historical perspective of Results-based M&E 27
2.2.3 The use of evidence in policy making/decision making 31
2.2.4 Learning in M&E 34
2.2.5 Performance Indicators 40
2.3 Conceptual Framework 46
CHAPTER 3 49
3.1 Methodology 49
3.1.1 Research approach and design 49
3.1.2 Research Tools and their Application 50
3.1.3 Sampling 51
3.1.4 Data collection 52
3.1.5 Data analysis 53
3.1.6 Limitations, feasibility and positionality 57
3.1.7 Ethics 58
3.1.8 Validity reliability and dependability 58
CHAPTER 4 60
4.1 Discussion of findings 60
4.1.1 The strategic planning process 63
4.1.2 The evaluation system 66

4.1.3 Evaluation recommendations and decision making 67
4.1.4 The adequacy of KPI's in monitoring achievement of organisational objectives 68
4.1.5 The usage of M&E tools in road infrastructure management 70
4.1.6 The internal and external threats facing the organisation. 72
CHAPTER 5 74
5.1 Analysis of findings 74
5.1.1 Results-based M&E 74
5.1.2 The use of evidence in policy and decision making. 75
5.1.3 Learning in M&E 76
5.1.4 Performance Indicators 77
5.1.5 Internal and external threats facing the organisation. 78
5.2 Summary of findings 80
CHAPTER 6 82
6.1 Recommendations and conclusion 82
REFERENCES 84
Appendix A 92
Appendix C 93
Ethics Clearance, University Clearance certificate and Turnitin report 93

List of figures

Figure 1: Map of the roads in the City of Johannesburg……..14

Figure 2: Diagram depicting the structure of results-based M&E……32

Figure 3: Results-based M&E system incorporating learning……40

Figure 4: Conceptual framework illustrating results-based M&E in road infrastructure management……..48

Figure 5: Thematic analysis process……54

List of tables

Table 1: research participants and their positions**……**51

CHAPTER 1

1.1 Introduction

Local government is the sphere of government that is closest to the people because it is constitutionally mandated to provide basic services to citizens. Ward councillors under the employ of municipalities are elected by communities to ensure that their needs are fulfilled (Constitution, 1996). In the case of metropolitan municipalities, road Infrastructure management, which includes road construction, maintenance, and repair is the responsibility of local government. The South African Constitution of 1996 confers the provision of the basic service of road infrastructure management to local government. The study investigates the effectiveness of the JRA results-based M&E system.

The JRA is a municipal entity tasked with the responsibility to construct, maintain, and manage infrastructure networks in relation to roads, road reserves, storm water, footways, railway sidings, and traffic mobility management on behalf of the City of Johannesburg (JRA, 2015). The JRA is a municipal entity that operates in accordance with the service delivery agreement (SDA) drafted between itself and the City of Johannesburg. The JRA was established through the Municipal Structures Act in terms of Section 12(1) through notice no. 6766 of 2000, published in the provincial Gauteng government gazette.

The JRA has an M&E system in place with a logical framework that is depicted in its annual business plans and reporting documents (City of Johannesburg, 2016). Mid-term and end of term reviews are prescribed activities for all public institutions. These reviews are evaluations aimed at assessing the performance of an entity's programmes in relation to the Medium-Term Strategic Framework (MTSF) (DPME, 2007). The MTSF is the government-wide strategic plan that gives expression to government priorities within a specific period. The study further seeks to determine the comprehensiveness and effectiveness of these prescribed M&E systems in managing road infrastructure within the City of Johannesburg.

The study examines the JRA M&E system in order to highlight the extent to which M&E plays a role in the implementation of all organisational programmes linked to road infrastructure management. Results-based M&E tools are best applied at all stages; from programme planning, implementation, to producing outputs, outcomes and, ultimately, to having

impacts. Every employee has a role to play at the different levels and stages of programme implementation, which goes hand-in-hand with the application of M&E processes.

Road infrastructure is an important asset of any country; its benefits include ease of access to markets and interconnectedness because of ease of mobility (Mwareya, 2022). The effective management of this infrastructure also ensures road safety. The challenges identified, which include the deterioration of road infrastructure, have necessitated the importance of identifying management measures that can assist the processes of constructing, maintaining, and repairing road infrastructure.

Electoral losses by ANC in local government elections in 2016, and further losses in 2021 within Metros, has signalled growing dissatisfaction among urban citizens. Historically, the ANC has won majority votes in most municipalities by a big margin, with the exception of municipalities in the Western Cape. Delivery and the quality of basic services is almost always cited as being an issue (Justesen, Schulz-Herzenberg, 2018). In the service delivery outcry, road infrastructure within the City of Johannesburg has been deteriorating. With the aim of arresting this decline, the new administration for the City has embarked on a public-private partnership with two big insurance companies, being Dial Direct and Discovery Insure. Both companies have so far fixed over 100 potholes in the city (Mwareya, 2022).

M&E is an important tool in managing road infrastructure, many African countries face various challenges utilising it effectively (Munyai and Vermeulen, 2018). M&E is a management tool that is used mainly to track the progress of an intervention and to assess its effectiveness, appropriateness, efficiency, and impact. In road infrastructure its use can range from monitoring construction projects, ensuring that they are aligned to existing quality standards, to monitoring traffic loads and making assessments to determine whether the road structure adheres to safety standards—considering changing traffic patterns (Lalendle, Goedhals-Gerber and Van Eeden, 2021).

M&E aids decision making by providing evidence-based information on the status of an intervention (Kusek, and Rist, 2015). The South African government developed the government-wide results-based M&E system with the aim of improving service delivery, providing an evidence base for public resource allocation decisions and to identify how challenges should be addressed and successes replicated (DPME, 2007)

M&E proposes a management system that has the ability to facilitate quick identification of challenges (warning system mechanism) and it utilises experience so that inefficiencies and ineffective measures are discarded. The literature gap that was identified for the study is that there is no research that links results-based M&E to road infrastructure management in government agencies in South Africa.

1.2 Problem statement

This study explores the effectiveness of the JRA M&E system, it identifies the deficiencies that exist in the current M&E system and identifies areas of improvement that can benefit the road network of the City of Johannesburg. The South African government adopted results-based M&E as a management tool that the state should use to improve service delivery. The study will explore the results-based M&E tools in use at the JRA. The JRA manages roads that span approximately 14 000 km, this includes gravel and pavement roads. The City of Johannesburg is the economic hub of South Africa and the mismanagement of its road infrastructure—a high value asset—is likely to negatively impact important investments that have been made by other sectors within the city. The City's success is hinged upon proper management of all its resources.

Service delivery and the quality thereof has been identified as a big challenge facing South Africa today (Gumede, 2018). With respect to the focus of this study, the issue of crumbling public road infrastructure in the City of Johannesburg presents the impetus for the implementation of M&E for the JRA as the responsible government agency. Municipal roads have a lot of potholes, and the condition of the roads continues to deteriorate with very little intervention (Killian, 2017). According to the JRA (2017), in terms of engineering standards, the roads condition index throughout the City has decreased from 89% in 2013 to 64% by 2017, this indicates a 25% increase in the deterioration of the road network condition. Maintenance backlogs are currently huge and lack of maintenance leads to increased expenditure down the line. The more deterioration is allowed to occur, the more work needs to be done to extend the lifespan of the road (Munyai et al, 2018). Road safety is compromised when the road condition is poor. Poor road conditions are a result of shoddy

workmanship during construction, and lack of maintenance and repair over its lifecycle—to name a few (Neumann and Krieger, 2019).

Results-based M&E is a management tool that sets programme objectives which are reflected in the Goal/impact statement, Outcome statement and in the Outputs statement of a programme. It ensures that these are achieved by identifying key performance areas (KPA) and key performance indicators (KPI) linked to them. The indicators are critical in tracking achievement of these predetermined objectives (DPME, 2007). Results-based M&E is a relatively new management tool adopted by the South African government with the aim of improving service delivery. Its application in most institutions is not comprehensive enough and more work needs to be done to ensure that it is fully entrenched in all government operations (Eresia-Eke and Boadu, 2019)

The management systems and processes in place to manage these road networks is an area of interest for this study. The research focuses on exploring the effectiveness of the results-based M&E system of the JRA, and the way in which M&E systems can assist in getting this infrastructure better managed. M&E is an organisation-wide multidisciplinary mechanism, and it is important that it is entrenched in all areas of an organisation. This, therefore, requires that it is understood by all members of the organisation.

1.3 Research purpose

The purpose of this research is to explore the effectiveness of the JRA results-based M&E system, it investigates the strengths and weaknesses of the JRA M&E systems and how the JRA can strengthen this system. M&E is a multidisciplinary field that is utilised to enhance the effectiveness, efficiency, appropriateness, and sustainability of development interventions.

The study, therefore, seeks to determine the effectiveness of the JRA M&E system and to determine the ways in which M&E can improve road infrastructure in the City of Johannesburg. The study further seeks to identify deficiencies and strengths in the current JRA M&E system.

Main research question

The effectiveness of the results-based M&E system of the JRA.

Sub-questions

1. What are the results-based M&E management tools being implemented at the JRA?
2. What are the current strengths and weaknesses of the JRA results-based M&E system?
3. How can the JRA strengthen its results-based M&E system?

1.4 Structure of report

Chapter 1 provides an overview and purpose of the study. It outlines the background, the problem statement, the significance of the study, and the research questions. Chapter 2 explores the theoretical framework which covers the theories and concepts forming results-based M&E, with attention placed on the concepts and theories the study focuses on. There is also the literature review that covers the way that road infrastructure management and results-based M&E coincide.

Chapter 3 outlines the methods of data collection and the analysis techniques that were used in the study. The discussion of results from the key informant interviews is presented in Chapter 4. Chapter 5 conducts an analysis of findings based on the results, literature review, and the themes that emerged from the study. The last chapter presents recommendations on how the JRA can strengthen its results-based M&E system and commends the organisation in areas of good performance.

CHAPTER 2

2.1 Literature review

The literature review for this research provides a foundation of knowledge on results-based M&E in road infrastructure management, it also identifies some areas of prior research within this field to ensure that the current study is not a duplication of work already done. The gaps that have been identified, which lead to the conceptualisation of this study and provides the reasons why it is important that this study was initiated.

The gap that was identified, which led to the formulation of the study, is that there is no research or studies that connect M&E tools to road infrastructure management in the City of Johannesburg. The process of formulating this study included reading literature that focuses on the role of M&E in road construction and road infrastructure management. M&E as a management tool literature was also assessed. Literature from various independent parties who have made assessments on the road conditions of the City of Johannesburg was also investigated. The use of information from different independent sources is aimed at confirming and getting accurate data on the current road conditions.

2.1.1 Monitoring and Evaluation practice

Monitoring and Evaluation is identified as two separate, but interlinked, management tools. Monitoring is a continuous exercise that is utilised to track the progress of an intervention, while the tracking of progress is achieved through performance measures called indicators. These provide feedback on whether pre-determined objectives are being met (Boadu and Eresia-Eke, 2019). The tracking of progress allows for management and stakeholders to take decisions that ensure that the intervention is kept on track. Evaluations are periodic and are used to assess the effectiveness, efficiency, appropriateness, impact, and sustainability of an intervention. Evaluations can be formative or summative. Formative evaluations are concerned with programme design, whilst summative evaluations focus on implementation and the achievement of objectives encompassed in the results chain (Kusek and Rist, 2015).

M&E improves governance as it ensures accountability, transparency, and ensures inclusion of the marginalised (South African Presidency, 2018; Shivambu, 2020; Otundo, 2016; Kariyanga, 2015; Kusek and Rist, 2015). The oversight function of M&E ensures that an intervention is scrutinised from planning through completion and beyond. These processes involve clear documentation of all aspects of the intervention to ensure that successes are replicated, and lessons are learnt from the process. Aigbavboa and Tengan (2018), point out how M&E ensures that interventions are economically implemented by ensuring that resources are utilised in an efficient manner. This approach is in line with the issue of limited resources many governments manage, these resources need to be used to impact the lives of all citizens in a meaningful way. M&E is viewed as a useful management tool because its process of collecting and assessing intervention information provides programme managers with the opportunity to redirect the intervention towards the fulfilment of pre-determined objectives when offtrack (Neumann and Krieger, 2019; Canan, 2017)

M&E is useful in ensuring an intervention is completed on time and within the allocated budget (Kariyanga, 2015). Public entities provide services with limited resources and it is, therefore, important that these limited resources are used efficiently. A government is successful when it can provide quality services efficiently to all citizens in a timeous manner. It is desirable that all citizens have access to roads that are in a good condition and are regularly maintained. During the February 2023 budget speech, followed by the medium-term budget policy statement, the Minister of finance highlighted that South Africa's economy is growing at a very slow rate and that the country's Gross Domestic Product (GDP) was not optimal (Treasury, 2023). This situation means that tax collection is limited and, therefore, there will be limited resources that are allocated for public services. This will impact the quality and the access to these services, including road infrastructure (Treasury, 2023).

Monitoring systems are important for the timeous achievement of objectives. The breakdown of expected achievements usually expressed as targets over a specified period allowing for an early warning to be provided. This means that when an intervention falls short in achievement of a specific period, decisions can be taken to ensure that the intervention is returned to schedule and, as such, delivering the intervention timeously.

2.1.2 Monitoring systems

A monitoring system structure is often provided in the form of a logical framework. It represents a plan as to how an intervention will progress from identified inputs, activities, outputs, outcomes, to impact. It illustrates programme/project progression from input to impact stages. Performance measures (indicators) are usually part of this structure and measure the level of change to identify whether predetermined objectives are being achieved (Kusek and Rist, 2015). Theories of change are sometimes depicted as a logical framework. The logical framework also includes intervention activities, outputs, and output performance measures (indicators), outcomes and outcome-performance measures, and the impact and impact indicators (Kusek and Rist, 2015).

(Otundo, (2016); Kariyanga, (2015); Lalendle et al, (2021) highlight the importance of M&E systems and processes being built throughout the life cycle of an infrastructure project—from construction to the end of life of that infrastructure. They acknowledge that sub-Saharan Africa has capacity (financial and technical) constraints that hamper the quality of its road networks. Frameworks are regarded as important elements of an M&E system in a project as they clearly detail the important phases and sequence of a project or programme to ensure fulfilment of targeted outcomes (Canan, 2017).

Management or decision makers should be responsive to feedback information generated by the M&E processes beginning with the tracking of performance measures to making use of evaluation recommendations, as a lack of responsiveness will render the system useless. M&E processes and systems can ensure quality roads are built by monitoring the implementation of contract specifications, which should be in line with set quality standards to ensure that road maintenance and repair systems are in place and that they are sustained. This approach will lead to road infrastructure being of good quality and having a longer lifespan.

2.1.3 Evaluations

According to Better Evaluation (2023), evaluations are seen as the process of examining the performance of an organisation, programme, project, policy, or any other intervention to

determine its relevance, adequacy, effectiveness, efficiency, and progress for the purpose of identifying areas for improvement.

Evaluations are periodic interventions that are used to establish the quality of an intervention based on several dimensions. In the South African context, the evaluation of government programmes is new, with the National Evaluation System (NES) having been established in 2011. Due to the late establishment of the NES, the requisite skills base in the country is limited, but is improving with time (Goldman et al, 2018).

According to the DPME (2019) little effort has have been made to establish a systematic evaluation culture in the local government sphere. Currently, there has been little consideration of monitoring as a means of collecting data to inform policy and programme evaluation. The DPME's focus has been in the two spheres of government, being national and provincial government. DPME does acknowledge that all existing policies linked to M&E apply to all spheres of government.

Evaluations are categorised according to their purpose. This is an important criterion in which the purpose of an evaluation often dictates who carries out the evaluation, how it is carried out, and when it is carried out. In the context of the JRA these different types of evaluations should be conducted as a means of driving improvement in the interventions that the organisation implements. The improvement can range from improved use of financial and human resources, improved turnaround times in the repair of potholes, and improved quality standards for newly-constructed roads—this list is not exhaustive.

Evaluation theory is not concise or axiomatic, and it is not a single theory but rather a collection of diverse theoretical writings held together by the common aim of having evaluation practice as their target; this is according to Shadish (1998). Evaluation theories can be informative for initial needs assessment and programme design. Evaluation theory gives effective strategies for dealing with the challenges regarding the evaluation process (Shadish, 1998).

Evaluations have been seen as a means of strengthening effectiveness, efficiency, and impact, as well as accountability of government policies and programmes (Department of Planning Monitoring and Evaluation, 2011).

Effectiveness and efficiency evaluations

Effectiveness and efficiency assessments or evaluations are periodic and make use of intervention data to determine the quality of the intervention. Efficiency assessments examine issues of cost; they use of human resources and adhere to the programme plan. Effectiveness assessments examine the adequacy or suitability of the theory of change in achieving predetermined objectives (Kusek and Rist, 2015). The efficiency in the utilisation of resources is very important in any intervention, as wasted resources lead to limitations in scaling up an intervention.

The theory of change of an intervention seeks to achieve the predetermined objectives of an intervention, an ill-conceived theory of change will fail to meet programme objectives (Kusek and Rist, 2015). It is important that an intervention is tested for appropriateness before implementation. Appropriateness evaluations are formative evaluations that examine the theory of change and its likelihood of achieving set objectives. According to Kariyanga (2015), M&E is crucial in managing a project as it ensures that due process is followed, and that adherence to project specifications and standardisation are upheld.

Impact Evaluations

Impact evaluations determine both the intended and unintended consequences of an intervention. It is an evaluation approach that supports evidence-based policy making and determines cause and effect relationships of an intervention (Gertler et al, 2016). Impact evaluations build knowledge about the effectiveness of development programmes by providing information about interventions that work and those that do not work. Impact evaluations usually estimate the average impact of an intervention.

An example of a road construction impact evaluation is one that was conducted by the Council for Scientific and Industrial Research (CSIR) in 2005, on the road construction of the Amadiba road in the Mbizana local municipality. The Mbizana area is one of the poorest areas in the country, with unemployment rates recorded at approximately 75% at the time of the impact evaluation study. The study makes findings on the impact that the construction of the road has had on the Amadiba community. The study concludes that the balance of

evidence points to the fact that the road has made a positive impact to the livelihoods of the Amadiba community. It also pointed out that other sectoral interventions were required to completely set the community on a positive socio-economic trajectory.

Impact evaluations provide cost benefit information, they help identify how the benefits of a project are distributed across various project beneficiaries, and they also help assess the effectiveness of alternate implementation possibilities that can be selected by policymakers in the future (Andre's, Limi, Orfei, 2013).

Impact Evaluations can be divided into two categories, prospective and retrospective evaluations (Gertler et al, 2016). Retrospective evaluations assess the programme impact after implementation, and prospective evaluations are built into the programme, and are developed as the intervention is being designed (Gertler et al, 2016). In prospective evaluations baseline data is collected before the intervention is implemented; this data is then utilised as part of the process of determining cause and effect relationships after programme implementation.

Intervention modalities or a design innovation, for example, can include elements that are created to improve road safety or to have the lives of communities in a certain area be improved by the construction of a road or bridge to enable better access to markets. In the road safety example, it would be important to have baseline data on the accident statistics of the road before the implementation of the new innovations that improve road safety. After safety innovations have been completed, new accident statistics would have to be measured and comparisons made; taking into consideration any other factors that can be attributed to a reduction in accident data if this is what is recorded.

Retrospective evaluations assess the programme impact after the intervention has been implemented. The challenge with this approach is that baseline data is not collected before the intervention is implemented, therefore, it becomes challenging to determine attribution (Gertler et al, 2016). Prospective impact evaluations provide strong and credible evaluation results because baseline data is collected to establish measures of outcomes of interest before the intervention begins. The measurement of baseline data pre-intervention implementation also provides the opportunity to develop exact and clear outcomes that an intervention seeks to achieve and measuring this post-intervention implementation.

Baselines also assist in determining the effectiveness of an intervention allowing for the intervention to be scaled up where necessary (Gertler,2016). The choice of an impact evaluation method depends on the operational characteristics of an intervention. These include available resources, eligibility criteria for selecting specific roads/routes (in the case of this study), and timing for programme implementation.

Sustainability evaluations

Sustainability evaluations examine the financial, economic, social, environmental, and institutional capacities of systems required to sustain the benefits of interventions over time (Arshad et al, 2021). Sustainability evaluations are aimed at ensuring the implementation of solutions that can be sustained over extended periods. Sustainability assessments explore these elements throughout the lifecycle of an infrastructure. The environmental aspects of road infrastructure are a critical consideration throughout the lifecycle of the infrastructure—this process should not stop before or during construction.

Financial sustainability determines the economic viability of an intervention, this takes into consideration maintenance costs throughout the lifecycle of an infrastructure. The benefits of an intervention should not come at great cost or even destruction of all sustainability dimensions, for example the financial cost of an intervention should not lead to the financial ruin of the implementing organisation.

The social elements of sustainability evaluations assess the social impact of these infrastructure projects. The categories that can be assessed include health and safety, socio-economic repercussions, cultural heritage, and governance (Arshad et al,2021). The sustainability of road infrastructure solutions is a vision put forward by the Road Infrastructure Strategic Framework (RISF), this framework advances the strategic focus for South Africa's road management agencies.

Conducting sustainability evaluations would assist the organisation in better managing its resources in relation to maintaining its road infrastructure, especially in an environment of limited financial resources. Resources will also be utilised in viable and beneficial interventions that do not drain the coffers of the organisation. Assessment of societal benefit of interventions can be identified, with projects which have the most benefit being implemented.

2.1.4 Road Infrastructure Management

Road infrastructure management includes the construction, maintenance, and repair (when damaged) of road infrastructure. Road infrastructure is built with the aim of making parts of a country accessible, it enables the movement of goods and people (Kariyanga, 2015). According to Wall (2009), road infrastructure supports quality of life and is the foundation of a thriving economy. Road infrastructure ensures that there is ease of movement for citizens and road freight transport, leading to inter-connectivity and ease of conducting business. These benefits are critical in a developing country like South Africa, which has very limited rail infrastructure.

The elements that accelerate the deterioration of road infrastructure include poor workmanship during construction, increases in traffic volumes/loads, adverse weather conditions, and pollution. The construction of any road network needs to consider load models and design rules, which have (and continue to) change overtime, based on changing traffic patterns and advancement in construction knowledge (Lalendle et al, 2021; Neumann and Krieger, 2019). The City of Johannesburg has road maintenance backlogs which have led to the increased deterioration of its road network. Poor workmanship or construction and an inability to maintain/service road infrastructure leads to decreased lifespan of the road network (Killian, 2017).

A recent assessment of Johannesburg's surfaced roads by the JRA indicates that high quality-rated roads have decreased from 52% to 45% (Killian, 2017). The population of the City is increasing rapidly whilst the City's economic growth has been declining, this means that the City has less revenue and more pressure to deliver services, i.e., road infrastructure (IDP 2016-2021, 2016). The combination of inadequate state capacity, reduced budget allocations, and the added issues of increased traffic volumes, road freight transport, and harsh weather conditions have led to the rapid deterioration of the road network with each situation having varying impact. State capacity and budget allocations stimulated by a growing economy are interlinked. The state will struggle to train or employ a sufficient number of highly-qualified individuals if its coffers are constrained.

Quality control in road infrastructure management

South Africa has a well-developed set of regulations that are used to define the standards of workmanship and materials for construction works (CIDB, 2011). The most common are International Organisation for Standardisation (ISO) and South African National Standards (SANS) (ibid). The SANS and ISO standards representatives ensure that construction projects are of quality by reviewing quality management plan and inspecting the actual work whether it conforms with the quality standards (CIDB, 2011). According to Kenny (2007), quality can be hard to assess in many construction projects as projects usually have a multitude of players these include, the client, engineers, architects, and subcontractors, he adds that in many instances it is easy to circumvent regulations—especially in the developing world where corruption is rampant.

In the procuring and selection of a service provider to construct road infrastructure, it is important that they are selected based on best-value contracting method. This involves awarding contracts based on demonstrated past performance, technical and managerial merit, technical innovation, and financial health of service provider over the price they charge (Byaruhanga and Basheka, 2017). The view adopted in conducting this research, is that Broad-Based Black Economic Empowerment policy (B-BBEE) would be challenged if this approach was to be on boarded. The B-BBEE policy would be challenged on the basis that it aims to transform the economy by introducing new players to the construction sector. Most new players lack experience and financial reserves, and their selection to be a service provider to drive such projects would be limited.

Engineering standards of road condition indexes across the City indicate a deterioration from 89% in 2013 to 64% in 2017, and the budget to arrest this decline is very small and cannot keep up with the rate of deterioration (Killian, 2017). The last assessment was conducted in 2017 according to the JRA. It is important that quality standards and control be managed stringently in the development and construction of road infrastructure, and contractors who fail this test need to be sanctioned.

Physical components of road infrastructure

Road infrastructure consists of physical elements, and the condition of these physical elements (Bennett at al, 2006). It is important to establish a sustainable and appropriate

data collection and management programme by having an inventory list of the physical elements and the condition of such physical elements (Bennett et al, 2006). The inventory of the physical elements hardly changes overtime. The condition, however, changes. In the assessment of the road condition, issues of texture, roughness, skid resistance, mechanical and structural properties, surface distress, and geometry are assessed (Bennett at al, 2006). The structure is another element of road infrastructure that requires constant monitoring and assessment to determine satisfactory performance in relation to effects of traffic loads and environmental conditions (Bennett at al, 2006; Andrei et al, 2010). Road surveys can either be functional or structural. A functional survey assesses the surface condition of the road while a structural survey determines the stability of the road structure. Many data collection or road assessment survey equipment that are available is quite expensive, and any innovative measures considered for managing municipal road infrastructure needs to look at issues of cost and capacity to ensure viability. Manual measures are time consuming, require a lot of capacity and are vulnerable to errors and subjectivity. In the long term the use of advanced technology works out cheaper, even though the initial costs are quite high (Currie, 2022).

2.1.5 Management key performance indicators for roads

According to Agaienz et al (2001), there are three aspects that need to be addressed in the management of KPIs for roads; these include performance (functional elements i.e., skid resistance and roughness of road), visual appearance (extent of defects), and structural condition (calculation of life). Non-technical measures of performance extending beyond asset condition should also be put in place by a managing authority. These non-technical KPIs should include the speed of repair response to road defects, compliance to inspection plans, road safety, smoothness of ride, environmental impact, traffic management and disruption, user satisfaction, corridor vegetation control, and timelines of response to complaints, etcetera (Agaienz et al, 2001). Performance measures break down the functions of an organisation into manageable streams. They also allow for the tracking of performance to determine that set objectives are being met timeously.

Road infrastructure has three important dimensions that are used to determine the road condition, these include functional elements, visual appearance, and the structural

condition. It is, therefore, important that the sampling of the road infrastructure performance measures cover all three dimensions, as road infrastructure performance is determined by these three dimensions.

The use of sampling is because it is not realistic for indicators to measure absolute performance. The measurement of road infrastructure performance or changes can occur on a road that is in use to determine maintenance needs, as well as on a road that is under construction.

The indicators or performance measures used in this process should meet the characteristics of a good indicator which includes that these must be relevant, precise, measurable, time-bound, realistic, and useful. Poorly-crafted indicators can hamper the process of measuring the change occurring in the road infrastructure. This change can be because of maintenance works, change because of the road being used by motorists, and change as a result of a new road being constructed. This can then make it difficult to determine if critical objectives are being fulfilled. An example of a critical objective on a road infrastructure is being able to determine the roughness of the road and its structural condition.

Indicators should be developed at all levels of the road construction and maintenance exercise. All South African government entities are mandated to implement results-based M&E; because of this, indicators should be developed at all three result levels (output, outcome, and impact levels). An example of this is that, at the output level, the output indicators of a newly-constructed road will measure and report that the road is delivered according to the technical specifications that ensure that the road is fit for use by the public. At an outcome level, the indicators are likely to measure the utilisation of the road of by the community and reveal how it has as improved ease of movement. At an impact level, indicators will measure the socio-economic impact of a road—such as improved livelihoods.

Indicators should also be developed at input and activity levels, as these become important in the assessment of the efficiency of implementation and use of resources. What is measured at input level is the financial and human resources committed to a project. Activity-level indicators measure the various implementation activities required to produce outputs.

Innovative infrastructure management systems, such as the Markov statistical deterioration forecasting, is at times used to assess the condition of an infrastructure. This is done through the measurement of a continuous indicator within the framework of Kalman filter algorithm to predict deterioration within a dynamic infrastructure management system. This framework accounts for heterogeneity factors and employs both time-series and panel data to analyse the effects of interventions over the life cycle of infrastructure systems, and it includes measurement errors (Kobayashia et al, 2012). It is important that when road/pavement condition surveys are conducted that these are done accurately in order that any interventions are implemented effectively and resolve the challenge.

2.2 Theoretical framework

2.2.1 Introduction

This research seeks to place results-based M&E into context in relation to works conducted earlier within the field. The research considers the history and evolution of results-based M&E and explores the theories and concepts that form results-based M&E.

The theories and concepts that have been considered, include evidence-based policymaking (EBP) which determines that policy decisions should be informed by available evidence and must include rational analysis. Another concept that has been focused on is the learning aspect of results-based M&E. Making use of lessons learnt is a crucial element of results-based M&E, the replication and scaling of what works and discarding of what does not work is deemed to be what ensures the achievement of desired results/objectives. Learning is closely linked to the use of evidence in policymaking. Any learning that happens is because credible evidence exists and informs what works and what needs to be discarded.

The above are theories and concepts that are key components forming part of results-based M&E. They provide an understanding of why results-based M&E has become a popular management tool for governments and institutions operating in the development space.

Another M&E concept that is investigated is the KPI or performance measures. Performance measures are critical in any M&E system because they determine success or failure by determining if progress is being made in a specific intervention.

2.2.2 Theoretical and historical perspective of Results-based M&E

The origin of M&E is rooted in the perception of public sector failures that can be traced back as early as the 1950s. The concept of evaluation occurred in the USA in the 1960s and 1970s with support from the US government under the strategies of "war on poverty" and "the Great Society" (Waithera & Wanyoike, 2015). Many state funded programmes underperformed or completely failed, leading to the creation of independent M&E units with responsibilities ranging from data collection, processing, and analysing the same (Cameron, 1993). The M&E department's functions also included reporting on programme performance against predetermined targets to ministries and international agencies. This involved the tracking of performance against planned targets to determine whether what has been planned is being achieved. The measurement of results identifies success from failure. The ability to identify failure gives an opportunity to correct inefficient actions taken, and being able to identify success provides an organisation with the opportunity to learn from and replicate such successes. The ability to demonstrate results in M&E has been around for a while and has featured in many disciplines of study and practice (Cameron, 1993).

Traditional M&E focused on intervention inputs, activities, and outputs. Inputs with regards to a programme or project include, for example, the financial and human resource and equipment that is set aside for the implementation of a programme. Programme or project activities include all the actions that are taken to produce outputs or results. Outputs include tangible goods and services that are because of a programme. An example of this is a government entity providing bursaries to underprivileged matriculants. The inputs of this programme include financial resources to fund the bursaries and the human resources appointed to coordinate this process.

The activities include the identification of courses and reputable higher education institutions that are able to educate these matriculants. The outputs of this bursary programme are the degrees or qualifications obtained by these students. Traditional M&E

only focuses on these first three components which includes outputs as the first result level. The assessment of inputs, activities, and outputs in the traditional approach was limited in its focus as it did not assess intermediate and the long-term effects of a programme. Intermediate effects include, for example, behavioural changes, changes in attitude, and changes in knowledge and skills of programme beneficiaries. Long-term effects include the sustained effects of a programme (intended and unintended).

An example of knowledge and skills changes is a matriculant selected into a bursary programme to study further, after completing their degree they have increased insight and understanding of their chosen profession. This then leads to changes in their knowledge and skills base because of the training they have undergone. They then become employable in their chosen profession because of the changes in their knowledge and skills.

According to the Spreckley (2009) results-based monitoring is focused on higher-level results—these are outcomes, objectives, and impact, and do not include lower-level activities. Outcomes and impacts are characterised by the fulfilment of the objectives and goals of the programme or project. The generation of outputs through activities should ultimately transform into the achievement of objectives. An example would be conducting education and awareness around the importance of communities not littering and, therefore, taking care of their environment. The output of this campaign would be the information given to communities, the outcome or objective would be witnessing the change in behaviour of the community. The behavioural change is an end to littering and the impact is a clean environment.

Results-based M&E is different from traditional implementation-focused M&E in that it moves beyond an emphasis on inputs and outputs to a greater focus on outcomes and impacts (Kusek and Rist, 2015).

Results-based M&E is structured in manner that ensures an intervention has performance measures that enable the tracking of outputs, outcomes, and impact (Department of Planning, Monitoring and Evaluation, 2007). These performance measures act as an early-warning system that provide evidence on the areas in which an intervention is falling short. Results-based M&E combines traditional M&E with the assessment of outcomes and

impacts. It allows organisations to modify their theory of change and/or implementation processes.

According to Kusek and Rist (2015) there was a change in public sector management which led to the coming together of a variety of forces that pushed for governments and organisations to be more accountable to their stakeholders. The move towards results-based M&E can also be seen in the Millennium Development Goals (MDG) process when developed countries pledged more funding to developing countries in return for governance systems that were more stringent.

Governments were called upon to demonstrate results, the question became have policies, programmes and projects led to the desired results (Kusek and Rist, 2015). An output in the form of for example a service or a product is a good to have but does it lead to meaningful and sustained transformation as initially conceived (Policy Framework for the Government-wide Monitoring and Evaluation System, 2007).

The developed economies were first to adopt M&E in their governments and most of these countries have provided donor funding to the developing countries. Due to this funding, there was therefore increased demand for developing countries to put in place governance measures that would ensure that the funds were used meaningfully, and results were achieved (Kusek and Rist, 2015).

Evaluations are not widespread among African governments; evaluations are prevalent in donor-driven programmes or projects (Goldman et al, 2018). In 2007 an important policy experiment emerged in the governments of South Africa, Benin, and Uganda, all of whom implemented national evaluation systems. These countries, along with the Centre for Learning on Evaluation and Results (CLEAR), Anglophone Africa, and the African Development Bank, partnered in a pioneering African partnership called Twende Mbele. The project was funded by the United Kingdom's Department for International Development (DFID) and the Hewlett Foundation. The aim has been to jointly strengthen M&E systems and to work with other countries to develop M&E capacity and share experiences (Goldman et al, 2018).

In the South African context government adopted results-based M&E as a response to dissatisfaction with the delivery of services to the poor, which led to political tensions

(Goldman et al, 2018). The policy framework for government-wide M&E 2007 was developed as a means of ensuring that all government entities put in place M&E systems. Monitoring systems have been part of government's role for a long time, but establishing capacity for evaluations has been a challenge as this is a new function (Goldman et al, 2018).

An example of an evaluation that was initiated by the Department of Basic Education, assessed progress that the country's education system had made to universalise primary education and reduce illiteracy. This evaluation was conducted because of a commitment South Africa made with 155 countries in 1990 at the Education for All (EFA), a global initiative that was launched at the World Conference on Education for All in Jomtien, Thailand. Six goals were later agreed to at the World Education Forum held in 2000 in Dakar, Senegal. These goals focused on access to early childhood development programmes, access to primary education, gender parity and equality, learning needs of young people and adults, adult literacy, and quality education (Department of Basic Education, 2014).

The evaluation assessed the achievement of EFA goals and the progress the country had made in this regard. Post democracy, the government embarked on putting in place education policies that supported its education agenda which was aligned to the EFA goals.

The conclusion of the report was that South Africa had made great progress towards achieving the EFA goals. This includes promulgating regulations and policies to ensure that children, youth, and adults have access to some form of educational institution and skills development programmes. South Africa achieved universal primary education by 2013, reporting that 99% of primary learners were in school. More girls have also enrolled in primary and secondary schools. The South African Constitution (Act 108 of 1996) makes provisions in respect of equality, as it puts in place a foundation that ensures that the rights of girl learners are realised (Department of Basic Education, 2014).

The number of secondary students has risen substantially, the number of 14- to 18-year-olds attending school reached 90% by 2013. Progress has also been made in increasing access to schools for children with disabilities. More public schools equipped to facilitate children with disabilities are being built. Relating to the quality of education, poor learning outcomes have been identified as a weakness. More needs to be done to raise the quality of education (Department of Basic Education, 2014). This example reflects a growing evaluation culture,

and the conclusions of the study reflect the usefulness of evaluation. Government received feedback in areas in which they were performing well and areas where further attention is required.

Results-based M&E seeks to ensure government is engaged in meaningful programmes that ensure sustainability and the meaningful transformation of the lives of people (Policy framework for government-wide M&E system, 2007). An example of results-based M&E is that in road infrastructure management the construction of a road would be an output, increased access to markets and interconnectivity would be an outcome, and increased GDP per capita in the region of the road network is the desired impact. Figure 1 depicts the structure and processes of results-based M&E.

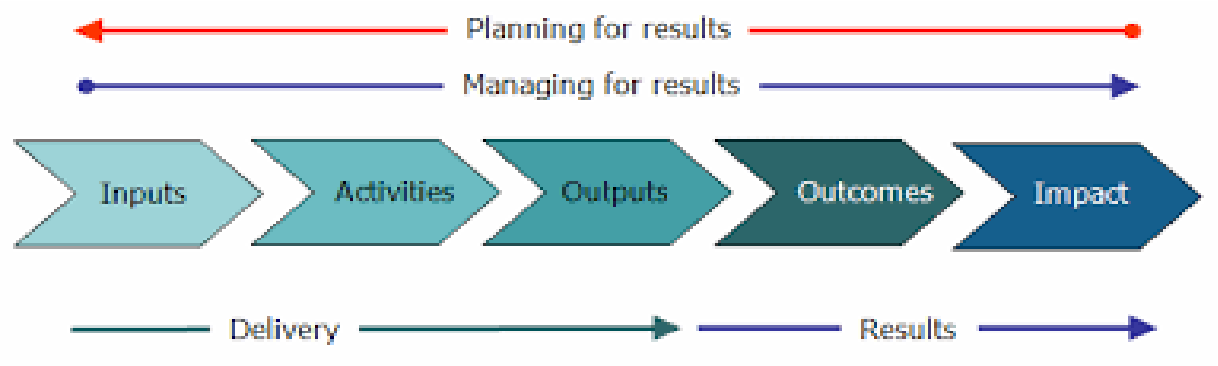


Figure 1. Diagram depicting the structure of results-based M&E (Spreckley 2009)

2.2.3 The use of evidence in policy making/decision making

Evidence-based policy making (EBP) aids decision making because decisions taken are informed, and are driven, by facts and what works. Evidence-based decision making ultimately leads to the achievement of better outcomes (Funke at al, 2010).

According to Sutcliffe and Court (2005), EBP is a set of methods which informs the policy process, rather than aiming to directly affect the goals of the policy. It supports a more rational, rigorous, and systematic approach. The focus of EBP is based on the premise that

policy decisions should be informed by available evidence and should include rational analysis.

M&E involves the systematic tracking and assessment of programme performance this process then provides evidence that is utilised to improve or rethink an intervention or programme and, therefore, feeding back into decision making. This decision-making finds expression in the policy decisions (programme rules), strategic decisions, and implementation procedures that are adopted. In the maintenance of road networks, the tracking of the road network condition and structure involves the collection of data, which is assessed. This assessment provides clarity on what interventions are best taken to improve road condition and fortify the road structure. The collection of data and assessment of this data provides evidence that motivates for the action that needs to be taken to improve road infrastructure.

M&E processes can also detect, for example, the increased frequency of a road infrastructure requiring maintenance. This then can lead to an investigation of why this is the case, which in turn can lead to the identification of increased truck volumes using the roads. This evidence can influence policy that prohibits trucks from using certain roads. This policy will then influence the road infrastructure management strategy (action plan) adopted. Policy influences strategy which is a set of implementation choices that are taken to achieve specific objectives.

EBP should be based on research-based evidence. The widely accepted definition of research is that it is a systematic effort to increase knowledge. Evidence is therefore information that has been collected through a systematic process. This may include a systematic critical investigation process and evaluation, theory building, data collection, analysis, and codification related to development policy and practice (Sutcliffe and Court, 2005).

Departments and units within the government tend to make hierarchical judgements in selecting evidence to use, where to use them, and how. These decisions are often deeply rooted in assumptions over validity and power. Government departments prefer empirical research, viewing it as the most reliable form of evidence (Sutcliffe and Court, 2005).

Key characteristics of evidence that influence whether it is used include evidence quality, accuracy, objectivity, credibility, relevance, and practicalities. The accuracy of the evidence

is based on the evidence correctly describing what it purports to do. There are arithmetical (are the numbers added up correctly), statistical (are the cause-and-effect parameters correctly specified), and representative (do the quotes really represent what the body of people felt) issues that can be considered to address the relevance of evidence. There are also issues of objectivity of the evidence and its sources. Any bias in the evidence base needs to be identified to deepen our understanding of how it influences our interpretation of the evidence for policy (Sutcliffe and Court, 2005).

Credible evidence is based on a strong and clear line of argument analytical rigour throughout the processes of data collection and analysis. This relates to the reliability of the evidence and whether we can depend on it for monitoring, evaluation, or impact assessments and planning for the lessons learnt approach. Policy makers often rely on the reputation of the source in their use of evidence. An example is that research and research findings from academic institutions and reputable thinktanks tend to be viewed as more credible than civil society groups or community leader opinions (Sutcliffe and Court, 2005).

The relevance of evidence is important with the key issue being that evidence is timely, topical, and has policy implications. The type of evidence being referred to, matters together with the audience it is being presented to and the likely impact it can create. An example is that policymakers in the public sector would be more interested in evidence that requires action (what has already happened) rather than opinion. The relevance of evidence also requires that it is generalisable. Referring to whether there is extensive information or just a few case studies and, therefore, how easily applicable the argument is. This also relates to the way in which inferences are made. For some information, generalisability will refer primarily to sampling procedures; for others, it will be more about our understanding of context (Sutcliffe and Court, 2005).

Practicalities relate to the extent to which the evidence is available to policymakers; whether policymakers have access to it in useful form and the ease with which it can be translated into policy. This also refers to the cost of the research and, therefore, whether it is feasible and affordable (Sutcliffe and Court, 2005).

It is important that M&E recommendations and conclusions are reached based on systematic empirical research processes. This will ensure that they meet the important

criteria of accuracy, credibility, quality, and objectivity for use in influencing policy decisions. M&E is the main empirical process in which evidence is collected to influence policy which then intervention implementation. The relevance of evidence is closely linked to timing and the audience to whom the information is delivered. It is critical that any important evidence emanating from an empirical systematic research process is disseminated to the right audience at times during which it can influence crucial policy.

An example of this can be the JRA having a thought leadership framework wherein some important recommendations and conclusions with policy implications emanating from their M&E processes can be escalated to the Department of Roads and Transport—the entity responsible for coordinating policy matters. A typical M&E recommendation can be that the City of Johannesburg needs to limit the number of trucks using its road network as the road conditions and structure are being adversely affected, and the situation has become unsustainable. The city can then disseminate the report to the relevant Department of Roads and Transport structure and possibly motivate for the increased use of goods trains to transport goods into the city.

2.2.4 Learning in M&E

Learning is another important dimension of results-based M&E. According to Simister (2018), there is widespread agreement that M&E should play an important role in learning. '*Learning is the social process by which we develop knowledge, skills, insights, beliefs, values, attitudes, habits, feelings, wisdom, shared understanding and self-awareness.'* (Britton 2005, p55).

According to Patton and Millet (1998), high-quality lessons learnt contain knowledge that can be applied to future action and can be derived from screening according to specific criteria. A lesson can be identified as any useful knowledge distilled from experience establishing principles for guiding action (Simister, 2018).

Learning can be applied at different levels; these levels include learning at individual level; this type of learning involves individuals learning in different ways. These ways include learning by doing, analysing, reflecting, theorising, and learning by experimentation. Individual learning is a critical building block to organisational learning (Simister, 2018).

According to Chipato (2016) M&E allows for learning, and organisations can use experience to contribute to better decisions. These decisions will lead to improved performance and accountability. A performance-based M&E process contributes to the construction of information feedback systems that strengthen learning and build organisations that value critical reflection and learn from success and failure alike (Chipato, 2016).

Collective learning happens within small groups, these groups come together to share, discuss, and analyse information. Groups may be built on the basis of specific projects or programmes. Collective learning can sometimes be applied immediately in these projects or programmes (Simister, 2018).

Organisational learning happens both at an individual level and collectively. Learning in an organisational environment contributes to changes and usually enhances organisational behaviour. Organisational learning extends beyond individual and collective learning, it involves the establishment of systems and procedures which enable an organisation to test its approaches, capture, share, and implement its joint experiences (Simister, 2018).

Wider learning occurs when learning goes beyond individual organisations. The learning may be focused around a specific sector for example, education, a geographic area, a programme of work involving multiple partners and organisations, or any other conceivable situation. This learning happens at times because of informal processes involving different groups of people. Sometimes more formal learning opportunities are developed, for example dedicated conferences or communities of practice (Simister, 2018).

Learning can be intentional or emergent. Intentional learning occurs usually because of an individual, group, or organisation that sets out to identify learning around a certain topic. Emergent learning takes place when staff learn in the natural course of events, without seeking out that learning (Simister, 2018).

There are different loops of learning. Single-loop learning is focused on whether an organisation is doing things well. It is concerned with existing rules and procedures and dealing with immediate problems. If carried out well, single-loop learning results in improved project or programme performance (Britton, 2005).

Double-loop learning is concerned with whether an organisation is doing the right things. It involves questioning existing assumptions and broadening understanding of how and why an organisation is doing what it does. It can lead to new strategies, systems, rules, and procedures (Britton, 2005).

Triple-loop learning involves examining core identities and values, and re-thinking fundamental purposes and principles. It can result in a renewed mission and vision (Britton, 2005).

Learning is usually specific to a particular context, such as a geographic location, a culture, a sector, a working approach, a political environment, a project or programme, or any other kind of context. Learning may also be specific to a combination of different contexts (Britton, 2005).

For learning to be useful in M&E, it needs to feed into improved performance or practice. This can happen in many ways including feeding into decision making within a project or programme, it can assist an organisation to review and redirect where necessary its strategies or assumptions, vision, values, and mission. It can contribute to messaging for advocacy campaigns or policy influencing initiatives (Simister, 2018). It may be disseminated for use by other stakeholders within or outside the organisation generating the learning and within pilot or innovation projects. Learning may be deliberately carried out to decide whether, or how, to replicate or adapt the projects (Simister, 2018).

Organisations that limit change versus being open to meaningful change do not benefit from the learning that is possible when basic assumptions, strategies, goals, and relevance are periodically revisited (Chipato, 2016).

The purpose of M&E is that of a tool for communicating what is happening in the project and, if necessary, deciding how to change it, which can then result in double-loop learning (Chipato, 2016).

M&E systems often include organisational processes and mechanisms designed to communicate and disseminate learning. Learning can be communicated in many ways, including written reports, presentations, photographic displays, videos, websites, intranet sites and blogs (Simister, 2018).

Some M&E systems support processes designed to create mutual learning between a variety of stakeholders. These processes can include stakeholder reviews, workshops, peer reviews, exchange visits, seminars, conferences, and many other mechanisms supported by technology. These processes allow for staff and other stakeholders to assess and analyse information, and openly discuss successes, failures, and lessons learnt in a safe environment (Simister, 2018).

Participatory M&E can support a variety of stakeholders to engage in mutual learning. This helps to instil a sense of ownership in a project or programme as well as generating useful learning. Sometimes this learning can be used immediately to improve a project or programme. M&E systems or evaluations sometimes include decision-making mechanisms which are designed to translate M&E findings, conclusions, and recommendations into actions (Simister, 2018).

The data collection process in M&E allows for the analysis and review of a project or programme. The data that has been collected provides evidence of how the project or programme is performing. Data is usually collected after a specific period of implementation, and this period allows achievements and non-achievements to be identified. Once it is determined in which areas there is underperformance, overperformance, and performance as planned it is, therefore, important to determine what has caused these scenarios.

Emergent and intentional learning should characterise these processes. Emergent learning is when programme and project implementation occurs in which certain information emerges. An example of this is when a theory of change that has worked in many contexts suddenly does not work in another. Intentional learning occurs when active engagement and a system of collecting information on specific issues is put in place. Intentional learning in most cases occurs through evaluations which determine the effectiveness, efficiency, sustainability, appropriateness, and impact of a programme.

Effectiveness evaluations identify the extent to which the intervention achieved, or is expected to achieve, its objectives, and results. Efficiency evaluations determine the extent to which the intervention delivers, or is likely to deliver, results in an economic and timely way. This determines how inputs are converted into outputs, outcomes, and impacts. Sustainability identifies the extent to which the net benefits of the intervention continue or

are likely to continue. This includes an assessment of the financial resources, economic, social, environmental, and institutional capacities of the systems needed to sustain programme benefits over medium to long term.

Appropriateness assessments determine the theory of change of an intervention and whether contextual issues have been considered. An example of this occurred when owls were used as means to kill rats in a South African township, what was not considered were issues of context. In townships some superstitions exist, and people view owls as tools for witchcraft. What ended up happening was that the owls were killed by the people, and the rat infestation issue was not resolved.

Impact assessments identify the extent to which the intervention has generated intended or unintended higher-level effects. Impact identifies the transformative effects of an intervention. It identifies the social, environmental, and economic effects of an intervention that are long term.

Single-loop learning focuses on project or programme implementation. It reviews whether strategies, policies, and procedures are being implemented as envisaged in organisational plans. It ensures that any diversions from existing plans, policies, and procedures are immediately rectified.

Double-loop learning is concerned with whether the organisation has the right strategy, theory of change, policies, and operating procedures that enable the achievement of its objectives. An example of this is a review to determine if current key performance indicators measure achievement of all intended objectives of a programme. If a deficiency is detected in the performance measures which form part of the monitoring tools of a programme, it is important that this is rectified. The ability to measure performance on objectives helps to determine failure or success.

Triple-loop learning involves assessing identities and values, and re-thinking fundamental purposes and principles. This can result in renewed mission and vision. This type of learning is focused on what the organisation is about how it will strive to achieve its objectives. An assessment is made on what the organisation stands for in society and the perceptions people have of it. An example of this is a coal company that commissions a study around the use of fossil fuels and learns the use of fossil fuels is being discouraged and will soon be

extinct. This is because issues of climate change and saving the planet have become prominent. Another lesson is that governments are putting in place tax measures to ensure that companies comply with reducing carbon emissions. Issues of ethics are also coming to the fore with growing perceptions that a company that does not address issues of climate change does not care about the planet and fellow humanity. With these issues to contend with, the coal company is then placed in a position of re-examining its business model. This can lead to a move into the renewable energy sector. New programmes and the use of new technologies will arise from this process. This change will lead to changes of its vision, mission, and principles.

Learning is an important component of M&E. The objective of M&E is to measure performance and to review that implementation is progressing as planned (all operating procedures, policies, and strategies). Review that the design of the programme is sufficient to meet all envisaged objectives and finally review that the external environment is accepting and supportive of the vision, mission and procedures of the programmes and projects of the organisation.

These processes involve the learning of lessons, this learning comes in some instances in the form of M&E findings, recommendations, or conclusion. These M&E findings, recommendations or conclusions are then implemented to transform and ensure that the organisation together with its programmes and projects fulfil its objectives. Figure 2 reflects how learning is engaged in the M&E process.

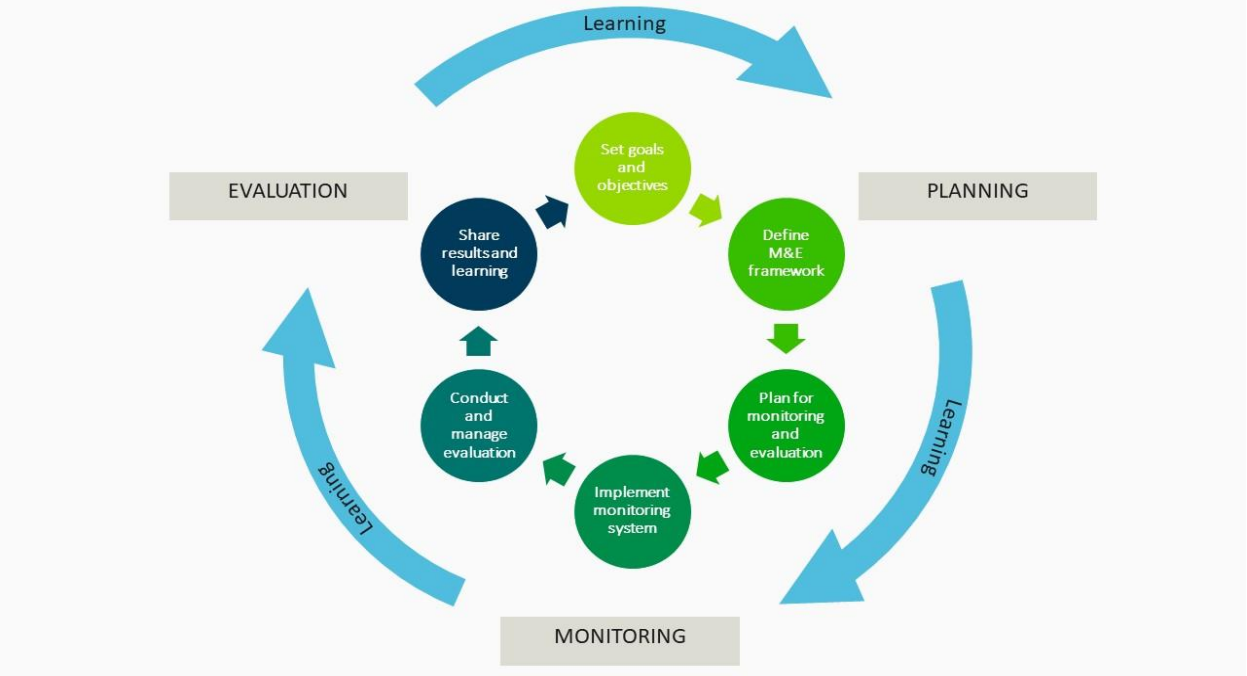


Figure 2. Results-based M&E system incorporating learning (Bonsucro 2022)

2.2.5 Performance Indicators

According to Bakewell et. al (2003) indicators are an observable change or event which provides evidence that something has happened, whether an output was delivered, immediate effect occurred, or long-term change observed. Indicators are quantitative or qualitative factors or variables that provide a simple and reliable means to measure achievement. They reflect changes connected to an intervention or help assess performance (Kimaro et al, 2018).

Indicators may be set to track performance against a project or programme's desired changes at output, outcome, or impact level. Indicators can also be used to help identify organisational (internal) change, as well as changes in the external environment (Bakewell et al, 2003).

According to Sen et al (2018), a good indicator should assist a programme to assess the status of its activities and the resulting changes caused by those actions. The characteristics of a good indicator include that it needs to be relevant, precise, measurable, time-bound, realistic, and useful. An indicator should be relevant to the change that it is trying to

measure. For example, poverty reduction can be measured through tracking performance of poverty indicators (nutrition, empowerment, working conditions etc.) and not change in enterprise productivity (Sen et al, 2018).

An Indicator is precise because it is specific to the change that it is trying to measure. This might not be possible at the initial programme or project design stage when the exact changes are still being defined. Once intervention design is complete and implementation is ready to begin, the intervention should be able to clearly define the indicators of change. For example, a poorly-defined indicator is a percentage of productivity change in business centres, whereas a well-defined indicator can be written in this manner as a percentage of change in the contribution of gross profit to cover consultant salary costs (Sen et al, 2018).

It is important that indicators are measurable. If this is not the case, then we will not be able use it to assess changes. Therefore, all projects and programmes must ensure that the indicators that they use can be measured. For example, if a project seeks to improve safety and health regulations in agro-processing companies, a measurable indicator to assess change would be if employees follow ten basic rules of health and safety when packing products.

A good indicator should be time bound, it should be clear over which time period each indicator will be measured. For example, an indicator saying ‘Average sales’ is ambiguous, as it does not indicate a period over which measurement should be done. This means that this indicator may be measured in different periods. An example of a time-bound indicator is ‘Average monthly sales over the previous six months’ (Sen et al, 2018).

Programmes or projects need to be realistic in selecting indicators, as this has implications on the resources needed for monitoring. An example is a project which aims to reduce poverty, which may then select an indicator of poverty reduction to measure this change. However, it is important to note that measuring poverty is expensive and technically challenging. Ultimately, it might be unrealistic for the programme to measure poverty directly, and so a choice may be made to select a more easily measured indicator such as increased household spending (Sen et al, 2018).

It is important that indicators are useful by providing the most useful information possible. An example is a project that wants to monitor an increase in sales. It identifies two possible

indicators, being an increase in revenue and an increase in sales volume. It then may choose that the increase in sales volume is a more useful indicator, as revenue can also be affected by fluctuations in the exchange rates, price of goods, and any other situation (Sen et al, 2018).

It is important the indicators that are used to measure the performance of a programme or project meet the above criteria. Badly-crafted indicators can limit the performance of an intervention as wrong data that does not add real value to the monitoring for the fulfilment of programme objectives can be monitored.

According to Kimaro et al (2018), it is unrealistic to expect indicators to measure absolute performance. Indicators apply a sampling approach or a selective or proxy approach. Too many indicators can be difficult to manage and track. It is, therefore, important to ensure that when indicators are developed that they measure achievement of programme/project objectives at the various levels of programme planning, implementation, and the three result levels. The ability to track performance on programme objectives allows for the identification of success or failure. Indicators in this instance show the efficiency of an organisation in its pursuit of its objectives.

There are different types of indicators, these include a key difference between quantitative and qualitative indicators. Quantitative indicators are reported as numbers, such as units, prices, proportions, rates of change and ratios. Qualitative indicators are reported as words, case studies and reports (Bakewell et al, 2003).

In addition to quantitative and qualitative indicators there are other kinds of indicators which can be useful in some instances these include mixed, scoring and ranking, simple yes/no, picture indicators, proxy indicators, and framing indicators.

Mixed indicators have an element of both quantitative and qualitative data. These indicators can be used to show both the scale and depth of change. An example is the number and description of how policies have changed. Reporting on the number of policies that have changed would give the scale of change (quantitative), but the individual descriptions might show a wide range of different policy changes resulting from different types of interventions (qualitative) (Bakewell et al, 2003).

Scoring and ranking indicators are quantitative in nature. They are sometimes collected directly but may also be generated from qualitative data. An example is rating satisfaction from one to ten, or ranking satisfaction according to predefined categories such as 'very satisfied', 'satisfied', and 'unsatisfied' (Bakewell et al, 2003).

Simple yes/no indicators can be used to define if something has happened. For example, a yes/no to determine if a new law is enacted before the end of 2020 (Bakewell et al, 2003).

In some situations, pictures can also be used as indicators. Pictures can contain information that provides evidence of change. An example of this can be photographs taken before and after a project is completed can show how the physical environment has changed (Bakewell et al, 2003).

Proxy indicators measure change in each phenomenon or process in an indirect manner. Therefore, a proxy indicator does not measure something directly, but through another phenomenon. An example of this is that the distribution of condoms is sometimes used as a proxy measure for reduced rates of HIV infections (Bakewell et al, 2003).

Framing indicators are used when it is difficult to predict the changes resulting from some work. They define the domain in which change is expected to occur. An example of this are the changes in the lifestyles of women following an empowerment exercise. They usually do not measure change but instead provide illustrations of change that may be occurring (Bakewell et al, 2003).

Other types of indicators include input, activity/process, output, outcome (intermediate and/or result), and impact indicators. Input indicators are performance indicators that measure the resources and inputs that are required to successfully implement a programme or project. These indicators provide information about the resources that have been invested in a programme, project, or intervention and are usually used to measure the efficiency of the programme or project.

Output indicators are a performance indicator that measure the products or services that result from a programme or project. Output indicators give information on the quantity and quality of the goods or services that have been produced and are usually used to assess the effectiveness of a programme or project implementation (Kimaro et al, 2018).

Outcome indicators are performance indicators that measure specific measurable changes in behaviour, knowledge, skills, attitudes, or situation that result from a programme or project. Outcome indicators provide data on the intended and unintended consequences of a programme or project and are usually used to assess the effectiveness of the programme or project (Kimaro et al, 2018).

Process indicators are performance indicators that measure the activities, steps, or processes that are required to implement a programme or project. Process indicators provide data on how a programme or project is being implemented and are typically used to determine the quality and efficiency of the implementation process (Kimaro et al, 2018).

Impact indicators are performance indicators that measure the long-term and sustainable effects of a programme or project on the target population or environment. Impact indicators provide information on how much a programme or project has achieved its overall goals and objectives and are usually used to assess the effectiveness of the programme or project in achieving long lasting change (Kimaro et al, 2018).

Indicators can be developed at all levels of a programme or project, these levels are the input, activity/process, and the three result levels (output, outcome, and impact). Input indicators measure the resources and other inputs required to successfully implement a programme. They measure the cost effectiveness of a programme and seek to determine that resources are being used efficiently. It is important that a project or programme is not run at a greater cost than it should; wasted resources will limit the scaling up of a programme where necessary. Most governments work with limited resources, and it is, therefore, important to avoid wastage as this will limit the number of people a programme can reach.

At the activity level, programme implementation is measured to determine the efficiency of the implementation process. The data collected at this level allows for analysis to made if implementation is happening as planned. An example of this is in a waste management education and awareness campaign some of the activities identified could include the distribution of information pamphlets to all the households of a community. An indicator to measure performance for this activity would look at the number of pamphlets distributed in that specific community versus the target which can be all the households of that community.

The three result levels of an intervention include outputs, outcomes, and impact. It is important that indicators are developed for all three levels as the success or failure of a project in fulfilling objectives is measured at these three levels. Outputs provide information on the quantity and the quality of the products or services emanating from an intervention. It is therefore important to measure performance to determine success or failure in achieving planned targets. An example of this is a government entity tasked with the responsibility of supplying water in a city. A typical quality indicator will test the levels of harmful chemicals/substances in the water, very high levels of these exceeding set targets will indicate that the water quality is poor. With regards to quantity a typical indicator in this scenario can be the number of households with excess to running water.

Outcome indicators measure changes in behaviour, attitudes, knowledge, and skills because of a programme. For a programme to be deemed successful it is important that beneficiaries learn, understand, and change their behaviours because they are better informed. An example of this is when HIV was increasing rapidly (late 90s) in South Africa, the department of health embarked on extensive education and awareness campaigns. After a certain period, HIV infection rates reduced signalling that people started behaving differently by using condoms as they were better informed.

Impact Indicators measure long-term sustainable effects of a programme, this includes intended and unintended consequences of a programme. An example of this is the education and awareness around HIV involved the promotion of the use of condoms. The intended impact of the campaign was to reduce the number of people living with HIV, some of the other unintended consequences was that it reduced the number of unplanned pregnancies and other sexually transmitted infections (STI) infections.

The use of evidence in policy and the implementation of programmes that work has also become an important priority for most governments. There is consensus that only a government that achieves the best results for their citizens is poised to retain political power. Results-based M&E uses evidence generated by the measuring of results to determine if a programme is worth scaling up.

The South African government adopted results-based M&E as a means of improving service delivery (Policy framework for government-wide M&E system, 2007). Service delivery can

be improved when institutions know what works and what does not work. This information is generated through the measurement of the level of achievement of results after implementation.

2.3 Conceptual Framework

The literature studied in the above chapters gives rise to the conceptual framework depicted in detail below and in Figure 3.

The interrelated main units of analysis include learning in M&E, the use of evidence to influence policy and strategic planning processes, performance Indicators to measure achievement of objectives, and evaluations as empirical evidence sources. The literature above focuses on some key components that make up results-based M&E and the interconnections existing between these components. These include the decisions taken in policy and strategy that are influenced by evidence stemming from evaluations. Intentional learning that occurs through evaluations and emergent learning happening as a result of programme implementation and performance indicators, monitoring tools that measure achievement of predetermined objectives. It is important to have these at all result levels (output, outcome, and impact levels).

This study explores the effectiveness of the results-based M&E system of the JRA, it identifies its strengths and weaknesses and, finally, how this system can be strengthened.

The learning concept emanates from the implementation, data collection and evaluation process whereby evidence is extracted on what is working and what is failing in an intervention. Emergent and intentional learning occur in this situation. Emergent learning occurring as implementation proceeds, and intentional learning happens mainly because of evaluations. The use of evidence to influence policy and strategy is a concept that is based on the premise that decision making is informed and driven by a rational process of having identified what works. The identification of what works is driven through an empirical process. This ensures that the evidence elicited by this process is credible.

Performance indicators measure intervention performance. They help identify intervention success or failure. Success is achieved when programme objectives are met. It is, therefore, important that performance indicators are constructed in a way which allows for the

measurement of progress in achieving intervention objectives as it is not realistic to measure absolute performance.

Evaluations are periodic assessments of intervention quality. They follow an empirical process that allows individuals and organisations to learn from their processes and assumptions. The learning that occurs because of evaluations is intentional. The recommendations and conclusions coming from evaluations should feed into the decision-making process at policy, strategy, and implementation levels.

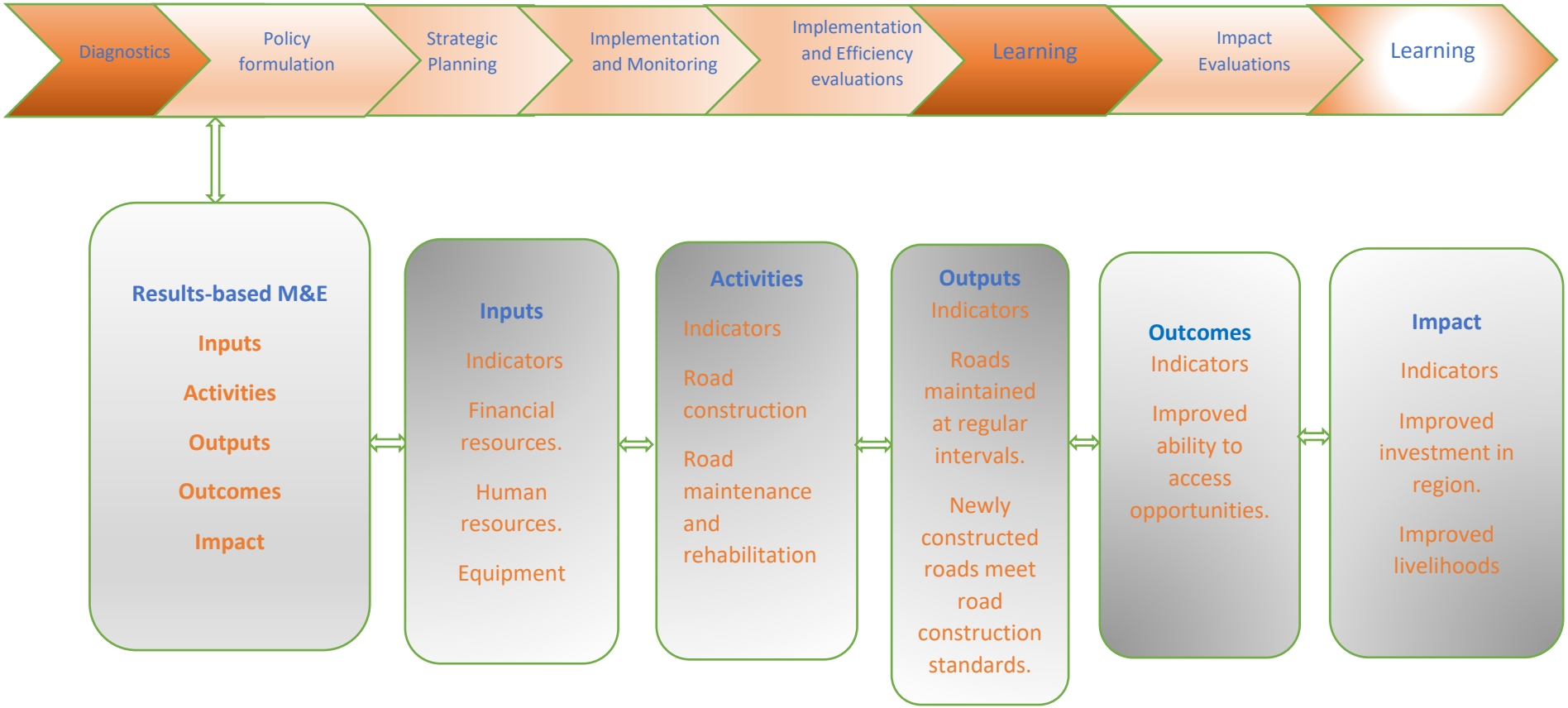


Figure 3. Conceptual framework illustrating results-based M&E in road infrastructure management

CHAPTER 3

3.1 Methodology

This section focuses on identifying and explaining the research approach, procedures, and methods that were used in the collection, processing, and analysis of the data. This chapter will explain and describe the research approach, research tools, and their application. I will also select a sample from the population under study and will determine the size of the sample. The chapter will also explain and describe data analysis methods, it will describe the limitations, feasibility, as well as the positionality of the researcher.

3.1.1 Research approach and design

There are two types of research methodologies, these include qualitative and quantitative methods. The study follows a qualitative approach. Key informant interviews will be utilised to respond to the research questions. Key informants were selected on the basis that they have specialised knowledge of the management systems that the JRA has in place. The post-positivist paradigm informs this study. This paradigm is based on the view that social reality cannot be completely explained but it could be approximated. Qualitative researchers point out that there are fundamental limits to the extent to which the methods and procedures of the natural sciences could be applied to the social world. Post-positivist philosophy is often associated with qualitative research.

A cross-sectional design has allowed the collection of data from JRA staff at a single point in time to provide their views on the effectiveness of the JRA M&E system. The research questions have guided the methods used to collect and analyse data. The design is not experimental or longitudinal the use of these methods requires more resources as data is collected at different points in time from research participants. It is to be noted that this study does not warrant the use of these methods.

Secondary and primary data sources are used for the study. Secondary data will be accessed from information generated by the entity in its operations. This secondary information has

been used to gain understanding on the make-up of the management systems making up the JRA. Primary data was accessed through a qualitative technique of key informant interviews.

The qualitative process focuses on assessing the comprehensiveness of the M&E processes of the JRA. Key informant interviews were conducted to get in-depth information about the institutional culture in relation to M&E and to help identify any operational challenges that are preventing effective performance in the management of road infrastructure. The key informant interviews are also aimed at eliciting any crucial information that is not explicit or cannot be illustrated in the JRA secondary data documents.

An open-ended questionnaire was used on the key informants to keep the interview focused but also allowing for a discussion. Semi-structured interviews provide comparable qualitative data. The key informants by their responses will determine in which way the interview is directed (Patton, 2015). Sometimes semi-structured interviews allow for discussions to diverge from what was asked leading to more interesting information being gained. According to Lockot (2021), key-informant interviews reinforce power dynamics and silence the less powerful—unfortunately, this is the downside of using this method.

3.1.2 Research Tools and their Application

Primary data was collected through key informant interviews. The open-ended interview schedule focuses on questions that link planning processes to performance monitoring, evaluation, and the incorporation of the outcomes of both processes in decision-making.

The selected key informants have been chosen on the basis that they have in-depth knowledge and understanding of organisational management processes and systems and road infrastructure management. Decision makers forming part of the senior management team have been interviewed. The interview had some structure as means of ensuring that important questions were asked and not forgotten. The key informant interviews were conducted in person. Six senior managers were interviewed. The aim was to understand the organisational culture and to get more information on operational strengths and weaknesses impacting the performance of the organisation. The aim of the interviews was to also determine the role of M&E in JRA operations.

3.1.3 Sampling

The participants forming part of the study are the staff members of the JRA in the city of Johannesburg metropolitan municipality. The JRA is an entity of the City of Johannesburg Municipality, its main function is to manage the road infrastructure of the City of Johannesburg. The sampling frame of the study included JRA management. The sampling frame was selected on the basis of the perceived decision-making capacity together with the knowledge and understanding of management systems within the organisation.

Key informant purposive sampling was utilised for the study. Purposive sampling technique is a type of non-probability sampling that makes use of knowledgeable experts. It is important that key informants are reliable and competent (Tongco, 2007). It will be difficult to determine the reliability of each key informant as this relates to them being honest and truthful in their responses. Purposive sampling, also called judgement sampling, is the deliberately selected due to the qualities the informant possesses. Purposive sampling is a non-random technique that does not need underlying theories or a set number of informants (Tongco, 2007). The researcher decides what needs to be known and sets out to find people who can and are willing to provide this information.

To ensure that the characteristics of key informants was fulfilled five senior managers and one staff member in middle management were selected. The selected individuals were identified on the basis that they interact with M&E processes on a regular basis and are, therefore, deemed as competent. They include the heads of internal audit, performance information management, M&E, operations, and planning. The key informants are individuals who are involved in decision making within the organisation and can provide in-depth information on challenges encountered at the different levels of road infrastructure management.

Participant	Business Unit
Participant 1	Internal Audit
Participant 2	M&E
Participant 3	Planning
Participant 4	M&E
Participant 5	Operations
Participant 6	Performance information

Table 1: Profile of key informants

To avoid bias the selected sample is representative and is not only focused on M&E staff but includes other divisions within the organisation. M&E staff only might end up being defensive and providing a good picture that is not holistic about the M&E systems they have put in place. My judgement as the researcher has been used to select the sample, there might be researcher bias, but I believe the selection of the participants was well considered.

3.1.4 Data collection

Key informant interviews were done in person and virtually, using Microsoft teams. The interviews were semi-structured, with an interview schedule. The interview schedule was aimed at ensuring that all the important questions were asked and not forgotten. Semi-structured, in-depth interviews are flexible and allow for deep exploration of thoughts and experiences of the key informants who can inform the topic under study.

The participant information sheet was given to all the participants of the interview. It informed them about what the research is about, that confidentiality and anonymity would be maintained in the research process. The names of participants would not be published, and the data collected would be kept safe in a password encrypted computer. Participants were also informed about the risks of the research which were identified as no more than what happens in everyday life. The participant information sheet also provided the participants with an option to opt out of the study if they so wished, their opting out would not in any way prejudice them from continuing to receive benefits they are entitled to. Participants were also informed that they would not receive any benefits by partaking in the study.

Four senior managers and two staff in middle management were interviewed for the study. These managers were selected on the basis that they lead M&E and road infrastructure management processes. They were selected with the aim that they can provide more information on the M&E systems that are in place and which processes are still a challenge. The information they provide will respond to some of the research questions that focus on the effectiveness of the JRA M&E system and how the system can be improved by identifying its strengths and weaknesses.

The key informants were recorded, and the researcher also took field notes during the interview process. This was to ensure that key information was not lost or missed. The interviews that were conducted at the JRA provided me with an opportunity to take comprehensive field notes. Field notes provide an opportunity to record observations that are important that provide information on the context, the setting and what went on, field notes are also descriptive (Patton, 2015). The process of analysis will involve the identification of themes and their interpretation.

The questions of the key informant interviews focused on exploring systems that are in place to implement legislated M&E processes and the stumbling blocks that are hampering optimal performance. The key informants were interviewed in English because this is the business language used by all state institutions.

The key informant interview schedule is attached as an appendix.

3.1.5 Data analysis

Primary Data analysis

Key informant interviews were selected as means of providing in-depth information on the M&E processes of the JRA, the key informants are decision makers within the organisation who have more depth and understanding about the operations of the JRA. The key informant interviews for the qualitative study were recorded when conducted, these were then transcribed by the researcher to enable analysis. Two key informant interviews were conducted at the JRA premises, with the remaining four interviews being conducted virtually, using the Microsoft team's platform. To ensure accuracy of transcripts the audio recordings

were further played back to ensure that these truly reflected the interview. Pseudonyms were used to identify these recordings and to refer to the participants. This was aimed at ensuring that their identities were protected.

Thematic analysis will be used to analyse the data. A combination of deductive, inductive and theory-driven data coding and analysis processes will be utilised (Clarke and Braun, 2012). The deductive aspect of our analysis will draw from M&E theory and road infrastructure management theory and ideological frameworks. The inductive element of the study will draw from the transcript based on the information that is provided by the participants which is usually informed by their experience (Clarke and Braun, 2012). Thematic analysis involved the process of dividing the data into differences and similarities and this was followed by reducing the data into manageable components (Schurink, 2009).

The steps that were followed in the analysis of data are shown in figure four, below.

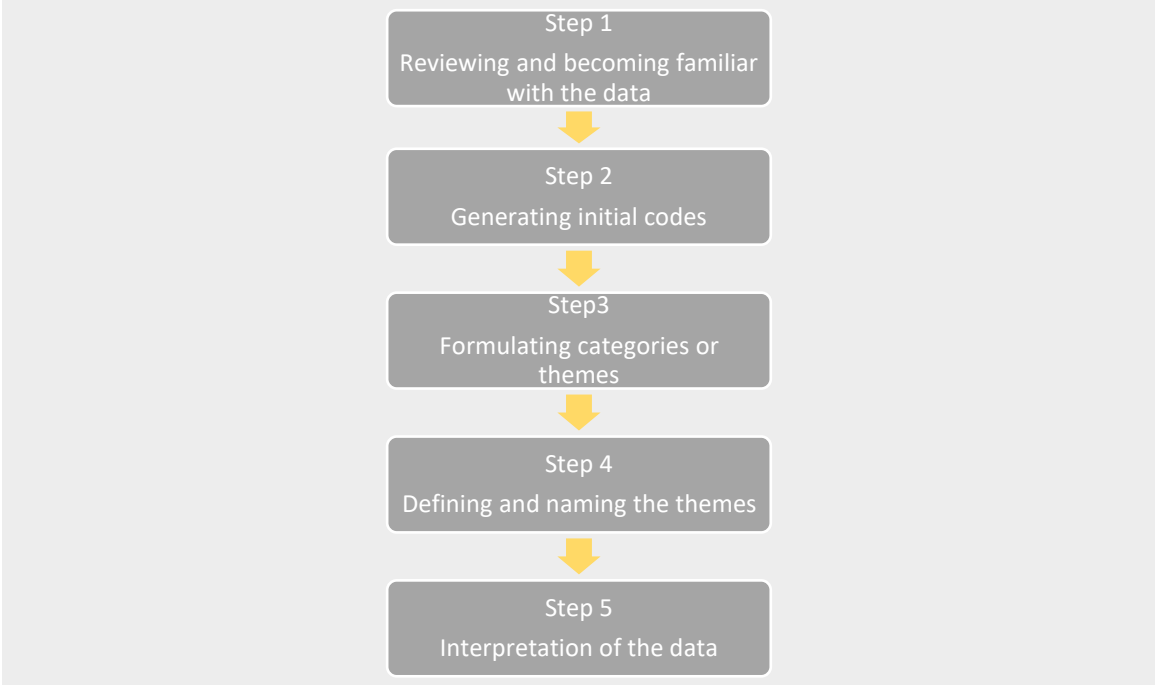


Figure 4. Thematic analysis process

Reviewing and becoming familiar with the data: This step involves reading the data several times, this included reading through the interview transcripts and going through the interview recordings. Notes were taken together with a record of comments and annotated transcripts as information was read and listened to. When reviewing the data, it was important to be critical and to start getting meaning from it. This phase was to ensure familiarity with the dataset and to start deriving information that responds to the research questions.

Generating initial codes: This step in the process involves the systematic analysis of the data. Codes provide a label to a feature of the data that can potentially respond to the research question (Clarke and Braun, 2012). This process involved going through the transcripts of each participant that was interviewed and comments and statements that were repeated and were of interest were then labelled and given codes.

Formulating categories or themes: A theme identifies something important about the data in relation to the questions of the research and represents some level of patterned response within the data question (Clarke and Braun, 2012). The coded data was reviewed, and areas of similarity and overlap were identified, and some codes were combined to form a single theme.

Defining and naming the themes: This step involved identifying elements that are unique and specific to each theme. It is a good indication when a theme can be summed up in a short sentence. It important that themes do not overlap, are not overloaded with information and, lastly, that they should address the research question (Clarke and Braun, 2012). These processes were followed, and an analysis was done to tell a story about each theme.

Interpretation of the data: This process of analysis involves making sense of the themes and telling a story that goes beyond being descriptive. The themes are arranged to connect logically in telling a story about the collected data. Arguments are then put forward in response to the research questions.

Secondary data analysis

Secondary data was accessed from the JRA. The organisational strategic plan, Annual Business Plan, mid- and end of term reviews, and Annual Reports were accessed. The scrutiny of these documents was aimed at providing the study with a holistic view of the systems in place to support the results-based M&E processes. As prescribed in government documents (revised

framework for strategic plans and Annual Performance Plans) the Strategic Plan and the Business Plan are the foundation upon which an organisational M&E system is built. It is important that these documents adhere to such prescripts to ensure alignment with the results-based M&E framework of government.

The strategic Plan of an organisation provides a broad overview of the organisation's objectives or institutional outcomes in line with its legislative mandate. It also provides information on national legislation that empowers and directs the organisations activities. According to (DPME, 2007) the five-year strategic plan, which is aligned with the planning cycle and the five-year political term, gives the institution's impact statement, intended outcomes, related outcome indicators and five-year targets for the outcomes. In line with results-based M&E the strategic plan needs to have an impact statement in place together with outcome Indicators.

The business plan is a one-year plan of an organisation, that outlines its outputs over the year. It expresses a breakdown of what the organisation seeks to achieve in a year as a contribution to achieving its five-year strategy. The logical framework is usually expressed in the business plan. The logical framework is an expression of programme inputs, activities, and outputs. Output indicators have annual targets that are broken down—usually quarterly and bi-annually. Other elements of the logical framework which is the outcome indicators and impact statement are expressed in the strategic plan (DPME, 2007).

Mid and end of term reviews are evaluations that determine an institutions progress in implementing its strategic plan. It is prescribed that all government institutions have a responsibility of conducting these reviews. Elements of efficiency in the use of resources and effectiveness of programme theories of change are also part of these reviews. These determine the value of interventions, determine what is working and what is not (DPME, 2019). Conclusions and recommendations stemming from this process are supposed to feedback into decision making, an example of this is when a programme is lagging in terms of meeting its five-year targets it then becomes important that in the upcoming period steps are taken to ensure fulfilment of these targets by the development of a catch-up plan. What is also deemed as not working and is harming beneficiaries or not adding value in the fulfilment of objectives can be discarded (DPME, 2019).

It is further prescribed that an implementation plan needs to be developed by an institution to ensure the implementation of evaluation findings and recommendations and progress of this implementation needs to be reported in the annual report (DPME, 2019).

The annual report is a document used to report an institutions performance and achievements over a period of 12 months. It reports on performance information and financial information. Performance information speaks to programme implementation and progress in achieving set targets. Financial information focuses on expenditure and the management of financial resources in relation to the resourcing of programmes and other miscellaneous operational aspects. Revenue generated forms part of financial information. The annual report is an accountability tool which lays bare the activities of an institution over the reporting period, including actions taken in the implementation of evaluation recommendations.

3.1.6 Limitations, feasibility and positionality

The study is only generalisable to the JRA and not to all South African road infrastructure management agencies. The study sample was sourced from Senior management and middle management at the JRA. The study will utilise primary and secondary data sources. The secondary data on documented M&E systems and road infrastructure management will be accessed from the JRA. The Promotion of Access to Information Act (PAIA), allows for citizens to access information held by any public entity.

The data collection for the study was done by me without a need or use of assistants. The offices of the JRA are in Johannesburg where I reside. The sample of the study is six participants who are not dispersed over a huge geographical area. This made the research affordable and, therefore, feasible.

The researcher has a passion for service delivery and good stewardship of public resources, they believe this is the foundation of building a just, sustainable, and successful system. In the process of conducting this study, a neutral stance was maintained, and the interviewer's own views were not inserted. This research provided a good opportunity to explore management mechanisms that can enhance the delivery of quality road infrastructure.

3.1.7 Ethics

Research ethics are concerned with ensuring that researchers uphold and respect the rights of their research subjects (National Commission for the protection of Human Subjects of Biomedical and Behavioral Research, 1978). As part of ensuring that this research study upheld ethical principles, the researcher applied and obtained an ethics clearance from the Wits Ethics Committee.

The study ensured that confidentiality, protection against harm, voluntary participation, and informed consent were practiced towards research participants.

A participation information sheet was given to all, the participation information sheet detailed the objectives and purpose of the research.

Participants were assured of anonymity and that they will not be exposed to any harm, their comments and assessments of the issues facing the JRA, and their own perceptions of M&E were not linked to their names. As much as the JRA granted permission for the researcher to conduct research within the organisation, participation remained voluntary. Measures were taken to ensure that the rights of participants were upheld, if any participant decided to withdraw from participating in the study, then they were given the opportunity to withdraw at any point. All participants provided verbal consent.

Recordings and transcripts from the key informant interviews were all stored in a password-encrypted laptop to limit access and to ensure confidentiality.

3.1.8 Validity reliability and dependability

Validity is defined as the soundness of the research and is determined by whether the research truly measures its objectives (Baker, Smith and Henrichsen,1997). This determines whether the means of measurement are accurate and whether they are measuring what they are intended to measure (Golafshani, 2003).

It was important that the research process was kept credible. In order to achieve credibility, the researcher ensured that the data-collection process remained reliable. The reliability of the research process was ensured by the collection of data consistently and accurately. In the

analysis of data, the information that was collected was read many times to ensure familiarity, saturation and understanding.

To ensure validity and dependability, data analysis procedures were assessed for appropriateness in line with qualitative research procedures that were suited to this study. Results of the study have also been communicated truthfully and accurately.

Reflexivity was applied ensure for self-awareness. Reflexivity refers to the ability of the researcher to reflect continuously on how his or her values, beliefs, perceptions, and actions impact upon the research setting and can affect data collection and analysis (Lembert, Joneema & Mc Sherry, 2010). Reflexivity had to be applied even more actively in the two interviews that were held in person to avoid influencing the participants in any way through body language and any other mannerisms.

It was important to ensure that the interviewer's own beliefs and perceptions did not influence the data that was collected. The ability to reflect and maintain a posture of neutrality ensured that the data collected was true and not influenced by the interviewer's own views.

Interviews were recorded, and notes were also taken to ensure no information was lost. After the collection of quantitative data only the researcher had access to the data this was to ensure that the quality of the data remained intact.

CHAPTER 4

4.1 Discussion of findings

This chapter presents the research results including the themes coming out from the study. These were obtained by using the research methodologies discussed in the previous chapter. I also briefly discuss the configuration of the road network of the City of Johannesburg in which results-based M&E is to be implemented on with the aim of improving this road network under the JRA. There were six key themes that were prominent from the interviews. All the themes that arose are interconnected. The key themes emanating from the study include 1) the strategic planning process 2) evaluation systems 3) evaluation recommendations and decision making and 4) The adequacy of KPI's in measuring achievement of strategic objectives 5) M&E tools used in road infrastructure management and 6) The internal and external threats facing the organisation.

The 14 000 km road network of the City of Johannesburg is made up of roads that have different classifications. In 2009, CoJ undertook a process to align its road classification system with the Road Infrastructure Strategic Framework for South Africa (RISFSA) Road Classification System, which was developed by the National Department of Transport in 2008 (City of Johannesburg, 2010). The RISFSA system went beyond defining road hierarchy as a trade-off between mobility and accessibility, by incorporating the following characteristics:

- Functionality.
- Traffic Volume.
- Public Transport.
- Geometry.
- Access Spacing.
- Pedestrians.
- Freight; and
- Traffic Calming.

The conclusion of this alignment process was the re-classification of existing roads in each of the regions of the Regional Spatial Development Framework (RSDF) and development of proposals for classification of future roads (City of Johannesburg, 2010).

Class 1: High mobility road (freeway/primary distributor) pedestrians and bicycles are prohibited from using these routes. These routes are characterised by high-quality facilities and and low travel delay (City of Johannesburg, 2010).

Class 2: This class of road represents major arterials; these routes are the most direct link between home and work centres. Some of these roads have low-income settlements adjacent to them. The COJ was tasked with the responsibility of creating pedestrian crossings and class 2 cyclists' facilities. The COJ has struggled to bring these projects into fruition. These routes form part of the Strategic Public Transport Network (SPTN), public transport modes need to be given priority (City of Johannesburg, 2010).

Class 3: These are district distributor roads; exceptional care needs to be taken in separating pedestrians and vehicles in these roads. Characterised by average quality facilities and average travel delay (City of Johannesburg, 2010).

Class 4: These include Central Business District (CBD) roads, local distributor, and Industrial roads. These roads have more pedestrians and class 3 cycling lanes are the most appropriate. In CBD's the roads are characterised by on the street parking and in Industrial roads curb radii need to accommodate heavy vehicle turning movements (City of Johannesburg, 2010).

Class 5: These are residential streets/collectors speed reduction measures such as speed humps are in place to ensure the safety of pedestrians and cyclists (City of Johannesburg, 2010).

Class 6: Includes pavements and pathways, cars are prohibited except for emergency vehicles are allowed when there is an emergency. These routes are for pedestrians and cyclists (City of Johannesburg, 2010).

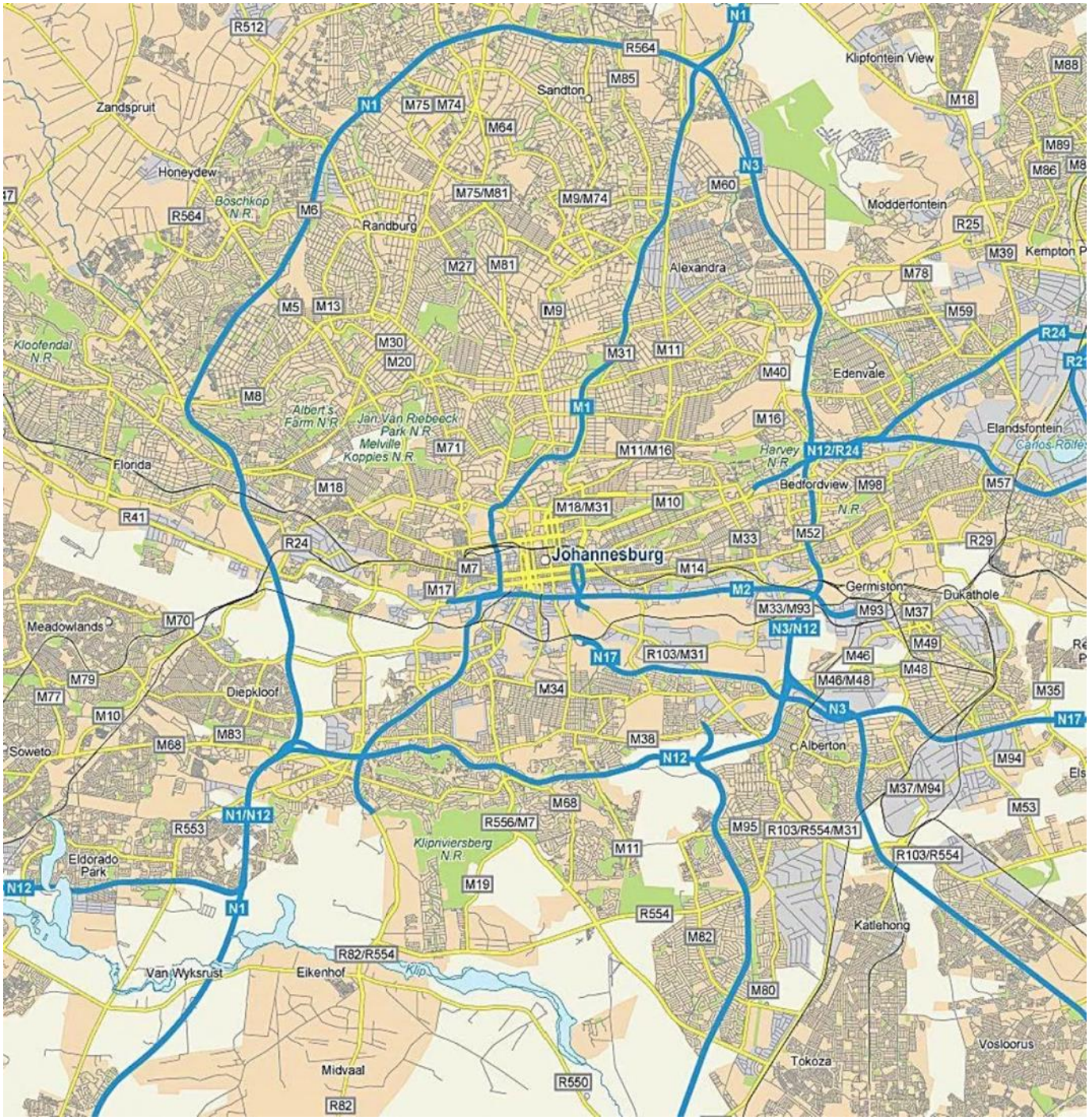


Figure 5: Map of the roads in the City of Johannesburg

Source: https://johannesburgmap360.com/johannesburg-(joburg-jozi)-street-map

This chapter will also assess the key themes as presented from the interviews and their relation to performance indicators; the use of evidence to influence policy making and decision making and learning because of M&E.

The results have been analysed using thematic analysis in consideration of the key components of results-based M&E presented in the literature review.

The six managers that were interviewed in the study were interviewed on the various M&E related processes and systems that are used by the organisation. Questions related to the challenges the organisation faces in the fulfilment of its objectives were also asked. The aim of asking questions around other challenges that affect the JRA from fulfilling its mandate were to identify other significant issues outside results-based M&E that have led to the deterioration of the condition of pavement roads within the City. This will assist in getting a holistic view of the challenges faced by the JRA that affect its performance. The findings from the study, outline the broad themes which are explained in the form of a narrative account. The findings of this study are therefore presented in line with these six broad themes.

4.1.1 The strategic planning process

All the senior managers mapped out the planning process establishing that the IDP is the Strategic Plan of the City of Johannesburg, the IDP is a plan made up of all the components that ensure that the COJ fulfils its service delivery mandate. These components range from Road Infrastructure management, Economic Development, Water and Sanitation and many other services. The JRA derives its strategic plan from the IDP. Municipalities provide services including the management and maintenance of roads within its authority. The JRA has the mandate to manage and maintain road infrastructure.

It is important to note that the election term of South Africa is five years, at the beginning of each term government priorities for the upcoming five years are put forward the priorities or Outcomes address all the different sectors of the state (IDP, 2021). These priorities then become filtered down to government departments and municipalities. It is important to note that local government terms are not aligned, and this can have its challenges. It is important that these priorities then find expression in the five-year strategic plans of all government institutions considering all other processes involved in municipal strategic planning.

The IDP considers the Gauteng Development Strategy (GDS) this is a regional/provincial Development Plan in which the City of Johannesburg is located within. This plan maps out the development path of the region and it is important that the City of Johannesburg aligns to this plan (IDP, 2016). Visual condition assessments of pavement surface, structural and functional condition inspections also inform planning processes. These assessments are designed to record relevant material engineering information, as it pertains to the surfacing, structure, functional condition as well as limited socio-economic factors of paved roads (IDP, 2016). This information derived from the assessments then informs planning processes by ensuring that strategic objectives/priorities are developed as means to remedy material challenges that have been identified.

All participants identified financial constraints as negatively impacting the important focus areas of planning.

Participant 5 "*Currently the City has a lot of ageing road infrastructure that is over 20 to 30 years old this infrastructure requires rehabilitation; the rehabilitation and maintenance of these roads is very expensive and requires billions of rands".*

Participant 6 "*How much the road infrastructure is used by motorists also determines how quickly the road needs to be rehabilitated, with increased motorists and trucks on the roads there is growing pressure to rehabilitate these roads even earlier*"

Financial constraints impact on the planning process as some important interventions are delayed and, in some cases, even abandoned. Two participants indicated that the budget process is very politicised it is a process driven by council who are representatives of political parties. Each political party has a set of priorities, the majority party will usually have its set of priorities funded. Five of the participants indicated that even in the case of the majority party having its priorities funded the budget cannot accommodate funding all these priorities. These competing priorities are usually all important and cannot all be funded because of limited resources.

According to participant (1) "*Politicians are sometimes not driven by evidence and what is in the long term likely to benefit the City, but they are driven by short term interventions that receive public applause and win them support".*

Consultative processes with communities also inform the IDP, public participation is a local government imperative that is clearly stipulated in Chapter 4 of the Municipal Systems Act. Local government (Municipalities) has a responsibility to conduct public meetings, consult, and inform citizens as means of aiding decision making within local government (Salga, 2013)

According to participant (3) "*communities bring forward a shopping list of demands which many a times are unrealistic and cannot be fulfilled over that planning cycle".*

Planning is the foundation of any M&E system, without plans M&E cannot exist. M&E ensures that strategic plans that are derived from existing government policy are implemented effectively, timeously, efficiently, sustainably and with impact. Evaluation recommendations were not identified as feeding into the planning process by any of the participants, evaluations provide evidence-based information about programme performance. Recommendations or findings contain information pertaining to institutional programmes and projects, their weaknesses, and strengths. An example of this is that efficiency evaluations can help determine if financial or human resources are being used efficiently. As a result of this review recommendations can be made identifying areas where financial resources can be saved and areas where more capacity/human resources are required. An impact evaluation identifies intended and unintended consequences that occur because of a programme. With regards to unintended consequences the evaluation might identify very negative effects of the programme on beneficiaries. These unintended consequences can outweigh any benefits the programme has. This discovery can lead to recommendations that suggest that a programme needs to be scrapped altogether or certain adjustments need to be made.

After assessing the organisations secondary data in the strategic plan, I was able to discover that outcome Indicators are not clearly articulated in the organisations strategic plan. Outcomes are the second level of results in the results chain of results-based M&E. Outcome indicators are important measures that indicate achievement of the organisation's higher-level objectives. Achievement at the second level of results leads to the desired impact as the assumptions reflected in the theory of change (TOC).

4.1.2 The evaluation system

The senior officials all pointed out that evaluations are currently not fully implemented, taking into consideration the different categories of evaluations.

Three participants including the person in charge of M&E indicated that the JRA does conduct mid-term reviews and that its reviews are currently mainly focused on the monitoring of progress in achieving strategic objectives. In order for the M&E system to be fully functional it would have to have in place the different types of evaluations including those that determine programme effectiveness, impact, efficiency, and sustainability.

Mid- and end of term reviews are legislated processes that are mandatory, these happen halfway through the term to determine progress in achieving the five-year strategy. How far reaching these go, at times depend on the capacity of the institutions (DPME, 2019). These reviews go beyond being a monitoring tool but should also play an evaluation function. To determine the efficiency of implementation, the effectiveness of the programme theory and the sustainability of interventions must be assessed. Long-standing programmes also present an opportunity to have impact assessments conducted. End of term reviews occur at the end of the five-year term to determine progress in the achievement of the five-year strategic plan (DPME, 2019).

Participant 1 "I *am not that aware of the types of evaluations the organisation conducts; more work needs to be done in this area as information is not readily available".*

Participant 5 indicated that the JRA conducts efficiency evaluations in the form of budget adjustments and annual targets, and a performance indicator changes when challenges or a need arises. It is important to note the role of budget adjustments in relation to programme implementation is to adjust expenditure estimates upwards in the event of increased and material revenue collection, and downwards when there is significant under collection. To authorise unforeseen expenditure within a prescribed framework if a recommendation is made by the municipality. To authorise the projected savings of one vote to spend on another vote. To correct errors in annual budget and finally to authorise spending on funds that were not spent at the end of the previous financial where underspending was unforeseen

(Treasury, 2003). Budget adjustments are focused on the projected availability funds and the appropriation of unused/available funds. Budget adjustments are not evaluations.

Some senior officials indicated that there is currently no M&E framework in place to formally guide the M&E processes of the organisation. M&E is an organisation wide function that has a responsibility of mapping out organisational processes from planning to completion. The M&E function tracks organisational and programme performance and conducts periodic evaluations to feedback into decision making. It also ensures that lessons are learnt, and this is aimed at improving organisational performance.

4.1.3 Evaluation recommendations and decision making

The managers indicated that recommendations emanating from mid- and end of term reviews do feedback into decision making. The feedback is clearly inadequate as the institutions still faces many challenges in fulfilling its mandate. These challenges include maintenance backlogs and pothole repair backlogs.

Participant 4: “The reviews always point out the shortcomings of the organisation in achieving its set medium-term targets.”

The DPME prescribes that annual reports need to publish the progress that has been made in the implementation of evaluation findings. Currently, there is no organisational system in place to determine whether recommendations from mid- or end of term reviews are being implemented, and the progress that is being made in this regard. Annual reports enlist the activities and achievements the organisation has made in the year under review. All the managers indicated that they do not develop catch-up plans when they have failed to meet targets set within a specific period. It should be noted that the use of catch-up plans is not institutionalised and this means that there is a risk that the organisation’s five-year strategy may not be fully implemented. This negates any impact that the organisation seeks to make in the long term. A catch-up plan is a well thought out strategy of making sure the organisation catches up on targets it was unable to meet at certain set periods within the five-year term. This then ensures that the organisation can implement its strategy timeously to reap the full benefits of its intended outcomes and impact.

Participant 1 “I am not sure what a catch-up plan is meant to do, I have not had to engage with it in my work.”

The lack of implementation record of lessons learnt compromises the ability of the institution to improve on the work it does. Lessons learnt are because of evidence extracted during M&E processes. The recommendations and conclusions of evaluations provide a record of these lessons. Lessons learnt contain knowledge that can be applied to future action and can be derived from screening according to specific criteria. A lesson can be identified as any useful knowledge distilled from experience establishing principles for guiding action.

4.1.4 The adequacy of KPI’s in monitoring achievement of organisational objectives

All senior officials unanimously agreed that the KPIs do not cover all the important KPAs of road infrastructure management. It is also important to note that it is not practical to develop indicators that measure overall performance. It is good practice that all intended outputs, outcomes, and impact have indicators linked to them as it becomes possible to measure achievement of objectives.

Some of the Indicators that were identified by participants as significant and not appearing in the business plan include indicators measuring compliance to inspection plans and road safety indicators. The reason for the absence of these indicators was linked to capacity and skills challenges.

Participant 5 “The current indicators are certainly not adequate and getting more indicators on the Business plan is also not practical, one only hopes in the future this becomes possible.”

Compliance to inspection plans guarantee that work done within a project goes forward as planned and is according to requirements, standards, and regulations. Adherence to standards and regulations is very important as the safety of the infrastructure becomes guaranteed (Agaienz et al, 2001). There is currently a well-developed set of regulations which is used to define the standards of workmanship and materials for construction works (CIDB, 2011). The most common are International Organisation for Standardisation (ISO) and SANS (ibid). The SANS and ISO standards representatives ensure that construction projects are of quality by reviewing quality management plans and inspecting the actual work whether it conforms with the quality standards (CIDB, 2011).

Road safety indicators refer to Road Infrastructure Safety Management (RISM) which is a set of procedures that support a road management authority in decision making related to the improvement of safety on a road network. Some of these procedures can be implemented to existing infrastructure, enabling a reactive approach; and other procedures are utilised in the early stages of a road construction project's life cycle allowing a proactive approach (Persia et al, 2016). These procedures are proven effective in preventing road accidents—especially in developed countries where they are used extensively. These safety procedures are applied at different stages of road infrastructure development. In the planning and design stage Road Safety Impact Assessment (RIA), Efficiency Assessment Tools (EAT), and Road Safety Audit (RSA) procedures are applied. In the construction and preopening stage, the RSA procedure is applied. At normal operation stage Network Operation (NO), road infrastructure Safety Performance Indicators (SPI), and Network Safety Ranking (NSR) procedures are applied. At the error, correction, and hazard elimination stage, Road Assessment Programmes (RAP), Road Safety Inspection (RSI), High Risk Sites (HRS), and In-depth Investigation procedures are implemented, while at the road rehabilitation or renewal stage, RIA, EAT procedures are applied (Persia et al, 2016).

After assessing secondary data, it was possible to identify that the response to pothole complaints timelines are in place, and the 2021/22 annual report indicates that the set targets were achieved. This conflicts with the big challenge of potholes faced by the City. This has even led to private insurance business intervening by patching the potholes and having their names and company logo attached to the patched pothole. This is most likely indicative of low set targets. All the participants identified the backlog challenges that the entity is dealing with these backlogs are in maintenance, potholes, and rehabilitation.

Other important road infrastructure management indicators that are not in the business plan, and were not mentioned in the interviews, include user satisfaction, corridor vegetation control, smoothness of ride, and environmental impact.

4.1.5 The usage of M&E tools in road infrastructure management

It emerged that the JRA has fully-fledged strategic planning and monitoring processes, together with systems, in place. Senior officials identified that evaluations are currently the area in which much improvement is needed. Another area that requires improvement is the monitoring systems which are made up of KPI'S as mentioned above.

Participant 4 "Our yearly business plan has a clear logical framework in place which provides a clear picture of the organisations programme inputs, performance indicators, targets with set timelines and expected outputs."

Two senior officials tasked with managing the M&E function indicated that the evaluation function is not fully fledged and that many different types of evaluations are not being implemented. Impact, sustainability, effectiveness, and efficiency assessments are some of the evaluation categories that need to be put in place and strengthened going forward.

Participant 2 "The evaluation function is still our biggest challenge, and we are gearing up to beef up this function."

It is important to note that evaluations are new in the South African government ecosystem, whereas monitoring is a long-standing government function. Monitoring systems tend to be fully functional and evaluation systems are a work in progress (Goldman et al, 2018). DPME (2019), acknowledges that earlier, when the NES was established, the focus was on national and provincial government—this focus has only recently moved to local government. The National Evaluation framework (2019), acknowledges that local government has some way to go in establishing fully-fledged M&E systems.

Sustainability evaluations

Take into consideration environmental, financial, and social implications of road infrastructure. The road maintenance backlogs with very limited resources are an indication that the JRA needs to improve on this aspect.

Impact evaluations

There are two categories of impact evaluations, these include prospective and retrospective evaluations. Prospective evaluations are developed at the same time as the programme is

being designed and are built into programme implementation. Baseline data is collected before the intervention is implemented, this data is then utilised as part of the process of determining cause and effect relationships after programme implementation (Gertler et al, 2016). Most of the current programmes at the JRA, and at government in general, are not developed with impact evaluation processes built into them, more needs to be done in this regard to improve the outcomes of interventions.

How this can happen within the JRA is that when a road is newly constructed in a region, data can be collected on, for example, the economic activity, important environmental information, and the accessibility of the region linked to the constructed road both pre and post construction. Comparisons can then be made on the pre- and post-construction data, leading to the identification of intended and unintended consequences. This will provide information on the impact of the road.

Effectiveness evaluations

These types of evaluations determine the extent to which an intervention is achieving its objectives and results, including any differential results achieved across different groupings of roads in this case (DPME, 2019). These evaluations also assess the TOC of a programme and its underlying assumptions and adequacy in achieving predetermined outputs, outcomes, and impact.

More work needs to be done to ensure fidelity to programme plans, this is depicted by the difficulty to maintain the set quality standards (quality control) in road construction, repair, and maintenance processes. An attempt to bring in Indicators that seek to manage quality standards would go a long way. Currently there are no quality control KPIs in place. This can be attributed to the challenge of a shortage of skilled workers in the depots of the JRA, as highlighted by three participants. This challenge needs to be dealt with urgently as the road condition index will further deteriorate, reducing the asset value of the road network and compromising the safety of the thousands of commuters who use the 14 0000 km road network.

It is important to note that it is critical for an organisation to assess the adequacy of its targets and KPIs. Targets that are set too low and KPIs that do not cover all the KPAs of an organisation’s mandate and objectives can lead to failure in achieving its vision. This situation

happens in some instances when there are capacity challenges in an organisation when there are not enough people to ensure the work is done

Another area in which these effectiveness assessments can be used, for example, is in meeting road safety standards. The safety of road infrastructure can be assessed to determine the adequacy of the steps taken to achieve the different quality dimensions of safety.

Efficiency assessments

Determining the extent to which the programme or project delivers, or is likely to deliver, results in an economic and timely way.

Economic refers to the conversion of inputs (financial resources, human resources, natural resources, time, etcetera) into outputs, outcomes, and impacts in the most cost-effective way possible. Timely delivery is within the intended timeframe or set timelines (DPME, 2019).

Proper management of resources is very important, especially in an environment of limited resources with dwindling revenue streams and a growing population that needs to benefit from the provision of services. The IDP reveals that the City of Johannesburg is currently collecting less revenue than it did a few years ago. This revenue has been reducing progressively over the past ten years (City of Johannesburg, 2021). Reduced funds at the City mean reduced financial allocations to the JRA.

4.1.6 The internal and external threats facing the organisation.

The emerging of this theme is because of the interview schedule's question that sought to determine what challenges the organisation encounters in fulfilling its mandate. This question was aimed at ensuring that other significant matters that are ailing the organisation can be identified, as this will lead to the continuous deterioration of the road condition index.

Participant 1 "The JRA has crippling financial constraints, and one wonders if things will ever change."

It emerged that financial resource constraints are a big challenge, and this has led to huge road maintenance backlogs. The financial constraints also impact on staff at depots working on weekends or evenings which are the best times for doing road works because of reduced

traffic volumes. Working outside office hours means that the employer must provide extra compensation to employees for working during these hours.

Participant 5 “In operations we have become weary of dispatching our employees to dangerous parts of the city as they face the risk of being mugged and in worst case scenarios even killed.”

It was emphasised by the participants that vandalism in the form of cable and manhole cover theft are some of the biggest challenges faced by the organisation. Limited financial resources end up being used to reprocure stolen goods and insure property at higher rates. Some participants also mentioned that some staff members, who try to work under bridges and in some areas of the city, are attacked and have their phones and equipment stolen from them. There is also a high staff turnover—especially at a middle management level. High staff turnover has negative repercussions for any organisation, and these include decreased productivity as positions are left vacant and new recruits spend a bit of time in training getting acquainted to the operations of the organisation.

Some participants indicated the organisation has a legal dispute with the sole bitumen producer in the country. Bitumen is a very important element used in road construction and maintenance activities. It is important that this dispute is resolved quickly, as this will have a negative effect on road infrastructure management processes.

It also came to light that capacity issues in road maintenance staff at depots is a challenge impacting the performance of the JRA. The upskilling of staff has become a priority. The quality of the road condition index has been impacted by this challenge. The road condition index has decreased over the years according to engineering standards.

CHAPTER 5

5.1 Analysis of findings

The main objective of this study was to explore the effectiveness of the results-based M&E system of the JRA, to determine results-based M&E tools that are being implemented by the organisation and the strengths and weaknesses of this system. This section will provide an analysis of the findings based on the interviews with the six JRA managers and secondary data obtained from the organisation.

I will further discuss these findings in relation to results-based M&E, key performance Indicators an important component of M&E, the learning aspect of M&E and the use of evidence to influence policy and decision making.

5.1.1 Results-based M&E

The JRA has fully-fledged strategic planning and monitoring systems in place. This is demonstrated in the strategic plan. The business plan intends to produce a one-year plan that has a logical framework that aids implementation by breaking down the strategic plan into outputs and output indicators, with targets that are time-bound. Still there are areas that can be improved within this aspect, as the strategic plan and the foundation of results-based M&E does not align fully to existing prescripts set in the revised framework for annual performance plans and strategic plans. The absence of outcome indicators and an impact statement indicates that the organisation is unclear and unable to measure its higher-level objectives. Achievement at the second level of results leads to the desired impact as is the assumption reflected in the TOC. Second and third level results are a critical component of results-based M&E, these result levels demonstrate that a sustainable system is being established because attitudes and behaviours of programme recipients are being changed. In this way, they assist government to embed and sustain its programmes.

Evaluations are a critical component of results-based M&E, this is currently the area in which much improvement is needed. Evaluations that assess (programme design, impact, sustainability, and efficiency) are some of the evaluation categories that need to be put in place. This finding corresponds with what is articulated in the NEPF 2019 that M&E in local government, which is less than optimal and more needs to be done to get it at the same level

with national and provincial government departments—where most of the focus has been placed by the DPME. Government adopted results-based M&E as a mechanism to improve service delivery; local government is the sphere closest to people and most of service delivery happens at this level. It is puzzling that little has been done to strengthen M&E at this level. The road maintenance backlogs, with very limited resources, are an indication that the JRA needs to improve and implement sustainability assessments for its infrastructure.

Prospective impact evaluations provide strong and credible evaluation results because baseline data is collected to establish measures of outcomes of interest before the intervention begins. Most of the current programmes at the JRA and in many government institutions are not developed with impact evaluation processes built into them; more needs to be done in this regard to improve the outcomes of interventions.

According to DPME (2019), the efficiency of programmes is assessed to determine the extent to which the intervention delivers, or is likely to deliver, results in an economic and timely way. Therefore, this requires the use of resources (human, financial, and natural) in a cost-effective way to help translate inputs into activities, outputs, outcomes and, finally, impact. Efficiency also means that resources are used in a cost-effective manner, allowing an entity to scale and reach out to more beneficiaries and to be able to upgrade the quality of services it provides. This then indicates that such evaluations are important, especially in a resource-constrained entity like the JRA. Such evaluations would assist the entity to better manage its resources.

5.1.2 The use of evidence in policy and decision making.

Evaluations occur periodically. After each evaluation recommendations or evidence is brought forth on how interventions can be kept on track or improved to ensure fulfilment of objectives. The evidence that is assembled can also provide direction on how certain practices/actions within interventions need to be discarded, as they are not helpful in achieving objectives. Evaluations allow for lessons to be learnt and it becomes important that these recommendations feedback into decision making at various levels to ensure the fulfilment of every objective. Currently, the JRA has no clear framework in place on how evaluation recommendations are to be implemented and monitored. The existing prescripts of publishing progress in the implementation of these recommendations in the annual report

is not in place. This is further confirmation of an evaluation culture that has not taken root yet.

The absence of a well-established evaluation culture impacts negatively on the organisation's ability to influence road infrastructure management policy and decision making in programme implementation. Evaluations are conducted through an empirical process whereby, through evidence, we can determine the strengths and weaknesses of interventions.

5.1.3 Learning in M&E

Learning occurs as a result of evaluation, recommendations, and conclusions, as well as during the implementation of an intervention. These recommendations and conclusions are reached through the identification of evidence-based information of what works and what does not in relation to an intervention. The learning that occurs because of intervention implementation is emergent, and the learning happening as result of an evaluation process is intentional. This learning contributes to better decisions. These decisions should lead to improved performance and accountability. The performance M&E process contributes to the construction of information feedback systems that strengthen learning and build an organisation that values critical reflection and learn from success and failure alike.

In the case of the JRA, learning is not happening as well as it should. This situation compromises the ability of the organisation to determine success from failure. An evaluation culture has not taken root effectively, and the JRA should be mindful that evaluation is a crucial intentional learning mechanism. The only way learning occurs is through programme implementation. The inability to fully determine success from failure leads to the organisation not being effective in its operations as failures continue to thrive unmitigated.

Wider learning occurs when learning goes beyond an individual organisation. The limited learning capacity within the JRA limits its ability to influence wider learning because of limited capacity to contribute to road management policy and decision making.

5.1.4 Performance Indicators

Important road infrastructure management indicators that are not in the business plan and were not mentioned in the interviews include user satisfaction, corridor vegetation control, smoothness of ride, and environmental impact indicators. The indicators mentioned by participants are as important, but do not form part of the business plan are road safety and compliance to inspection plans indicators. Compliance to inspection plans indicators seek to manage issues of quality control in road construction, maintenance, and rehabilitation. Road safety indicators are aimed at making use of road design procedures to try and prevent road accidents. User satisfaction indicators measure the needs and expectations of road users. Determining this information can assist in identifying road user needs, which can aid in the road network improvement. Corridor vegetation indicators are aimed at roadside vegetation management. These consist of eliminating or controlling vegetation through a variety of activities including mowing, brush cutting (mechanical and hand), use of herbicides, grazing by livestock, cultivating desirable vegetation, and re-vegetation. All these measures are to ensure the safety of motorists. Smoothness of ride indicators determine the riding quality of a road surface which influences the travel experience significantly. An uneven road surface translates vibrations through the suspension and tyres to the vehicle body, and from there to the occupants and driver (Dreyer and Steyn, 2015). There is enough data to indicate a zone above which vibration is certainly intolerable and below which is irrelevant (Dreyer and Steyn, 2015).

Environmental impact indicators also do not reflect on the organisation's business plan. These indicators focus on the effect that road construction and maintenance projects have on the environment. Road construction and upgrading have a tremendous impact on the ecological resources, because during these activities there is opening of the earth’s surface as well as dust emissions and pollution from the burning of fuels. Air pollution is increasingly linked to serious health problems. South Africa may not adequately afford strict emission control standards but can plan and prioritise means of vehicle inspection and maintenance, as well as road construction with modern technologies to minimise impact on the ecological resources (Karani, 2004).

When indicators are developed it is important that the organisation has the capacity to ensure their achievement; the absence of some important indicators can undermine the ability of the JRA to fulfil its mandate as their absence indicates that they are not a critical focus area, given that performance in this area is not tracked.

The sources and tools for collecting data for each performance indicator are not mentioned in the business plan for 2021/22 but this information is available in the 2022/23 business plan, signifying that M&E processes are consistently being strengthened. Sources of data collection for performance indicators are important as they assist in ensuring that the data collected to measure performance on a specific indicator is valid.

It is important to note that it is critical for an organisation to assess the adequacy of its targets and KPIs. Targets that are set too low and KPIs that do not cover all KPAs of an organisation's mandate and objectives, can lead to failure in achieving its vision. This situation happens in some instances when there are capacity challenges in an organisation, and when there are not enough people to ensure that the work is done.

5.1.5 Internal and external threats facing the organisation.

Other significant matters identified as impacting on the ability of the JRA to fulfil its mandate include the issue of constrained resources, high staff turnover, vandalism (which further constrains limited financial resources), and staff capacity issues that require further financial resources through training interventions. The identification of these matters indicates that the JRA faces an uphill battle in pulling the necessary resources (human and financial) to turn the tide and arrest the deterioration of the road condition index. Issues of vandalism require an integrated approach and collaboration with law enforcement agencies. Criminality should not be allowed to thrive and prevent state officials from fulfilling their responsibilities to tax paying citizens.

When road infrastructure is allowed to further deteriorate, this will make it even more difficult for the city to get more investment and collect more revenue. According to the city of Johannesburg (2022), economic growth in the city has dropped significantly over the last few years. Over the last decade, economic growth declined from 2.7% in 2011, moving into the negative at -5.3% in 2020. Economic growth decline indicates that the city is in a position

of collecting less revenue. The revenue goes into service delivery including the management and upgrading of the city's road infrastructure. Less revenue collection means less funds are allocated to road infrastructure management. The city has a population of six million, and this population is rapidly growing. It must be noted that revenue used to service this population is dwindling.

High staff turnover means that the institution loses skills and institutional memory at a fast rate. This has a negative impact on the stability of the organisation as staff are always on a path of learning about the systems and processes of the organisation; and when they are able to add value, they leave. Staff-retention strategies need to be developed to arrest this challenge. This is especially important for staff employed at the depots who undergo a lot of training to improve their skills in the maintenance of roads.

M&E has a lot of advantages that it can bring on board in improving the road network of the City of Johannesburg. When planning has been done well in terms of identifying the necessary KPA and the necessary interventions required to fulfil objectives then M&E intervenes by putting in place management systems that track performance and ensure timeous achievement of set targets. It is important that the tracking of performance is achieved by developing a set of holistic indicators that track achievement of key objectives. Without this in place it becomes difficult to determine if progress is being made.

Formative evaluation processes are used to test the adequacy of the programme design as a means of ensuring that the conceived outcomes, and impact, are achieved. Summative evaluations look back at programme implementation wherein emergent and intentional learning occurs because of evidence that emerges during implementation. This evidence varies from progress that is being made to achieve programme objectives—resulting in negative consequences for the project. This evidence and learning should influence decision making to refine or discard policy and improve programme implementation and its related outcomes.

5.2 Summary of findings

The summary of findings in relation to the research questions concludes that the JRA results-based M&E system is not fully effective; there are many areas that require development and improvement. Implementation evaluations are the only evaluations that are in place. These focus on assessing progress in programme/project implementation to determine achievement of set targets. Mid- and end of term reviews are the only form of evaluations that are used to assess this progress in implementation, as means of determining achievement of the targets of the five-year term.

Performance indicators are another area that requires attention. As much as it is not possible to measure absolute performance, it is important to have a set of performance indicators that measure the attainment of predetermined objectives and align to universal principles of road infrastructure management.

Other weaknesses are identified in the strategic documents of the organisation. There are no outcome indicators in place; the organisation focuses only on outputs. Outcome indicators are important to measure at the end of the five-year term as these give an indication if a programme is on track to achieve the intended impact and the overall predetermined objectives beyond outputs. The strategic plan is the foundation of a results-based M&E system in the public sector. In its development key strategic outcomes and priorities are identified. This leads to the breakdown of this information to important elements, including outcome indicators, outputs and their related indicators, activities linked to achieving the outputs and outcomes, and data collection instruments.

Intentional learning is currently not happening effectively as evaluations are not fully in place. Emergent learning attained through programme implementation is the only learning the organisation can engage in, which is not adequate given that many areas in which learning can occur are not fully explored.

The use of evidence in influencing policy and decision making is also limited as evaluations and empirical process to determine the strengths and weaknesses of programmes is not fully in place. Evidence is only accessed through monitoring processes an example is in tracking

performance of an indicator it can be determined that the organisation is on track to achieve its set targets within a set timeframe.

The results-based M&E system of the JRA is neither fully in place nor effective; more work needs to be done to strengthen all of its key components, as reflected above.

CHAPTER 6

6.1 Recommendations and conclusion

This chapter provides recommendations and the conclusion of the research findings. The recommendations provide direction as to how the JRA can strengthen its results-based M&E system. Also highlight in this chapter are commendations of good practice.

This study utilised qualitative methods to explore the effectiveness of the JRA results-based M&E system and identified the strengths and weaknesses of the system, and ways in which these systems can be improved.

It is important for senior management to lead from the front and promote a results-based M&E and learning culture. The workshopping of M&E-related functions, where necessary, is important. It is also important that sufficient allocation of human and material resources for conducting, supporting, and maintaining M&E activities is put in place. These steps will ensure that M&E is taken seriously, and staff will significantly become more engaged.

More work needs to be done to ensure the institutionalisation of results-based M&E. The development of an M&E framework, which is a policy framework that maps out M&E processes, is the first measure that the organisation needs to put in place. This is important as it will indicate that M&E is an integral part of the organisation. The JRA should also consider establishing relations with the DPME with the aim of ensuring that they get the necessary support in strengthening their results-based M&E system within the existing national policy frameworks.

The planning processes need to be aligned to existing results-based M&E guidelines. These include the revised framework for Strategic plans and Annual Performance plan (equivalent of the business plan) prescripts. Currently outcome indicators are not reflected in the organisations planning documents. Evaluation recommendations do not fully influence programme planning decision making because of very limited implementation of evaluations.

The JRA needs to fully engage the evaluation function. Currently, this function is deficient. Many important opportunities for learning and influencing decision making and policy are being missed. Once this evaluation system is in place, it is important that recommendations

emanating from evaluations are implemented, and that progress in implementation is documented in the annual report—as prescribed by the NEPF 2019. The mid- and end-term reviews that are currently happening in their limited capacity, need progress in implementation of documented recommendations. The prescribed mid- and end-term reviews are in place, which is commendable but require the full-scale implementation of the evaluation function.

The JRA needs to add more performance indicators to its current set of performance measures. The new indicators should include user satisfaction, corridor vegetation control, smoothness of ride, environmental impact, road safety, and compliance to inspection plans indicators. The adding of these indicators will ensure that the KPA for road infrastructure management have interventions put in place for their attention. The current set of performance indicators fit the set criteria of performance measures. These are time bound, specific, measurable and are realistic.

The sources and tools for collecting data for each performance indicator are not mentioned in the 2021/22 business plan but this information is available in the 2022/23 business plan, signifying that M&E processes are consistently being strengthened.

It is also important to note that the challenges of the JRA extend beyond M&E and include serious financial constraints and challenges with vandalism. The JRA receives its budget from its mother body, the City of Johannesburg, which currently does not generate enough revenue. This affects the allocation provided to all its entities and departments. The JRA can only function within its limited budget to fulfil its obligations. Vandalism, which is a crime, remains a significant challenge. The JRA needs support from law enforcement agencies to stamp out the scourge. Currently, the organisation uses its limited resources to reprocure stolen items this further constrains it from fulfilling its mandate.

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Appendix A

Key Informant interview schedule
1. What informs strategic planning processes?
2. Does the JRA conduct mid-term and end-term reviews?
3. Do the recommendations from these feedback into decision making?
4. Are set Performance Indicators adequate and do they cover all the KPA of road infrastructure management?
5. Do you feel enough is being done to actively engage M&E tools in all road construction, maintenance, and repair processes?
6. If not, where do the shortcomings lie?
7. What challenges is the organisation encountering in fulfilling its mandate?

Table 4. Interview schedule

Appendix C

Ethics Clearance, University Clearance certificate and Turnitin report