Cape Peninsula
University of Technology

MUNICIPAL INFRASTRUCTURE PROJECT PERFORMANCE: AN ASSESSMENT OF MUNICIPAL CAPABILITY THROUGH THE APPLICATION OF A PROJECT MANAGEMENT MATURITY MODEL

by

DENVOR RUAN CLOETE

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Supervisor: Dr C. J. Nel

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DECLARATION

I, Denvor Ruan Cloete, declare that the contents of this thesis represent my own unaided work and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Signed Date: 27 January 2024

ABSTRACT

Poor project performance is prevalent in developing countries, often considered to be poorly resourced. In South Africa there are pockets of excellence, but the country generally still requires improvement across national, provincial, and local governments. Studies have suggested that the successful utilisation of project management practices can contribute to addressing such poor project performance. To assess organisational capability in terms of project management practices, many different project management maturity models (PMMMs) have been developed over the last decade by different organisations. PMMMs are however not widely used in the South African government. A need therefore existed to study the available PMMMs and their applicability to determine the project management maturity of municipalities in the South African context.

As a result, this study aimed to assess municipal capability through the application of a project management maturity model by meeting the following objectives: 1) to identify and adapt an existing project management maturity model appropriate for this study; 2) to assess what level of project management capability Western Cape municipalities have through the application of the identified and adapted PMMM; and 3) to determine how Western Cape municipalities can improve their capability. To aid the process of achieving these objectives, six research questions were also formulated.

With regard to research methodology, a mixed-method design consisting of qualitative and quantitative data collection and analysis was selected. Data was collected through interviews with officials responsible for project management in six sampled municipalities. The interviews consisted of two sections. The first section consisted of a structured interview with close-ended questions, through which quantitative data was collected and analysed through an MS Excel-based model. The second section consisted of semi-structured interviews with open-ended questions, from which qualitative data was collected and analysed through thematic analysis.

The study successfully achieved its objectives and thereby the overall aim. Firstly, the PM Solutions PMMM was identified as an appropriate project management maturity model for this study. Secondly, through the application of this model, the maturity ratings of Western Cape municipalities were determined as a level 3 (out of 5). Thirdly, the study identified five themes of challenges municipalities experience, and proposed five thematic areas of improvement interventions, namely to improve human capacity, strengthen stakeholder management, enhance leadership and management oversight, address funding constraints, and enhance procurement regulations.

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DEDICATION

For

our two baby girls, Daisy and Diana in heaven.

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LIST OF ABBREVIATIONS AND ACRONYMS

CCPM	Critical Chain Project Management
CMMI	Capability Maturity Model Integration
CPM	Critical Path Method
DCOG	Department of Cooperative Governance
DLG	Department of Local Government
DPLG	Department of Provincial and Local Government
DWS	Department of Water and Sanitation
IDP	Integrated Development Plan
IPMA	International Project Management Association
KPMMM	Kerzner's Project Management Maturity Model
NPM3	National Project Management Maturity Model
MISA	Municipal Infrastructure Support Unit
MMM	Management Maturity Model
OPM3	Organisational Project Management Maturity Model
P2MM	Prince2 Maturity Model
P3M3	Portfolio, Programme & Project Management Maturity Model
PERT	Programme Evaluation Review Technique
PM2	Berkeley PM Maturity Model
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PMM	Prado's Project Management Maturity Model
PMMM	Project Management Maturity Model
PMU	Project management unit
PM PMMM	PM Solutions Project Management Maturity Model
PRINCE	Projects in Controlled Environments
PPS	Project Planning and Scheduling
OCG	Office of Government Commerce
WBS	Work Breakdown Structure

CHAPTER 1 INTRODUCTION

1.1 Introduction

This study aimed to assess the project management capability of municipalities within the Western Cape, South Africa, through the application of a project management maturity model. This chapter provides an overview of the research undertaken and introduces the foundation concepts.

It includes the research problem, aim, objectives, and research questions as formulated to guide the research process. The chapter further discusses the delineation, significance, and expected outcomes of the research. Finally, a summary of the research methodology is provided as well as an overview of the thesis structure and a brief description of the chapters to follow.

1.2 Background to the research problem

Infrastructure projects delivered by municipalities are often late, over budget, and/or outside the approved scope (Hatamleh et al., 2020:17; Aftab et al., 2016:511; Fernandes et al., 2015:1052). Hatamleh et al. (2020:17) noted that implementing successful projects in developing countries is often uncertain, while Aftab et al. (2016:511) concluded that projects in the construction industry often experience poor performance related to cost, time, and quality.

This leads to slow progress of infrastructure development and service delivery goals which further delays economic growth in developing countries (van der Walt, 2020:1; Hatamleh et al., 2020:18). Van der Walt (2020:1) stated that poor implementation of project management practices negatively affects the government's capability to implement programmes and projects successfully, while Hatamleh et al. (2020:18) noted that the performance of infrastructure projects should be a priority given the significant role that the sector plays in developing countries. Van der Waldt (2020:1) further confirmed there is a huge lack of knowledge of project management within the South African government. The extent to which poor project management contributes to poor project performance in Western Cape municipalities is however not known.

Previous studies have found that poor project performance may result from a wide range of factors. These include the unsuccessful implementation of project management practices (Alkhlaifat et al., 2019:47; Badewi, 2016:761; de Carvalho et al., 2015:1510; Mir & Pinnington, 2014:215) the competence of the project manager and team members as well as the organisational structure and cultures (Pretorius et al., 2012:3); project governance factors

(Chikwem, 2019:5) and political interference; and owner centredness (Ninan et al., 2021:7). It is therefore critical that organisations be able to identify which specific factors affect their specific performance. Authors have demonstrated that project management maturity models can be used to identify the specific project management knowledge areas that require improvement to enhance capability and project performance (Backlund et al., 2014:837).

1.3 Problem Statement

Based on the scientific and knowledge gap that exists within the body of research as described above, a need exists to analyse existing project management maturity models to identify and adapt an existing model; and to apply it to selected municipalities to assess their project management capabilities and to determine key areas for improvement in the Western Cape.

The problem statement for this research has therefore been formulated as follows:

> *Poor infrastructure project performance is still prevalent within municipalities. Although a wide range of options exists to assess project management capabilities and define improvement strategies, these are not widely used in the Western Cape, South Africa, due to a lack of research and awareness.*

1.4 Aim and Objectives

The first step in addressing and solving the research problem indicated above is to identify an aim that can be used as a guide to the researcher in exploring the different aspects of the research problem. The research aim was as a result formulated as follows:

> *To assess municipal project management capability through the application of a project management maturity model.*

Figure 1.1 below depicts the development of the research aim as formulated from the research problem.

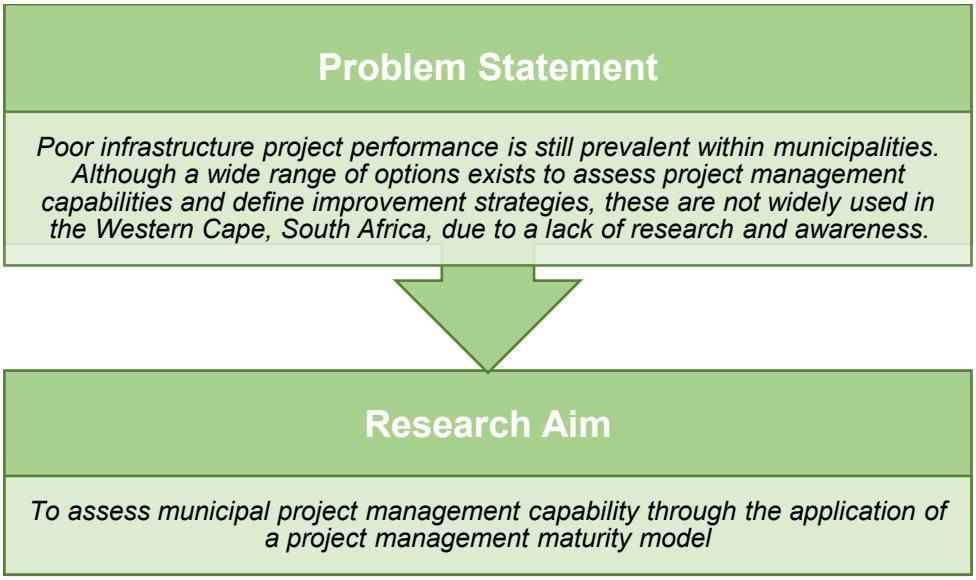


Figure 1.1: Research overview: formulation of research aim

To achieve this aim the researcher first needed to identify an appropriate maturity model; secondly to apply the model to determine the project management maturity of municipalities; and then thirdly to explore ideas towards improvement. Consequently, three objectives were derived from the research aim, which are stated and described in the sections to follow.

1.4.1 Objective 1

The first objective derived from the research aim follows, after which the purpose for the objective is given as well as in which chapter it will be addressed.

> ***Objective 1:*** *To identify and adapt an existing project management maturity model appropriate for this study.*

The purpose of this objective was to identify a project management maturity model (PMMM) that can be adapted for this study. This was an important objective as it formed the basis upon which the balance of the research was undertaken. The objective will therefore be addressed in a dedicated chapter (Chapter 3: Project Management Maturity Models), through which the available maturity models will be reviewed and analysed to identify and adapt an appropriate model for this study.

1.4.2 Objective 2

Subsequent to the first objective being addressed, the next step was to apply the selected model in the context of this research, thereby contributing to reaching the overarching aim stated above. The second objective was therefore formulated as follows:

> ***Objective 2:*** *To assess what level of project management capability Western Cape municipalities have through the application of the identified and adapted PMMM.*

This purpose of the objective was to apply the adapted PMMM to sampled municipalities in the Western Cape to assess their current project management capabilities. Objective 2 will be addressed in Chapter 5 (Project Management Maturity of Western Cape municipalities).

1.4.3 Objective 3

The third objective that added to achieving the research aim and thereby addressing the research problem is stated below:

> ***Objective 3:*** *To determine how Western Cape municipalities can improve their capability.*

Following the assessment of the project management capability of the municipalities, the purpose of this objective was to determine what interventions can be used to improve the current levels of maturity that exist in these municipalities. The objective is addressed in Chapter 6 (Interventions towards Improved Capability).

As noted above, each of the objectives was developed to contribute towards achieving the aim of the research and addressing the research problem. Figure 1.2 below presents the connection between the problem, aim, and objectives of this research.

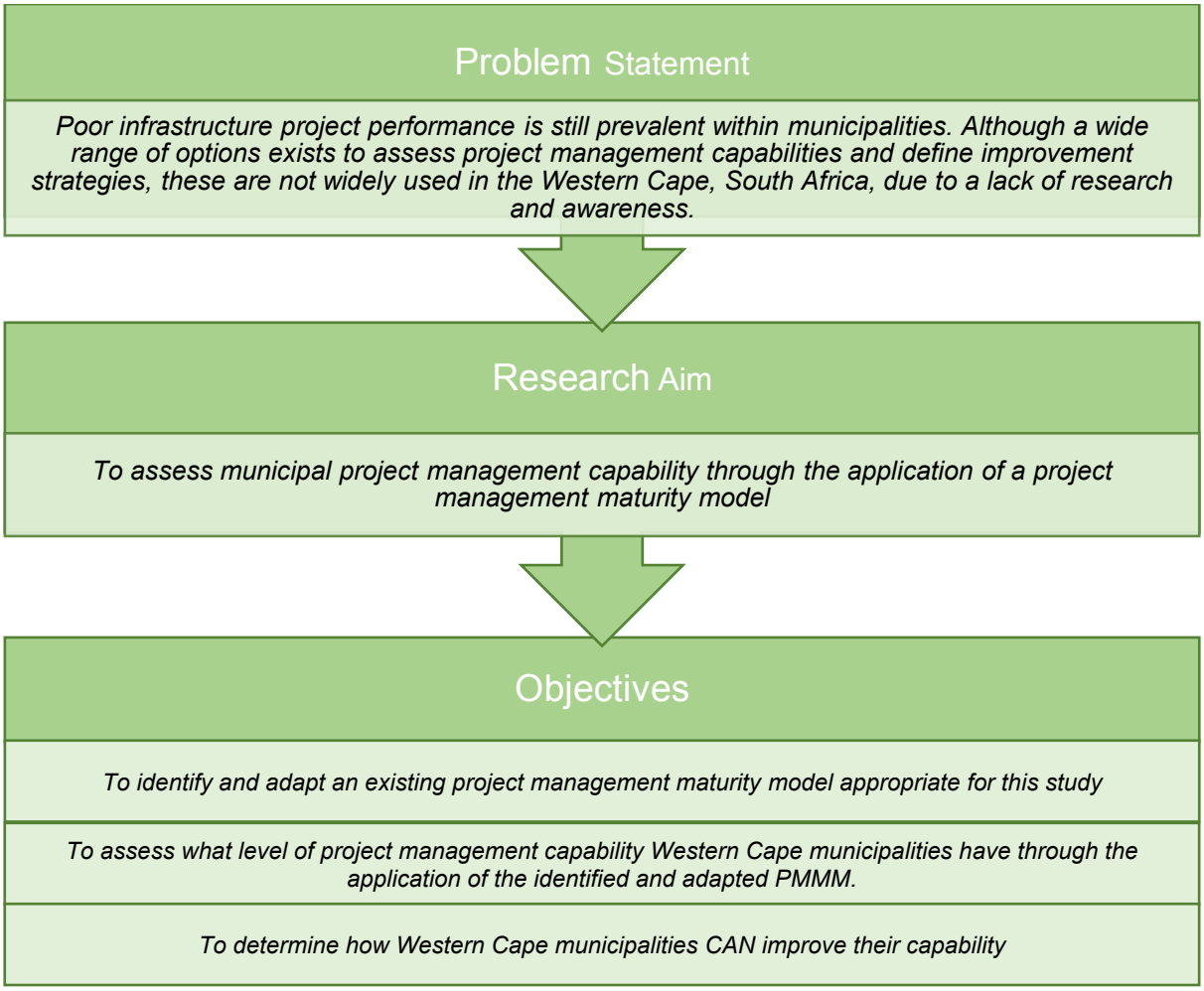


Figure 1.2: Research overview: formulation of research objectives

1.5 Research Questions (RQs)

In the previous sections, the research problem, aim, and objectives were stated as well as the reasoning behind how these interlink with each other within the study. To further assist with achieving the aim of this study and to aid the structuring of the thesis, the following research questions were formulated.

1.5.1 Research Questions 1, 2 and 3

The following three research questions were formulated to contribute towards addressing objective 1:

> ***RQ 1:*** *How will the existing project management body of knowledge influence the identification of a project management maturity model?*

This research question is answered in Chapter 2 (Literature Review) by discussing general project management concepts, the history and development of project management as well as specific methodologies.

> ***RQ 2:*** *How will the local conditions of Western Cape municipalities influence the identification of a project management maturity model?*

In Chapter 2, the purpose and function of municipalities, the level of service delivery and infrastructure development, and the overall perceived level of project management capability of municipalities in general are discussed to answer the above question.

> ***RQ 3:*** *What project management maturity models exist and what model can be identified and adapted for this study to serve as an assessment questionnaire?*

Research question 3 is answered in Chapter 3 (Project Management Maturity Models). The chapter includes a detailed description of the available maturity models and an analysis of these models, based on the local conditions of the municipalities. The chapter further includes the development of the first part of the research instrument (questionnaire).

1.5.2 Research Question 4

The following research question was formulated to contribute towards addressing objective 2:

> ***RQ 4****: What is the project management capability of Western Cape municipalities?*

This research question is answered in Chapter 5, following the analysis of the results received from the application of the identified PMMM.

1.5.3 Research Questions 5 and 6

The following research two questions were formulated to contribute to addressing objective 3:

> ***RQ 5:*** *What are the main challenges that limit the improvement of project management capability in municipalities?*

Research question 5 is answered in Chapter 6. It is based on the results and discussion of the second part of the questionnaire.

> ***RQ6:*** *What ideas and interventions can be proposed towards improving the current levels of maturity that exist in the municipalities?*

Based on the results as obtained, ideas and interventions are proposed in Chapter 6 towards improving the current levels of project management maturity that exist in municipalities of the Western Cape.

Up to this point, the basic foundation of the research has been presented, consisting of the problem statement, research aim, objectives, and research questions as presented in Figure 1.3 below.

Problem Statement

Poor infrastructure project performance is still prevalent within municipalities. Although a wide range of options exists to assess project management capabilities and define improvement strategies, these are not widely used in the Western Cape, South Africa, due to a lack of research and awareness.

Research Aim

To assess municipal project management capability through the application of a project management maturity model

Objectives	Research questions	Chapter
To identify and adapt an existing project management maturity model appropriate for this study	*How will the existing project management body of knowledge influence the identification of a project management maturity model?*	*Chapter 2*
	How will the local conditions of Western Cape municipalities influence the identification of a project management maturity model?	*Chapter 2*
	What project management maturity models exist and what model can be identified and adapted for this study to serve as an assessment questionnaire?	*Chapter 3*
To assess what level of project management capability Western Cape municipalities have through the application of the identified and adapted PMMM.	*What is the project management capability of Western Cape municipalities?*	*Chapter 5*
To determine how Western Cape municipalities can improve their capability	*What are the main challenges that limit improvement of project management capability in municipalities?*	*Chapter 6*
	What ideas and interventions can be proposed towards improving the current levels of maturity that exist in the municipalities?	*Chapter 6*

Figure 1.3: Research overview: formulation of research questions

1.6 Delineation

Given the broadened scope of project management, it is important to state the limitations of this study to ensure the correct application and reading of it within the context of what specific research problem the study intends to address and what aims it intends to achieve.

Based on the research problem as stated in the above sections, it is important to note that this research study only considers the project management capabilities of Western Cape municipalities within the South African context. Project management capability will further only be assessed in the context of infrastructure projects.

It is further necessary to state that the research primarily addresses an academic and knowledge problem with the purpose of fulfilling the requirements of the Master of Engineering degree.

1.7 Significance of Research

Notwithstanding the above limitations of this research, it still intends to make a valuable contribution to the body of knowledge.

Firstly, this research provides a new analysis of 12 of the most frequently used project management maturity models within the South African municipal context, which could aid future research studies. As a result, other researchers could use this analysis in similar studies within other provinces of South Africa, without having to conduct an in-depth study of these maturity models.

Secondly, this research is expected to provide a deeper understanding of the project management capabilities that exist within municipalities in the Western Cape, South Africa. The research not only provided the overall project management maturity of municipalities but also the specific knowledge areas that require improvements. This will assist interested stakeholders to focus on these specific areas and thereby maximize their efforts towards improvement.

Thirdly, it is expected that the findings of the study will specifically assist municipalities to improve their project management maturity and therein their capability by providing improvement interventions to successfully implement infrastructure projects that will enhance service delivery, economic growth, and development.

1.8 Expected Outcomes

The significance of the research implies that there must be very specific outcomes flowing from the research study. These outcomes must further be aligned with the research objectives.

The reader is reminded that the aim of the research was to assess project management capability by applying a project management maturity model.

It was therefore expected that the research produce the following outcomes:

- The identification and adapting of an existing project management maturity model;
- The assessment of project management capability in Western Cape municipalities; and
- The development of interventions of how Western Cape municipalities should improve their capability.

1.9 Overview of Research Methodology

This section briefly introduces the methodology applied in this research. A detailed description is provided in Chapter 4: Research Methodology.

Based on the philosophical belief of the researcher, the ontology for this research was selected as objectivism and the epistemology as positivism. The researcher further followed an inductive approach to theory development. Given the research aim, objectives, and research questions of this study, a mixed-method research design was selected, consisting of both qualitative and quantitative data collection and analysis.

Data was collected through interviews with officials responsible for project management in sampled municipalities that were selected as the cases for this study. The interviews consisted of two sections. The first section consisted of a structured interview with close-ended questions, through which quantitative data was collected. The second section consisted of semi-structured interviews with open-ended questions through which qualitative data was collected. The quantitative data was analysed through a Microsoft Excel-based model that determined the project management maturity models of sampled municipalities. The qualitative data obtained in this research was analysed through thematic analysis, including coding, categorising, and developing themes.

Data was collected through six sampled municipalities. Taking into consideration the type of research, and the different types, sizes, and perceived capabilities of the municipalities, the sample was taken through a combination of probability sampling and non-probability sampling.

1.10 Overview of the Remaining Thesis Chapters

Literature Review Chapters

Chapter 2: Project Management Theory and Municipal Context

This chapter provides the first part of the study's literature review. Key literature supporting the research problem and research questions are discussed, including a detailed description of project management theory, and the project management capability of municipalities in the Western Cape municipalities.

Chapter 3: Project Management Maturity Models

Chapter 3 is dedicated to the key concept of this study, namely project management maturity models. The chapter firstly describes the available project management maturity models, and secondly provides an analysis of these models, with the aim of selecting an appropriate model for the study.

Chapter 4: Research Methodology

In this chapter, the methodology used in this research study is described in detail. The research methodology serves as a strategic guide that outlines how the research will be undertaken. The chapter will therefore firstly include an overview of accepted research methodology theory. Secondly, the methodology chosen for this research is explained with theoretical justification. Thirdly, the chapter details the sampling techniques used.

Results and Discussion Chapters

Chapter 5: Project Management Maturity of Western Cape Municipalities

Chapter 5 presents and discusses the results obtained in this study. This includes the project management capability assessment conducted in the sampled municipalities, based on the selected model as defined in Chapter 3, and the methodology as described in Chapter 4.

Chapter 6: Interventions towards improved capability

Interventions to improve the project management capability of municipalities in the Western Cape are proposed in Chapter 6. These are based on the results obtained in the study, following a thematic analysis of the interviewee responses related to this area.

Chapter 7: Conclusion and Recommendations

This chapter concludes the thesis through a review of the objectives and research questions, thereby confirming to what extent the aim of this work was achieved. The chapter further outlines recommendations flowing from this work as well as suggestions for future studies.

To visualize the connection and flow of the chapters within the thesis, a schematic overview is provided on the next page that depicts the content as noted above.

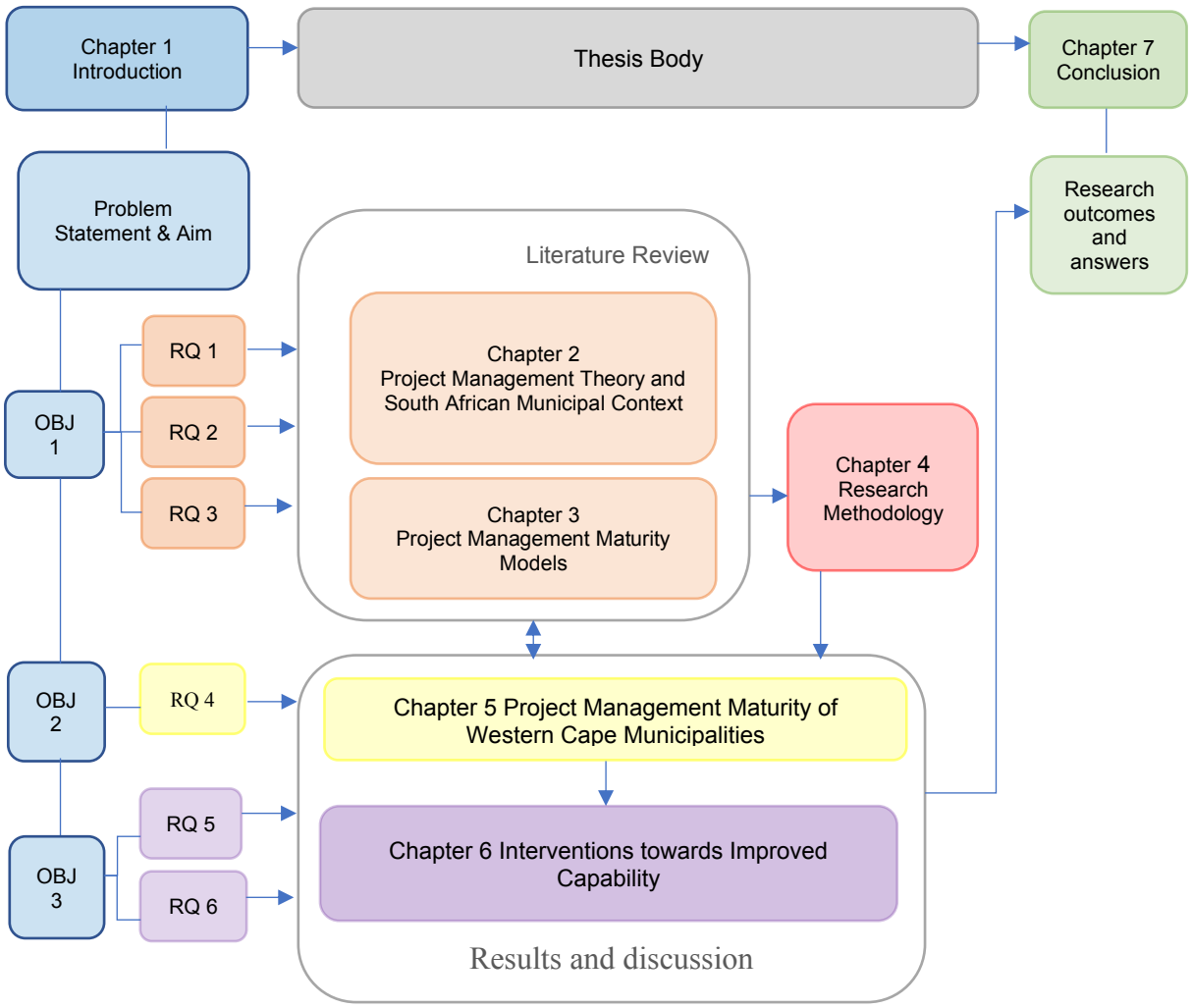


Figure 1.4: Thesis structure

1.11 Chapter Summary

This chapter provided an introduction to the thesis with an overview of the research and an indication of what can be expected throughout the rest of the thesis chapters. It included the research problem, aim, objectives, and research questions. The chapter further discussed the delineation, significance, and expected outcomes of the research. Finally, a summary of the research methodology was provided as well as an overview of the thesis structure and a brief description of the chapters to follow.

The next two chapters discuss the literature supporting the research. Chapter 2 discusses literature related to project management theory and the its context in South Africa, while Chapter 3 will discusses literature related to available project management maturity models.

CHAPTER 2 PROJECT MANAGEMENT THEORY AND MUNICIPAL CONTEXT

Chapter 1 provided an overview of the research, including the research problem, aim, objectives, and research questions. The chapter confirmed that there is a research-worthy problem to investigate. The following two chapters present the literature review of the study (Figure 2.1), as the first step towards addressing the research problem.

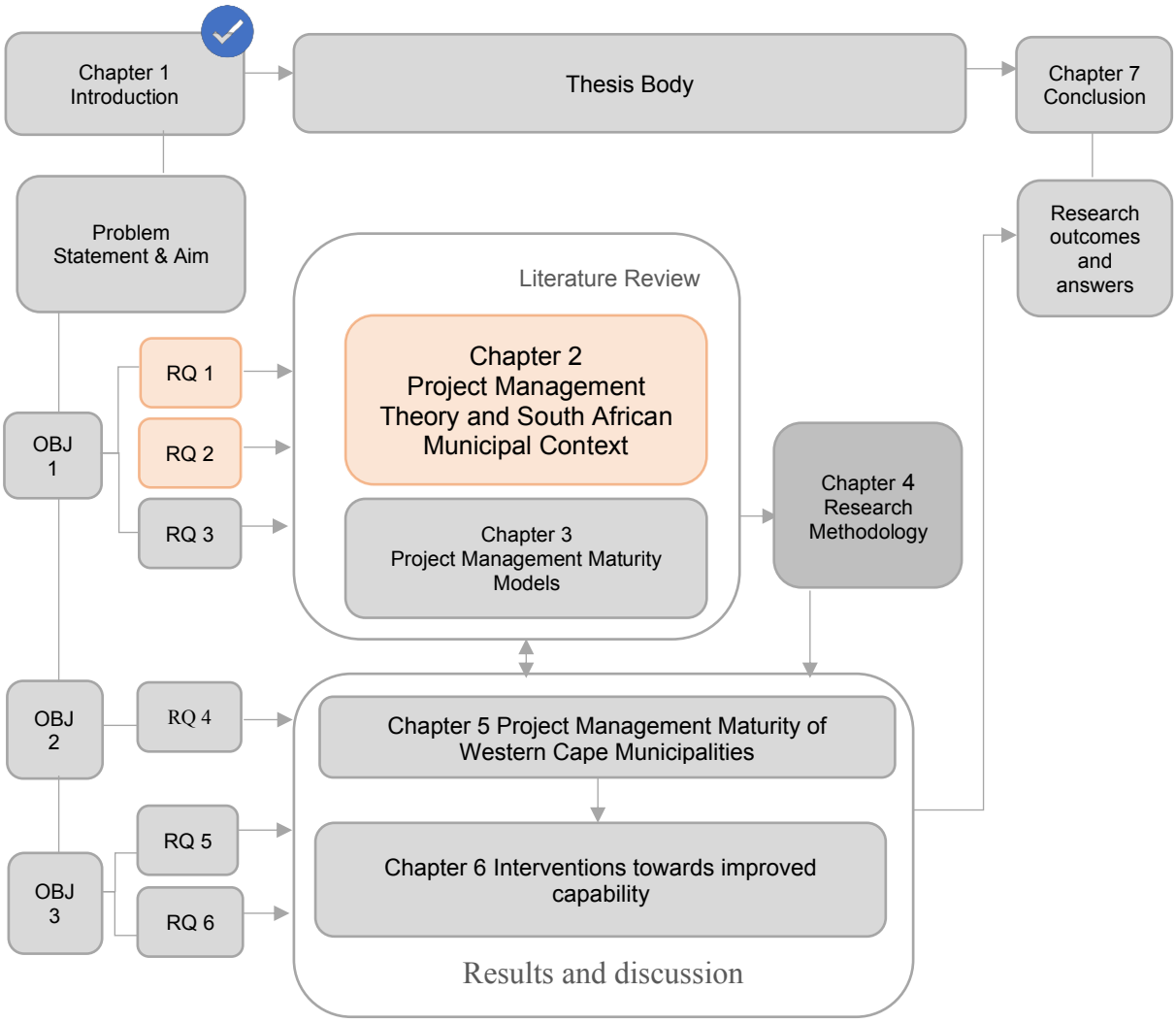


Figure 2.1: Graphic representation of Chapter 2 and thesis progress

2.1 Introduction

The literature review of a study forms a foundation to guide the research and ensure that the work does not repeat previous studies but addresses a research-worthy problem and a specific gap in the body of knowledge. This literature review was drafted based on the two foundational concepts of this research, namely project management theory and project management maturity models. Given the extent and importance of these concepts, it was decided to dedicate a chapter to each of them.

This chapter therefore presents the first part of the literature review and includes the following:

- Project management theory, to detail the foundational concepts supporting the research and to provide a basis to answer research question 1, including:
    - Key concepts to provide definitions in the context of this study;
    - History and development of project management theory to demonstrate the growth of the industry over time;
    - Project management methodologies that will influence the selection of a project management maturity model.

- Project management in municipalities, with a specific focus on Western Cape municipalities is discussed to demonstrate the current state of affairs, and to explore which conditions may influence the identification of a PMMM in answering research question 2, including:
    - Purpose and function of municipalities;
    - The state of basic service delivery;
    - The documented project management capabilities of municipalities.

Chapter 2 therefore answers the following two research questions:

> ***RQ 1:*** *How will the existing project management body of knowledge influence the identification of a project management maturity model?*
>
> ***RQ 2:*** *How will the local conditions of Western Cape municipalities influence the identification of a project management maturity model?*

2.2 Project Management Theory

This section describes the key concepts, and the history and development of project management and provides literature on the different approaches and methodologies. The purpose of this section is to reflect on the key theory of the main broad topic area of this research to ensure that further work aligns with the generally accepted body of knowledge.

2.2.1 Key Concepts: Definitions and Context

It is expected that the reader of this work may be familiar with project management knowledge. There are however slight differences in the definition, application, and approach of key concepts related to this work. It is therefore the aim of this section to define key terms within the context of this research study.

2.2.1.1 Projects

In his book *Reconstructing Project Management,* Morris (2013:12) defines a project in these terms: “Projects are an undertaking to realize an idea”. The Project Management Institute (PMI) defines a project as a “temporary endeavour undertaken to create a unique product, service or result” (Project Management Institute, 2017). Projects, therefore, have the following characteristics as depicted in Figure 2.2 below:

- Projects are temporary with a definite beginning and end;
- Projects create a unique product, service, results, or combination of the above-mentioned. Projects, therefore, fulfill specific organisational objectives aligned with strategy by producing deliverables.
- A project enables change in an organisation by moving it from a current state to a future desired state in line with the organisational vision and mission.
- Projects facilitate business value creation, which may be tangible such as monetary assets, fixtures, etc., or intangible, such as goodwill, public benefit, and reputation.

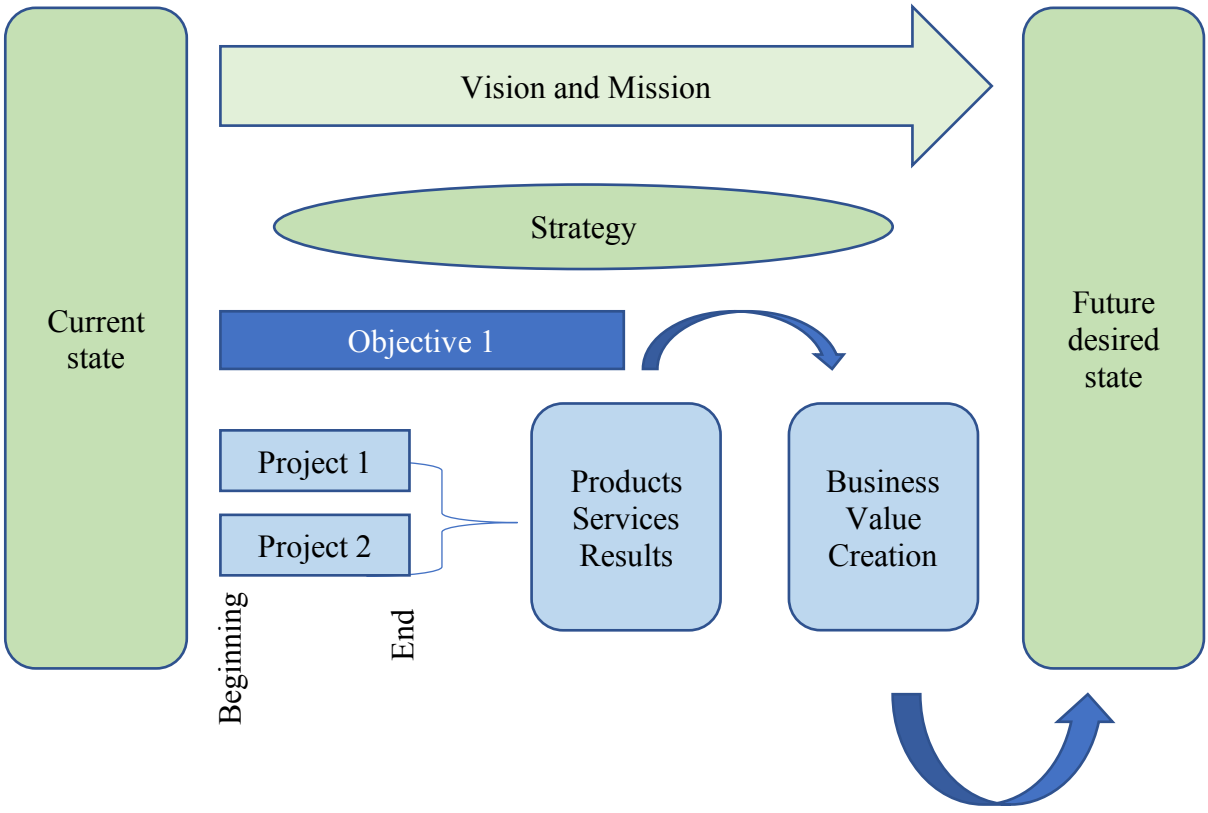


Figure 2.2: Graphic representation of projects

Within the context of municipalities, projects are often undertaken with the objective of improving service delivery in communities. Municipalities generally plan in five-year cycles with

the development of their Integrated Development Plan (IDP), which sets out their vision, mission, and strategic objectives for the planning horizon. Projects are subsequently identified through various means to meet these objectives (Nel, 2001:610; Brown & Botha, 2005:3).

Given the context of this study, 'projects' will mainly refer to municipal infrastructure (construction) projects.

2.2.1.2 Project, Programme, and Portfolio Management

Portfolio, programme, and project management often interact and align within organisations. Projects may be executed individually, or within a programme or a portfolio, depending on the organisation's requirements and objectives. A programme may consist of multiple projects that share the same objectives, which are grouped to ensure coordinated implementation. Portfolios may be used to effectively manage programmes and projects to achieve organisational strategic objectives.

Project management is defined by the PMI as the "application of knowledge, skills, tools, and techniques to project activities to meet the project requirements". Project management ensures that projects are executed effectively and efficiently therein creating business value by meeting the organisational objectives (Project Management Institute, 2017).

According to Brown and Botha (2005:3), effective project management is critical in municipalities to ensure the implementation of their IDPs. In his study on project management in municipalities, Nel (2001:610) highlighted that project management often includes the following phases in municipalities:

- Conception: identification and formulation of new projects as influenced by the IDP. The process should ensure that identified projects address the needs of the communities and directly contribute to the strategic objectives of the municipality.

- Preparation: includes various processes, such as planning for the project components, risk analysis, and stakeholder identification amongst others. Typically, this phase also includes funding applications.

- Implementation: ensuring the efficient and effective use of allocated human and financial resources through monitoring and control to reach the project objective.

- Evaluation: verifications and assessments to determine to what extent the project objectives have been achieved.

Programme management is defined as the "application of knowledge, skills, and principles to a programme to achieve programme objectives and to obtain benefits and control not available by managing programme components individually" (Project Management Institute, 2017).

In municipalities, programmes are often formed around the following two principles:

- Funding Mechanism:
  Municipal infrastructure projects are generally externally funded by national grants. To this extent, municipalities form programmes that group projects funded by the same grant (Mokgethi & van der Waldt, 2020:130).

- Basic Services:
  Programmes can also be arranged according to the service they intend to address. A municipality may form a programme for all water-related projects, and another for all road-related projects (van der Waldt, 2014: 853).

Portfolio management is the centralised management of one or more portfolios to achieve strategic objectives (Project Management Institute, 2017).

Programmes and projects in municipalities are generally clustered in portfolios based on their strategic objectives. As an example, a portfolio may consist of all the basic services programmes to improve service delivery, while another portfolio may include citizen-centric programmes to enhance public participation.

Figure 2.3 below provides a schematic layout that depicts the relationship between portfolio, programme, and project management.

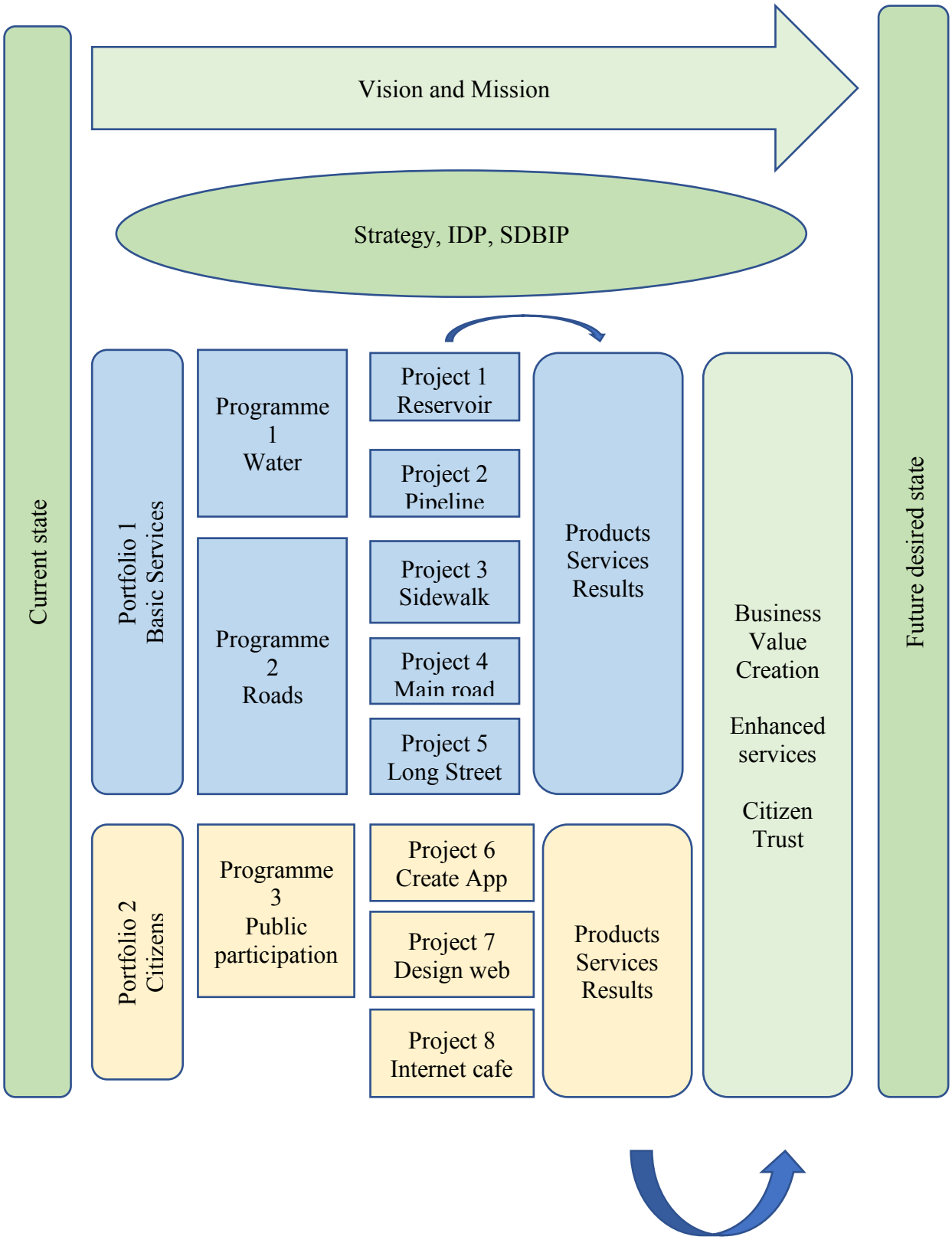


Figure 2.3: Graphic representation of portfolios, programmes, and projects in the context of municipalities

2.2.1.3 Project Manager

The Project Management Institute defines a **project manager** simply as someone who leads the project team and who has the responsibility of achieving the project objectives. The role and function of a project manager however may differ, depending on the specific organisation or the specific project that they manage. Notwithstanding the above, there are common roles, responsibilities, and characteristics of project managers (Project Management Institute, 2017).

Project managers require several competencies to be successful. According to PMI (2017), the following summarises the three most important skill sets a project manager should have:

- Technical project management
  The skills and knowledge within the areas of portfolio, programme, and project management, as well as technical aspects related to the role.

- Leadership
  The knowledge and skills required to motivate, direct, and guide the project team to achieve the project objectives.

- Strategic and business management
  The knowledge and expertise in the specific industry are required to enhance the delivery of business outcomes and value creation.

2.2.2 History and Development of Project Management

The section above provided an overview of key concepts within project management to ensure alignment for the rest of the work to follow. It is important to reflect on how these concepts were developed over time.

The aim of this study is to apply a project management maturity model. PMMMs, as with other project management tools, have been developed over time. The purpose of this section of the literature review is therefore to provide a brief overview of the development of project management from prehistoric times to the current era.

2.2.2.1 Prehistoric to ancient times

The definition of Morris (2013:12), as indicated above, implies that projects have been implemented by people since the beginning of human social organisation. Examples of early projects include cave paintings, hunting, and cooking food around 35 000 BC. As humans developed, larger and more complex projects were introduced, which included the Giza

Pyramids (2700–2600 BC) and Stonehenge (3000–1600 BC) (Morris, 2013:13–14). These projects required someone to lead large groups of people over many years to construct them and ensure that they complied with the requirements of the owner at the time. There are however opposing views that these early projects may have had no budget and time limits, and therefore it cannot be assumed that project management would have been applied. The consensus though is that project management would have been very different during ancient times, but that the key principles of planning, executing, and monitoring would have still applied. Furthermore, it can be said that the skills, knowledge, processes, and tools of project management have incrementally improved and developed over time (Seymour & Hussein, 2014:233–234).

People however did not think of themselves as project managers nor was the concept of project management known during and before ancient history (Morris, 2013:14). This may be because the educated class of the time was not concerned with the methodology of the projects, but rather the final product. The working class figures managing and building these projects further may not have seen the importance of recording their methods. Another reason may be that the execution of these projects was kept secret in certain families that specialised in the work and carried on from one generation to the next (Seymour & Hussein, 2014:234).

2.2.2.2 Modern history

It was only during the 19th and 20th centuries that project management theory showed signs of development. According to a historical analysis by Seymour and Hussein (2014:234), two prominent people contributed to the early formulation of project management theory and tools.

Firstly, Henri Fayol who lived between 1841 and 1925 developed five functions of management, namely planning, organising, commanding, coordinating, and controlling. He further created an additional 14 principles that guided the implementation of the five functions. These functions of management stood the test of time and were continuously reinforced and refined with newer developments. Secondly, Henry Gantt (1861–1919), an American engineer and management consultant, contributed to the development of project management tools. For example, Gantt formally developed the Gantt Chart in 1917. This development indicates that the project managers of the time recognised the need to break down large projects into smaller manageable components. The Gantt chart were initially used in large projects during World War I and later in the construction of the Hoover Dam. These projects led to the adoption of the Gantt chart all over the world (Seymour & Hussein, 2014:135).

‘Project management’ as a term however only appears in texts around 1952 in the US Air Force. Later in the 1950s, other project management tools such as the Critical Path Method

(CPM) (1957–1959) and the Programme Evaluation Review Technique (PERT) (1961–1962) were developed (Morris, 2013:14). The PERT was developed as part of the United States Navy Polaris project, considered to be the first submarine-launched ballistic missiles carrying nuclear warheads. The project was complex with uncertain schedules. The PERT therefore assisted the management team with visualising the different scheduling options. The development of the CPM was a result of a major construction project undertaken by the E.I. du Pont de Nemours Company. The company required a tool to accurately estimate the time and cost of the project and therefore developed what was first called Project Planning and Scheduling (PPS). The technique was then later refined and named the Critical Path Network (Seymour & Hussein, 2014:235).

The concept of project management continued to grow and develop to the extent that project management associations started to be established to formalise project management knowledge (Morris, 2013:51). According to Seymour and Hussein (2014:235) the first association formed was the International Project Management Association (IPMA) during 1965. A second association called the Project Management Institute (PMI) was later founded in 1969 in the USA. The PMI further published the first edition of the *Guide to the Project Management Body of Knowledge* (*PMBOK*) during the 1980s. This period is also known for the advancement of computer software programmes which allowed for the analysis of complex projects.

2.2.2.3 Recent Developments

Over the last four decades, project management has developed significantly, given the ongoing need for quality project managers to drive the global economy. In addition, new ideas and approaches have emerged to enhance project management performance. Several new processes, methods, and tools were developed by different organisations and professionals. This is evident in the subsequent publications of the *PMBOK* by the PMI, now in its 7th edition (Bushuyev & Wagner, 2014:303); the development of Projects in Controlled Environments (PRINCE) and PRINCE2; and the creation of an alternative to CPM and PERT, called the Critical Chain Project Management (CCPM) (Seymour & Hussein, 2014:236).

Organisations have also become more complex, with a volatile mixture of issues, including politics, economical constraints, legislation, enhanced environmental concerns, and new technologies. These complexities require a more flexible approach to project management. This has led to new adaptive approaches such as agile and iterative methods (Van der Waldt, 2011:5). According to a study by Whiteley et al. (2021:26), the Agile manifesto was published in 2001, although evidence exists that suggests earlier application of the approach. Adaptive

approaches provide for enhanced management of projects in complex changing environments (Van der Waldt, 2011:10).

2.2.3 Project Management Methodologies

The previous section highlighted the continuous development of project management over time. It is therefore important for project managers to constantly grow and educate themselves in the latest developments. This fact will be a key informant of the methodology and questionnaire to be used in this work.

Given this reflection, the literature review will now delve into current project management methodologies. This section therefore aims to review the accepted methodologies, including processes, tools, and knowledge of project management. This is important for the study to establish a foundation on which the selection and amendment of a project management maturity model will be based, and to ensure alignment with the generally accepted project management concepts.

The review will include an analysis of one most known approaches to project management, namely, the *Guide to Project Management Body of Knowledge*, 6th edition (*PMBOK® Guide*) as published by the Project Management Institute as well as how the processes and knowledge area relates to municipalities.

2.2.3.1 Project Management Processes and Knowledge Areas

Effective project management is achieved through the application of processes that logically group together. Project management processes are activities that are logically linked by the outputs they produce which aid the management of the project. These processes are grouped as follows (Project Management Institute, 2017):

- Initiating Process Group which is performed to define a new project;
- Planning Process Group which is to establish scope, time, and cost;
- Executing Process Group which refers to a process to complete the work;
- Monitoring and Controlling Process Group which includes processes to track, review, and regulate the progress and performance; and
- Closing Process Group which is performed to formally complete the project.

The Project Management Institute further defines the project management knowledge areas. These include Project Integration Management, Project Scope Management, Project Schedule Management, Project Cost Management, Project Quality Management, Project Resource

Management, Project Communication Management, Project Risk Management, Project Procurement Management, and Project Stakeholder Management (Project Management Institute, 2017).

The processes, process groups, and knowledge areas as defined by the PMBOK are interrelated and can be presented as follows:

Table 2.1: PMBOK process groups, knowledge areas, and processes (PMI, 2017)

Knowledge Area	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
Project Integration Management	Develop project charter	Develop project management plan	Direct and manage the project work	Monitor and control the project work Perform integrated change control	Close project or phase
Project Scope Management		Plan scope management Collect requirements Define scope Create work breakdown structure		Validate scope Control scope	
Project Schedule Management		Plan schedule management Define activities Sequence activities Estimate activity durations Develop schedule		Control schedule	
Project Cost Management		Plan cost management Estimate cost Determine budget		Control cost	
Project Quality Management		Plan quality management	Manage quality	Control quality	

Project Resource Management		Plan resource management Estimate activity resources	Acquire resources Develop team Manage team	Control resources	
Project Communication Management		Plan communications management	Manage communication	Monitor communication	
Project Risk Management		Plan risk management Identify Risk Perform qualitative risk analysis Perform quantitative risk analysis Plan risk responses	Implement risk responses	Monitor risks	
Project Procurement Management		Plan procurement management	Conduct procurements	Control procurements	
Project Stakeholder Management	Identify stakeholders	Plan stakeholder management	Manage stakeholder engagement	Monitor stakeholder engagement	

Processes are performed within each knowledge area as depicted above. Each knowledge area typically includes a plan for the area and processes to execute, monitor and control work related to the knowledge area. The knowledge areas can be described as follows (Project Management Institute, 2017).

2.2.3.2 Project Integration Management

According to the Project Management Institute (2017), integration management can be characterised by consolidating, communicating, and unifying relationships. This knowledge area includes activities that identify, define, coordinate, combine, and unify all the processes within the process groups. The processes as depicted in Table 2.1 above can be described as follows (Project Management Institute, 2017):

- Develop project charter: this includes developing a document that authorizes the existence of a project.

- Develop project management plan: the process of defining, preparing and coordinating all components of the main project plan.
- Direct and manage work: this process includes performing the work as per the agreed project management plan.
- Manage project knowledge: the process of utilising existing knowledge and creating new knowledge.
- Monitoring and control project work: includes tracking, reviewing, and reporting project performance and progress.
- Perform integrated change control: the process of reviewing, approving, and managing change requests.
- Close project or phase: finalising all activities within the project or phase.

The project charter is very important as it relates to initiating a project in the municipalities. In his study, van der Waldt (2011:73) mentions that projects can only be a success when the right conditions exist. It is therefore important for project managers in municipalities to ensure that the project management plan define all components of the project plan and that effective integration management throughout the different processes are implemented.

2.2.3.3 Project Scope Management

Following the initiation of the project, the next main step usually occurs within the Project Scope Management knowledge area. This includes processes to ensure that the project consists of all the work required, but not more than what is required. Scope Management processes include the following (Project Management Institute, 2017):

- Plan scope management: the process of creating a document that will define, validate, and control the project scope, namely the scope management plan.
- Collect requirements: to determine and document the needs of stakeholders.
- Define scope: process of detailing and describing the project.
- Create WBS: includes the subdividing of project deliverables or scope into smaller components or activities.
- Validate scope: formalising project deliverable acceptance.
- Control scope: the process of monitoring the progress and managing changes to the scope.

Van der Waldt (2011:72) highlighted the importance of establishing definable, measurable deliverables to ensure the achievement of strategic outcomes in his study on project management within the public sector.

2.2.3.4 Project Schedule Management

This knowledge area consists of processes needed to ensure that the project is completed on time. Scheduling provides a plan that indicates when the project will deliver each milestone as defined in the WBS. This plan is further used as a basis for performance monitoring. The Project Schedule Management processes are described below (Project Management Institute, 2017):

- Plan schedule management: includes the establishment of policies, and procedures to plan, develop, manage, execute, and control the schedule.
- Define activities: the process of identifying and documenting the required actions to be executed.
- Sequence activities: Identifying and document how activities relate to each other.
- Estimate activity durations: The process of estimating how long each activity will take to complete.
- Develop schedule: To analyse activity sequences, durations, and constraints with the aim of developing a schedule.
- Control schedule: The process of monitoring the status of the project, updating the schedule when necessary, and managing changes to the schedule.

2.2.3.5 Project Cost Management

Cost Management includes planning, estimating the cost, and creating a project budget. The knowledge area also includes processes related to financing, funding, managing, and controlling the project budget. The specific processes are depicted in Table 2.1 above and described below (Project Management Institute, 2017):

- Plan cost management: the process of defining the methods to estimate cost, to budget, and to manage, monitor, and control the cost.
- Estimate cost: calculating the approximate monetary resources.
- Determine budget: the process of aggregating the estimated cost of each activity to establish an authorised cost baseline.
- Control cost: to monitor the status of the project and manage cost changes.

Managing and controlling cost is extremely important in municipalities. According to van der Waldt (2011:81), government budgets often operate on the principle of use it or lose it, meaning that when approved budgets is not spent in a given timeframe, it is often lost to national fiscus. This is because many municipalities rely on national grants to fund their infrastructure projects,

leading to additional reporting and controlling requirement in managing the budgets and cost of projects (van der Waldt, 2014:848).

2.2.3.6 Project Quality Management

This knowledge area consists of processes to incorporate existing quality policies within the project. Quality Management further supports the continuous improvement of processes. Project Quality Management includes the following processes (Project Management Institute, 2017):

- Plan quality management: to identify quality standards for the project and define how compliance will be measured.
- Manage quality: the process of translating a plan into activities that can be executed to incorporate the organisation's policies into the project.
- Control quality: includes the monitoring of results in executing quality activities and assessing performance in line with expectations.

2.2.3.7 Project Resource Management

To ensure that the right resources are available for the project at the right time and place, Project Resource Management includes the identification, acquisition, and management of project resources. Processes include (Project Management Institute, 2017):

- Plan resource management: the process of defining how resources will be acquired and managed on the project.
- Estimate activity resources: includes the estimation of team resources, such as the type and quantity of material, equipment, and supplies to complete the project.
- Acquire resource: the process of obtaining people, equipment, materials, and other supplies required for the project.
- Develop team: to improve the competencies of team members.
- Manage team: tracking performance, providing feedback, and managing changes with the team.
- Control resources: the process of ensuring that resources assigned to the project are available at the right time and of monitoring the actual use of resources against the plan.

2.2.3.8 Project Communication Management

Project Communication Management consists of processes related to the information needs of the project and stakeholders. Processes are generally divided into two parts, namely developing a strategy, and implementing the strategy. These include the following (Project Management Institute, 2017):

- Plan communication management: consists of developing an approach and plan for communicating during the project.
- Manage communications: the process of ensuring timely collecting, creating, distributing, storing, retrieving, managing, monitoring, and disposing of information.
- Monitor communications: process of ensuring the communication plan is implemented.

Project managers in government need to be aware of the additional communication requirements, which often include public participation processes, special community project steering committees, and political briefings (van der Waldt, 2011:76).

2.2.3.9 Project Risk Management

The purpose of project risk management is to enhance the chances of project success by increasing the impact and/or probability of positive risks and decreasing the impact and/or probability of negative risks. This includes processes of risk planning and identification, response planning and implementation as well risk monitoring. As indicated in Table 2.1 above, the specific processes within this knowledge area are (Project Management Institute, 2017):

- Plan risk management: the process of defining how the risk management activities will be conducted.
- Identify risks: the process of identifying project risks, sources of such risks, and describing them.
- Perform qualitative risk analysis: the analysis of prioritised risks by assessing their probability of occurring and potential impact.
- Perform quantitative risk analysis: the numerical analysis of the effect of identified project risks.
- Plan risk responses: the process of developing options and agreeing on actions to address project risks.
- Implement risk responses: The process of implementing agreed responses to project risks.

- Monitor risks: to monitor the implementation of agreed responses, track identified risks, identify new risks, and evaluate the effectiveness of responses.

2.2.3.10 Project Procurement Management

Procurement management includes processes required to purchase or acquire goods and services outside the project team. These processes may either be done within the project team or by the organisation's procurement department or unit. Project Procurement Management includes (Project Management Institute, 2017):

- Plan procurement management: to document project procurement decisions, specify the approach to procurement and identify sellers.
- Conduct procurement: the process of obtaining seller responses, selecting a seller, and awarding a contract.
- Control procurement: the process of managing relationships, monitoring performance, change control, and closing contracts.

Procurement in municipalities must adhere to several laws and regulations, including the Local Government: Municipal Finance Management Act, No 56 of 2003, the Preferential Procurement Regulations, National Treasury regulations and circulars, and council supply chain policies (van der Waldt, 2011:77–78).

2.2.3.11 Project Stakeholder Management

Project Stakeholder Management consists of processes of identifying external or internal people, groups, and organisations that could be impacted by the project or that may impact the project. It further includes the analysis of the impact as well as the development of strategies to manage stakeholders. Specific processes of this knowledge area include (Project Management Institute, 2017):

- Identify stakeholders: the process of identifying stakeholders and documenting appropriate information about them.
- Plan stakeholder engagement: developing approaches to involve and engage stakeholders, based on their requirements and expectations.
- Manage stakeholder engagements: the process of communicating with stakeholders to meet their requirements and expectations.
- Monitor stakeholder engagements: to monitor relationships, and tailor developed approaches for engagements.

Managing relationships between all internal and external stakeholders is regarded of particular importance in government projects, which typically include cabinet ministers, officials from departments, the public, civil society, and organised labour(van der Waldt, 2011:72–73).

Project management approaches and methodologies form an important part of this research work as they will have a direct impact on the selection of an appropriate PMMM. A secondary factor for selecting a PMMM to assess municipalities will be to understand the purpose and function of municipalities and the view of current literature on their capability in terms of project management.

2.3 Project Management in South African Municipalities

While the previous sections discussed project management in general, this section now aims to specifically review the available literature regarding the project management capabilities of municipalities in South Africa. Firstly, the purpose and function of municipalities are discussed, followed by a review of the current state of service delivery and infrastructure with a particular focus on Western Cape municipalities as the subject matter for this work. Lastly, the specific project management capability as reported in the literature will be discussed as a basis against which the findings of this research will be analysed.

2.3.1 Purpose and Function of Municipalities

In order to explore the project management capabilities of municipalities, it is firstly important to describe how these municipalities function within the context of the South African government.

South Africa has three spheres of government, namely the national, provincial and local governments, each with its own executive and legislative authority. These three spheres should however work together in a cooperative manner to achieve the country's overall developmental objectives. The local government sphere is made up of municipalities that have the right to govern the affairs of their communities (municipalities.co.za, 2023).

Municipalities are established consistent with Section 155 of the Constitution of South Africa and have the following categories (South Africa, 1996: 1331(3); South Africa, 1998:14):

- Category A (Metropolitan Municipalities):
  Municipalities with exclusive municipal executive and legislative authority.

- Category B (Local Municipalities):

Municipalities that share executive and legislative authority with a Category C Municipality within whose area it falls.

- Category C (District Municipalities):
  Municipalities that have executive and legislative authority in an area that includes more than one Category B municipality.

This work primarily focusses on category B (local) municipalities.

According to the 2023 *Local Government Handbook* (municipalities.co.za, 2023), there are 257 municipalities in South Africa, consisting of 8 metropolitan, 44 district, and 205 local municipalities. In the Western Cape, there are 1 metropolitan, 5 district, and 24 local municipalities, as indicated in Figure 2.4 below.

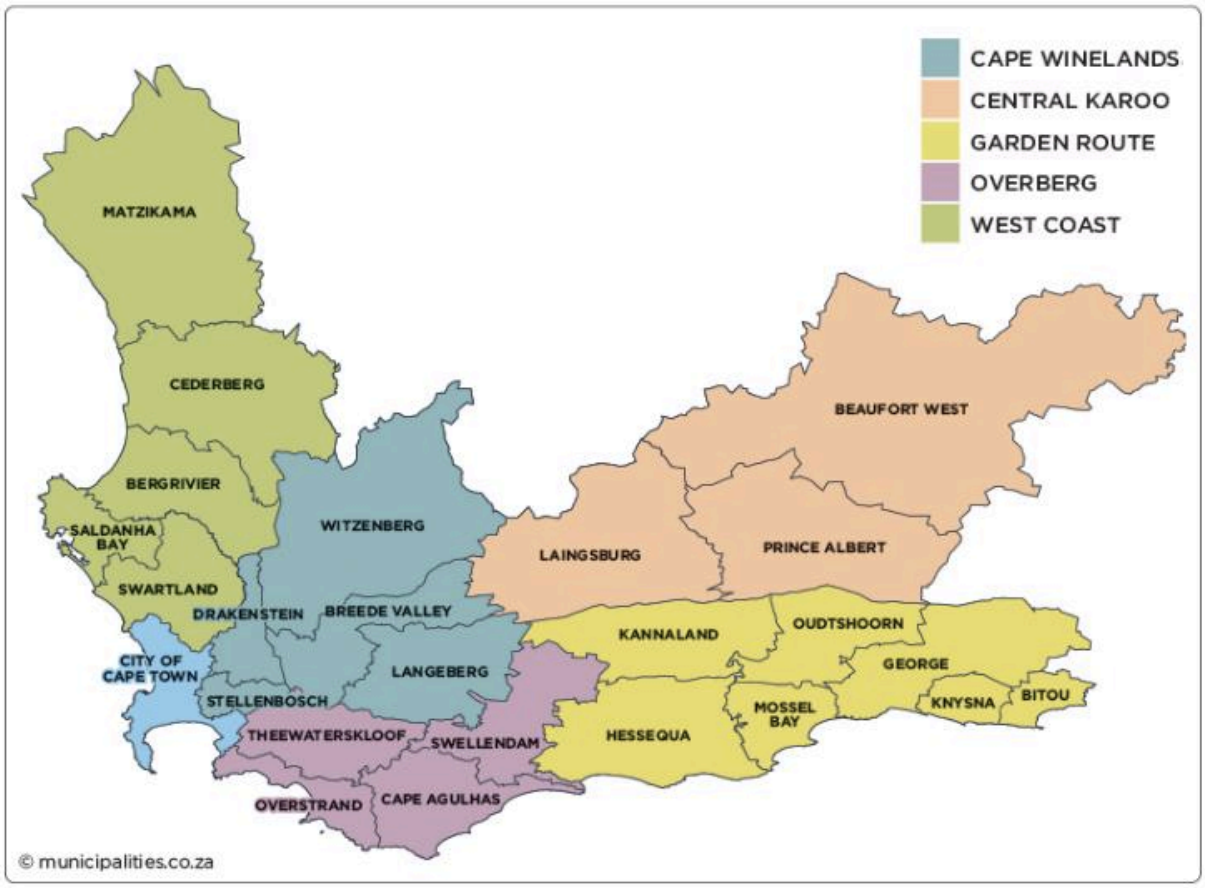


Figure 2.4: Western Cape municipalities

(municipalities.co.za, 2023)

The role of municipalities as per Section 153 of the Constitution is to structure and manage their processes related to administration, planning, and budgeting in line with the basic needs

of the communities and to promote socio-economic development. Several functions are assigned to municipalities as detailed in Schedule 4, Part B of the Constitution. These include amongst others, municipal planning, public transport, public works, stormwater management, and water and sanitation services (South Africa, 1996:1331(37)).

Municipalities are further legally required to prepare integrated development plans in terms of the Local Government: Municipal Systems Act, 32 of 2000. These plans should outline a municipality's process for integrated planning, responsibilities, timeframes, and costs. All municipal projects should therefore be implemented in line with their IDPs (van der Waldt, 2011:74). Integrated development planning should further ensure that municipalities achieve service delivery and development goals in a sustainable and effective manner (municipalities.co.za, 2023). Municipalities were further required by the White Paper on Local Government to innovatively find ways to improve and fast-track the delivery of municipal services (Mokgethi & van der Waldt, 2020:130).

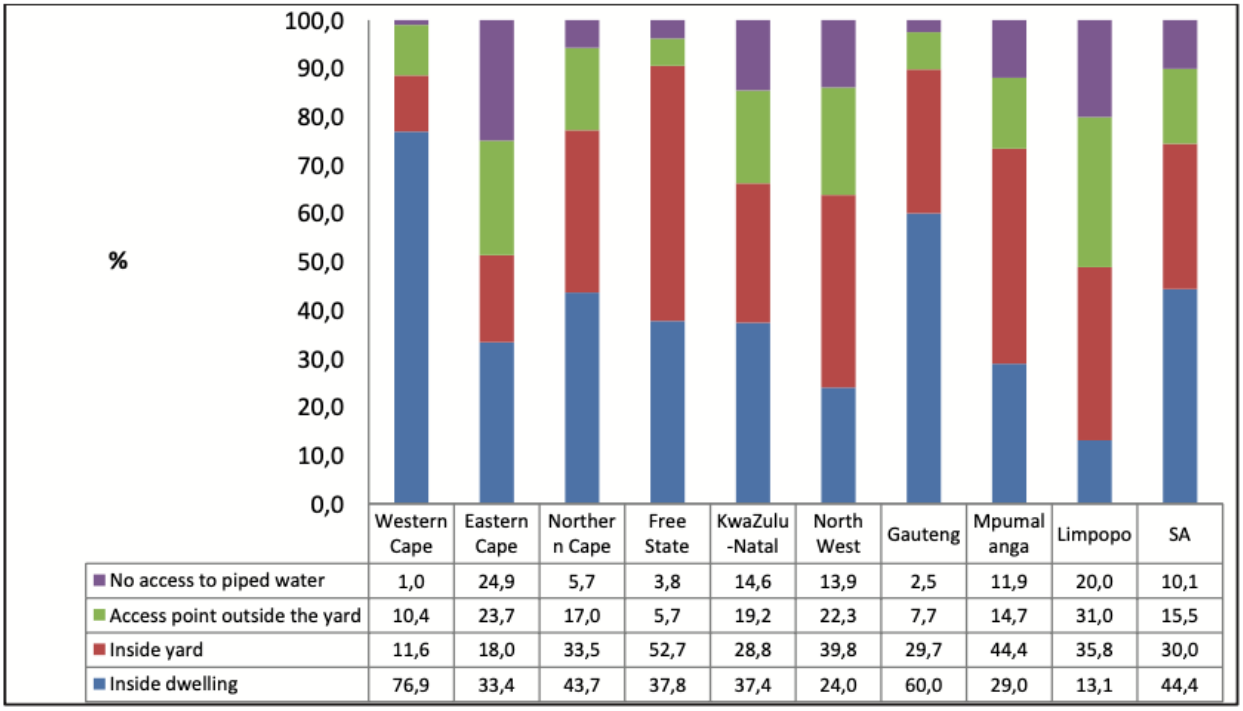
2.3.2 The State of Basic Services and Infrastructure Development

Following the previous description of municipalities, this section provides a brief overview of the current state of service delivery by these municipalities.

Municipal services are often not rendered to the desired level to address the basic needs of citizens. This is a result of challenges related to infrastructure development, including inadequate planning, limited capacity, poor maintenance, and environmental constraints. There are further large service delivery backlogs due to the socio-economic history of the country as well as the rapid rate of urbanisation (van der Waldt, 2014:845). As noted above, municipalities should ensure the provision of basic services, which include water, sanitation, electricity, and waste removal.

One of the most critical services is the provision of safe drinking water, as it is seen as a fundamental human right (Statistics South Africa, 2016). According to the Water Services Act (South Africa, 1997:18), municipalities have the responsibility to provide efficient, affordable, economical, and sustainable water services to communities. The 2016 Community Survey (Statistics South Africa, 2016), however reported the lack of safe and reliable water supply as the primary challenge in municipalities across South Africa. As indicated in Figure 2.5 below, only 44.4% of South African households have access to piped water inside their houses, with a further 30% having access to water inside their yards. 10% of households in South Africa still did not have access to water when this report was published (Statistics South Africa, 2016:66). To measure aspects contributing to sustainable water services and the provision of

safe drinking water, the Department of Water and Sanitation (DWS) introduced an incentive-based approach, called the Blue Drop Certification Programme (South Africa. Department of Water and Sanitation (DWS), 2022a:i). According to this report, 48% of South Africa's water systems can be regarded as low risk, while 34% are regarded as a high and critical risk. In the Western Cape, the Blue Drop report indicated that 85% of the water supply systems are low risk, while 7% of the systems are regarded as high and critical risk (South Africa. Department of Water and Sanitation (DWS), 2022a:382). Statistics South Africa (2016) also reported that 99% of households in the Western Cape have access to water, as depicted in Figure 2.5 below. Water services in the Western Cape are generally reported to be better in comparison to other provinces (Department of Local Government, 2022).



	Western Cape	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Gauteng	Mpumalanga	Limpopo	SA
No access to piped water	1,0	24,9	5,7	3,8	14,6	13,9	2,5	11,9	20,0	10,1
Access point outside the yard	10,4	23,7	17,0	5,7	19,2	22,3	7,7	14,7	31,0	15,5
Inside yard	11,6	18,0	33,5	52,7	28,8	39,8	29,7	44,4	35,8	30,0
Inside dwelling	76,9	33,4	43,7	37,8	37,4	24,0	60,0	29,0	13,1	44,4

Figure 2.5: Access to water services by Province

(Statistics South Africa, 2016:68)

Sanitation is a second important basic service that ensures the dignity and health of citizens. It is the responsibility of government, including municipalities, to ensure effective sanitation services and wastewater systems. In 2016, only 60% of households in South Africa had access to flush toilets inside their dwellings, while 2.4% of people had no access to sanitation services (Statistics South Africa, 2016:68). The DWS also introduced the Green Drop Certification Programme to induce a change in the behaviour of individuals and municipalities to continuously improve wastewater networks and treatment works. The 2022 Green Drop Progress Report provided a comparative analysis and diagnostics to assist municipalities to identify specific areas for improvement (South Africa. Department of Water and Sanitation

(DWS), 2022b:x). The report indicated that 39% of municipal wastewater systems were identified as critical risks. In the Western Cape, only 18 of 158 systems were regarded as a critical risk.

Solid waste removal is another key service rendered by municipalities to ensure clean and healthy environments. According to the 2016 Community Survey (Statistics South Africa, 2016), 61% of households' waste was removed at least once a week, while 5% of households did not have access to this service. The survey noted an improvement over previous years but highlighted a concerning gap that needed to be addressed by municipalities. The provision of electricity remains important to ensure people's livelihoods. In 2016, 82.7% of households in South Africa had access to electricity, while 16.4% made use of gas, paraffin, or wood as energy sources.

The results of the above-mentioned reports show a noticeable difference between the average performances of the country compared to those of the Western Cape. The reports highlight that basic services in the Western Cape are generally regarded as acceptable. The State of Municipalities Report of the Department of Local Government acknowledges this, but cautions that work still needs to be done to improve the lived experience of citizens and to ensure that all people have access to the same level of service (Department of Local Government, 2022)

2.3.3 Project Management Capability of Municipalities

Up to this point, the function and purpose of municipalities as well as the state of service delivery have been discussed. These sections were provided to form an understanding of the context and environment within which project management occurs within the municipalities of South Africa. With this background in mind, this section now specifically focusses on project management capabilities within municipalities.

To improve the current levels of service delivery provision in municipalities, it is critical that infrastructure development takes place effectively and efficiently. Municipalities should therefore ensure that their projects are implemented on time, within budget, and according to the required quality. This implies that project management capability within municipalities should improve, specifically for infrastructure projects (van der Waldt, 2020:1). Typical infrastructure projects in municipalities include water and sanitation systems such as treatment works, pipelines and reservoirs, roads and sidewalks, and stormwater systems as well as electrical infrastructure such as street and area lighting (van der Waldt, 2014:844).

Project Management Structures

Project management units (PMUs) are established in municipalities with the aim of improving the implementation of infrastructure projects (Mokgethi & van der Waldt, 2020:131). PMUs are accountable to the municipal council and administrative leadership, and their establishment ensures the institutionalisation of the project management function within municipalities (van der Waldt, 2014:852). Project management units typically report to the director of infrastructure, who is responsible for the overall planning and execution of projects. This also includes establishing and maintaining healthy relationships with consultants and contractors. According to the Department of Provincial and Local Government (2007) (now Department of Cooperative Governance and Traditional Affairs (CoGTA)), PMUs are responsible for the following key tasks:

- Management and administration of grant funding;
- Coordination of project identification in terms of the IDP;
- Coordination of relevant feasibility studies;
- Establishment of contracts with consultants and contractors;
- Project management; and
- Coordination of project-based capacity-building initiatives;

To further support project management units in municipalities, CoGTA established the Municipal Infrastructure Support Agent (MISA). The main purpose of MISA is to address capacity challenges by supporting municipalities with planning, management, and technical advice to implement infrastructure projects (van der Waldt, 2014:852).

State of Project Management in Municipalities

The implementation of infrastructure projects across the world remains challenging, despite many studies proposing recommendations to improve project performance (de Carvalho et al., 2015:1509; Fernandes et al., 2015:1052; Aftab et al., 2016:511). Aftab et al. (2016:511) emphasised that projects often experience poor performance related to time, cost, and quality. Poor project performance is also specifically prevalent in developing countries, often considered to be poorly resourced (Hatamleh et al., 2020:17).

Project management capability in South Africa is generally regarded as poor. While municipalities are increasingly using the concepts of project management, there remain challenges related to integrated planning, organisational capacity, appropriate competencies, and skills (Mokgethi & van der Waldt, 2020:127). A study by van der Waldt (2020:10) observed that there are pockets of excellence, but the country generally still requires improvement

across national, provincial, and local governments. He concluded that most projects are poorly implemented by the government. Van der Waldt (2011:73) further found that government is reliant on the private sector to assist with service delivery and particularly project implementation. Reasons for this reliance include a skills shortage amongst officials as well as the perceived capacity and advanced knowledge and efficiency of private firms.

According to the 2018-19 Auditor General's Consolidated Report on local government audit outcomes, low levels of trust exist in municipalities' ability to deliver services (Auditor-General South Africa, 2020). Weaknesses in infrastructure projects and inadequate maintenance and management of assets are often observed. The report further notes that infrastructure grants are generally underspent due to poor project management. Non-compliance with procurement regulations, inadequate planning, and contract management are prevalent in municipalities across the country.

An article by *Engineering News* (Parker, 2021) also confirms that municipalities in South Africa are failing to successfully implement projects due to poor project management. The article states that poor performance is due to systemic, behavioural, and political challenges. It is further stated that municipalities' organisational structures should be project-orientated instead of the current functional structures. Municipalities also do not invest in project management tools, such as costing or scheduling software.

Different views exist within the literature regarding the factors that influence project performance. The successful implementation of projects is often subjective, perceived, and not easy to measure as it is influenced by many factors (Pretorius et al., 2012:3). Morris et al. (2016:9), argue that there is no single set of success factors, but the selection of success factors depend on the specific project and should be decided upon during planning. Generally, authors believe that the successful implementation of project management practices contributes to successful projects (Alkhlaifat et al., 2019:7; Badewi, 2016:761; de Carvalho et al., 2015:510; Mir & Pinnington, 2014:215). However, many studies have demonstrated that other factors should also be considered. These factors include the skills and competence of the project manager and team members as well as the organisational structure and cultures (Pretorius et al., 2012: 3), project governance (Chikwem, 2019:5), and political interference, and owner-centredness (Ninan et al., 2021:7).

A study by Adewumi (2022:1) showed that effective implementation of project management in South African municipalities is complicated by poor financial allocations and improper release of funding as well as political interference and politicisation of projects. Project managers must further comply with several pieces of legislation, including the Municipal

Finance Management Act, No 56 of 2003, the Division of Revenue Act, No 5 of 2022, infrastructure grant frameworks, as well as procurement regulations (van der Waldt, 2011:76). Projects in government can therefore only be successful when the right conditions exist. It is therefore important for project managers to understand the relevant conditions that complicate project management during the planning stage (van der Waldt, 2011:73).

The literature indicates evidence of poor project management capability that exists in the municipalities in South Africa. Limited knowledge is however available on the exact capability of specific or individual Western Cape municipalities, as well as the specific project management knowledge areas that may require improvement. The aim of this work, which is to assess the project management capability of Western Cape municipalities, therefore remains important.

2.4 Chapter Summary

This chapter provided the first part of the literature review of this study. The literature review answered the following two research sub-questions:

- ***RQ1**: How will the existing project management body of knowledge influence the identification of a project management maturity model?*
- ***RQ 2:** How will the local conditions of Western Cape municipalities influence the identification of a project management maturity model?*

The review firstly provided a general overview of project management, including its history, development, approaches, and methodologies to highlight the key foundational theories and concepts supporting the research, and to provide a basis to answer research question 1. Secondly, the project management capability of municipalities, with a specific focus on Western Cape municipalities was discussed to demonstrate the extent of current knowledge within this research area and to demonstrate which conditions may influence the identification of a PMMM in answering research question 2

The literature review confirmed that poor project management is prevalent in municipalities in South Africa and that this often leads to poor project performance. There is however limited literature available on the extent of poor project management in Western Cape municipalities.

The next chapter presents the second part of the literature review.

CHAPTER 3 PROJECT MANAGEMENT MATURITY MODELS

As mentioned in the previous chapter, the literature review of this study was split into two chapters, each discussing an important concept of this work. Chapter 2 focussed on project management theory and described the current project management capabilities of municipalities as reported in the literature. This chapter now aims to provide a detailed account of the second key concept, namely project management maturity models.

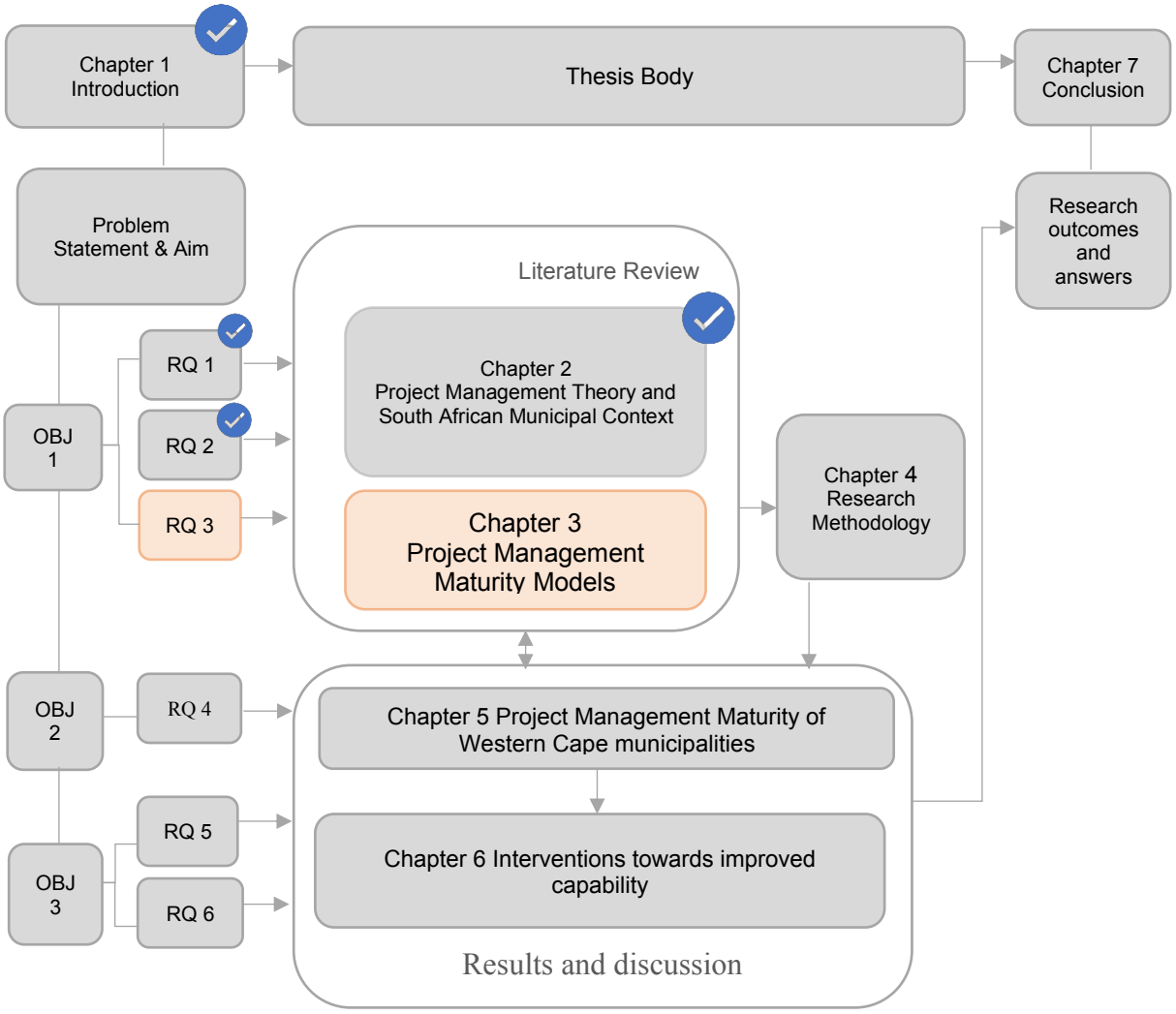


Figure 3.1: Graphic representation of Chapter 3 and thesis progress

3.1 Introduction

As detailed in the previous chapters, there is a need to determine the project management capability of Western Cape municipalities and to determine the specific project management knowledge areas that require improvement.

Project management maturity models are often used to assess organisational capability in terms of project management practices (Gomes & Romão, 2015:35). This chapter, therefore, details available literature on PMMMs, and includes the following:

- An overview of project management maturity models, consisting of a definition, and common characteristics to ensure an adequate understanding of the concept;
- A description of 12 available project management maturity models that consists of their definitions, by whom and when they were developed as well as how their maturity ratings are defined;
- Application of project management maturity models in different sectors, to assist with the identification of a PMMM for this study;
- Analysis and identification of the available maturity models in order to identify an appropriate PMMM for this study.

The chapter therefore answers the following research question:

> *RQ 3: What project management maturity models exist and what model can be identified and adapted for this study to serve as an assessment questionnaire?*

3.2 Overview of Project Management Maturity Models

Before the available PMMMs are described, it is important to ensure an understanding of the concept, how it was developed and what the common characteristics are. This sections aim to do just that.

A project management maturity model can be defined as a formalised tool used to assess project management practices within an organisation to determine its capability and develop improvement strategies (Fabbro & Tonchia, 2021:31). Brookes et al. (2014:234) further highlight that PMMMs should be systematic and repeatable, and that they should allow for the identification of improvement initiatives. It is therefore important for organisations to approach project management maturity with purpose and not recklessly. In order to improve its maturity, an organisation needs to understand where it is in terms of the current level of maturity, and secondly which specific areas require improvement (Grant & Pennypacker, 2006:59).

Over the last four decades, over thirty different maturity models have been developed by different organisations, which differ in terms of their structure, the type of model, characteristics, features, applicability, and specific usage (Brookes et al., 2014: 233; Fabbro & Tonchia, 2021:35). Notwithstanding these differences, authors agree that all maturity models are based on similar principles. According to Brookes et al. (2014:232), PMMMs often include

an assessment of organisational capability and an improvement path based on the current maturity level. The maturity of organisations is measured in terms of levels. While the respective models define these maturity levels slightly differently, they all have the same basic meaning (Bushuyev & Wagner, 2014:303):

Level 1: defined
Level 2: established
Level 3: applied
Level 4: controlled
Level 5: continuously improved

Maturity models are relatively simple and easy to apply, but they should be conducted by an external evaluator with project management knowledge (Fabbro & Tonchia, 2021:35). They further have the value of being used as an analysis, benchmarking, and positioning tool for organisations (Brookes et al., 2014:232; Grant & Pennypacker, 2006:59).

3.3 Available Project Management Maturity Models

The previous section introduced the concept of PMMMs as a basis for this section that now describes in detail selected PMMMs.

Fabbro and Tonchia (2021:31) conducted a detailed literature review on the available maturity models. They grouped models according to three categories, i.e., maturity models from leading organisations, models most cited, and recently developed models as indicated in Table 3.1 below:

Table 3.1: Project management maturity models (Fabbro & Tonchia, 2021:35)

PMMM Category	Organisation
Maturity models from leading organisations	Organisational Project Management Maturity Model IPMA Delta Portfolio, Programme & Project Management Maturity Model PRINCE2 Maturity Model
Maturity models most cited	Capability Maturity Model Integration Berkeley PM Maturity Model Kerzner's Project Management Maturity Model PM Solutions Project Management Model Prado's Project Management Maturity Model
Maturity model recently developed	National Project Management Maturity Model Management Maturity Model Sustainable Project Management Maturity Model

Notwithstanding the over thirty developed PMMMs, this research will focus on the twelve identified by Fabbro and Tonchia. Each of these maturity models is described below with a view of assessing their applicability to this study's aims and objectives.

3.3.1 Capability Maturity Model Integration (CMMI)

Most of the project management maturity models are based on the Capability Maturity Model (CMM) developed between 1986 and 1993 by Carnegie Mellon University's Software Engineering Institute (Backlund et al., 2014: 837; Brookes et al., 2014: 233). The model was later upgraded in order to be applied to any sector and renamed as the Capability Maturity Model Integration (CMMI) (Silva et al., 2014:1028).

The CMMI assessment consists of a comparison between the existing process in an organisation and best practices within the field. While this model was specifically designed for software development, it can be adapted for any organisation or field (de Souza & Gomes, 2015:94).

The Model consists of the following maturity levels:

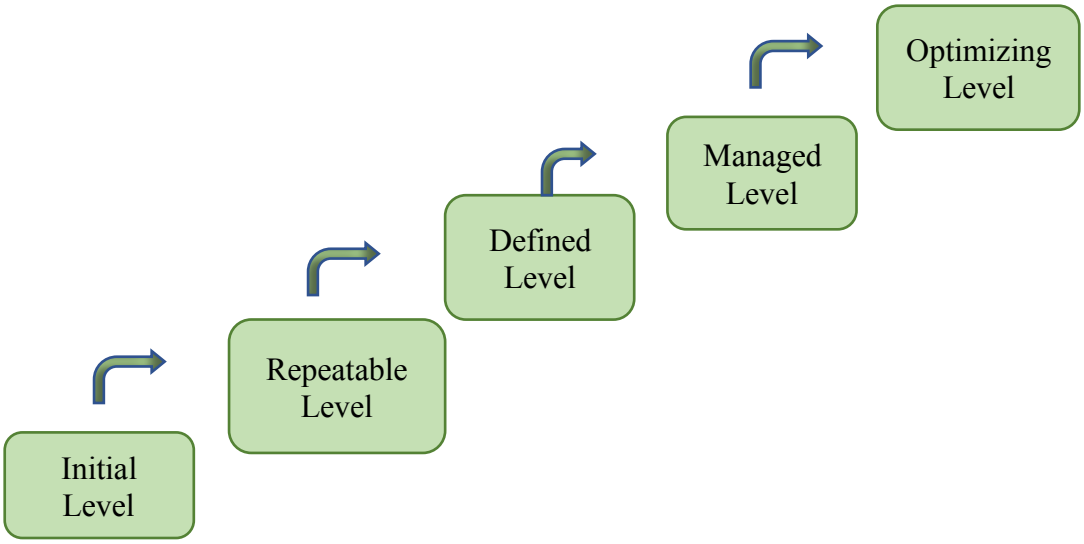


Figure 3.2: CMMI Organisational maturity levels

3.3.2 Organisational Project Management Maturity Model (OPM3)

The OPM3 was developed by the PMI between 1998 and 2013 (Fabbro & Tonchia, 2021:34). The first edition was introduced in 2003 and consisted mainly of an assessment questionnaire. In 2008 the second edition was launched which then also included organisational enabling

criteria and the PMI portfolio standard of 2006. The third edition was published in 2013, which ensured alignment with other PMI standards launched during that period (Silva et al., 2014:1029–1030).

The model provides an approach for any organisation to assess their capability against global organisational project management best practices. (Fabbro & Tonchia, 2021:34). It also provides a systematic evaluation and improvement method which can be applied to a single project or a portfolio of projects in any organisation. The OPM3 consists of tools and methods that provide for a continuous assessment as well as techniques to identify specific problem areas and improvement initiatives (Silva et al., 2014:1029–1030).

According to Fabbro and Tonchia (2021:34), one of the key advantages of the Organisational Project Management Maturity Model is that it assesses precisely which best practices and capabilities organisations need to adopt and which to leave out, which allows them to focus on critical areas and specific project management areas for improvement. In addition, the assessment is based on comprehensive international best practices that are used to compare and evaluate maturity and are therefore accepted worldwide (Silva et al., 2014:1030; de Souza & Gomes, 2015:94)

According to de Souza and Gomes (2015:94), the OPM3 assesses maturity in several dimensions. Firstly, organisations are classified according to development stages as reflected in below Table 3.2.

Table 3.2: OPM3 organisational maturity levels (Silva et al., 2014:1030)

Stage / Level	Indicator	Description
Stage 1	Standardise	The organisation adopted structured processes
Stage 2	Measure	Data is utilised to evaluate performance of processes in the organisation
Stage 3	Control	The organisation developed a control plan for measures
Stage 4	Continuous Improvement	Processes within the organisation are optimised

A second dimension indicates the progress made in terms of best practices related to three domains, i.e., project, programmes, and portfolios. The model links the project management process groups with the four development stages and three domains. For an organisation to mature, each of the process groups should be present in each domain, with the execution of a process dependent on their development stage (de Souza & Gomes, 2015:94).

3.3.3 Kerzner's Project Management Maturity Model (KPMMM)

This Maturity Model was developed by Harold Kerzner in 2002 with the aim of enhancing skills and culture to institutionalise project management in organisational processes. The KPMMM can be viewed as an extension of the CMMI, with more focus on project management processes as defined by the *PMBOK* (de Souza & Gomes, 2015: 94; Fabbro & Tonchia, 2021:38).

According to Silva et al. (2014:1029), the Kerzner Model consists of five maturity levels as indicated by the below table

Table 3.3 KPMMM organisational maturity levels (Silva et al., 2014:1029)

Stage / Level	Indicator	Description
Level 1	Common Language	The importance of basic project management knowledge is understood and recognised in the organisation.
Level 2	Common Processes	The organisation realizes it is important to implement project management methodologies and processes.
Level 3	Singular Methodology	All corporate methodologies are combined into a single methodology with a centred focus on project management.
Level 4	Benchmarking	The organisation continuously maintain their competitiveness through benchmarking within their sector.
Level 5	Continuous Improvement	Processes are improved using the information obtained from benchmarking.

The Kerzner Project Management Maturity Model differs from other models in that it assesses each maturity level separately (de Souza & Gomes, 2015:94). Silva et al. (2014:1029), described the assessment of each level containing a separate questionnaire aiming to determine the organisational performance in that level. These can be detailed as follows:

- Level 1: 80 questions regarding the main knowledge areas of project management
- Level 2: 20 questions on the life cycle of projects
- Level 3: 42 questions that assess the characteristics of the hexagon of excellence
- Level 4: 25 questions are used to determine the organisation's benchmarking performance

- Level 5: 16 questions regarding the processes and practices to apply lessons and institutionalize learning

3.3.4 PM Solutions Project Management Maturity Model

In 2002, PM Solutions developed its own version of the project management maturity model with the aim of helping organisations to develop and measure project management knowledge and skills based on the PMI's *PMBOK* (Fabbro & Tonchia, 2021:38).

According to de Souza and Gomes (2015:95), the assessment provides a road map for improvement once an organisation's level of maturity has been determined. Maturity is assessed based on the ten knowledge areas of the *PMBOK*.

The model utilizes a two-dimensional framework, which is based on accepted project management standards.

The first dimension indicates the level of maturity, based on the Capability Maturity Model, and includes the following levels (Grant & Pennypacker, 2006:61):
Level 1: Initial Process
Level 2: Structured Process and Standards
Level 3: Organisational Standards and Institutionalised process
Level 4: Managed Process
Level 5: Optimising Process

Grant and Pennypacker (2006:61) further states that the second dimension is based on the nine knowledge areas of the PMI. These areas were broken down into different components for providing a more detailed assessment.

3.3.5 Prado's Project Management Maturity Model (PMM)

The PMM (also referred to as MMGP by de Souza and Gomes (2015:95)) was developed by Darci Prado in 2008. Prado designed the model to conduct benchmarking of maturity in organisations. The PMM utilizes a questionnaire consisting of fifty-five questions regarding the following knowledge areas (Fabbro & Tonchia, 2021:39):

- Competence in Project and Programme Management
- Competence in Technical and Contextual Aspects
- Behavioural Competence
- Methodology Usage

- Computerisation
- Usage of the Convenient Organisation Structure
- Strategic Alignment

The model is separately applied to the different sections within organisations as it is believed that they may have different maturity levels. The PPM has six dimensions that is linked to the following five maturity levels (de Souza & Gomes, 2015:95; Fabbro & Tonchia, 2021:39):

Level 1: Initial
Level 2: Known
Level 3: Standardised
Level 4: Managed
Level 5: Optimised

3.3.6 Berkeley PM Maturity Model (PM2)

The Berkeley Model was created by Kwak and Ibbs in 2000. The model uses practical guidelines and tools to measure project management processes through the assessment of knowledge areas. The PM2 presents itself as applicable to any organisation and has been continuously improved over the years to enhance its efficiency and effectiveness (Fabbro & Tonchia, 2021:39).

According to Kwak and Ibbs (2000:150), their model provides an assessment process with order and discipline for organisations to achieve higher levels of maturity in project management.

The PM2 conducts its assessment utilising the nine project management knowledge areas and five project management processes as per the *Project Management Body of Knowledge*. The model, therefore, allows organisations to identify weaknesses and shortcomings in each of the knowledge areas and processes and therefore the opportunity to focus on these specific areas for improvement (Kwak & Ibbs, 2000:151).

Kwak and Ibbs (2000:152) defined their maturity levels as follows:

Table 3.4: PM2 organisational maturity levels (Kwak & Ibbs, 2000:152)

Stage / Level	Indicator	Description
Level 1	Ad-hoc	Basic project management processes are present

Level 2	Planned	The organisation conducts individual project management planning
Level 3	Managed at Project Level	Systematic project planning and control measures are in place
Level 4	Managed at Corporate Level	Planning and control measures of multiple projects are integrated
Level 5	Continuous Learning	The organisation continuously improves its project management processes

3.3.7 IPMA Delta

The International Project Management Association (IPMA), which is the world's oldest project management association, founded in 1965 in Europe, created this model in 2016 as a certification for project management performance in organisations (Bushuyev & Wagner, 2014:303). Like other maturity models, the IPMA Delta assesses the current maturity levels in an organisation and provides recommendations for improvement (Fabbro & Tonchia, 2021:37).

The IPMA Delta was based on a model developed by the German Project Management Association (GPM), called the PM Delta. In 2007 GPM commenced an update of its model and later combined its efforts with the International Project Management Association in 2009. This led to the publication of IPMA Delta (Bushuyev & Wagner, 2014:303–304). Based on the literature study by Fabbro and Tonchia (2021:37), the IPMA Delta consists of three excellence modules, which can be described as follows:

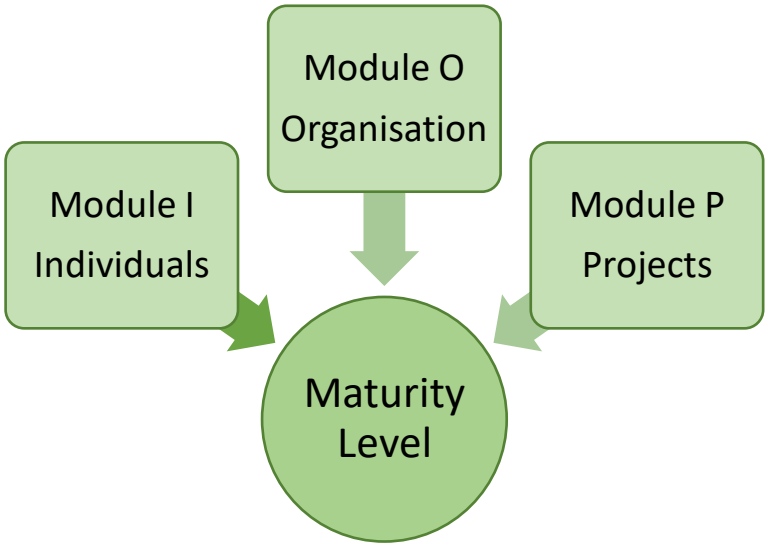


Figure 3.3: IPMA Delta excellence models

(Fabbro and Tonchia, 2021: 37)

The assessment determines the project management competence in relation to each of these modules through a range of questionnaires and standards. The assessment further integrates several project management standards, including the International Standards ISO 10006, ISO 21500 as well as the IPMA standards, i.e., ICB Version 3.0, the IPMA project excellence model, and the IPMA OCB (Bushuyev & Wagner, 2014:304).

Following the completion of the assessment as described above, organisations are rated according to the following maturity levels as described by Fabbro and Tonchia (2021:37):

Table 3.5 IPMA Delta organisational maturity levels (Fabbro & Tonchia, 2021:37)

Stage / Level	Indicator	Description
Level 1	Initial	No formal project management processes and structures in place
Level 2	Defined	The organisation has partially adopted some standards and processes
Level 3	Standardised	Well-defined processes and standards are adopted in the organisation.
Level 4	Managed	Fully achieved project management processes and standards are implemented and checked continuously
Level 5	Optimised	The organisation adopted completely developed standards, processes, and structures, which are frequently improved and optimised

3.3.8 Portfolio, Programme & Project Management Maturity Model (P3M3)

The Office of Government Commerce (OCG) in the United Kingdom developed the Projects in Controlled Environments methodology, commonly referred to as PRINCE2 in 1989. In 2006 the OCG also created the P3M3, which consists of three sub-models, namely, Portfolio Management (PfM3); Programme Management (PgM3); and Project Management (PjM3) (Fabbro & Tonchia, 2021:37). A later version was published in 2010 (Young et al., 2014:218).

In the study by Young et al. (2014:218), the P3M3 is described as a standard for maturity models and a frame of reference to assess organisational capabilities in terms of portfolio, programme, and project management. They further stated that this model assesses maturity through seven project management processes, including:

- Management control

- Benefits management
- Financial management
- Stakeholder management
- Risk management
- Organisational governance
- Resource management

These seven processes are assessed in each of three sub-models (Fabbro & Tonchia, 2021:37). The Portfolio, Programme & Project Management Maturity Model is further designed to allow for the three sub-models to be assessed independently from each other, depending on the requirement of the organisation. This, however, could be viewed as counterproductive as portfolios consist of programmes and programmes consist of projects. It can therefore be argued that some of the processes assessed by this model would be the same for each of the three sub-models (Young et al., 2014:220).

The P3M3 characterizes organisations on the below maturity levels as defined in the *Introduction and Guide to P3M3* by the OGC (Office of Government Commerce, 2010a:8):

Table 3.6 P3M3 organisational maturity levels

Stage / Level	Indicator	Description
Level 1	Awareness of Process	Recognition of programmes and projects
Level 2	Repeatable Process	Each programme and project is implemented with its own processes and procedures
Level 3	Defined Process	Centrally controlled processes are in place
Level 4	Managed Process	Management metrics are obtained to predict future performance
Level 5	Optimised Process	A continuous process of improvement exists in the organisation

3.3.9 PRINCE2 Maturity Model (P2MM)

The P2MM was also developed by the OGC as an alternative to the Project Management Maturity Sub-model of the P3M3, specifically for organisations which adopted PRINCE2. The model is like the structure of the PjM3 with the same seven project management processes underlying its functioning (Fabbro & Tonchia, 2021:38).

PRINCE2 Maturity Model assessment can be conducted either as a self-assessment or a formal review. The model is used to assess the extent to which organisations have adopted the PRINCE2 methodology and to allow them to develop improvement strategies (Office of Government Commerce, 2010b:6–8).

The model further makes use of similar descriptions for the maturity levels, as depicted in Table 3.7 below.

Table 3.7: P2MM organisational maturity levels

Stage / Level	Indicator	Description
Level 1	Awareness of Process	Recognition of projects, which is run separately from its business processes
Level 2	Repeatable Process	PRINCE2 has been adopted, but implemented inconsistently
Level 3	Defined Process	PRINCE2 has been adopted and embedded to align with other processes within the organisation
Level 4	Managed Process	Specific metric on the implementation of PRINCE2 has been obtained to better predict future success
Level 5	Optimised Process	A continuous process of improvement exists for PRINCE2 projects

3.3.10 National Project Management Maturity Model (NPM3)

Seelhofer and Graf developed the National Project Management Maturity Model in 2018 with the aim of increasing the area of organisational project management maturity to national contexts. The model proposes four maturity drivers that should be encouraged by government and project management associations (Fabbro & Tonchia, 2021:38), namely:

- National project management culture;
- National project management process saturation;
- National project management experience sharing;
- National project management application support.

The NPM3 utilizes the following maturity levels as part of its assessment:

Table 3.8: NPM3 organisation maturity levels (Fabbro & Tonchia, 2021: 38)

Stage / Level	Indicator	Description
Level 1	Nascent	Project management practices do not exist in organisations or are disorganised and unsystematic with limited support from government
Level 2	Developing	Some organisations uses project management practices, however with little support from government
Level 3	Adolescent	Many organisations implement project management practices, with assistance from associations and some support from government
Level 4	Mature	A large number of organisations routinely and consistently use project management practices with good support from both government and project management associations

3.3.11 Management Maturity Model (MMM)

The Management Maturity Model was developed by Langston and Ghanbaripour in 2016 in order to assess organisations through systematic, practical, and strategic methodology without rigid increments of maturity (Fabbro & Tonchia, 2021:39).

Fabbro and Tonchia (2021:39) stated that this model assesses six indicators of project success, including efficiency, value, impact, speed, complication, and innovation. A seventh indicator is included that combines scope, cost, time, and risk.

3.3.12 Sustainable Project Management Maturity Model

This maturity model was developed by Silvus and Schipper in 2015 with the aim of evaluating and developing organisational skills with integration into project management. A project is identified as a single unit and divided into the following two domains (Fabbro & Tonchia, 2021:39):

- Project Process, which considers how processes are implemented and managed and what resources are used.
- Project Product, which considers the project deliverables and their impact on stakeholders.

Fabbro and Tonchia's literature study adds that as the maturity level of an organisation increases, its vision should go from reactive to proactive, thereby impacting the sustainability of its environment.

3.4 Application of Project Management Maturity Models

Following the detailed description of available maturity models that can be considered for this study, it is important to understand how these models are implemented in practice. This assisted the researcher with the critical analysis needed to choose an appropriate PMMM.

As the demand for project management excellence continues to grow, several authors have conducted studies in which they applied PMMMs with aim of determining the maturity of organisations and to what extent said maturity aligns with actual project success. The section below briefly summarises the key methods and findings of a few of these studies.

3.4.1 Towards Project Management Maturity: the Case of the South African Government

This study was conducted by Gerrit van der Waldt and published in *Africa's Public Service Delivery and Performance Review* in December 2020. His study focussed on project management maturity in national government departments of South Africa. Given its close link to the objectives of this study, van der Waldt's methodology is discussed in detail below.

Van der Waldt (2020:5) used a qualitative case study design for his study that included content analysis and focus group interviews to collect data. Content analysis was used to analyse five national framework documents and a further eight supporting documents to investigate to what extent project management was applied within the South African government. He further used focus group interviews with senior managers employed at national departments. The focus groups consisted of 227 participants from 22 departments. In his study, van der Waldt (2020:5) did not directly apply a particular model but rather asked participants to rate their organisation's maturity level according to the common level descriptions.

He found that 85% of participants indicated that their organisations were at level 1 maturity. Participants highlighted the absence of a uniform approach to project management as the principal reason for the low maturity level in government departments. The study further found that some individual directorates in departments had adopted standard project management approaches, given their specialised nature, but this was not the case throughout the departments.

In summary, the study was successful in achieving its aim without directly applying a specific PMMM. This approach was therefore considered for the current study by this author. It is further noted that South African Government departments generally have a poor maturity rating.

3.4.2 Project, Programme and Portfolio maturity: a Case Study of the Australian Federal Government

Michael Young, Raymond Young and Julio Zapata from the University of Canberra in Australia conducted this study in 2014. The aim of the research was to evaluate the application of maturity models and the findings of project management maturity assessment conducted by other authors in Australia.

In their study, Young et al. (2014:220–221) used statistical analysis to determine the overall project management maturity of agencies within the Australian Federal Government. They used findings from the assessments that applied the portfolio, programme, and project management maturity model (as described in section 3.3.8) as a unit of analysis in the study. Only secondary data was collected from project management agencies that conducted maturity assessments using the P3M3 methodology.

Although Young et al. (2014), did not apply a PMMM in their study, they did provide a description of how the P3M3 was applied in the Australian context. It is therefore helpful to reflect on their description as it aided the author of this study to refine his own methodology.

Applying the P3M3 is shown to be rather complex and extensive. According to Young et al. (2014:221), interviews were held with employees at different management levels appropriate to the sub-models. In addition, project management documents were examined in detail to find evidence of the seven project management processes described in the P3M3. The findings of the interviews and the document analysis together informed a score for each process within each of the three sub-model, which was used to determine the overall maturity rating.

The study found that project management processes were rated at a mean of 2, programme management between 1 and 2, and portfolio management between 2 and 3. The study further established that smaller organisations generally were more mature in portfolio management, while larger companies were more mature in project management. It also appeared that the portfolio, programme, and project managements were implemented independently of each other.

3.4.3 Project Management Maturity: an Assessment of Project Management Capabilities among and between Selected Industries

The aim of this research project was to determine the project management maturity among industries. The study was conducted by Kevin Grant and James Pennypacker and published in 2006.

This research directly applied the PM Solutions PMMM as described in Section 3.3.4. A sample of 126 from a potential 900 participants was used in the study. Data was collected through interviews with the selected participants, in which specific questions on each of the 42 components of the PMMM were asked. The questions were in the form of a behavioural-anchored response scale which assisted participants to answer in line with the level description of the PMMM (Grant & Pennypacker, 2006:62).

The results of the study indicated that most of the organisations were rated poorly in terms of their project management practices, with 67% of organisations' overall maturity determined as level 1. The study further revealed that project management maturity is rather consistent between industries with no significant differences obtained.

The methodology of the study by Grant and Pennypacker provided a good basis for consideration in the refinement of this author's approach to his work.

3.4.4 OPM3 Portugal Project: Analysis of Preliminary Results

The OPM3 Portugal project was conducted in 2014 by Silva, Tereso, Fernandes, and Pinto, with the aim of assessing the project management maturity of 100 organisations across several sectors.

This study was undertaken as a major project and consisted of several phases. Firstly, planning and organising were conducted to define generic procedures and management and control of the project. Secondly, the actual assessments were undertaken. This followed the OPM3 process as described in Section 3.3.2 of this thesis. The assessment included meetings with several groups of people involved in the project environment. The results of these meetings were analysed to determine the maturity levels of organisations, Thirdly, industrial sectorial assessments were conducted. In this phase, the individual company levels were summarised to determine maturity ratings for specific sectors. The last phase of this project was country assessments, where the findings from the sectorial assessments were further analysed to create an overall maturity level for the country (Silva et al., 2014:1030–1031).

Silva et al. (2014:1031-1032) found that the overall maturity of organisations was 6.32%, with the highest score achieved reported as 31%. It should however be noted that these were preliminary results and that the project was still being completed when this research article was written. The authors further noted that the OPM3 was regarded as very strict in terms of measuring individual project outcomes.

This study was deemed less applicable given that it was implemented at a country-wide level. The results further suggest that the OPM3 may not be applicable to the author's study.

3.4.5 The use of Maturity Models in improving Project Management Performance: an Empirical Investigation

This study was done by Brookes, Bulter, Dey, and Clark in 2014. The aim of the work was to conduct an empirical investigation exploring the impact of project management maturity models on project improvement.

Brookes et al. (2014:235) used a multi-case study approach as their methodology. Seven organisations that represented different business sectors participated in the research. They applied the PM Solutions Project Management Maturity Model (described in 3.3.4) for their assessment. Data were collected from participants and analysed to determine a mean score for each of the project management knowledge areas. The results of each organisation were then presented again to the applicable participants, who were asked to provide an opinion on the level of maturity determined, and how their maturity could be improved. The findings from these interviews were thematically analysed.

This study found that organisations' maturity levels ranged between 1 and 3 (out of 5). It further appeared that larger companies had better maturity levels, although no organisation scored 4 or 5. The research also suggests that PMMMs can stimulate enhanced project performance (Brookes et al., 2014:238–239).

The above study aided the author in analysing the results with reference to how they relate to actual project performance.

3.5 Analysis of Available PMMMs

The following table outlines the analyses that were conducted to assist with the identification of an appropriate PMMM:

Table 3.9: Analysis of project management maturity models

PMMMM	Applicability Weight = 5		Adaptability = 2		Complexity Weight = 3		Weighted Score (10)
	Analysis	Score (out of 5)	Analysis	Score (out of 5)	Analysis	Score (out of 5)	
Capability Maturity Model Integration	The core elements of the assessment do not align with the research	1	Model not easily adapted	2	Complex to implement	2	3.0
Organisational Project Management Maturity Model	Based on international best practices and aligned with PMI standards – however, measured against international best practise, which may not be best suited for this research	2	Model not easily adapted	2	Highly complex to implement	1	3.4
Kerzner's Project Management Maturity Model	Based on PMI *PMBOK* – however the application method does not align with this research	2	Model not easily adapted	2	Complex to implement – set of questions for each level	2	4.0
PM Solutions Project Management Maturity Mode	Based on PMI *PMBOK* – however includes specific components	2	Model can be adapted easily	4	Simple to implement	4	6

	that do not all align with this research						
Prado's Project Management Maturity Model	Based on specific focus areas that do not align with this research	1	Model not easily adapted	2	Fairly simple to implement	3	3.6
Berkeley PM Maturity Model	Based on PMI *PMBOK* processes – aligns relatively well with this study	3	Model can be adapted	3	Complex to implement – requires benchmarking with others	2	5.4
IPMA Delta	Based on specific focus areas that do not align with this research	2	Model not easily adapted	2	Highly complex to implement	1	3.4
Portfolio, Programme & Project Management Maturity Model	Model assesses PRINCE2 processes only and requires organisations to follow PRINCE2	1	Model not easily adapted	2	Fairly simple to implement	3	3.6
PRINCE2 Maturity Model	Model assesses PRINCE2 processes only and require organisations to follow PRINCE2	1	Model not easily adapted	2	Simple to implement	4	4.2
National Project Management Maturity Model	Model used to assess maturity on a national level	1	Model not easily adapted	2	Fairly simple to implement	3	3.6

Management Maturity Model	Based on specific focus areas that do not align with this research	2	Model not easily adapted	2	Fairly simple to implement	3	4.6
Sustainable Project Management Maturity Model	Focus of the model not aligned with this research	1	Model not easily adapted	2	Fairly simple to implement	3	3.6

3.5.1 Identification of appropriate PMMM

As indicated in Table 3.9 above, all the project management maturity models described in this work have shortcomings. Only 2 of the 12 PMMMs scored above 5 out of 10 in the analysis. It is also important to note that all of the models were found not to align with the research and therefore scored very low under the applicability criteria. This agrees with the critique of some authors and confirms that PMMMs remain to be very specific in their application. A further analysis of adaptability indicated that most PMMMs are rigid, with little to no flexibility. This may be because the majority contain specific questions and processes in their assessment, with no guidelines or opportunity for amendment without compromising the credibility of the assessment. Only two models appear to allow some degree of adaptability, namely the PM Solutions Project Management Maturity Mode and Berkeley PM Maturity Model.

Consequently, none of the maturity models were deemed to be fully applicable to this work. The PM Solutions Project Management Maturity Model, however scored the highest points and did allow for a degree of flexibility. While this model did not fully align with the research, it does allow for adapting and are fairly simple to implement. It was therefore decided that this model would serve as a guide for the assessment. The researcher used the concept of the model to develop an assessment questionnaire.

3.6 Chapter Summary

This chapter provided the second part of the literature review of this study. The chapter answered the following research question:

RQ 3: *What project management maturity models exist and what model can be identified and adapted for this study to serve as an assessment questionnaire?*

This chapter provided an overview of project management maturity models, consisting of a definition, and common characteristics to ensure an adequate understanding of the concept; a description of 12 available project management maturity models including their definitions, by whom and when they were developed, as well as how their maturity ratings are defined; application of project management maturity models in different sectors, to assist with the identification of an PMMM for this study; and an analysis and identification of the available maturity models in order to identify an appropriate PMMM for this study.

The next chapter describes the research methodology selected for this work.

CHAPTER 4 RESEARCH METHODOLOGY

Chapters 2 and 3 provided a review of the key literature supporting the research problem and research questions. This chapter describes the methodology used in this research study.

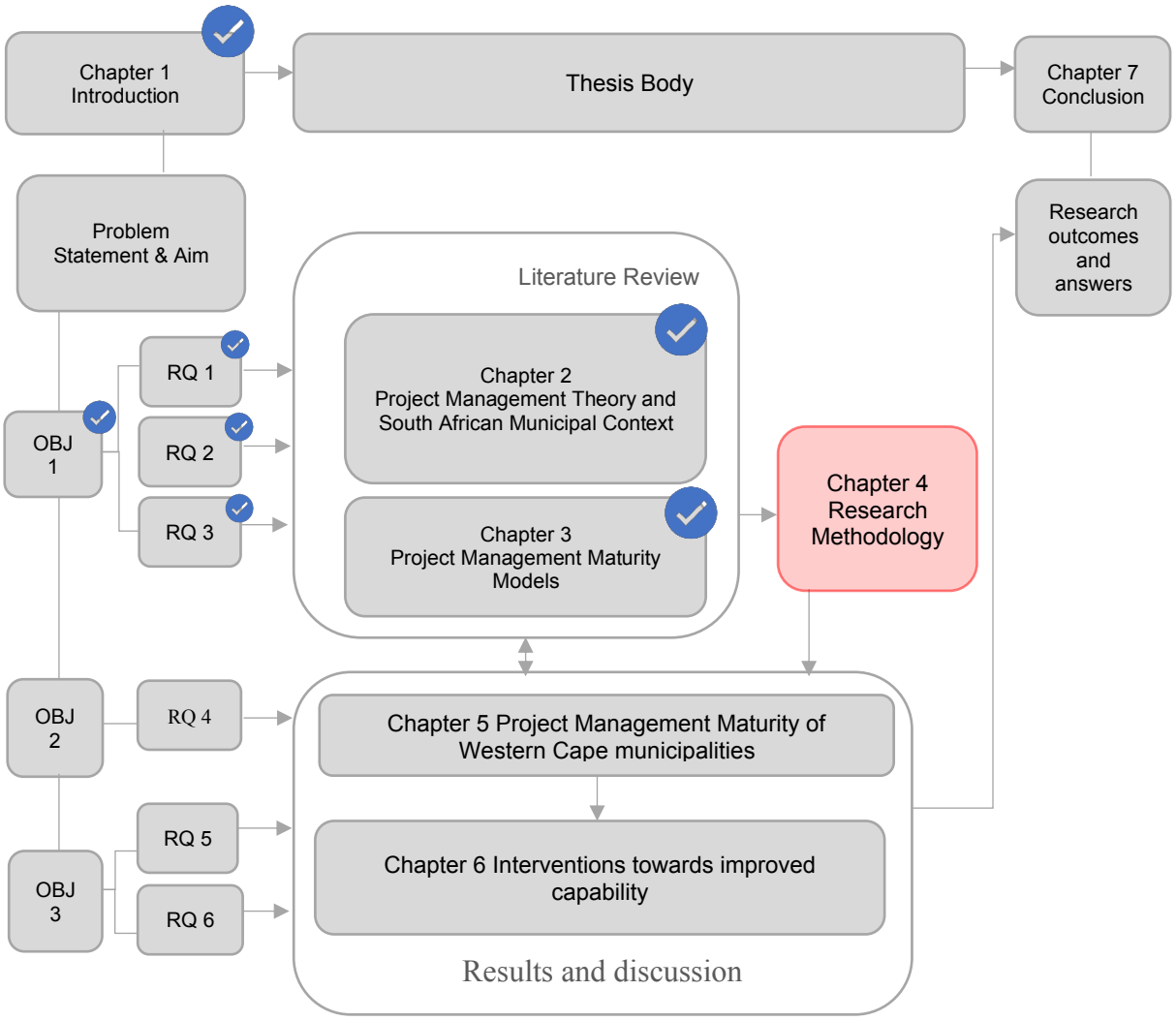


Figure 4.1: Graphic representation of Chapter 4 and thesis progress

4.1 Introduction

The research methodology serves as a general strategy indicating how the research will be undertaken, including a philosophical belief and an approach that directs the research, specific research strategies and design methods, as well as data collection and analysis techniques.

This chapter provides a theoretical overview in Chapter 4.2 to briefly introduce the literature and theory of the general research process. Chapter 4.3 then provides the specific methodology chosen for this work, including the research philosophy and approach, the research strategy, the research design, and data collection and analysis techniques. Chapter

4.4 describes how the identified PMMM was used to develop a questionnaire for this study. This last section (4.5) outlines the sampling techniques used in this research.

4.2 Research Methodology Theoretical Overview

Research methodology forms an integral part of a thesis and ensures that the research findings are credible and reliable. It is therefore important that the researcher follows an acceptable methodology to conduct the research, which requires a thorough understanding of this research process.

> *Methodology is a general research strategy which delineates the way how research should be undertaken. It includes a system of beliefs and philosophical assumptions which shape the understanding of the research questions and underpin the choice of research methods.*
>
> Melnikovas (2018:33)

This section thus aims to provide an overview of research theory. The specific research methodology chosen for this work is then described in detail in the next section. Several descriptions of research methodology exist within the body of knowledge. For the purposes of this thesis the theoretical concept of the “research onion” as proposed by Saunders et al. (2012), and analysed by Melnikovas (2018), will be used as a guide to define the methodology of this research. The research onion presents a detailed and logical description of the research process and theoretical basis for a specific methodology. It includes the philosophy and approach to the research; the methodological choice; research strategies; the time horizon; and techniques and procedures for conducting the research, as depicted by figure 4.2 below (Saunders et al., 2012:128).

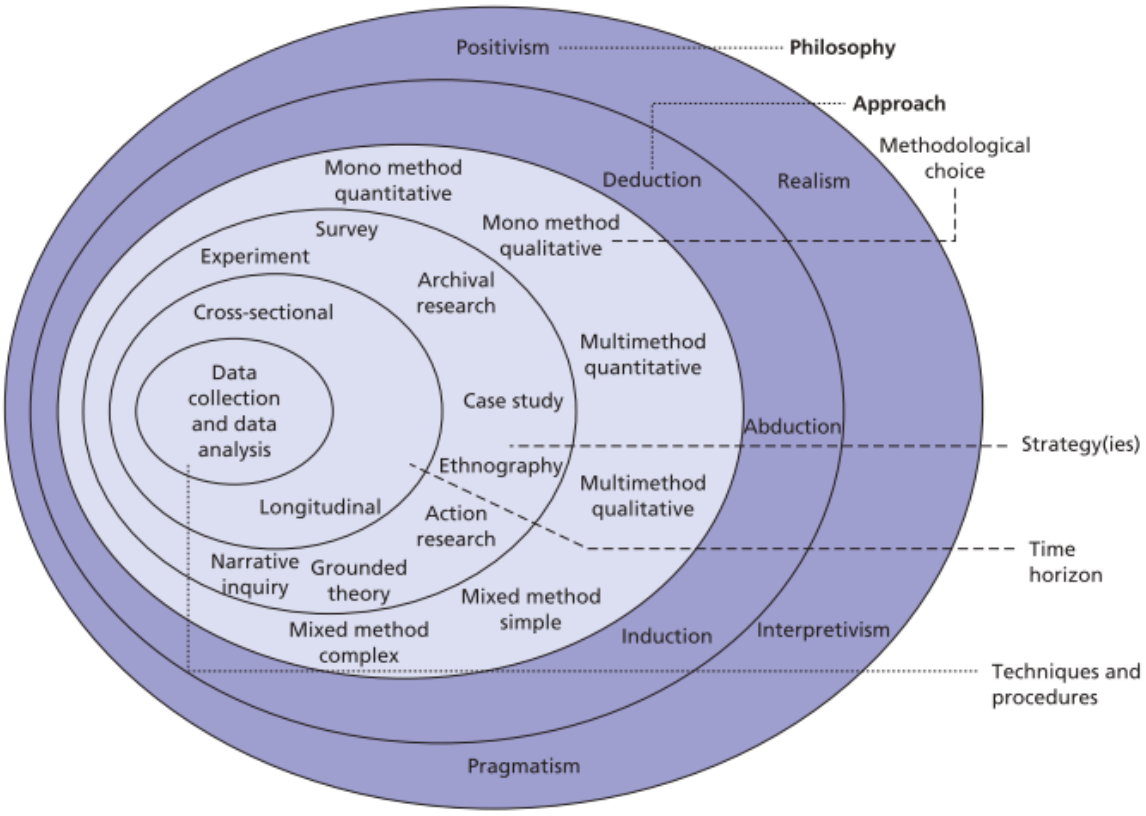


Figure 4.2: The 'research onion'

(Saunders et al., 2012: 128)

4.3 Research Methodology of this Research

While the previous section described research methodology theory in general, this section now details the methodology used in this research study. The section indicates which specific methodology was chosen with theoretical justification.

4.3.1 Research Philosophy and Approach

According to Saunders et al. (2012:127), the first part to consider in a research project is the philosophy of the research. In their book *Research methods for business students*, Saunders, Lewis, and Thornhill (2012) describe the philosophy as the assumptions a researcher makes about the manner in which they view the world. This will be influenced by the researcher's specific worldview regarding what is acceptable knowledge and the process by which knowledge is created. This view will then influence the selection of research strategies, tools and techniques. Research philosophy can therefore be regarded as a foundation for the research, and consists of ontology (nature of reality), epistemology (nature and sources of knowledge and facts), and axiology (values, beliefs, and ethics) (Melnikovas, 2018:34).

The ontology of the research presents the researcher with a choice between objective or subjective, while the epistemology normally can be either positivism or interpretivism (Melnikovas, 2018:35), although Saunders et al. (2012:128) also include realism and pragmatism as options. The axiology branch of research philosophy describes the role that values have on the research process (Saunders et al., 2012:137).

Following the philosophical choice, the next consideration for the researcher is their approach to theory development. The approach influences the design of the research and the presentation of findings and conclusions. There are approaches to consider, namely deductive, abductive, and inductive (Saunders et al., 2012:143). According to Melnikovas (2018:38), these approaches can be defined as follows:

- Deductive: involves reasoning which moves from a general rule to a specific law and is normally used to test a theory.
- Abductive: considered as a form of inference which starts with an observation which then provide the basic notion for further research.
- Inductive: involves theory building in which a specific observation forms the basis to formulate a general rule.

The above view on research methodology highlighted the importance of the researcher's philosophical stance and approach to theory development. These considerations were described as the foundation for the research consisting of ontology, epistemology, and axiology. Therefore, in considering the field of this research, the research problem and questions as well as the personal beliefs of the researcher, the ontology for this research was selected as objectivism and the epistemology as positivism. The researcher further followed an inductive approach for theory development in this research study.

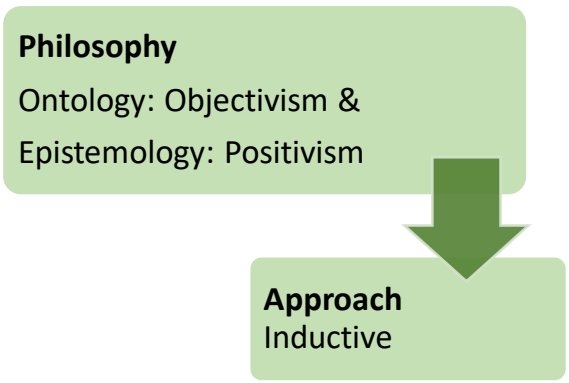


Figure 4.3: Research methodology: philosophy and approach

Saunders et al. (2012:131) describe objectivism as social entities existing independently of and external to social factors. Positivism represents the philosophical stance of a natural scientist, with objective assumptions in which knowledge is realised through observation (Melnikovas, 2018:35).

4.3.2 Research Design

With the philosophical belief of the research serving as a foundation, the next step is the research design, which includes the methodological choice, strategies, time horizon, and techniques for data collection and analysis. The research design can be regarded as a plan that outlines how the research will be undertaken. It further should be based on the research questions, aim and objectives, and should align with the philosophy of the researcher (Saunders et al., 2012:157–158).

4.3.2.1 Methodological Choice

The methodological choice determines the use of quantitative or qualitative methods or a combination of both. It includes mono method quantitative, monomethod qualitative, multimethod quantitative, multimethod qualitative, mixed method simple, and mixed method complex (Melnikovas, 2018:34). According to Saunders et al. (2012:163), quantitative research typically is associated with positivism, although in some instances it may align well with interpretivism. The research approach is further normally deductive. Qualitative research often aligns with an interpretive philosophy and an inductive approach. In reality, however, researchers often make use of a combination of quantitative and qualitative methods, which could either be multimethod research or mixed method research. In multimethod research multiple data collection techniques are used that may be either quantitative or qualitative. Mixed methods research on the other hand involves both quantitative and qualitative data collection and analysis.

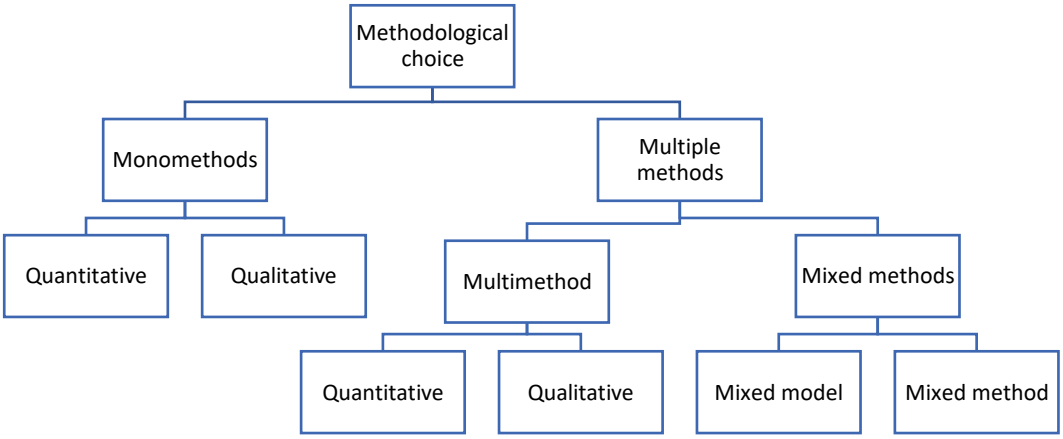


Figure 4.4: Methodological choices for the research design

(Saunders et al., 2012:165)

Researchers often associate positivism with quantitative methods and interpretivism with qualitative methods. There are however views that the link between epistemology and research methods is not univocal nor critical for the success of the research. It is more important that the selected research methods be appropriate to answer the research questions (Bentahar & Cameron, 2015:4–5).

Given the research question and objectives of this study, a mixed-method research design was selected.

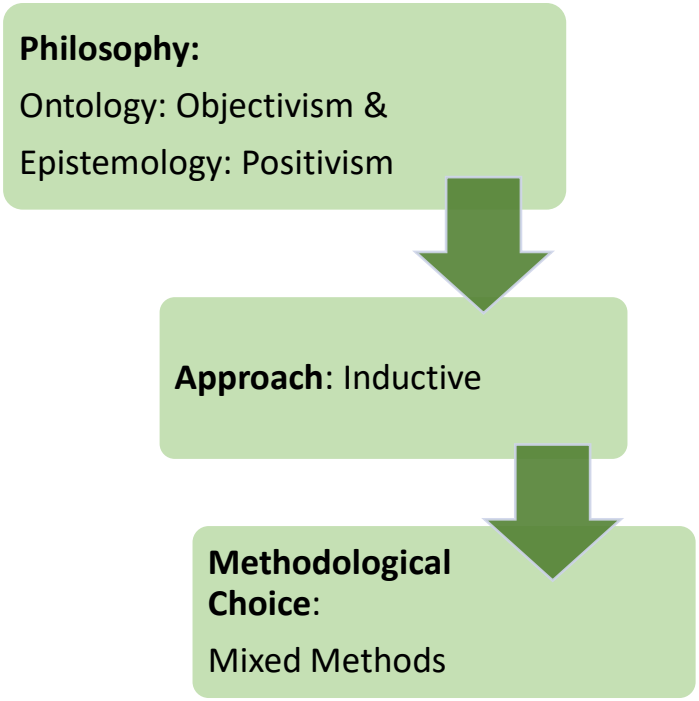


Figure 4.5: Research methodology: philosophy, approach and method

According to Johnson et al. (2007:120), mixed-method research can be defined as the "class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts, or language into a single study or set of related studies." There are further three key purposes for mixed methods research, i.e., exploration, triangulation, and complementarity. Exploration is used to gain an understanding of a phenomenon, and complementarity is referred to when one method is used to clarify or enhance the results from another method (Bentahar & Cameron, 2015:5).

4.3.2.2 Research Strategy

The research strategy can be described as the link between the philosophy and methodological choice for data collection and analysis. Specific research strategies may primarily align with one of the philosophies and one of the applicable approaches. However, as noted before, there

may be open boundaries, depending on the research. The research strategy may therefore be either one of the following or a combination of them: experiments, surveys, archival research, case study, ethnography, action research, grounded theory, and narrative inquiry (Saunders et al., 2012:173). These strategies may be implemented through any of the methodological choices presented in Figure 4.4 above (Saunders et al., 2012:163).

The strategy of this research was selected as a multi case study.

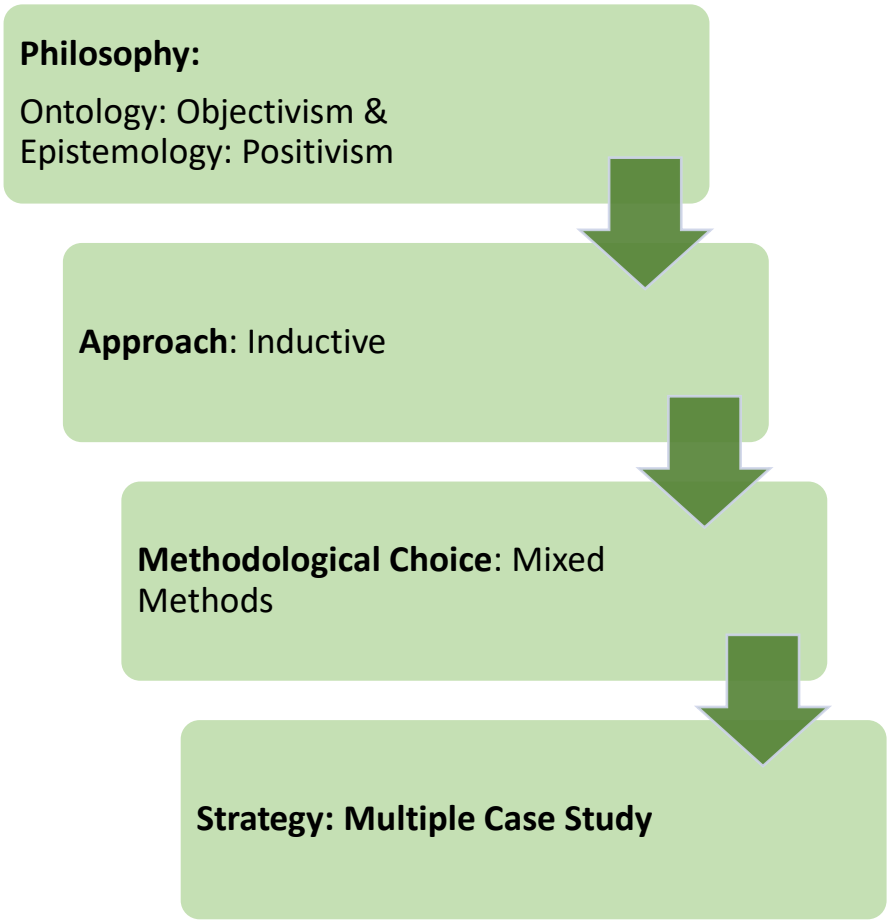


Figure 4.6: Research methodology: philosophy, approach, method and strategy

A case study considers a research problem within the context of the sampled unit. It is often used to gain a deep understanding of the research parameters and to assist researchers to answer the questions of what? and how? (Saunders et al., 2012:179). Given the research questions and this description by Saunders et al. (2012), the case study was deemed appropriate for this research.

Further, according to Yin (2009:1), case studies often combine well with mixed methods research as this allows for the triangulation of data. He further states that case studies may be implemented either as a single case or multiple cases. A single case normally represents a

critical or unique case, while multiple cases focus on replication of data across different cases. This replication may either be a literal replication where similar results are expected from the different cases, or theoretical replication where a specific factor is expected to differ between the cases. As mentioned before, a multiple case strategy was selected, given the context of this study. Six cases were selected as follows (refer to Section 4.5 for a detailed description of how these cases were sampled and how the categories were defined):

- 2 small municipalities
- 2 medium municipalities
- 2 large municipalities

The two municipalities within each category were expected to produce similar results (literal replication), while the they were expected to differ between the three categories (theoretical replication).

4.3.2.3 Data Collection and Analysis Techniques

Based on the chosen research strategy, several options exist for data collection and analysis techniques. The researcher may collect primary or secondary data, or both. Primary data refers to data collected directly by the researcher. Secondary data collection includes raw data and published summaries of data already collected for a different reason by someone else.

Data Collection

Data was collected through interviews with officials responsible for project management in sampled municipalities that were selected as the cases for this study. The interviews consisted of two sections. The first section consisted of a structured interview with close-ended questions, through which quantitative data was collected. The second section consisted of a semi-structured interview with open-ended questions through which qualitative data was collected.

Saunders et al. (2012:372) define an interview as a purposeful discussion between people, with an interviewer asking concise, unambiguous questions which an interviewee is able and willing to answer. They further highlight the importance for the interview to align with the research aim, objectives, and questions. Interviews could be formal and structured, or they may be informal and unstructured, depending on the type of research conducted. Typically, interviews may be categorised as follows (Saunders et al., 2012:373):

- Structured Interviews
  This interview type makes use of a formal questionnaire consisting of a set of predetermined and standard questions. Questions should be read exactly as written and with the same tone to limit bias. Structured interviews generally produce quantitative data.

- Semi-structured interviews
  The researcher using semi-structured interviews will normally have a list of themes to be explored and possibly some key questions to be asked. These questions may however differ from interview to interview, based on each interviewee's specific context. The researcher may further add questions during the interview if it could aid in answering the research questions. This type of interview generally produces qualitative data.

- Unstructured interviews
  These are informal in-depth discussions, without a predetermined list of questions. The researcher will however have a clear aim and specific themes to explore, while the interviewee will be free to talk openly about the events, behaviour or their beliefs in relation to the themes suggested by the interviewer.

As noted before this research made use of a combination of structured and semi-structured interviews. A questionnaire was developed that consisted of these two sections. A detailed description of how the questionnaire was developed is included in Section 4.4 below.

Data Analysis

As described above, both quantitative and qualitative data were collected for this research study.

The quantitively data was analysed through a Microsoft Excel-based model, that determined the project management maturity models of sampled municipalities. The individual ratings of the respective processes identified for each project management knowledge area were used as input data for the model. Maturity ratings for the knowledge areas were determined through calculating the mean of its processes. In turn, the overall rating of a municipality was determined through calculating the mean of the respective ratings of their knowledge areas.

The qualitative data obtained in this research was analysed through thematic analysis. According to Lochmiller (2021:2029), thematic analysis is an ambiguous technique often used in qualitative research. He defines thematic analysis as a process of identifying, analysing, and reporting patterns that exist in research data. Lochmiller further acknowledges that researchers use different approaches in their implementation of thematic analysis, but that most researchers include three main processes, namely coding, categorising, and developing themes.

Data Reliability

Reliability is about whether different researchers will collect similar data and come to similar conclusions should the research be repeated in a similar context or environment. One of the key challenges for reliability in interviews is bias. This may either interviewer or interviewee bias. Firstly, interviewer bias is when the introductory comments, tone and body language of the interviewer lead to bias in the manner in which the interviewee responds. Secondly, interviewee bias is caused when the interviewee has a certain perception of the interviewer or the research itself (Saunders et al., 2012:283).

To ensure data reliability, the researcher needs to overcome these forms of bias. Some measures suggested by Saunders et al. (2012:283) that were followed in this research include:

- The researcher has a good knowledge of the sampled organisations;
- The researcher ensured that the same information and context were provided to each interviewee;
- Specific care was taken during the opening remarks not to lead interviewees in a certain direction;
- The tone and approach to the interviews was kept constant;
- Data was recorded on prepared notepads and the interviews were recorded to ensure correctness.

Data Validity

This refers to which extent the interviewer is able to gain access to the interviewee's knowledge and experience and from that, being able to analyse the data correctly to infer meaning useful in answering the research questions.

Validity can be ensured through conducting the interviews with care. Semi-structured interviews allow for clarifying questions, which aids in ensuring valid data.

4.4 Development of the Questionnaire

This section describes the process of how the interview questionnaire was developed.

4.4.1 Adapting Identified PMMM and Development of Questionnaire

The purpose of the questionnaire was to firstly assess what level of project management capability Western Cape municipalities have in addressing objective 2, and secondly to determine how they should improve their capability to address objective 3. As noted before, the selected maturity model, i.e., PM Solutions PMMM was not directly applied to this research, but rather the concept was used as a framework for the development of the questionnaire. This PMMM is based on the knowledge areas of the PMI, of which each was broken down in components and measured against the five maturity levels. The questionnaire was therefore divided into three parts, namely Part 0: Demographics; Part 1: Capability Assessment; Part 2: Improvement Strategy. These were further preceded by an introductory narrative which summarised the purpose of the questionnaire, and briefly reminded the participants of the ethical considerations they were made aware of during the permission for participation process. The final questionnaire used for this research is included as Annexure A.

4.4.1.1 Interview Schedule Part 0 (IQ0): Demographics

The purpose of this part of the questionnaire was to collect general data regarding the sampled participants. During the ethics application process, it was confirmed that the personal information of participants would not be recorded or used in the research. This section therefore only collected data related the participants' qualifications and experience as well as information regarding the quantity and quality of projects implemented by their municipality.

4.4.1.2 Interview Questionnaire Part 1 (IQ1): Capability Assessment

The purpose of part 1 of the questionnaire was to address objective 2 and answer research question 4, of which the results are discussed in chapter 5.

Objective 2 and research question 4 are reiterated below:

> ***Objective 2:*** *To assess what level of project management capability Western Cape municipalities have through the application of the identified and adapted PMMM.*

> ***RQ 4****: What is the project management capability of Western Cape municipalities?*

The development of the questionnaire therefore consisted of the design of specific questions related to identified processes from each project management knowledge area as described in Section 2.2.3, with the purpose of assessing the maturity of each knowledge area, which was analysed to determine the project management capability of municipalities.

As mentioned in Section 4.3.2.3, the data collected through this part of the interview was quantitative. The interview questions were therefore close-ended using a behavioural anchored response scale (BARS) and asked in a structured manner.

A few questions were formulated on each knowledge area of which the quantity depended on the relative importance of said knowledge within the context of this research. Questions were in the form of a statement describing a process within a knowledge area. Participants were then asked to rate to what extent such process was implemented within their organisation. These ratings were based on the maturity levels used in the PM Solutions PMMM as indicated in Table 4.1 below. Each level is described in the context of this research to assist with the assessment to follow.

Table 4.1: Description of maturity levels developed for this research

Stage / Level	PM Solutions Project Management Maturity Mode	This study	
Level 1	Initial	Ad-hoc Approach	No established and repeatable processes exist. Processes are executed on an ad hoc basis
Level 2	Structured process and standards	Basic approach	Basic and structured processes are documented and implemented for individual projects
Level 3	Organisational standards and institutionalised process	Integrated approach	Processes are successfully implemented in most projects and integrated across the organisation
Level 4	Managed process	Managed approach	Processes are fully implemented in all projects and managed across the organisation by a project office
Level 5	Optimised process	Optimised approach	Project management processes are continuously improved and benchmarked against best practices

4.4.1.3 Interview Questionnaire Part 2 (IQ2): Improvement Strategy

This part of the questionnaire intended to address objective 3 and answer research questions 5 and 6, of which the results will be discussed in Chapter 6

Objective 3 and research questions 5 and 6 are reiterated below:

> ***Objective 3:*** *To determine how Western Cape municipalities can improve their capability.*
>
> ***RQ 5:*** *What are the main challenges that limit the improvement of project management capability in municipalities?*
>
> ***RQ6:*** *What ideas and interventions can be proposed towards improving the current levels of maturity that exist in the municipalities?*

This part of the questionnaire therefore consisted of questions designed to obtain opinions from participants regarding: i) the challenges they experience that limit the improvement of their PM capability; and ii) the proposed solutions towards addressing identified challenges.

As mentioned in Section 4.3.2.3, the data collected through this part of the interview was qualitative. The interview questions were therefore open-ended and asked in a semi-structured manner.

4.5 Population and Sampling

In general, it is impossible to collect or analyse all potential data from all potential cases, due to restricted time, funding, and access. Sampling is a technique that allows a researcher to reduce the quantity of data by only considering a subset rather than the entire population. This often allows for more accurate data collection and analysis as the researcher may have more time to conduct a detailed analysis on fewer selected cases. The selected sample should however be representative of the full set of cases in a meaningful manner that can be justified. (Saunders et al., 2012:258).

Sampling techniques should align with the selected research problem, aim, and specifically the research design. According to Saunders et al. (2012:261), there are two main types of sampling techniques, namely, probability and non-probability sampling. Quantitative research involves probability sampling, while qualitative research typically makes use of purposeful or non-probability sampling (Sandelowski, 2000:248).

Probability sampling is used to make an inference from the sample about the entire population and often include the following (Saunders et al., 2012:262):

- Identification of a suitable sampling frame;
- Selection of a suitable sample size;
- Selection of an appropriate technique;
- Application of selected technique; and
- Confirmation check whether the sample is representative of the population.

Non-probability sampling is an alternative to selecting random samples. These techniques often include some subjective judgment for a specific reason and may further assist in conducting an in-depth study focusing on a small number of cases. This type of sampling includes the same steps as for probability sampling except for the sampling frame (Saunders et al., 2012:282).

4.5.1 Population (Sampling Frame)

The population for this research was 24 local municipalities in the Western Cape, South Africa. While this may be deemed a relatively small population, it should be highlighted that this research was based on case study strategy. It therefore required an in-depth study related to municipalities specifically within the context of the Western Cape. As indicated in Section 4.4 and shown in Annexure A, the interview questionnaire developed for this research is extensive. It was therefore impractical to conduct such in-depth interviews at all 24 municipalities, thus requiring the use of sampling.

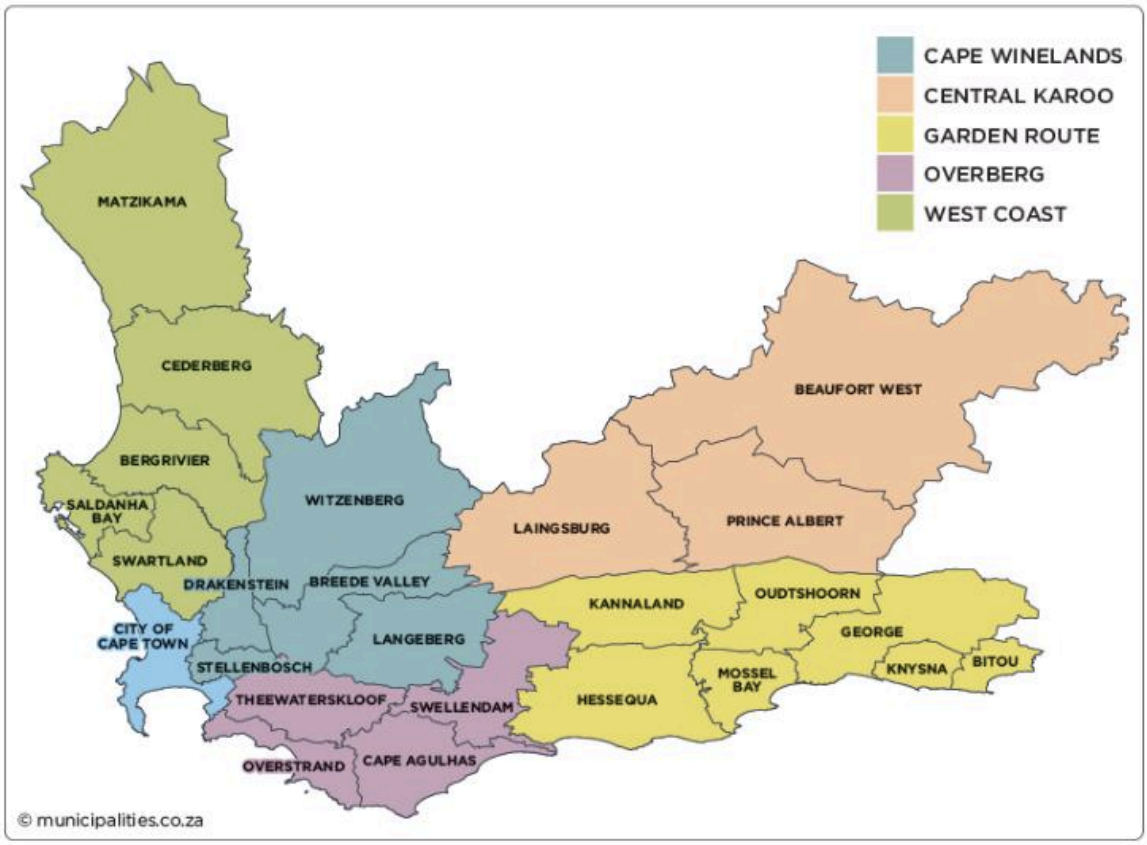


Figure 4.7: Municipalities of the Western Cape

(municipalities.co.za, np)

4.5.2 Selection of a Suitable Sample Size

According to Saunders et al. (2012:283), the validity of the sample in the case will depend on the understanding and insight during the data collection analysis and not so much on the sample size. The selection of the size is therefore based on the researcher's judgement and depends on the research objectives and questions, and on how much data is deemed enough to answer the research questions with confidence.

Saunders et al. (2012:283) do however make the following suggestions that can be considered:

Table 4.2: Minimum sampling sizes for non-probability sample (Saunders et al., 2012:283)

Type of Study	Minimum sampling size
Interviews	5–25
Ethnographic	35–36
Grounded theory	20–35
Homogenous population	4–12
Heterogeneous population	12–30

The sample size for this research was therefore selected as six municipalities.

4.5.3 Selection of an appropriate technique

Sandelowski (2000:248) noted that while there is a specific difference between the two main types of sampling, they can be combined especially when the researcher selected a mixed-method research design.

Taking into consideration the type of research, which was mixed method in this case, and the different types, sizes, and perceived capabilities of the population, a sample was selected through a combination of probability sampling and non-probability sampling. A suggestion by Sandelowski (2000:250) is stratified purposeful sampling. This technique allows researchers to ensure that the sample contains a selected number of specified kinds of variations that the researcher requires to successfully answer the research question.

4.5.4 Application of selected technique

Municipalities were therefore purposefully clustered based on their size in terms of population to ensure that all types of municipalities had the same probability of being selected. Municipalities were grouped into the following three different categories:

Table 4.3: Categorisation of municipalities according to population size

Large Population > 105 000	Medium Population 55 000–105 000	Small Population < 55 000
Breede Valley: 176 578	Bergrivier: 67 474	Cape Agulhas: 36 000
Drakenstein: 280 195	Bitou: 59 157	Kannaland: 24 168
George: 208 195	Mossel Bay: 94 135	Laingsburg: 8 895
Langeberg: 105 483	Oudtshoorn: 97 509	Hessequa: 54 237
Saldanha: 111 173	Overstrand: 93 407	Prince Albert: 14 272
Stellenbosch: 173 197	Knysna: 73 835	Swellendam: 40 211
Theewaterskloof: 117 167	Matzikama: 71 045	Beaufort West: 51 080
Witzenberg 130 548		Cederberg: 52 949
Swartland 133 762		

Two municipalities from each of these three groups were selected randomly, producing the sampling size of the following six municipalities:

Large: Langeberg & Swartland
Medium: Mossel Bay & Matzikama
Small: Laingsburg & Hessequa

4.6 Chapter Summary

This chapter described the methodology used in this research study.

This chapter provided a theoretical overview in Section 4.2 which briefly introduced literature and theory of the general research process. Section 4.3. then provided the specific methodology chosen for this work, including the research philosophy and approach, the research strategy, the research design, and data collection and analysis techniques. Section 4.4 provided an analysis of the PMMMs discussed in Chapter 2 to identify a model that could be adapted as an interview questionnaire for this study. Lastly Section 4.5 provided an overview of the sampling process followed in this work.

The next two chapters present and discuss the results and findings obtained in this research.

CHAPTER 5 PROJECT MANAGEMENT MATURITY OF WESTERN CAPE MUNICIPALITIES

The thesis has up to this point described the literature supporting the research (Chapters 2 and 3) as well as the methodology (Chapter 4) that served as a strategy indicating how the research was undertaken. As mentioned in Chapter 1 and as represented in the figure below, the next step of the process is to discuss the results obtained in this research. This will be done in two chapters. This chapter presents the quantitative results, namely the project management maturity of municipalities, while the next chapter presents the qualitative results, namely the proposed improvement interventions.

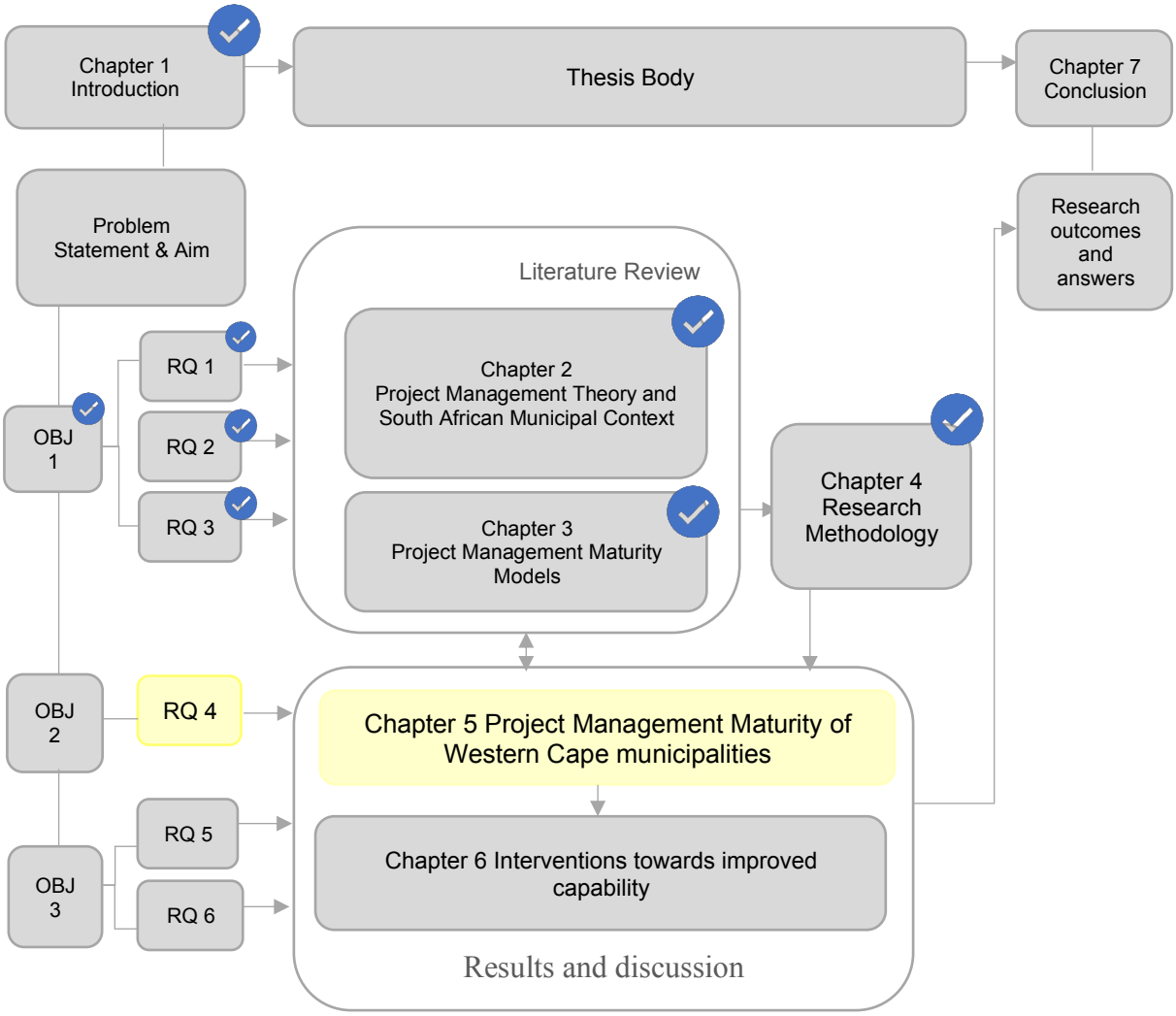


Figure 5.1: Graphic representation of Chapter 5 and thesis progress

5.1 Introduction

As noted above, this chapter presents and discusses the quantitative results obtained in this research. The reader is at this point reminded of the aim of the research, which was to assess

municipal project management capability through the application of a project management maturity model by achieving the following objectives and answering the subsequent research questions:

Objective 1: *To identify and adapt an existing project management maturity model appropriate for this study.*

RQ 1: *How will the existing project management body of knowledge influence the identification of a project management maturity model?*

✔ Answered in Chapter 2

RQ 2: *How will the local conditions of Western Cape municipalities influence the identification of a project management maturity model?*

✔ Answered in Chapter 2.

RQ 3: *What project management maturity models exist and what model can be identified and adapted for this study to serve as an assessment questionnaire?*

✔ Answered in Chapter 3.

Objective 2: *To assess what level of project management capability Western Cape municipalities have through the application of the identified and adapted PMMM.*

RQ 4*: What is the project management capability of Western Cape municipalities?*

To be answered in this chapter.

Objective 3: *To determine how Western Cape municipalities can improve their capability.*

RQ 5: *What are the main challenges that limit the improvement of project management capability in municipalities?*

To be answered in Chapter 6.

RQ6: *What ideas and interventions can be proposed towards improving the current levels of maturity that exist in the municipalities?*

To be answered in Chapter 6.

The results of this study were obtained through interviews based on a semi-structured interview questionnaire. The questionnaire consisted of three parts, namely 1) demographics, 2)

capability assessment, and 3) improvement strategy. The transcripts of the interviews are included as Annexure B**.** This chapter presents and discusses the first two quantitative parts of the questionnaire, namely the demographics describing each of the sampled municipalities in Section 5.2, and the results of the project management capability assessment conducted in the sampled municipalities in Section 5.3.

5.2 Demographics of Sampled Municipalities

This part of the questionnaire aimed to describe the sampled municipalities to form context and background against which the subsequent parts of the interview can be analysed. The section therefore presents data related to the qualification and experience of the interviewees as well as information regarding the quantity and quality of projects implemented by the municipalities.

The demographic section consisted of 4 interview questions. The results from each of these are presented and discussed below:

IQ 0.1. What is your highest qualification?

This question was asked to determine whether there is a correlation between the level of education of a project management unit (PMU) manager and the maturity of the municipality they work in.

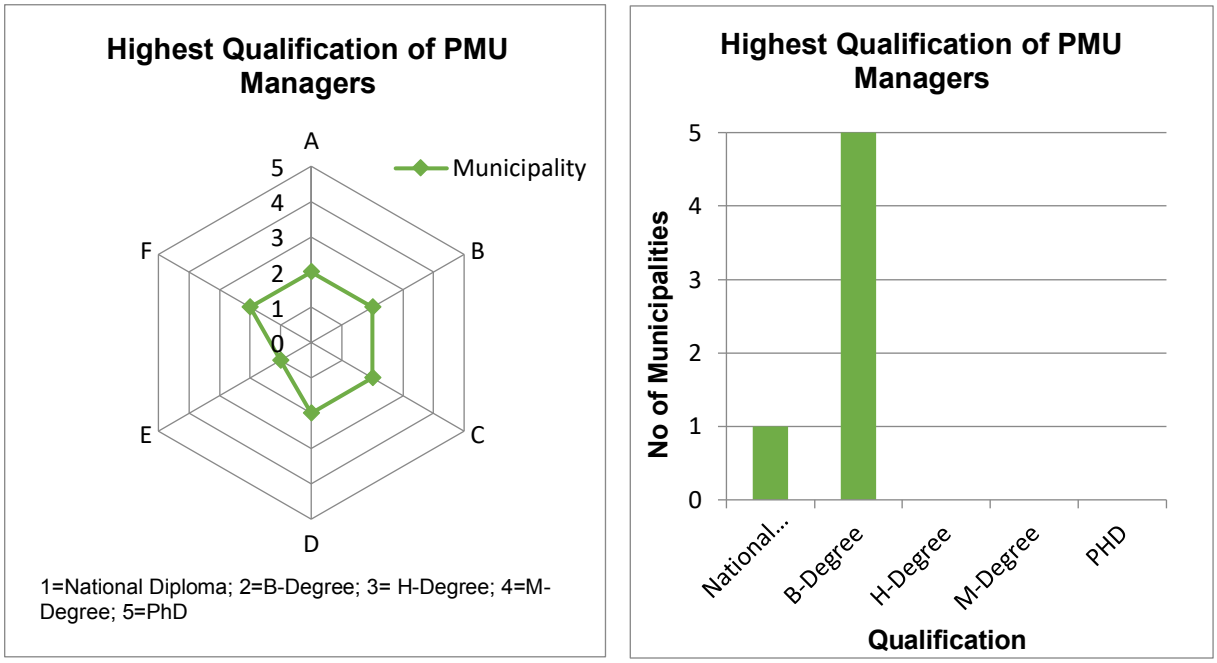


Figure 5.2: Highest qualification of PMU managers

As presented in
Figure 5.2 above, 5 of the 6 PMU managers interviewed have a B-degree, with only one interviewee having a National Diploma. The data shows that none of the interviewees currently has an Honours Degree or higher. This will form a basis to analyse and interrogate the maturity ratings of these municipalities with the aim of determining whether these levels of qualifications influence the maturity rating of their municipalities.

IQ0.2. What is the length of your project management experience?

As with the first question, this one also aimed to form a basis for the correlation between experience and project management maturity. The results obtained for this question are presented in below Figure 5.3.

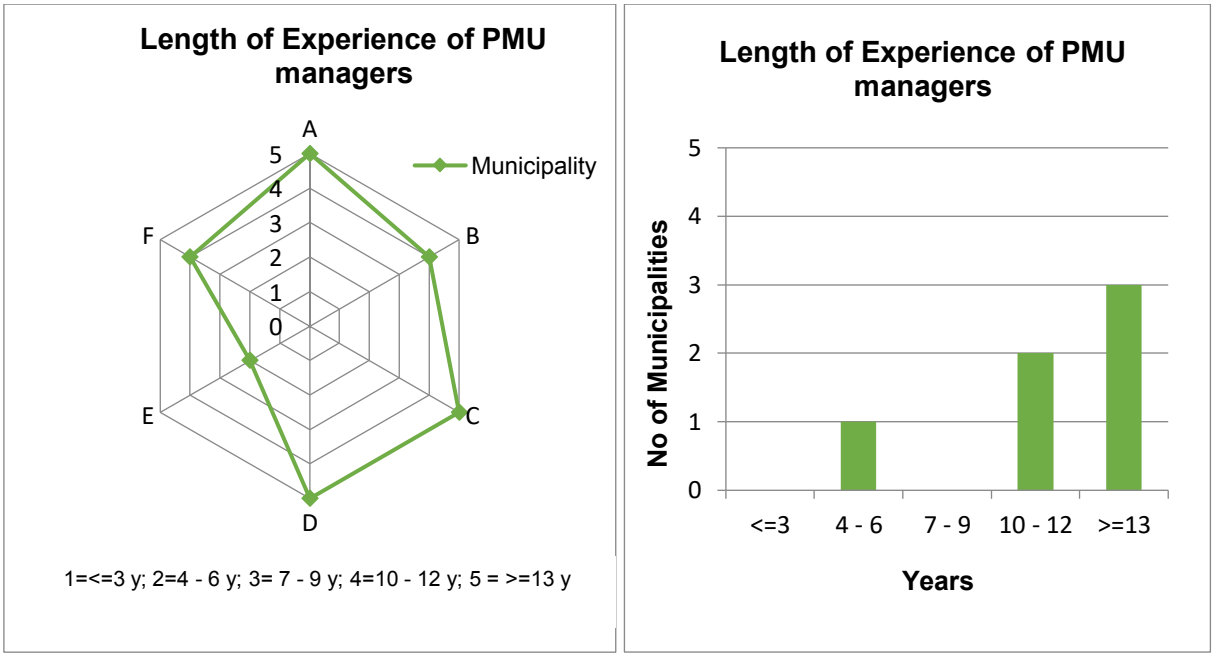


Figure 5.3: Length of experience of PMU managers

The experience of the PMU managers interviewed as part of this research varied to some degree. Three of the six managers indicated that they had 13 or more years of experience, while two said that they had between 10 and 12 years of experience, while one manager had between 4 and 6 years.

IQ0.3. How many infrastructure projects do you normally implement during a financial year?

The aim of this question was to establish a basis upon which the results of the maturity assessment could be analysed.

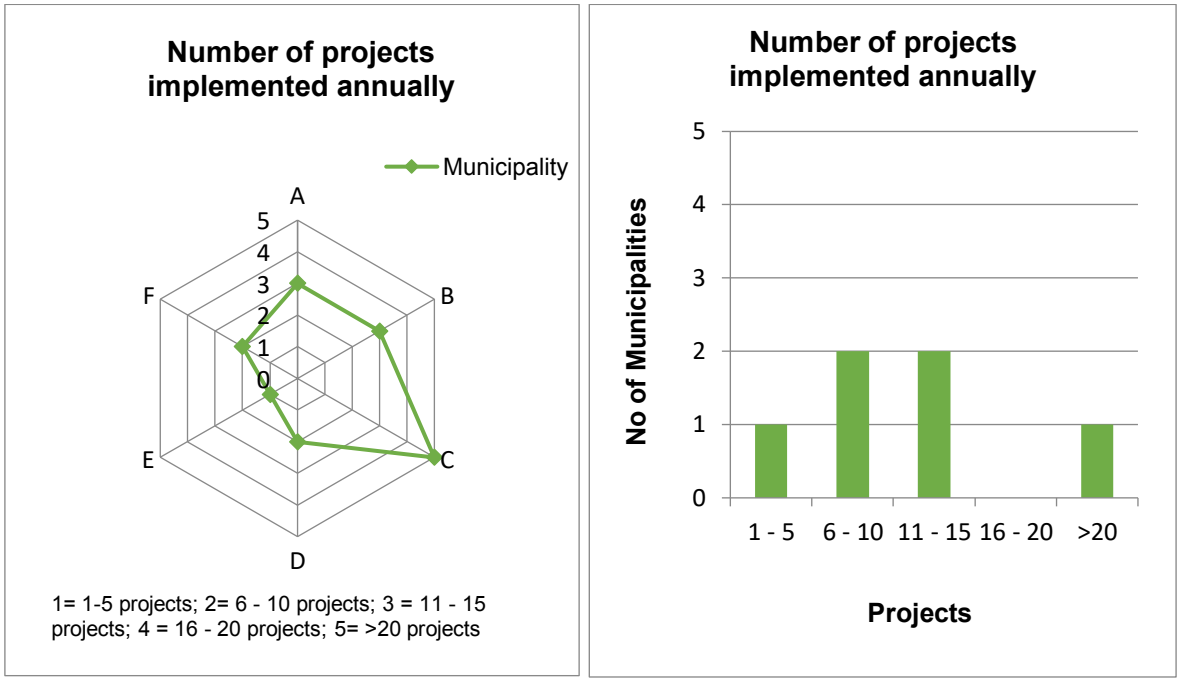
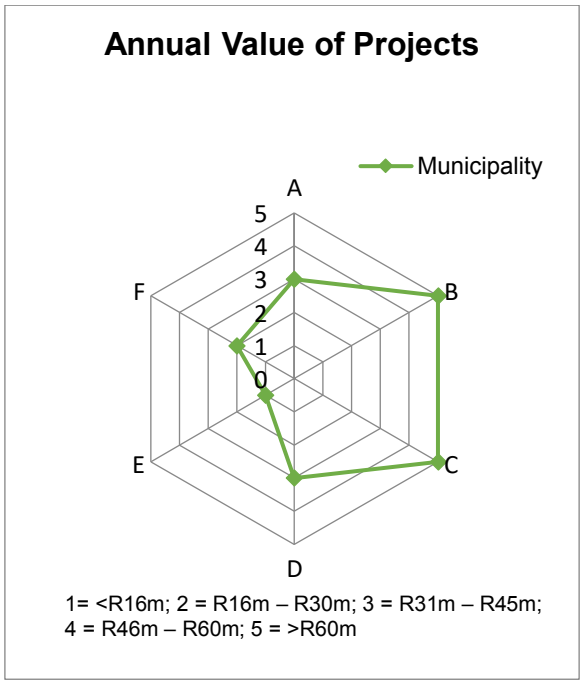


Figure 5.4: Number of project implemented annually

As indicated in the figure above, two municipalities indicated that they implemented between 6 and 10 projects a year, while another implemented between 11 and 15 projects. One interviewee indicated that they only implemented between 1 and 5 projects annually, while Municipality C implemented more than 20 projects a year. This presents a large variety of the number of projects being implemented in municipalities, which may have an influence on the level of maturity that exists in these municipalities.

IQ0.4. What is the value of your annual infrastructure budget?

This question was asked on the assumption that the value of the total budget allocated to the infrastructure projects might influence the level of maturity. To test this assumption, the results of this question were analysed against the maturity rating discussed in the next section.



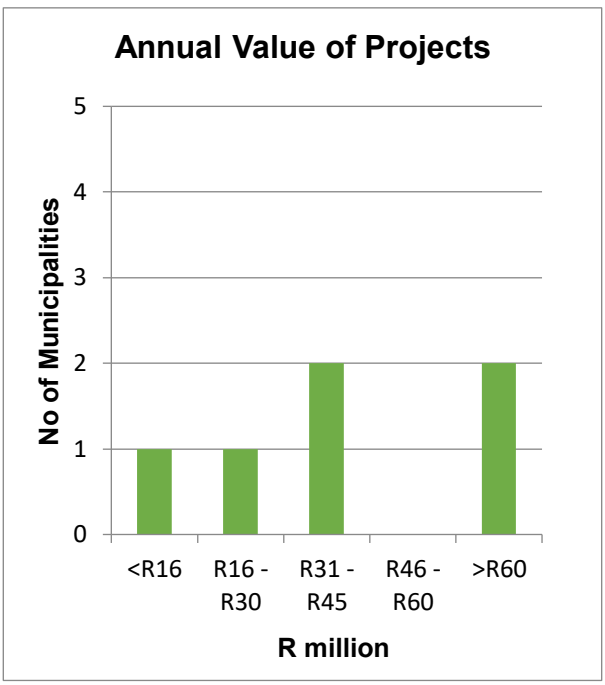


Figure 5.5: Annual value of projects

The annual budget allocated to municipalities in the Western Cape differs significantly. Municipality B and C both indicated that they had an annual budget of more than R60 million, while other municipalities (A and D) had a budget of between R31 million and R45 million. The PMU manager representing Municipality E said their budget was less than R16 million, and Municipality F's budget was indicated as between R16 million and R30 million.

5.3 Project Management Capability of Municipalities

As previously discussed in Chapter 3, the project management capability of municipalities was determined through the selected project management maturity model, namely the PM Solutions PMMM, which served as a guide for this assessment. The researcher used the concept of this model to develop this part of the interview questionnaire.

The questionnaire consisted of specific questions related to identified processes from each project management knowledge area, as described in Section 2.2.3. Questions were in the form of a statement describing a process within a knowledge area. Participants were then asked to rate to what extent such a process was implemented in their organisations. These ratings were based on the maturity levels used in the PM Solutions PMMM. Data was analysed in a Microsoft Excel-based model, as described in Section 4.3.2.3. This included determining the maturity rating for each knowledge area as well as the overall maturity rating for each municipality.

This section will therefore present and discuss the results as collected and analysed for the project management capability assessment in answering research question 4, restated below for reference.

***RQ 4**: What is the project management capability of Western Cape municipalities?*

Results are first presented for each of the 6 sampled municipalities. Secondly, the results of the individual municipalities are discussed in a comparative analysis. Lastly, an interference is drawn to derive the project management capability of Western Cape municipalities.

5.3.1 Results of Sampled Municipalities

5.3.1.1 Municipality A

Municipality A can be described as large municipality with a population of more than 105 000 residents. As indicated in Section 5.2, the demographics for Municipality A can be summarised as follows:

Table 5.1: Demographics of Municipality A

Highest Qualification of PMU manager	B-Degree
Length of experience of PMU manager	13+ years
Number of infrastructure projects per year	11–15
Value of annual project budget	R31–R45 million

a) Maturity Ratings of Project Management Knowledge Areas

Figure 5.6 below depicts the results obtained for the project management maturity ratings for the individual knowledge areas of this municipality.

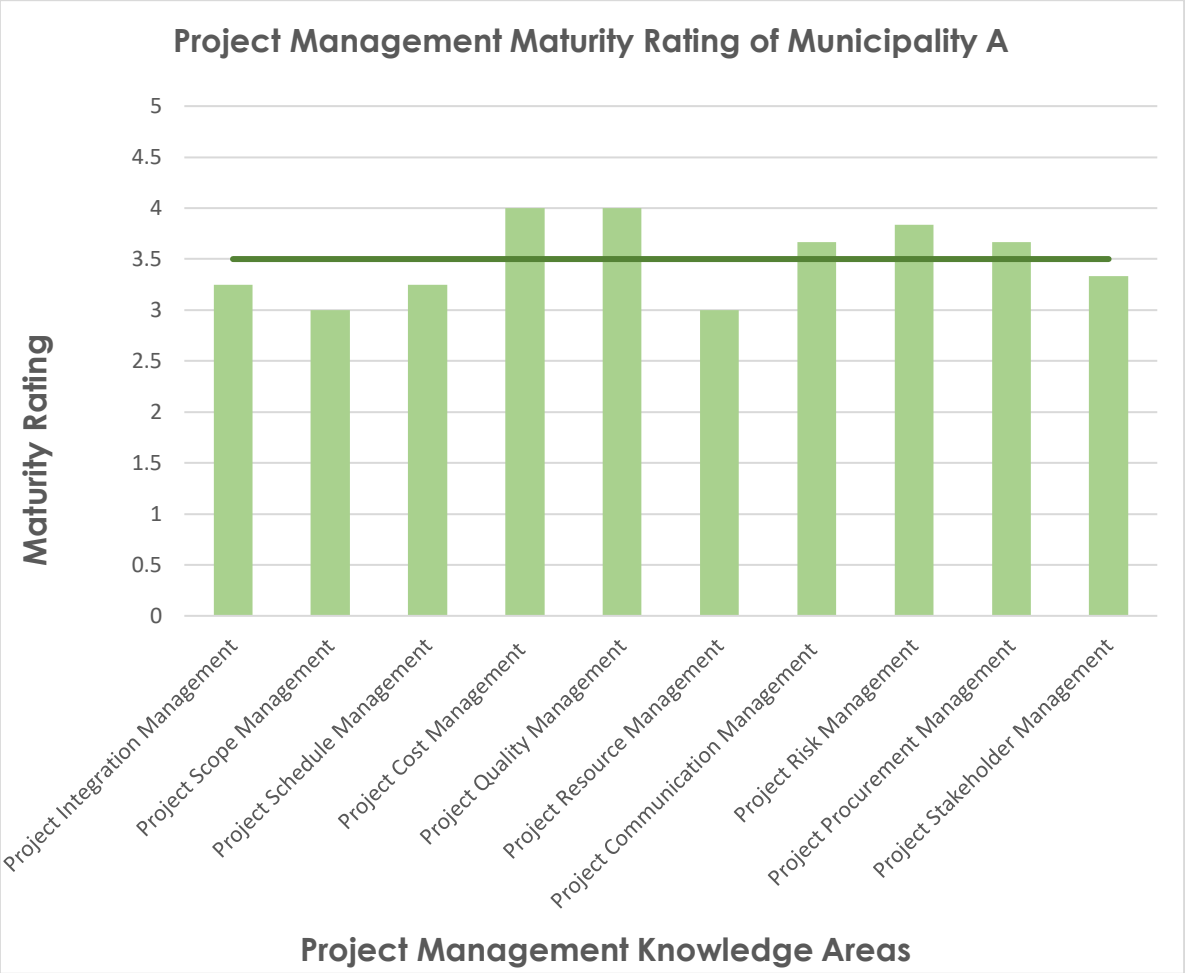


Figure 5.6: Project management maturity rating of municipality A

All of Municipality A's maturity ratings were determined to be between levels 3 and 4. Cost management and quality management were rated the highest of the 10 knowledge areas. These were determined to have a managed approach where processes are fully implemented during all projects and managed across the organisation by a project office.

In Chapter 2, Project Cost Management was described as a project management knowledge area that includes processes to plan, estimate the cost, and create a project budget. Table 5.2 below presents the results obtained for this knowledge area.

Table 5.2: Results for Project Cost Management of Municipality A

Process	Maturity Rating
Plan cost management	4
Estimate cost and determine budget	4
Control cost	4

The results of this part of the assessment indicate that the municipality places a high value on Project Cost Management. This is consistent with van der Waldt's (2011:81) conclusion that municipalities should ensure educated budget control mechanisms, given the importance of spending approved budgets within the required time frames. This municipality typically spends between R31 million and R45 million on infrastructure projects per year. The high maturity rating ensures that this funding is effectively managed and controlled.

Project Quality Management was defined in Chapter 2 as a project management area that ensures the incorporation of existing quality policies within a project. The individualised results of this knowledge area is shown in Table 5.3 below.

Table 5.3: Results for project quality management of Municipality A

Process	Maturity Rating
Plan quality management	4
Control quality	4

These results suggest that Municipality A has adequate quality policies in place and that they are successfully incorporated within their projects. This high focus on quality may be because of the large number of projects the municipality implements per year, i.e., 11–15 projects. The high maturity rating for this knowledge area suggests that these projects are implemented to the required quality standards which ensures that the customer gets value for money. This aligns with one of the key characteristics of projects highlighted by the Project Management Institute (2017), which is business value creation. The good maturity rating Municipality A achieved for project quality management also contributes to ensuring that its projects are implemented on time, within budget, and according to the required quality as highlighted by van der Waldt (2020:1) as key success factors for projects.

The two lowest-scoring project management knowledge areas were Scope, and Resource Management, both determined to be on a rating of 3, which means processes are successfully implemented during most projects and integrated across the organisation. Other low-scoring areas include integration, schedule, and stakeholder management.

b) Overall Project Management Capability

The overall project management maturity of Municipality A was subsequently determined as level 3. This equates to the following maturity description.

Table 5.4: Overall project management maturity of Municipality A

Mean	Mode	Median	Maturity Rating	Maturity Level	Maturity Description
3,5	3,25	3,5	Level 3	Integrated approach	Processes are successfully implemented during most projects and integrated across the organisation

Given the size of the municipality and the official responsible for project management's qualification (B-Degree) and experience (13+ years), these results can be considered adequate and can be deemed above the expectation as noted in the literature review, which found that the project management maturity is relatively low in South African municipalities.

5.3.1.2 Municipality B

Municipality B can be described as a large municipality with a population of more than 105 000 residents. As indicated in Section 5.2, the demographics of this municipality can be summarised as follows:

Table 5.5: Demographics of Municipality B

Highest qualification of PMU manager	B-Degree
Length of experience of PMU manager	10–12 years
Number of infrastructure projects per year	11–15
Value of annual project budget	R61+ million

a) Maturity Ratings of Project Management Knowledge Areas

The project management maturity ratings of the individual project management knowledge areas obtained for this municipality are presented in Figure 5.7 below.

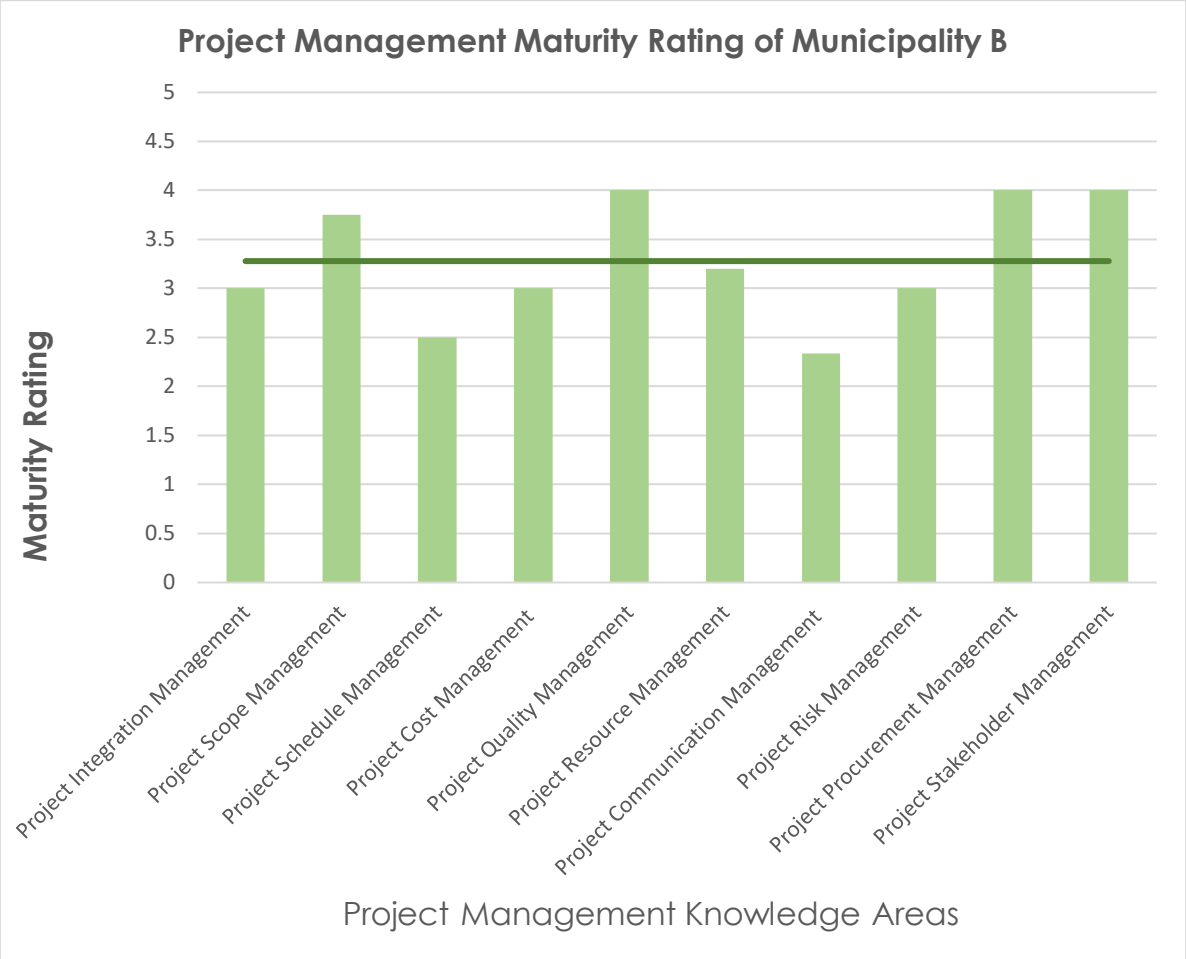


Figure 5.7: Project management maturity rating of Municipality B

Municipality B's maturity ratings were determined to be very inconsistent between levels 2 and 4. Three knowledge areas were determined as level 4, namely Project Quality Management, Project Procurement Management; and Project Stakeholder Management. They are further discussed below:

The definition of project quality management was restated above in 5.3.1.1 for reference and is thus not repeated here again. The results of this knowledge area are however presented in Table 5.6 below.

Table 5.6: Results for project quality management of Municipality B

Process	Maturity Rating
Plan quality management	4
Control quality	4

These results suggest that Municipality B also has adequate quality policies in place which are successfully incorporated within its projects. The importance of this knowledge area was also described in 5.3.1.1 and is thus not restated again.

Project Procurement Management includes processes required to purchase or acquire goods and services outside the project team as defined in Chapter 2. The maturity ratings for this area obtained by Municipality B are presented in Table 5.7 Table 5.7below.

Table 5.7: Results for project procurement management of Municipality B

Process	Maturity Rating
Plan procurement management	4
Conduct procurement	4
Control procurement	4

Given that procurement in government must adhere to several legislative prescripts, including the Municipal Finance Management Act, No 56 of 2003, the Preferential Procurement Regulations, National Treasury regulations and circulars, and council supply chain policies (van der Waldt, 2011:77–78), the high maturity ratings suggests that Municipality B has put the necessary control mechanisms in place to ensure compliance in this regard.

Project Stakeholder Management was defined in Chapter 2 as a knowledge area that includes processes to identify external or internal people, groups, and organisations that could be impacted by a project or that might impact a project. Results obtained for stakeholder management are presented in Table 5.8 below.

Table 5.8: Results for project stakeholder management of Municipality B

Process	Maturity Rating
Identify stakeholders	3
Plan stakeholder engagement	4
Manage and monitor stakeholder engagement	5

Van der Waldt (2011:72–73) highlighted in his research how important managing relationships between all internal and external stakeholders is, especially in government projects.

Municipality B's results in this regard are therefore in line with this statement and indicate the value the municipality places on its stakeholders being impacted by or impacting its projects.

It is further important to discuss the two low-scoring knowledge areas of this municipality, i.e., Project Schedule Management (2.5) and Project Communication Management (2.3). In comparison to the mean maturity rating and in relation to the other knowledge areas, these two project management knowledge areas were very low and are therefore further discussed in the tables and narratives below.

Project schedule management includes processes needed to ensure that the project is completed on time. Scheduling further provides a plan that indicates when the project will deliver each milestone as defined in the work breakdown structure. The results of this area are presented in Table 5.9 below.

Table 5.9: Results for Project Schedule Management of Municipality B

Process	Maturity Rating
Plan schedule management	2
Define and sequence activities	2
Estimate activity durations and develop schedule	3
Control schedule	3

The above table shows that the two processes contributing to the low maturity rating of this knowledge area are plan schedule management, and define and sequence activities. These are important processes, which if not done in the correct manner might negatively impact on the ability to complete the project on time.

Project Communication Management relates to the information needs of the project and its stakeholders. The low results obtained for this knowledge area, as presented below, may indicate that Municipality B does not place the required importance on ensuring effective communication within their projects.

Table 5.10: Results for project communication management of Municipality B

Process	Maturity Rating
Plan communication management	2
Manage communications	2
Monitor communications	3

b) Overall Project Management Capability

The overall project management maturity of municipality B was subsequently determined as level 3. This equates to the following maturity description.

Table 5.11: Overall project management maturity of Municipality B

Mean	Mode	Median	Maturity Rating	Maturity Level	Maturity Description
3,2	3	3,1	Level 3	Integrated approach	Processes are successfully implemented during most projects and integrated across the organisation

Given the size of the municipality and the official responsible for project management's qualification (B-Degree) and experience (10–12 years), these results can be considered adequate and can be deemed above the expectation as noted in the literature review, which found that project management maturity is relatively low in South African municipalities.

The results are however marginally on level 3 and suggest that the municipality has a long way to go in order to improve its maturity to the next level.

5.3.1.3 Municipality C

Municipality C can be described as a medium municipality with a population of between 55 000 and 105 000 people. As indicated in Section 5.2, the demographics for Municipality C can be summarised as follows:

Table 5.12: Demographics of Municipality C

Highest qualification of PMU manager	B-Degree
Length of experience of PMU manager	13+ years
Number of infrastructure projects per year	21+ projects
Value of annual project budget	R61+ million

a) Maturity Ratings of Project Management Knowledge Areas

The project management maturity ratings of the individual project management knowledge areas obtained for Municipality C are presented in Figure 5.8 below.

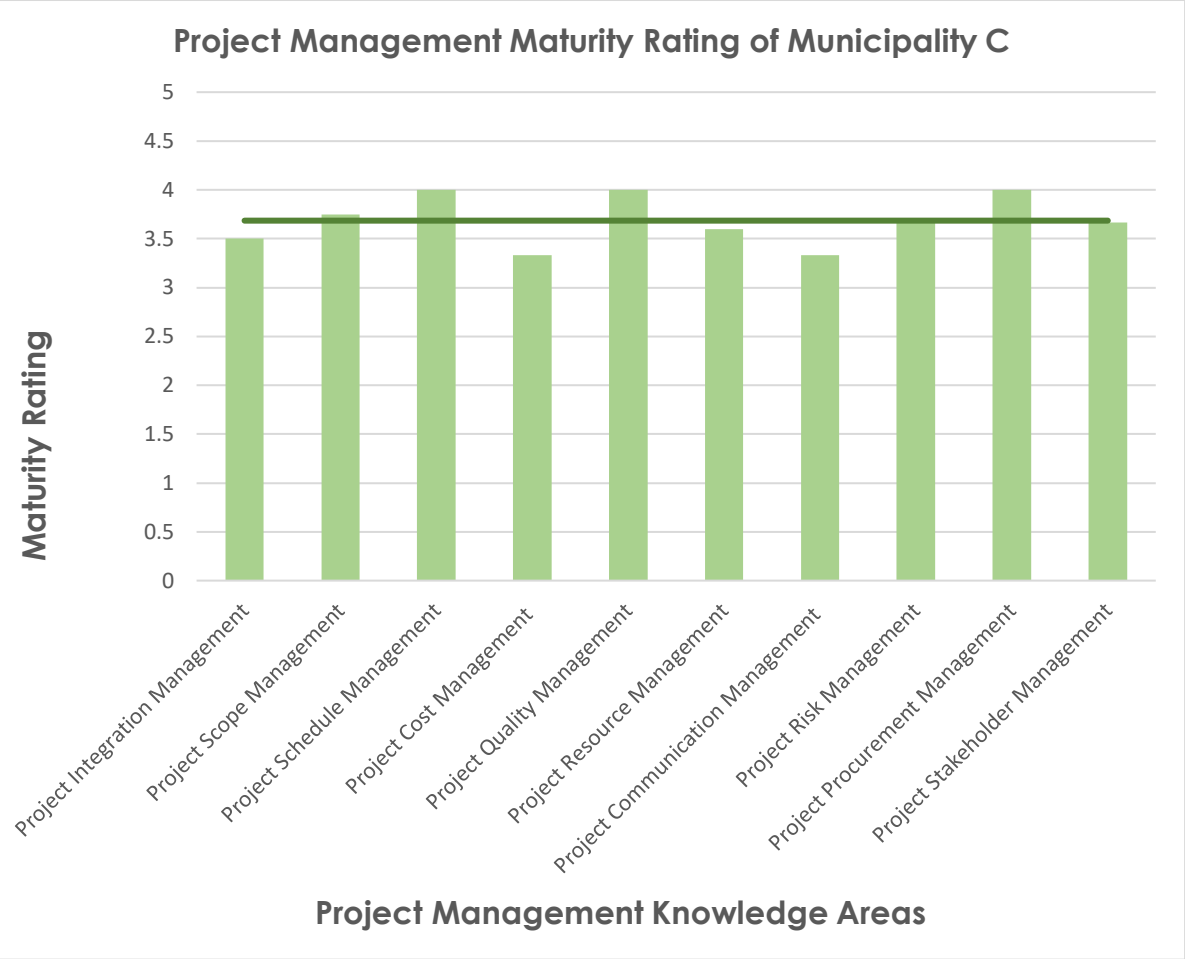


Figure 5.8: Project management maturity rating of Municipality C

The project management maturity ratings of Municipality C were determined to be between levels 3 and 4. Three knowledge areas were determined to be on a maturity rating of 4. They are project schedule, project quality, and project procurement management. These three knowledge areas were described in detail in Chapter 2 and restated in the above sections. This section therefore will only detail the breakdown of their maturity ratings in the tables to follow.

The maturity ratings for schedule management are presented below.

Table 5.13: Results for project schedule management of Municipality C

Process	Maturity Rating
Plan schedule management	4
Define and sequence activities	4
Estimate activity durations and develop schedule	4
Control schedule	4

Project Quality Management obtained the following results as presented in Table 5.14 below:

Table 5.14: Results for project quality management of Municipality C

Process	Maturity Rating
Plan quality management	4
Control quality	4

Municipality C's results for project procurement management can be presented as follows:

Table 5.15: Results for project procurement management of Municipality C

Process	Maturity Rating
Plan procurement management	4
Conduct procurement	4
Control procurement	4

The results presented in the tables above indicate that Municipality C consistently executes the processes within these knowledge areas on a level 4, which implies that their project management processes are fully implemented during all projects and managed across the organisation by a project office.

b) Overall Project Management Capability

The overall project management maturity of municipality C was subsequently determined as level 3. This equates to the following maturity description.

Table 5.16: Overall project management maturity of Municipality C

Mean	Mode	median	Maturity Rating	Maturity Level	Maturity Description
3,6	4	3,7	Level 3	Integrated approach	Processes are successfully implemented during most projects and integrated across the organisation

Given the size of the municipality (medium) and the official responsible for project management's qualification (B-Degree) and experience (13+ years), these results can be considered exceptional and can be deemed above the expectation as noted in the literature review, which found that project management maturity is relatively low in South African municipalities.

The results are further marginally close to a rating of 4 and suggest that the municipality has a short way to go in order to improve its maturity to the next level and may reach it, with some focus on their lower-scoring project management knowledge areas.

5.3.1.4 Municipality D

Municipality D can be described as a medium municipality with a population of between 55 000 and 105 000 residents. As indicated in Section 5.2, the demographics for Municipality D can be summarised as follows:

Table 5.17: Demographics of Municipality D

Highest qualification of PMU manager	B-Degree
Length of experience of PMU manager	13+ years
Number of infrastructure projects per year	6–10 projects
Value of annual project budget	R31 m–R45 million

a) Maturity Ratings of Project Management Knowledge Areas

The project management maturity ratings of the individual project management knowledge areas obtained for Municipality D are presented in Figure 5.9 below.

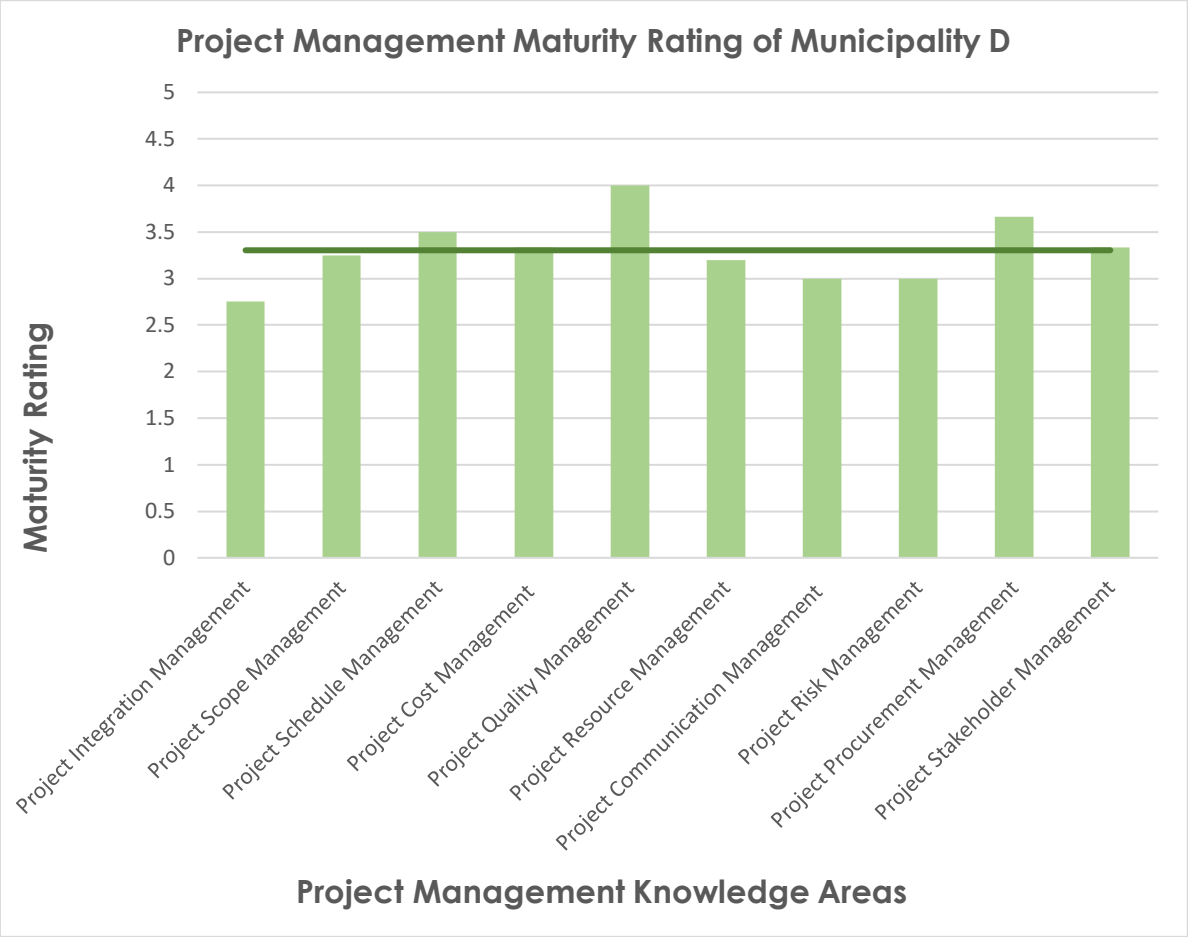


Figure 5.9: Project management maturity rating of Municipality D

The maturity ratings of this municipality are between levels 2.75 and 4. The different knowledge areas are rated fairly within the same region with the exception of project quality management and project procurement management. Project management knowledge areas were described in detail in Chapter 2 and restated in the above sections. This section therefore will only detail the breakdown of their maturity ratings in the tables to follow

Municipality D obtained the following results for project quality management.

Table 5.18: Results for project quality management of Municipality D

Process	Maturity Rating
Plan quality management	4
Control quality	4

The results obtained for Project Procurement Management are presented in table below

Table 5.19: Results for project procurement management of Municipality D

Process	Maturity Rating
Plan procurement management	3
Conduct procurement	4
Control procurement	4

b) Overall Project Management Capability

The overall project management maturity of municipality D was determined as level 3. This equates to the following maturity description.

Table 5.20: Overall project management maturity of Municipality D

Mean	Mode	median	Maturity Rating	Maturity Level	Maturity Description
3,3	3,3	3,29	Level 3	Integrated approach	Processes are successfully implemented during most projects and integrated across the organisation

Given the size of the municipality (medium) and the official responsible for project management's qualification (B-Degree) and experience (13+ years), these results can be considered adequate and in line with what can be expected. The results further indicate that the municipality's rating is closer to 3 than it is to level 4, with most of the knowledge areas rating between 3 and 3,5. This implies that it will take a significant effort in almost all project management knowledge areas in order to reach the next maturity level.

5.3.1.5 Municipality E

Municipality E can be described as small municipality with a population of less than 55 000 residents. As indicated in Section 5.2, the demographics for Municipality E can be summarised as follows:

Table 5.21: Demographics of Municipality E

Highest qualification of PMU manager	National Diploma
Length of experience of PMU manager	4–6 years
Number of infrastructure projects per year	1–5 projects
Value of annual project budget	<R16 million

a) Maturity Ratings of Project Management Knowledge Areas

The project management maturity ratings of the individual project management knowledge areas obtained for Municipality E are presented in Figure 5.10 below.

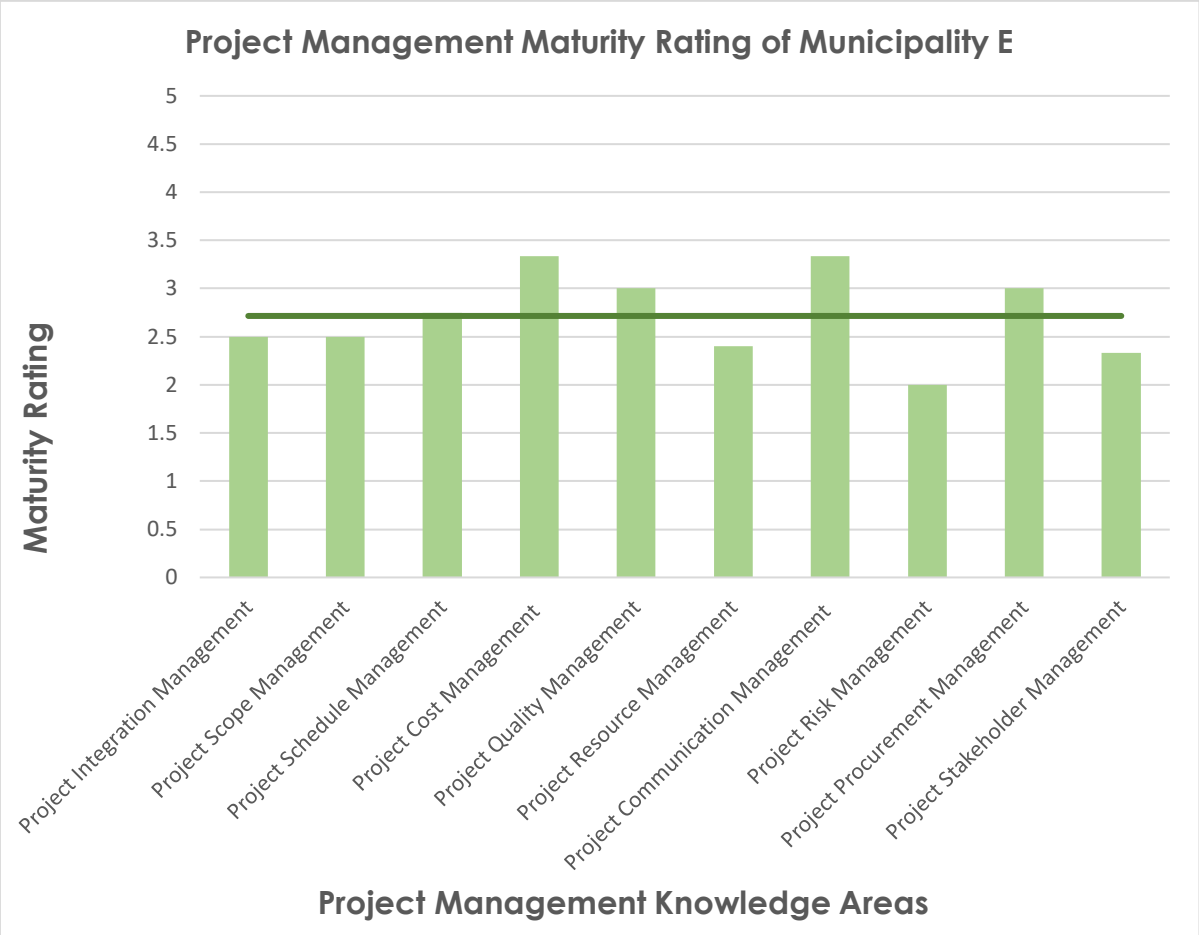


Figure 5.10: Project management maturity rating of Municipality E

The project management maturity ratings of Municipality E were determined to be between levels 2 and 3.3, which indicates a wide range of maturity between the different knowledge areas. Municipality E has no project management knowledge areas that were rated on a level 4. Only two areas were rated as 3.3 which are Project Cost Management and Project Communication Management. These knowledge areas were described in detailed in Chapter 2 and restated in the above sections. This section therefore will only detail the breakdown of their maturity ratings in the tables to follow.

The maturity ratings for schedule management area presented in below.

Table 5.22: Results for project cost management of Municipality E

Process	Maturity Rating
Plan cost management	3
Estimate cost and determine budget	3
Control Cost	4

Municipality E further achieved the following results for Project Communication Management as presented in Table 5.23 below

Table 5.23: Results for project communication management of Municipality E

Process	Maturity Rating
Plan communication management	3
Manage communications	4
Monitor communications	3

b) Overall Project Management Capability

The overall project management maturity rating was subsequently determined as level 2. This equates to the following maturity description.

Table 5.24: Overall Project Management Maturity of Municipality E

Mean	Mode	median	Maturity Rating	Maturity Level	Maturity Description
2,715	2,5	2,625	Level 2	Basic approach	Basic and structured processes are documented and implemented for individual projects.

Municipality E's maturity rating was defined as a basic and structured approach that was used for individual projects. It implies that there is no integration across the organisation that is driven by the PMU within the Municipality. If one considers the qualification of the PMU manager and the length of experience, this low rating in comparison to the other municipalities may be understood. Municipality E was also characterised as a small municipality implementing only 1–5 projects every year and with an annual budget of below R16 million. From the above results, it is evident that the PMU manager's lower qualification, short experience, and the municipality's low number of projects and low budget impact on their

project maturity. Given the small number of projects and low budget, there may be little management focus and oversight that leads to limited growth in their maturity. Specific challenges impacting this growth will be presented and discussed in the next chapter.

5.3.1.6 Municipality F

Municipality F can be described as a small municipality with a population of less than 55 000 residents. As indicated in Section 5.2 the demographics for Municipality F can be summarised as follows:

Table 5.25: Demographics of Municipality F

Highest qualification of PMU manager	B-Degree
Length of experience of PMU manager	10–12 years
Number of infrastructure projects per year	6–10 projects
Value of annual project budget	R16–R30 million

a) Maturity Ratings of Project Management Knowledge Areas

The project management maturity ratings of the individual project management knowledge areas obtained for Municipality F are presented in Figure 5.11 below.

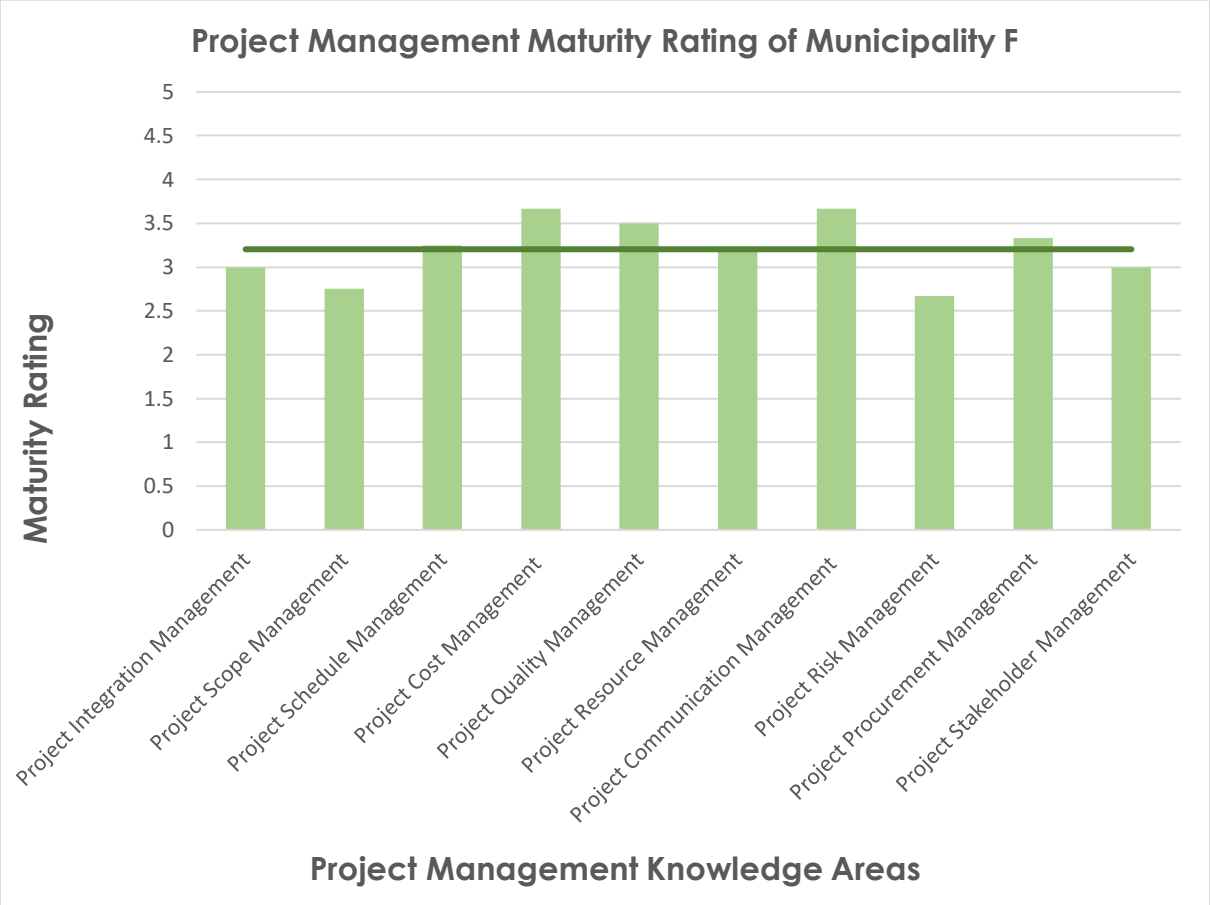


Figure 5.11: Project management maturity rating of Municipality F

The project management maturity ratings of Municipality F were determined to be between levels 2,7 and 3,7, which indicates a rather close range of maturity between the different knowledge areas. Two project management knowledge areas were rated the highest, namely Project Cost Management and Project Communication Management, both rated as 3,7. These knowledge areas were described in detail in Chapter 2 and again restated in the above sections. It remains however important to provide the reader with a breakdown of these two knowledge areas to gain an understanding of how each of their processes were rated.

Municipality F achieved the following results for Project Cost Management as presented in Table 5.26 below.

Table 5.26: Results for Project Cost Management of Municipality F

Process	Maturity Rating
Plan cost management	3
Estimate cost and determine budget	3
Control cost	4

The maturity ratings for Project Communication Management are presented in Table 5.27 below

Table 5.27: Results for project communication management of Municipality F

Process	Maturity Rating
Plan communication management	3
Manage communications	4
Monitor communications	3

b) Overall Project Management Capability

The overall project management maturity rating of Municipality F was subsequently determined as level 3. This equates to the following maturity description.

Table 5.28: Overall project management maturity of Municipality F

Mean	Mode	median	Maturity Rating	Maturity Level	Maturity Description
3,2	3	3,225	Level 3	Integrated approach	Processes are successfully implemented during most projects and integrated across the organisation

It is noteworthy to mention that Municipality F was rated higher than Municipality E, although both were described as small municipalities. Taking a closer look at the demographics of this municipality as described in Table 5.25 above, it is worth noting that the PMU manager's qualification and length of experience are more closely comparable to the medium-sized municipalities that were also rated level 3. Municipality F further indicated that they implemented 6–10 projects with an annual budget of between R16 million and R30 million. It therefore suggests that the qualification and experience of their PMU manager as well as the number of projects and annual budget affected the value the municipality and presumably their management places on project management. This concept will be further considered in the sections to follow.

5.3.2 Comparative Analysis of Maturity Ratings

The previous section presented and discussed the project management maturity ratings for the six sampled municipalities. This section will now compare the municipalities against each other to gain a greater understanding of the results and to determine whether any inference can be drawn between the different-sized municipalities and their specific demographic profiles as presented in Section 5.2.

Firstly, the project management knowledge areas are compared in the below Figure 5.12:

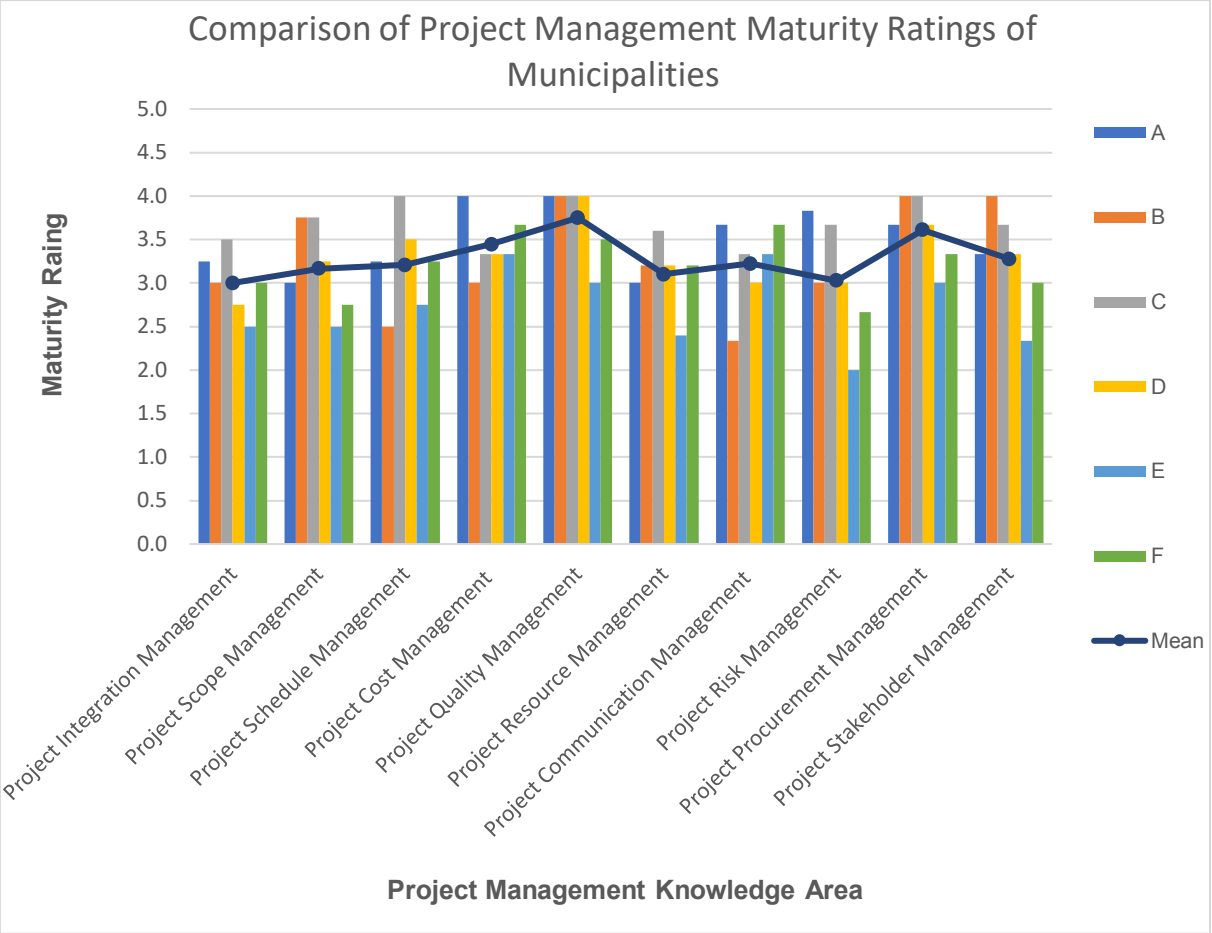


Figure 5.12: Comparison of project management maturity ratings of municipalities

Based on the figure above, it is important to discuss the three project management knowledge areas that were determined to be consistently higher than the others for most of the municipalities, namely Project Cost Management, Project Quality Management, and Project Procurement Management, which can be regarded as the first key finding of this research.

> ***Finding 1:*** *Project Cost, Project Quality, and Project Procurement Management were determined as the most mature knowledge areas*

These knowledge areas were described in detail in Chapter 2. Although there were not any specific areas that were highlighted to be more important than others, upon further analysis, the three highest rated areas do seem to be valued more within municipalities. This may be due to the unique context within which the municipal projects are implemented. In Chapter 2 it was noted that van der Waldt (2011:81) emphasised the importance of spending approved budgets within the required time frames, because of the principle of 'use it or lose it' This may explain why almost all municipalities had **Project Cost Management** as one of the highest rated knowledge areas. **Project Procurement Management** on the other hand is also important to municipalities. This may be because all municipalities appoint professional service

providers and contractors to implement infrastructure projects on their behalf. Municipalities should therefore ensure that the processes associated with this knowledge are implemented correctly, as this will have a significant influence on the rest of the project. **Project Quality Management** was also consistently higher than other knowledge areas. This project management knowledge area measures to what extent existing quality policies are incorporated in projects. The high rating across the municipalities suggests that most place a high value on the quality of projects.

Secondly, the overall project management maturity ratings for the municipalities are presented in Figure 5.13 below.

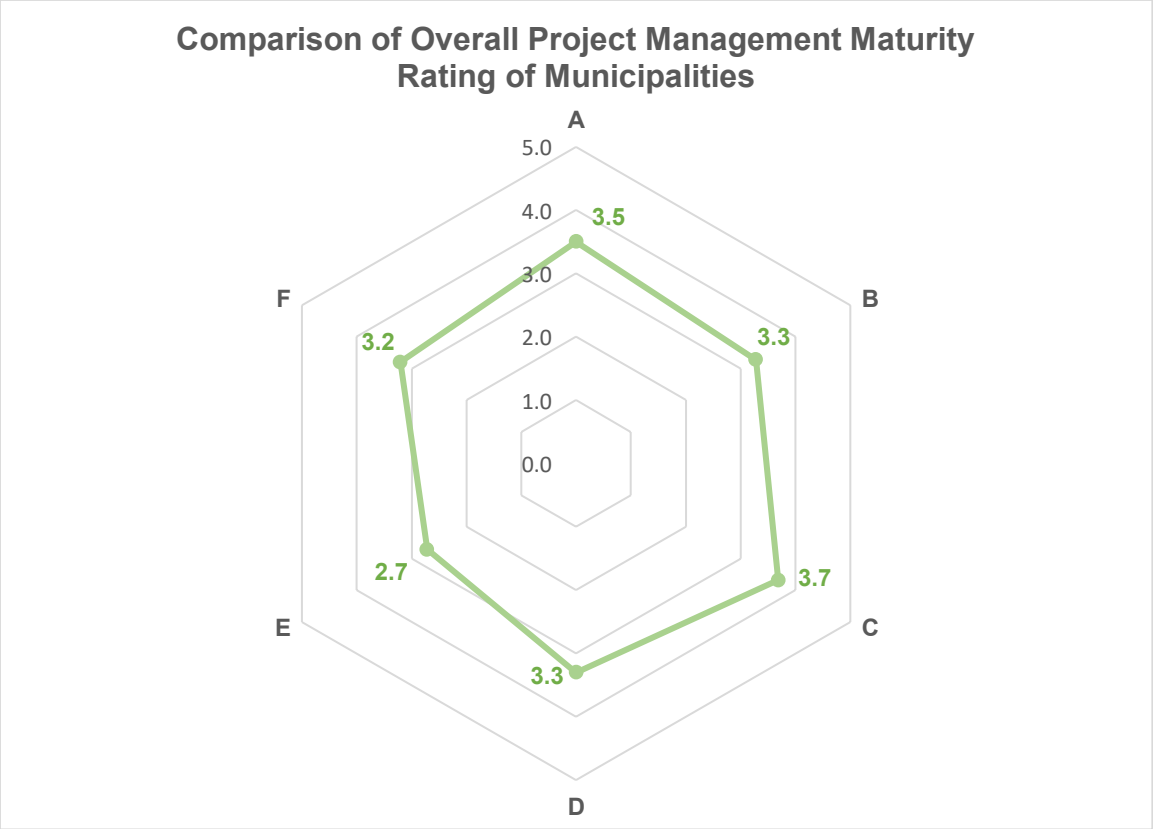


Figure 5.13: Comparison of overall project management maturity ratings of municipalities

The overall maturity ratings of municipalities were all determined to be between levels 3 and level 4, except for Municipality E. Municipalities A and C had the highest ratings of 3,5 and 3,7 respectively, while Municipalities B and E both had maturity ratings of 3,3, followed by Municipality F at 3,2 and Municipality E rated at 2,7. These results indicate that the size of the municipality does not severely affect the project management rating of a municipality.

> ***Finding 2:*** *The size of a municipality does not affect its project management maturity*

Thirdly the project management maturity of municipalities are compared with each other and analysed with the qualifications and experience of the PMU manager as presented in Figure 5.14.

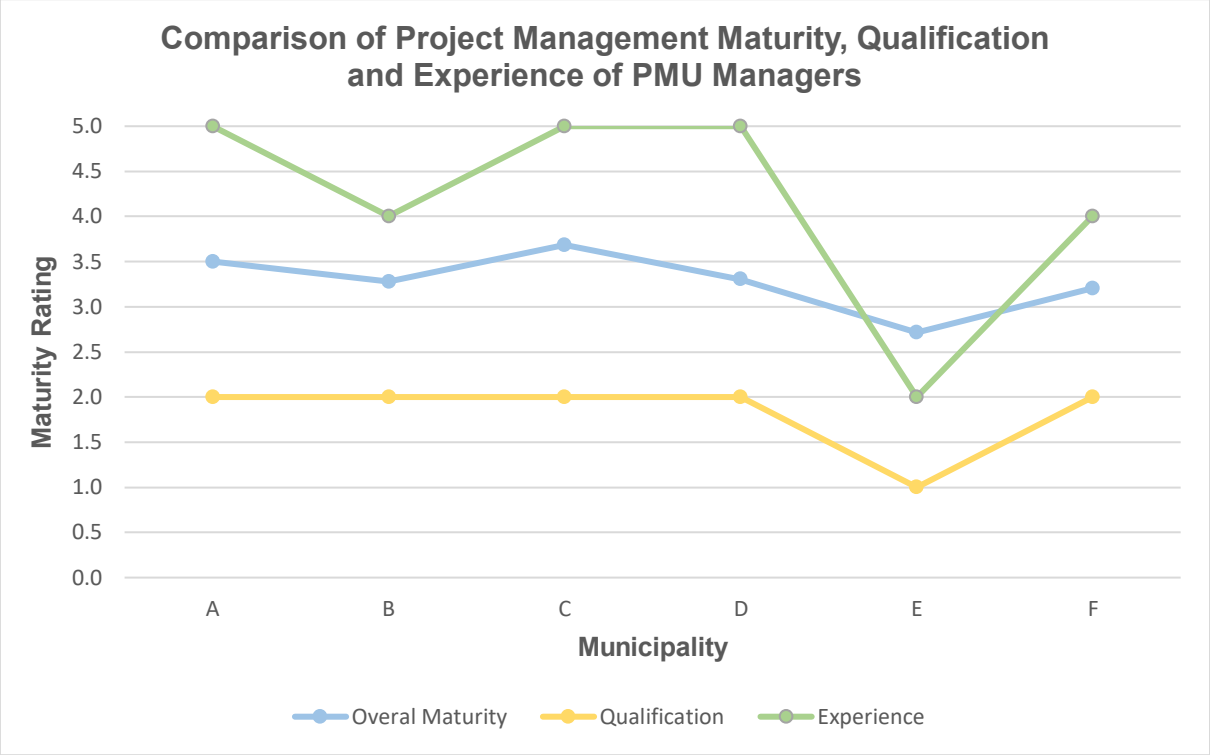


Figure 5.14: Comparison of project management maturity, qualification and experience of PMU managers

As indicated in Section 5.2, the PMU manager of Municipality E had the lowest qualification, as well as the shortest length of experience. The maturity rating of Municipality E was also determined to be the lowest, and the only one below a rating of 3. These results suggest that the qualification and experience of the PMU manager may have an influence on the project management maturity of a municipality.

> ***Finding 3**: The qualification and experience of PMU managers have an influence on the project management maturity of their municipalities.*

Lastly, the maturity ratings will be compared against the number of projects and annual budget of municipalities. Figure 5.15 presents this analysis

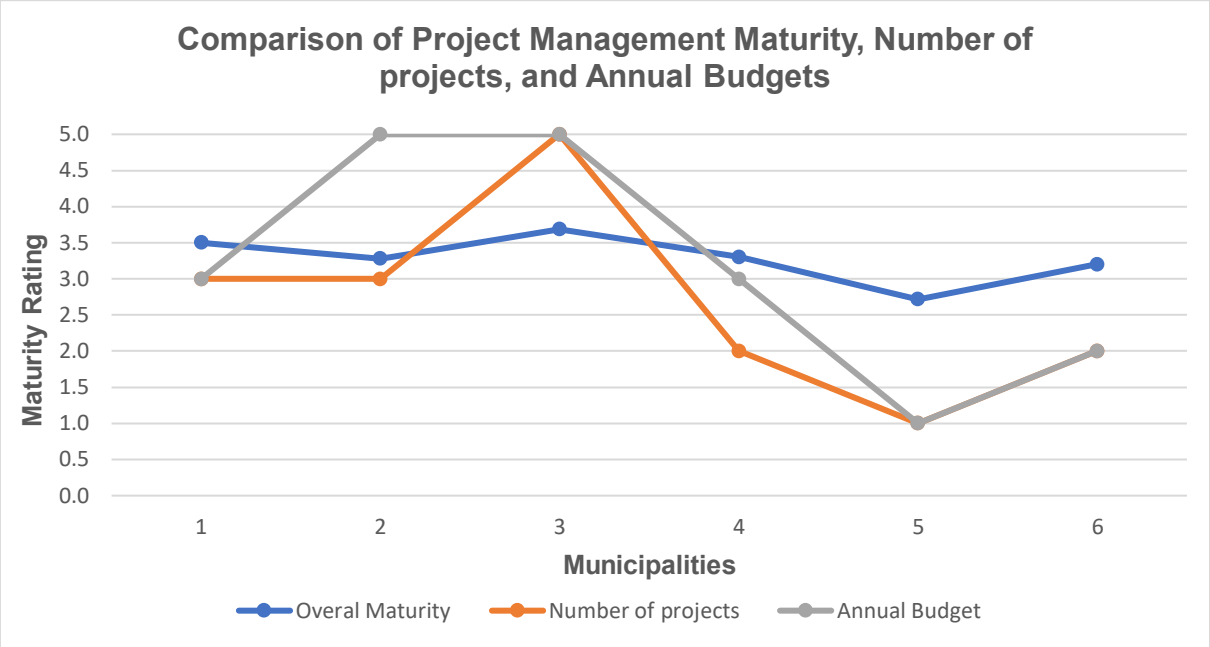


Figure 5.15: Comparison of project management maturity, number of projects and annual budget

This comparison suggests that the number of projects a municipality implements and the budget it allocates towards projects do impact on their maturity rating. This may be because of a perceived higher importance placed on project management when higher budgets are involved. The high number of projects consistently being implemented further suggests that municipalities need to place a higher value on ensuring integration between these projects.

> ***Finding 4**: The number of projects implemented and the value of their budget have an influence of the project management maturity of municipalities.*

5.3.3 Project Management Capability of Western Cape Municipalities

Following the presentation, discussion and comparison of the project management maturity of the individual sampled municipalities, this section aims to answer the main research question of this chapter, which is restated below:

> ***RQ 4**: What is the project management capability of Western Cape municipalities?*

The project management capability of the sampled municipalities was determined through the adapted PMMM selected for this study as previously described. The maturity ratings for these municipalities are presented again in the table below:

Table 5.29: Project management maturity ratings for sampled municipalities

Municipality	Maturity Rating	Maturity Level	Maturity Description
A (Large)	Level 3	Integrated approach	Processes are successfully implemented during most projects and integrated across the organisation
B (Large)	Level 3	Integrated approach	Processes are successfully implemented during most projects and integrated across the organisation
C (Medium)	Level 3	Integrated approach	Processes are successfully implemented during most projects and integrated across the organisation
D (Medium)	Level 3	Integrated approach	Processes are successfully implemented during most projects and integrated across the organisation
E (Small)	Level 2	Basic approach	Basic and structured processes are documented and implemented for individual projects.
F (Small)	Level 3	Integrated approach	Processes are successfully implemented during most projects and integrated across the organisation

As demonstrated in Table 5.29, 5 of the 6 municipalities sampled for this research study were found to be on a level 3 maturity rating. These municipalities were sampled based on their size in terms of population to ensure a well-represented group across the province, as detailed in Section 4.5.

> *The above results therefore suggest that the overall project management maturity of Western Cape municipalities can be determined as level 3.*

Several studies, as discussed in Section 2.3.3, indicated that project management maturity can generally be regarded as poor in South Africa. Mokgethi and van der Waldt (2020:127) noted that while there was an increase in the effective use of project management concepts, challenges remained in municipalities related to planning, organising, capacity, and competencies of officials with regard to project management. Other indications of poor maturity included an article by *Engineering News* (Parker, 2021) that stated that municipalities in South Africa were failing to successfully implement projects, as well as Auditor General findings which highlighted that weaknesses in projects are often observed in municipalities. Notwithstanding the aforementioned, van der Waldt (2020:10) concluded that while poor project management

maturity exists in most government departments and municipalities, there are indeed pockets of excellence.

The results of this study therefore align well with the available literature within the context of developing countries and municipalities. A maturity rating of level 3 indicates that municipalities in the Western Cape do have adequate project management knowledge and skills; however, there remains room for improvement. The results further suggest that the Western Cape municipalities' maturity ratings may be higher than expected, especially when compared to van der Waldt's (2020:1) findings that national government department's project management maturity can be regarded as a level 1 maturity. It should, however, be noted that van der Waldt studied national government, while this study consider local municipalities, which may explain the difference in maturity ratings.

5.4 Chapter summary

Chapter 5 answered the following research question:

***RQ 4**: What is the project management capability of Western Cape municipalities?*

The chapter presented and discussed the quantitative of this research study. This included the results obtained by the project management capability assessment conducted in the sampled municipalities. Maturity ratings for sampled municipality were presented and discussed, followed by a comparative analysis between municipalities, and finally the overall maturity of Western Cape municipalities.

The next chapter discusses the qualitative results of this study including the challenges limiting project management maturity improvement, as well as ideas towards improved project management capability.

CHAPTER 6 INTERVENTIONS TOWARDS IMPROVED CAPABILITY

As mentioned in the previous chapter, the results obtained in this study are presented and discussed in two chapters. Chapter 5 provided a detailed description of the quantitative results of the study, which was the project management maturity of municipalities. This chapter presents and discusses the qualitative results.

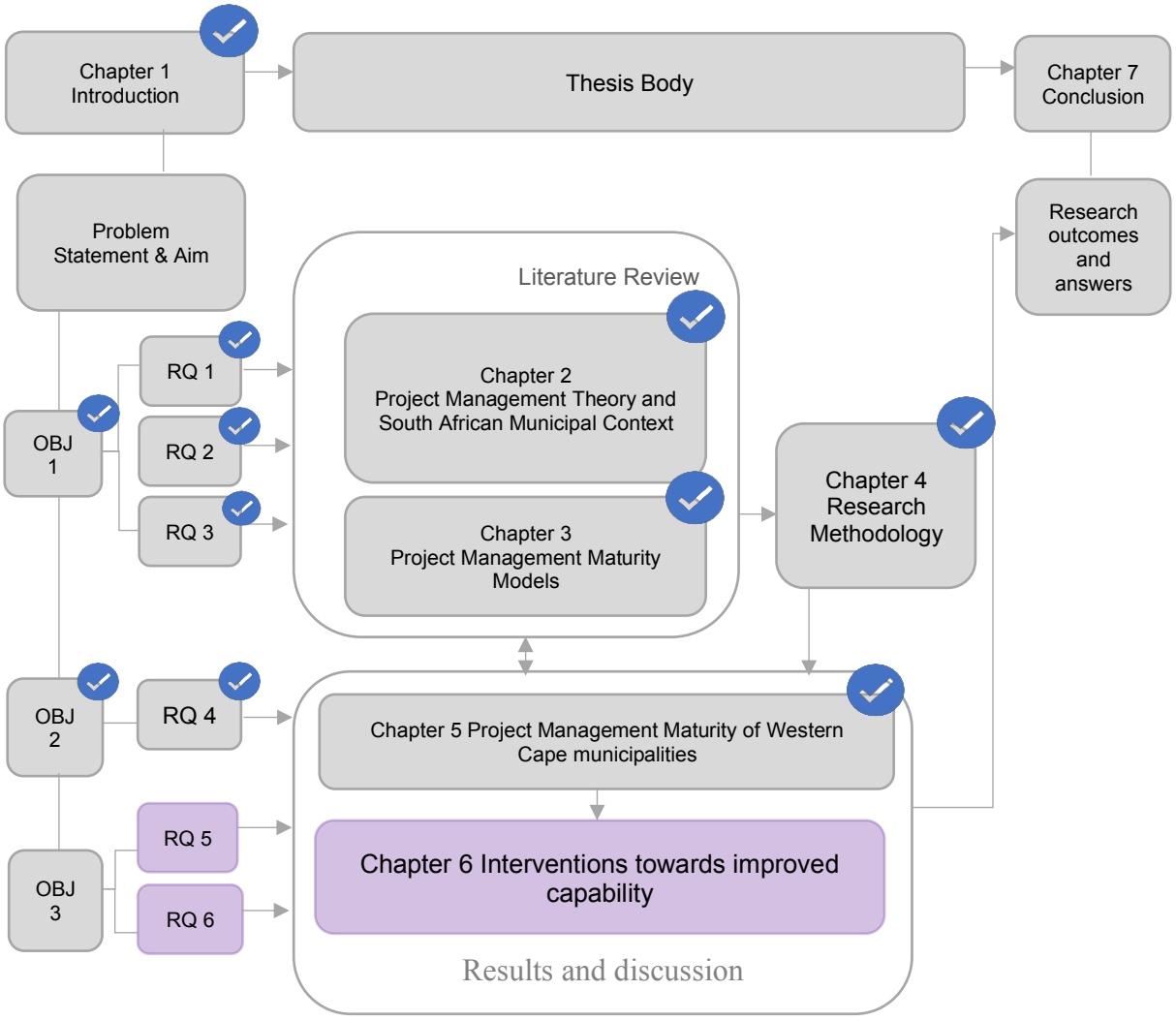


Figure 6.1: Graphic representation of Chapter 6 and thesis progress

6.1 Introduction

The overall aim of this chapter is to achieve objective 3, which is to determine how Western Cape municipalities should improve their capability and develop improvement interventions. In order to achieve this objective, the chapter includes the following two sections:

- Challenges limiting PMM improvement:

This section is based on the results obtained from the first two questions of the qualitative part of the interview questionnaire. It serves as a key informant to the improvement interventions, by providing context and factors that may limit improvement.

- Proposals toward improved maturity:
  This section is based on the results of the last two questions of the questionnaire as discussed in Chapter 4. It forms an integral part of the proposed interventions, as the ideas and proposals from the municipal officials will be of utmost importance.

Chapter 6 therefore answers the last two research questions.

> ***RQ 5:*** *What are the main challenges that limit the improvement of project management capability in municipalities?*
>
> ***RQ6:*** *What ideas and interventions can be proposed towards improving the current levels of maturity that exist in the municipalities?*

6.2 Challenges limiting project management capability improvement

This part of the questionnaire consisted only of 2 questions designed to determine the factors and circumstances that limit the improvement of project management maturity in sampled municipalities as well as their view of Western Cape municipalities in general. Questions were open-ended to allow participants wide range to answer as they saw fit. Data was processed through thematic analysis to derive themes that are discussed in detail in this chapter.

This section will therefore present and discuss the results as collected and analysed to determine the challenges limiting project management capability improvement, in answering research question 5.

6.2.1 Results of Sampled Municipalities

As noted above, participants were asked two open-ended questions to determine the challenges that limit maturity improvement. The responses by the interviewees to these questions are presented below. Firstly, each question asked to interviewees is restated for reference. Secondly, the specific purpose and the linkage to the research question are stated. Thirdly, the individual responses are presented in a table as a first step towards identifying themes which are further presented and discussed in the next sections. Lastly, a summary of

the interviewee responses is presented, with a discussion of the key observations from the researcher.

6.2.1.1 Interview Question 2.1

IQ2.1. What are the main challenges that limit your improvement in terms of project management capability as it relates to the processes assessed in part 1 of this interview? You may list up to 5 challenges.

The purpose of this interview question was for the interviewees to reflect on the challenges they experience within their daily functions related to project management, and more specifically, those challenges that they perceive limit their ability to improve in terms of the project management capability.

A summary of the individual responses from the interviewees is presented in Table 6.1 below

Table 6.1: Interviewee responses to interview question 2.1

Municipality	Response summary
A	The current organogram does not make sufficient provision for the staff required to ensure an effective PMU. Inadequate training and education of staff involved with project management. A silo approach exist whereby the PMU is not always involved during the conceptual stages of the projects.
B	Scope change and scope creep, due to additional work being requested by stakeholders, such as municipal councillor. Unrealistic stakeholder expectation for job creation that may not be possible during all types of projects. Poor quality contractors, in spite of adequate monitoring and regulation.
C	Limited time to plan and implement projects. *Limited human and financial resources.* Continuous and frequently changing legislation; Instabilities in South African economical sector leading to frequent price escalations.
D	Instability of municipal council, with frequent changes of key positions such mayor and speaker. Poor management and leadership pertaining to project management functions. The municipality is reliant on national grant funding for their projects. The remoteness of the area affects the municipality's ability to attract the right skills and talent.

E	PMU is not only responsible for project management, but also other functions such as building control, town planning. Another challenge is the time management of staff due to capacity constraints as noted above. The municipality is further 100% reliant on external grants to fund its infrastructure projects.
F	Procurement regulation aren't geared toward effective infrastructure development Project funding does not always align with the project timelines The municipality has severe capacity challenges. It is difficult to attract skills to a small municipality

The six municipal officials all listed challenges they often experienced within their specific environments. While each of them operated in very different circumstances, they did highlight a few challenges that appear to be common. These includes challenges pertaining to human capacity. Municipalities C, D, and E all expressed these critical challenges. The official interviewed for Municipality F gave the following context for this challenge:

> *Our municipality has capacity challenges with qualified and skilled staff members. Due to the size and remoteness of the municipality, it is difficult to attract qualified engineers and technicians.*
>
> *PMU manager of Municipality F*

Another common challenge listed by a few interviewees relates to procurement and supply chain management. Note that Project Procurement Management was one of the top 3 mature knowledge areas discussed in the previous chapter. It was highlighted that municipalities place a high value on the importance of procurement. The challenges expressed by the interviewees pertaining to this area further highlight its importance. This will therefore be one of the key topics to explore in the proposed interventions towards improving project management maturity.

Municipality D further noted the following important challenge that is worth discussing further:

> *The instability of the municipal council is a big challenge in this municipality. There are frequent changes in the key political positions such as mayor and speaker that result in delayed decision making impacting projects. This further leads to political inference in projects as new leaders often change the priorities and therein affect project planning and implementation.*

PMU manager of Municipality D

This is one of the areas that Adewumi (2022: 1) highlighted in his study in which he found that effective implementation of project management in South African municipalities is negatively affected by political interference and politicisation of projects. This challenge will also be further explored under the thematic analysis.

6.2.1.2 Interview Question 2.2

IQ2.2. Are there any other challenges that you think may limit improvement in terms of project management capability of municipalities in the Western Cape in general? You may list up to 3 additional challenges.

While the previous interview question sought to determine the challenges the municipal officials experience in their local environment, this question solicited their perception of challenges outside their environment that are more common and general in the Western Cape context.

A summary of the individual responses from the interviewees is presented Table 6.2 below.

Table 6.2: Interviewee responses to interview question 2.2

Municipality	Response *summaries*
A	Contractors are more eager to submit claims (even if not warranted), impacting on professional relationship between contractor and consultant. Poor enforcement of contract legislation.
B	Extensive procurement timelines, processes and regulatory requirements.
C	None.
D	Procurement regulations and supply chain policies often delay project implementation.
E	None.
F	None.

As indicated in Table 6.2 above, only a few challenges were added to those already listed in the previous question. The additional challenges given by Municipalities B and D were also listed in the previous section. This further highlights the importance of this challenge as it has now been listed by 4 out of the 6 interviewees.

The only new challenge from this interview question was provided by Municipality A. Their PMU manager noted the following:

> *I have observed an increase in contractors' claims being submitted during the construction phase, which often leads to additional time and/or budget. This affects the successful completion of projects and further impacts the professional relationship between contractors and consultants due to perceptions that form as a result of frivolous claims. There is also poor enforcement of contract legislation.*
>
> *PMU manager of Municipality A*

6.2.2 Themes of Challenges

The previous section provided a summary of the responses received from the interviewees in relation to the challenges that limit project management maturity improvement. This will serve as a basis for the thematic analysis as described in Section 4.3.2.3, consisting of the following three steps:

1) Coding

The responses of the interviewees were perused and analysed in detail with the aim of identifying potential codes that can describe key ideas and observations. It was decided to use short phrases as codes. This process resulted in the identification of the following codes as presented in Table 6.3 below.

Table 6.3: Coding of interviewee responses

Response Summary	Code
• The current organogram does not make sufficient provision for the staff required to ensure an effective PMU. • Inadequate training and education of staff involved with project management. • A silo approach exist whereby the PMU is not always involved in the conceptual stages of the projects.	Staff capacity Staff training Structure alignment
• Scope change and scope creep, due to additional work being requested by stakeholders, such as a municipal councillor. • Unrealistic stakeholder expectation for job creation that may not be possible during all types of projects;	Stakeholder interference Stakeholder expectation

• Poor quality contractors, in spite of adequate monitoring and regulation.	Contractor performance
• Limited time to plan and implement projects; • Limited human and financial resources. • Continuous and frequently changing legislation. • Instabilities in South African economical sector leading to frequency price escalations.	Limited time Limited resources Changing legislation Economics
• Instability of municipal council, with frequent changes of keys position such mayor and speaker. • Poor management and leadership pertaining to project management functions. • The municipality is reliant on national grant funding for their projects. • The remoteness of the area affects the municipality's ability to attract the right skills and talent.	Poor leadership Poor management Funding Staff capacity
• PMU is not only responsible for project management, but also other functions such as building control, town planning. • Another challenge is the time management of staff due to capacity constraints, as noted above. • The municipality is further 100% reliant on external grants to fund its infrastructure projects.	Staff organogram Limited time Funding
• Procurement regulations aren't geared toward effective infrastructure development. • Project funding does not always align with the project timelines. • The municipality has severe capacity challenges. It is difficult to attract skills to a small municipality.	Procurement regulations Funding Staff capacity
• Contractors are more eager to submit claims (even if not warranted), impacting on professional relationship between contractor and consultant. • Poor enforcement of contract legislation.	Contractor relationship Enforcing legislation
• Extensive procurement timelines, processes and regulatory requirements.	Procurement regulations
• Procurement regulations and supply chain policies often delays project implementation.	Procurement regulations

2) Categorising

Following the identification of codes as described above, several categories were derived, as presented below.

Table 6.4: Development of categories

Code	***Category***
Staff capacity Limited resources	Project management staff capacity constraints
Staff training	Inadequate education and training of staff
Structure alignment Staff organogram	Poor alignment of staff structures
Stakeholder expectation	Unrealistic stakeholder expectations
S*takeholder interference*	Improper stakeholder interference
Poor leadership	Poor, ineffective and unreliable municipal leadership
Poor management	Inadequate management oversight
Contractor Performance Contractor relationship	*Poor contractor performance*
Funding Limited resources	Limited funding for project implementation
Economy	Unstable economic environment
Procurement regulations	Extensive and changing legislation
Enforcing legislation	

3) Developing themes

The last step in the thematic analysis process is to develop the actual themes from the categories as described in the above sections.

The following figure presents the themes developed for this research and how they relate to the codes and categories.

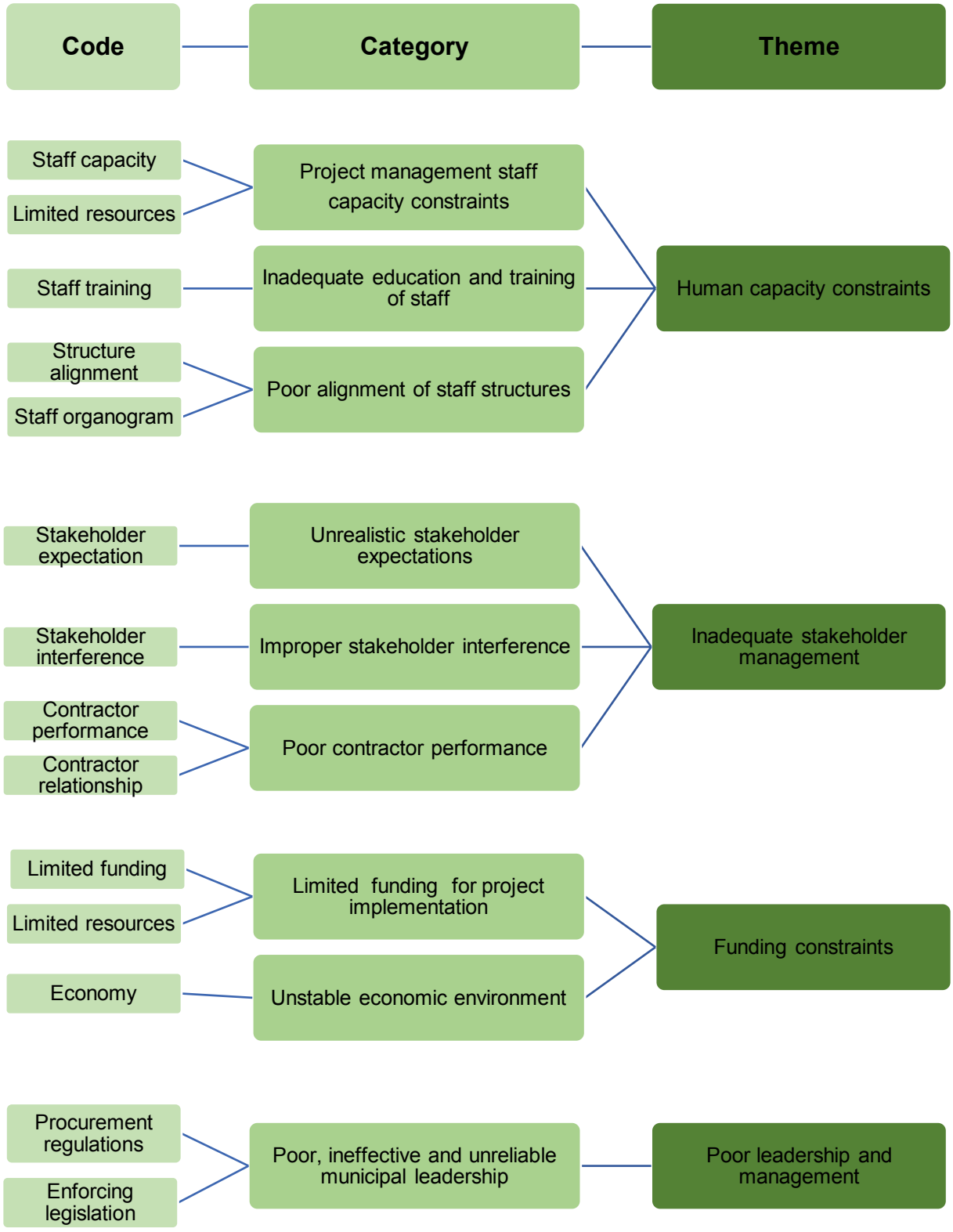


Figure 6.2: Development of themes

Theme 1: Human Capacity *Constraints*

Almost every interviewee highlighted a challenge that relates to the capacity of the officials responsible for project management. These challenges range from limited personnel assigned to the project management functions; misaligned organisation structures; and inadequate training. This is a concerning observation given the importance of the project management unit as reported by the Department of Provincial and Local Government (2007) and highlighted in the literature review. These challenges are furthermore perceived to persist even with the interventions introduced by the government such the establishment of the Municipal Infrastructure Support Agent. The abovementioned implies that these interventions have not yet yielded the desired results and that further proposals are required.

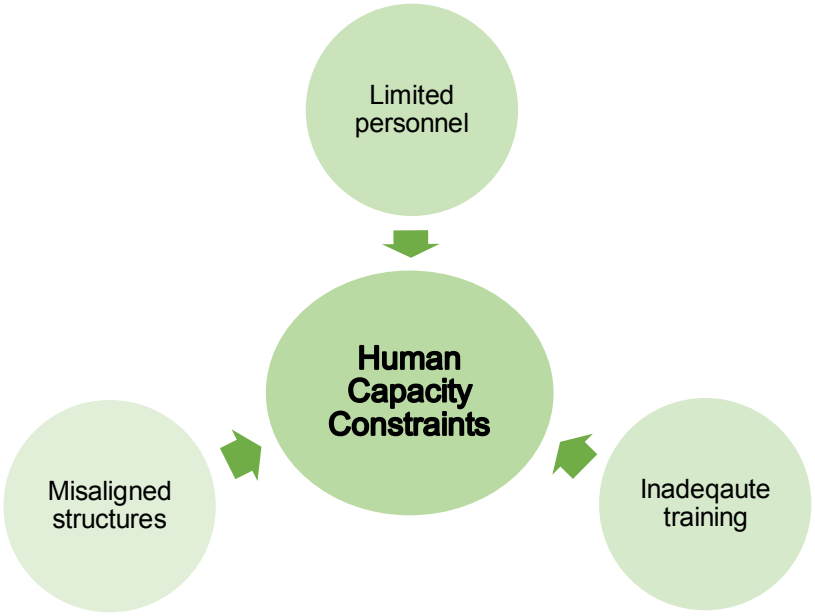


Figure 6.3: Theme 1: Human capacity constraints

Theme 2: Inadequate Stakeholder Management

Project Stakeholder Management was defined in Chapter 2 as a knowledge area that includes processes to identify external or internal people, groups, and organisations that could be impacted by a project or that may impact a project. It further includes the analysis of the impact as well as the development of strategies to manage stakeholders. The management and monitoring of stakeholders were also highlighted as very important by van der Waldt (2011: 72-73). While challenges related to this theme weren't as prevalent as those of theme 1, they remain concerning and thus require an appropriate response.

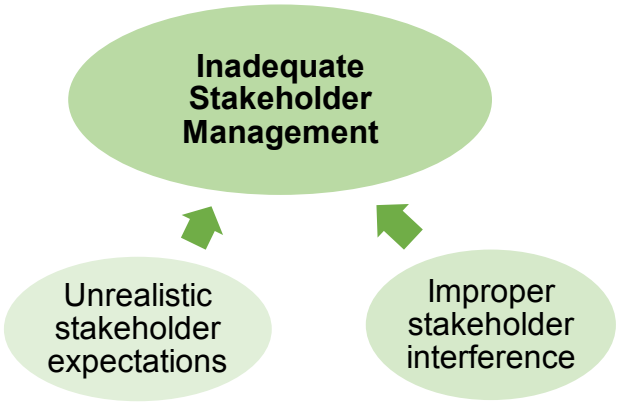


Figure 6.4: Theme 2: Inadequate stakeholder management

Theme 3: Poor Leadership and Management

Officials and managers within the municipal PMU's are often considered to be middle management, which implies that that they have limited decision-making powers. As a result, decisions in municipalities are the responsibility of the senior management and municipal council, depending on their nature. To this extent, several interviewees indicated that they experienced project delays due to poor or slow decision-making by senior management. They explained that this is often due to the instability in councils and frequent changes in leadership and management positions

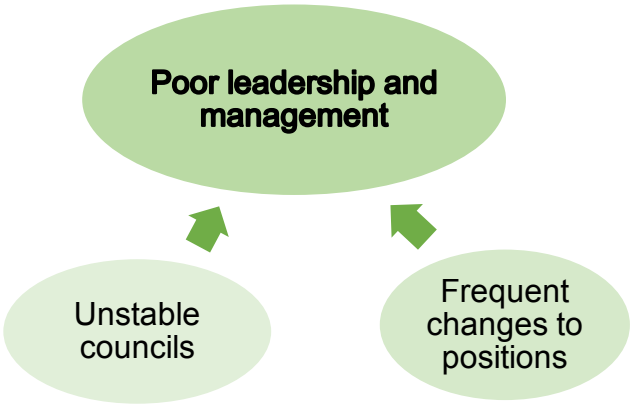


Figure 6.5: Theme 3: Poor leadership and management

Theme 4: Funding constraints

In one of his studies on government matters, van der Waldt (2011: 81) stated that municipalities often experience challenges related to project funding, including limited budgets as well as

strict milestone targets. The challenges reported by the interviewees in this study agree and align with these observations. Two specific areas that were highlighted include that municipalities are very dependent on national grant funding and that funding milestones do not align with project milestones. This theme thus gives some context as to why almost all of the municipalities' Project Cost Managements were rated as very mature in the maturity assessment. It follows that municipalities place a high value on ensuring that they properly manage the constrained funding they have. The solution to this problem should therefore come from external parties such as the national and provincial governments.

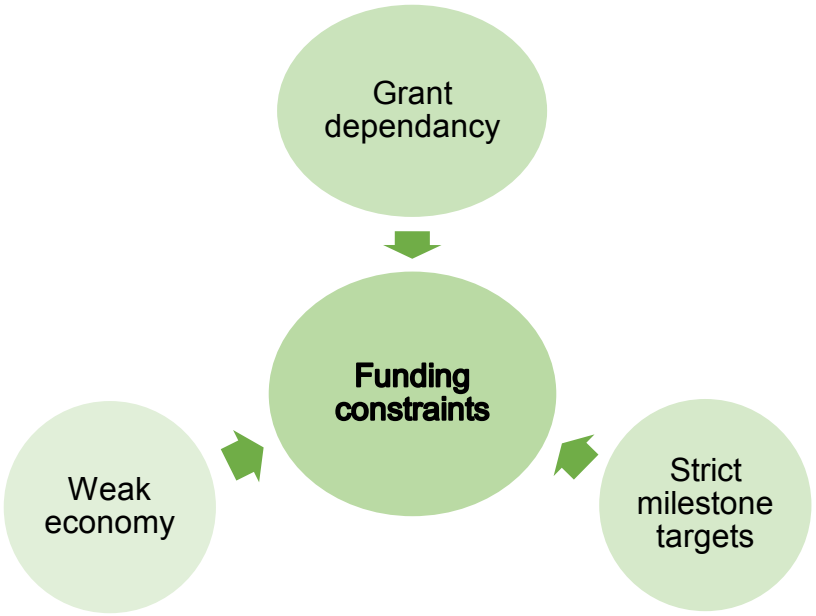


Figure 6.6: Theme 4: Funding constraints

Theme 5: Legislative Requirements

PMU managers interviewed as part of this study expressed their frustration with the extensive procurement legislative requirements to implement infrastructure projects. Van der Waldt (2011: 76) stated that these include the Municipal Finance Management Act, No 56 of 2003, the Division of Revenue Act, No 5 of 2022, infrastructure grant frameworks, and procurement regulations. The interviewees further noted that these requirements often result in a lengthy procurement timeline for the appointment of consultants and contractors. This challenge, together with the strict funding milestones, makes project implementation very challenging in the municipal environment. Further, it was indicated in the literature that the Auditor General often noted non-compliance with procurement regulations in its audit reports of municipalities. This non-compliance may be because of the frustration experienced or because of the long period procurement takes, leading to some trying to exercise shortcuts, ultimately resulting in non-compliance.

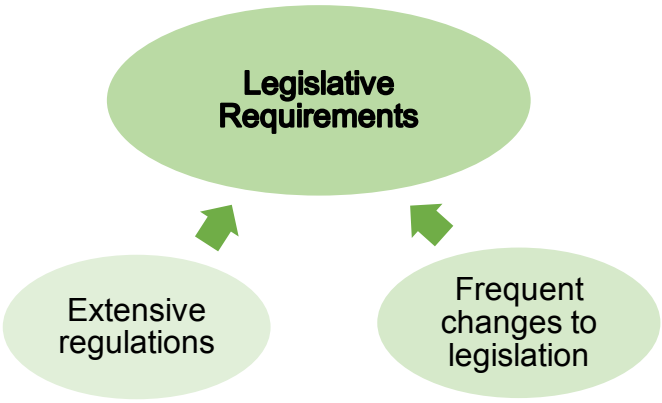


Figure 6.7: Theme 5: Legislative Requirements

6.3 Proposals toward improved maturity

The previous section detailed the challenges that limit or prevent the improvement of project management maturity. This section now presents proposed interventions on how these challenges can be addressed in order to contribute towards improving project management in municipalities.

This section will therefore present and discuss the results as collected and analysed to explore ideas and proposals toward project management capability improvement, thereby answering research question 6.

6.3.1 Results of Sampled Municipalities

As noted before participants were asked two open-ended questions to develop improvement interventions. These are presented and discussed below. Firstly, each question asked to interviewees is restated for reference. Secondly, the specific purpose and the linkage to the research question are stated. Thirdly, the individual responses are presented in a table as a first step towards identifying themes which will be further presented and discussed in the following sections. Lastly, a summary of the interviewee responses is presented, with a discussion of the key observations from the researcher.

6.3.1.1 Interview Question 2.3

IQ2.3. What interventions can you propose to address the challenges you identified in IQ2.1?

The purpose of this interview question was for the interviewees to reflect and provide ideas on how they think their specific challenges as previously identified, can be addressed.

A summary of the individual responses from the interviewees is presented in Table 6.5 below

Table 6.5: Interviewee responses to interview question 2.3

Municipality	Response Summary
A	Management should ensure the further training of officials within the PMU so that they stay up to date within the industry. The establishment of a PMU forum that can assist with knowledge sharing.
B	Training of councillors and stakeholders on the principles of tenders and construction projects to ensure that expectations are managed and that the impact of unnecessary delays is understood. Skills development programmes for contractors, with dedicated government funding to upskill contractors. The Construction Industry Development Board should have more strict policies in place related to the performance of contractors. This should include performance reviews by clients on the performance of contractors.
C	The development of a project management system to be utilised throughout the municipality that will assist with planning and efficient scheduling limited resources.
D	The national government should implement regulations and legislation that will contribute to stabilising municipal councils. Provincial government should employ qualified officials with the required experience who can be deployed to municipalities where and if urgent vacancies such as the municipal manager arise. Municipalities should receive more support on local economic development and revenue enhancement strategies to grow their own finances.
E	The municipal structure should be aligned with the mandate and purpose of the PMU. Dedicated staff to be allocated to the unit that will only focus on the planning and implementation of infrastructure projects.
F	Specific procurement regulations to be introduced for infrastructure projects. Management should focus on the development and training of internal staff members, thereby ensuring career growth and a proper staff retention strategy.

As with the previous section, the officials had similar ideas that could be applied to address the challenges they had identified and in doing so, improve their project management maturity. One of these common proposals related to the training of municipal officials and the appropriateness of the organogram in response to human capacity challenges. Both Municipality A and F respondents indicated that in their view training of existing staff would contribute towards addressing capacity constraints, while the Municipality E respondent added the following:

> *The municipal structure should be aligned with the mandate and purpose of PMU. Dedicated staff to be allocated to the unit that will only focus on the planning and implementation of infrastructure projects.*
>
> *PMU manager of Municipality E*

This idea was also proposed in the article by *Engineering News* (Parker, 2021) which recommended that municipalities' organisational structures should be project-orientated instead of the current functional structures.

In response to the challenge of poor leadership and management, the Municipality D respondent in particular had a good proposal to address this problem. His answer to this section is given below:

> *The leadership and management problem requires an intergovernmental response. The national government should implement regulations and legislation that will contribute to stabilising municipal councils. Provincial governments should employ qualified officials with the required experience that can be deployed to municipalities where and if urgent vacancies such as that of municipal manager exist.*
>
> *PMU manager of Municipality D*

6.3.1.2 Interview Question 2.4

IQ2.4. What interventions can you propose to address the challenges you identified in IQ2.2?

The purpose of this interview question was for the interviewees to reflect and provide ideas on how they though the general challenges as previously identified could be addressed.

A summary of the individual responses from the interviewees is presented in Table 6.6 below

Table 6.6: Interviewee responses to interview question 2.4

Municipality	Response Summary
A	There should be the necessary will at the management level to address the shortcomings within the sector and to ensure adequate expertise within the PMU department.
B	The procurement process should be streamlined within municipalities. Supply Chain officials should further be made aware of the importance of specific projects.

C	None to propose.
D	Review of procurement regulations to align better with infrastructure development.
E	None to propose.
F	None to propose.

Only three additional proposals were made in answering interview question 2.4. Two of these relate to the challenge of procurement regulations. While both Municipality B and D respondents suggested that new or revised regulations are needed, the Municipality B respondent provided a more detailed response which is shown below.

> *The procurement process should be streamlined within municipalities. SOP's can assist with ensuring a uniform approach within the organisation. Supply chain officials should further be made aware of the importance of specific projects and the impact if they are delayed. Management to facilitate a culture of working together.*
>
> *PMU manager of Municipality B*

The ideas that municipal officials had, proved to be helpful in formulating interventions that can be proposed to municipalities. These ideas are further explored in developing key themes below.

6.3.2 Themes of Improvement

The previous section provided a summary of the responses received from the interviewees in relation to the ideas and proposals for addressing the challenges that limit project management maturity improvement. This will serve as a basis for the thematic analysis as described in Section 4.3.2.3, consisting of the following three steps:

1) Coding

The responses of the interviewees were perused and analysed in detail with the aim of identifying potential codes that can describe key ideas and observations. It was decided to use short phrases as codes. This process resulted in the identification of the following codes as presented in Table 6.7.

Table 6.7: Coding of interviewee responses

Response Summary	Code
Management should ensure the further training of officials within the PMU so that they stay up to date within the industry. The establishment of a PMU forum that can assist with knowledge sharing.	Staff training Collaboration
Training of councillors and stakeholders on the principles of tenders and construction projects to ensure that expectations are managed and that the impact of unnecessary delays is understood. Skills development programmes for contractors, with dedicated government funding to upskill contractors. The Construction Industry Development Board should have stricter policies in place related to the performance of contractors. This should include performance reviews by clients on the performance of contractors.	Training of stakeholders Improve contractor performance Improve contractor performance
The development of a project management system to be utilised throughout the municipality that will assist with planning and efficient scheduling limited resources.	System development
The national government should implement regulations and legislation that will contribute to stabilising municipal councils. Provincial government should employ qualified officials with the required experience who can be deployed to municipalities where and if urgent vacancies such as that of municipal manager arise. Municipalities should receive more support on local economic development and revenue enhancement strategies to grow their own finances.	Leadership improvement Improving management Revenue enhancement
The municipal structure should be aligned with the mandate and purpose of the PMU. Dedicated staff to be allocated to the Unit that will only focus on the planning and implementation of infrastructure projects.	Aligned staff organogram
Specific procurement regulations to be introduced for infrastructure projects Management should focus on the development and training of internal staff members thereby ensuring career growth and a proper staff retention strategy	Dedicated procurement regulations Staff training
There should be the necessary will at the management level to address the shortcomings within the sector and to ensure adequate expertise within the PMU department.	Improving management
The procurement process should be streamlined within municipalities. Supply chain officials should further be made aware of the importance of specific projects.	Streamlined procurement Staff training
Review of procurement regulations to align better with infrastructure development	Procurement regulations

2) Categorising

Following the identification of codes as described above, several categories were derived from each code as presented in below

Table 6.8: Development of Categories

Code	Category
Staff training	Ensure adequate training of officials
Align staff organogram	Develop appropriate staff structures
Collaboration	Facilitate collaboration and knowledge sharing
Training of stakeholders	Ensure adequate training of project stakeholders
Improved contractor performance	Improve the performance of contractors
Leadership improvement	Improve leadership in projects
Improving management	Improve management oversight
Revenue enhancement	Implement revenue enhancement strategies
Dedicated procurement regulations	Ensure appropriate procurement regulations
Reviewed procurement regulations	
Streamlined procurement	

3) Developing themes

The last step in the thematic analysis process is to develop the actual themes from the categories as described in the above sections.

The following figure presents the themes developed for this research and how they relate to the codes and categories.

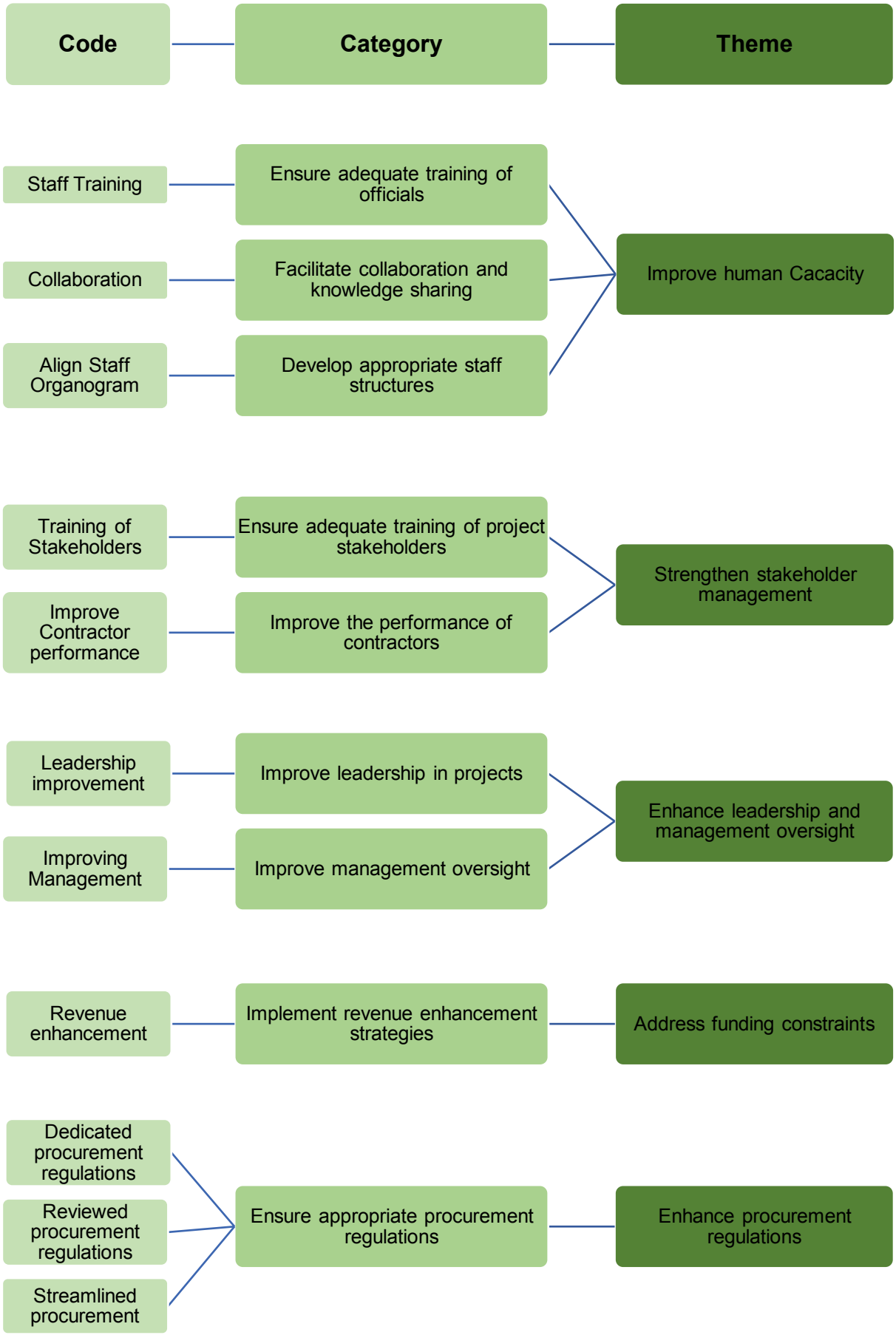


Figure 6.8: Development of themes

Theme 1: Improve Human Capacity

Human capacity constraints were listed as one of the key challenges that limit project management improvement. The interviewees similarly had a few proposals that in their view might address this problem. These proposals included the following:

- Proposal 1A: Align staff organogram
  The interviews revealed that municipal organograms are not always aligned and/or structured in a way that promotes effective and efficient project management. It is therefore proposed that municipalities review their organogram by considering the following key principles:
  - Organograms should include a dedicated unit/division solely responsible for project management of infrastructure projects;
  - The organogram should include an adequate number of officials aligned with the extent and complexity of the work.

- Proposal 1B: Maximize collaboration
  Notwithstanding the collaborative support programmes as noted in the literature, such as the Municipal Infrastructure Support Agent, the interviews revealed that there remains a need to further strengthen collaboration. Accordingly, it is proposed that municipalities maximize existing collaborative initiatives and further explore new ones, which may include:
  - PMU Managers Forum to be established that will promote the sharing of knowledge, common challenges, interventions, best practices, and advice;
  - Support programmes by the national and provincial governments should be aligned to complement each other and be appropriate to the municipality that serves.

- Proposal 1C: Train staff
  Training of municipal staff assigned to the project management units was highlighted by a few PMU managers. It is therefore proposed that municipalities design and implement appropriate training programmes that will ensure the following:
  - Continuous development and training in the latest technology, policies and regulations;
  - Facilitation of on-the-job training by senior officials;
  - Promoting and encouraging a culture of lifelong learning.

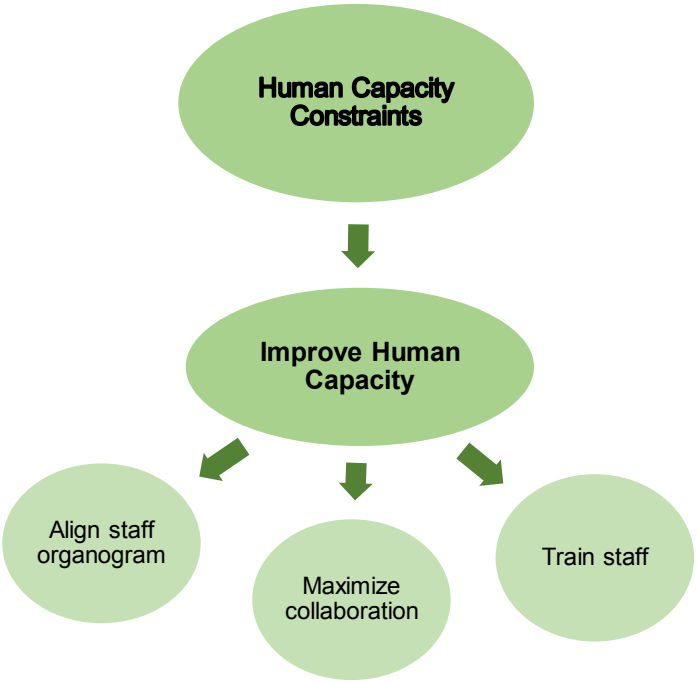


Figure 6.9: Theme 1: Improve Human Capacity

Theme 2: Strengthen Stakeholder Management

Stakeholder management and relationships was highlighted as an important aspect both in the literature review and by the interviewees. The following proposals are made to strengthen this area of project management:

- Proposal 2A: Training of stakeholders

  The interviews revealed that stakeholders such as councillors and community members often delay projects due to unrealistic demands and/or expectations. It is therefore proposed that these stakeholders be trained in the following key aspects:

  - Training in their role and responsibilities within the project team;
  - Training in the appropriate manner of public participation and community involvement.

- Proposal 2B: Improve contractor performance

  Poor contractor performance was indicated as a contributing factor that limits improvement of municipalities. The following interventions are therefore proposed to address this challenge:

  - Implementation of skills development programmes;
  - Introduction and enforcement of performance regulations;
  - Institutionalisation of performance reviews.

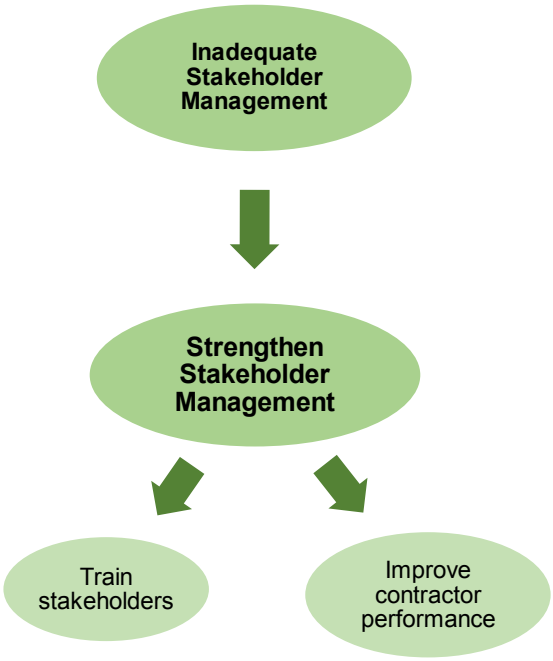


Figure 6.10: Theme 2: Strengthen Stakeholder Management

Theme 3: Enhance Leadership and Management Oversight

Several PMU managers interviewed cited poor and inadequate leadership, management and oversight as contributing factors impacting on their performance. Council instability leading to slow decision making was highlighted as a key concern. It is therefore important to propose solutions that address this challenge. These may include the following:

- Proposal 3A: Improve council leadership
  The current political system in municipalities frequently leads to coalition councils that in turn result in frequent changing of key leadership positions such executive mayor and speaker. This in turn causes slow decision making. The following intervention is therefore proposed:
  - National government should introduce legislation that will govern municipal council coalitions.

- Proposal 3B: Improve management oversight
  It was found that poor leadership as reported above often impacts negatively on the administrative oversight function of senior managers. As a result, municipalities also experience frequent management turnaround. It is therefore proposed that:

- Provincial government employs qualified professionals who can be deployed to municipalities where vacancies exist to ensure a stable and functional management team.

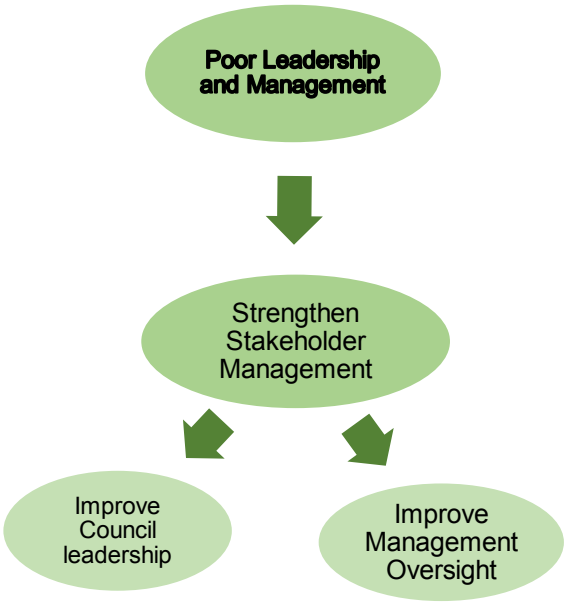


Figure 6.11: Theme 3: Enhance Leadership and Management Oversight

Theme 4: Address Funding Constraints

Limited funding to implement projects and strict funding milestones were given as challenges that influence project performance in municipalities. Several suggestions were therefore provided by the interviewees that included the following:

- Proposal 4A: Revenue enhancement

  One of the best ways to address funding shortfalls, according to the PMU managers interviewed, is to increase municipal revenue options and streams, including the following:
  - National government to streamline and consolidate infrastructure grants
  - Municipalities should increase their own revenue collection through adequate billing and credit control measures.

- Proposal 4B: Review grant frameworks

This proposal is based on the literature review during which it was reported that the frameworks that govern national grants are often misaligned with infrastructure development. It is therefore proposed that:

- National Treasury to review grant frameworks and associated regulations

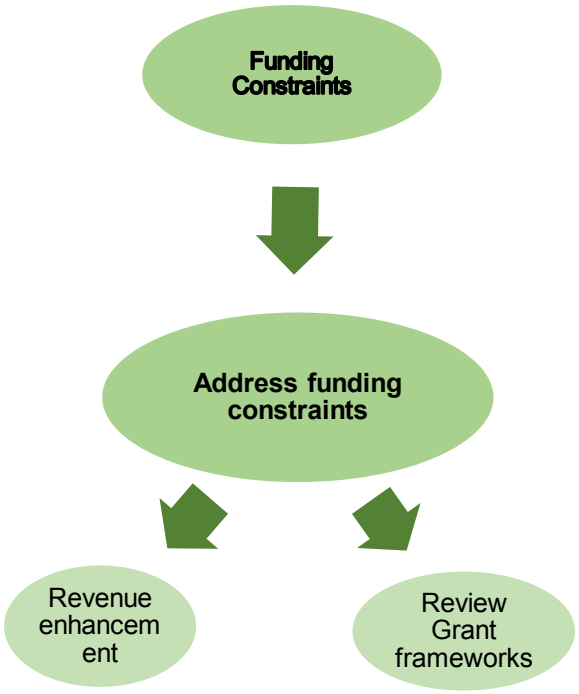


Figure 6.12: Theme 4: Address Funding Constraints

Theme 5: Enhance Procurement Regulations

In the previous section, procurement of consultants and contractors was highlighted as a contributing factor limiting project management improvement. In order to address this challenge several proposals can be made, including the following:

- Proposal 5A: Dedicated procurement regulations
  One procurement regulation currently exists that governs all types of procurement activities. However, given the unique nature of infrastructure projects, the following is proposed:
  - National Treasury to develop and implement specific procurement regulations that will govern infrastructure projects.

- Proposal 5B: Streamline procurement processes
  Municipalities should ensure that uniform procurement processes exist and are implemented throughout the organisation.

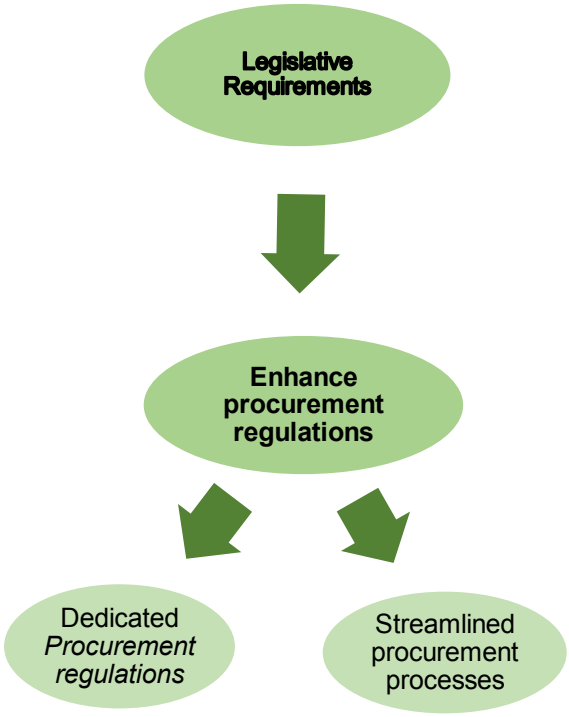


Figure 6.13: Theme 5: Enhance procurement regulations

6.4 Chapter Summary

Chapter 6 answered the following research questions:

- ***RQ 5:*** *What are the main challenges that limit the improvement of project management capability in municipalities?*

- ***RQ 6:*** *What ideas and interventions can be proposed towards improving the current levels of maturity that exist in the municipalities?*

The chapter presented and discussed the qualitative part of this research study. This included the challenges PMU managers experience that limit their project management capability improvement as well as ideas and proposals on how these challenges can be addressed. Themes of proposals were suggested as key solutions that should contribute towards improved project management maturity.

The next chapter concludes the thesis by confirming to what extent the aim and objectives have been met, and further summarises key recommendations flowing from this research study.

CHAPTER 7 CONCLUSION AND RECOMMENDATION

This is the final chapter of the thesis. It follows the preceding chapters, which included the following:

- Chapter 1 introduced the work, and indicated the research problem, aim, objectives, and research questions;
- Chapters 2 and 3 detailed the literature supporting the research study;
- Chapter 4 indicated what methodology was used for the research; and
- Chapters 5 and 6 presented and discussed the results obtained.

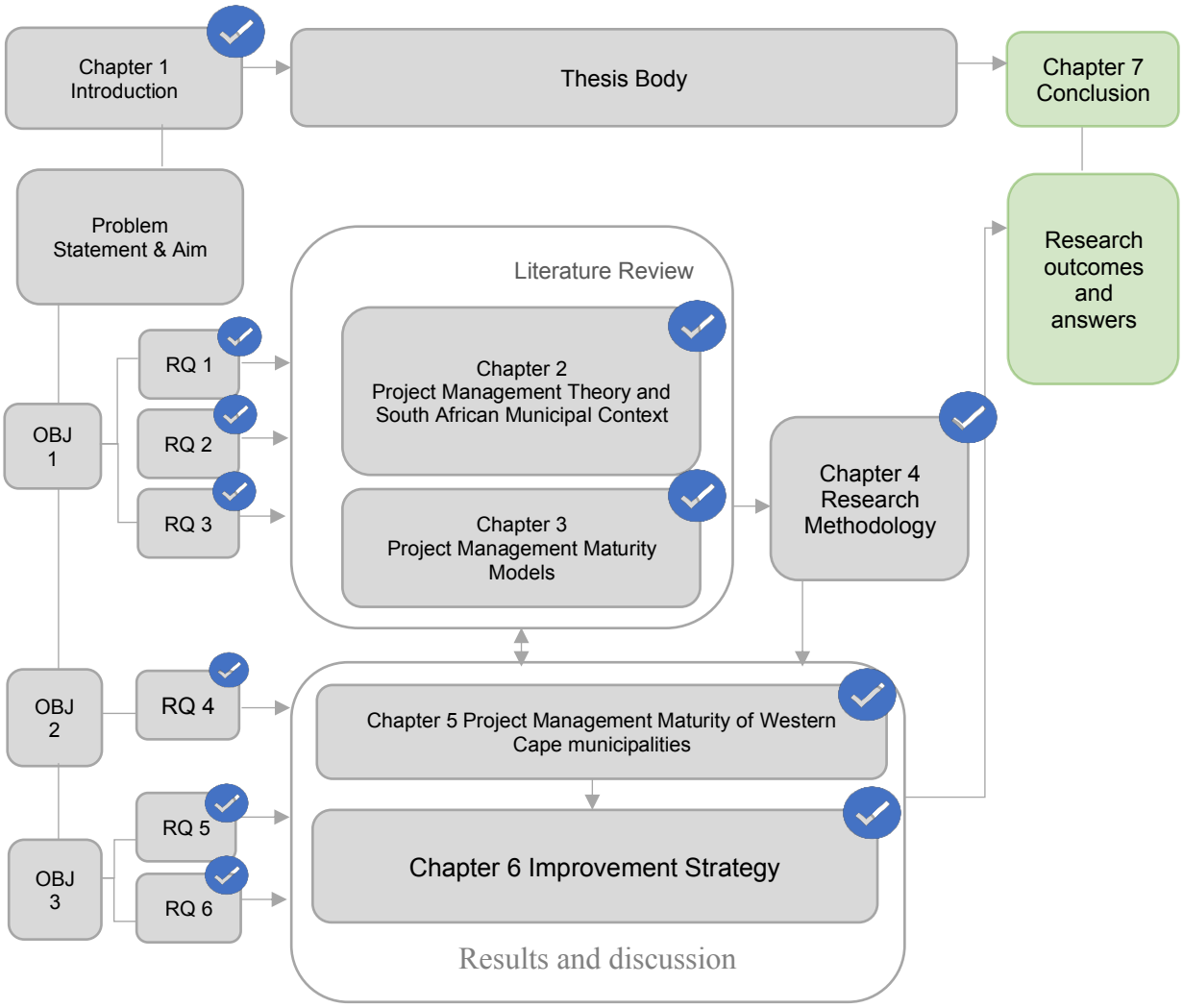


Figure 7.1: Graphic representation of Chapter 7 and thesis progress

7.1 Introduction

This chapter concludes the thesis by reflecting on to what extent the research aim and objectives have been met and to what extent the research questions have been answered.

The chapter further makes recommendations flowing out the research, and recommendations for future studies. The chapter will therefore consist of the following sections:

- Research outcomes and answers
  This section reflects on how and to what extent each objective of the research was met, as well as how and to what extent each research question was answered. This is done to ultimately conclude where the aim of the research was achieved and where the research problem was addressed.

- Reflection on research aim and research problem
  This section will review and confirm if the research aim was achieved and whether it led to addressing the research problem.

- Concluding remarks
  Based on the sections indicated above, this section summarises the importance of having achieved the research outcomes, what it means for the industry, and what unique contribution was made to the body of knowledge. The section also provides the concluding discussion of the thesis.

- Recommendations
  This section first provides recommendations that were formulated based on the findings, outcomes, and answers of this study to thereby enhance the significance of the research and present practical solutions that might be implemented in practice. Secondly, recommendations are provided to researchers who might conduct similar research studies in the future.

7.2 Research Outcomes and Answers

As stated above, this section presents the outcomes of the respective objectives as well as the answers to the research questions.

7.2.1 Outcome 1

Outcome 1 is based on objective 1, which was to identify and adapt an existing project management maturity model appropriate for this study. In order to meet this objective, three research questions had to be answered. These are restated below, each with their respective research answers.

7.2.1.1 Answer to Research Question 1

Chapter 2 provided specific literature on project management theory, the history and development of project management as well as project management methodologies. This entire chapter served as a basis for answering research question 1 as all of the literature reviewed in it collectively influencing the applicability of the project management maturity model, as further detailed in chapter 3.

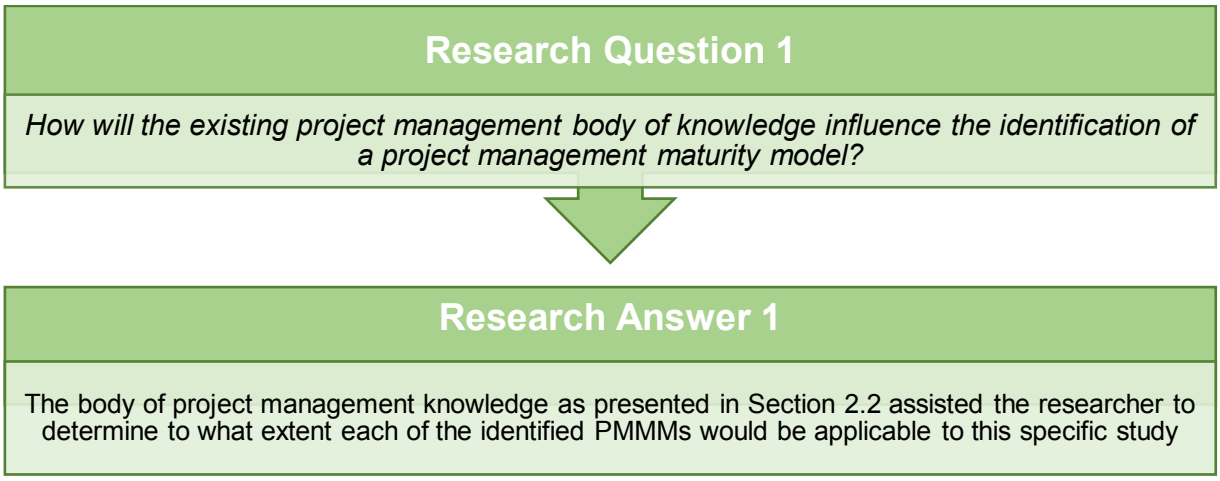


Figure 7.2: Answer to research question 1

7.2.1.2 Answer to Research Question 2

Research question 2 was also answered in Chapter 2. Section 2.3 specifically described the purpose and function of municipalities, the state of basic services as well as the project management capability of municipalities in the Western Cape. The above-mentioned literature collectively assisted the researcher to formulate an answer this research question.

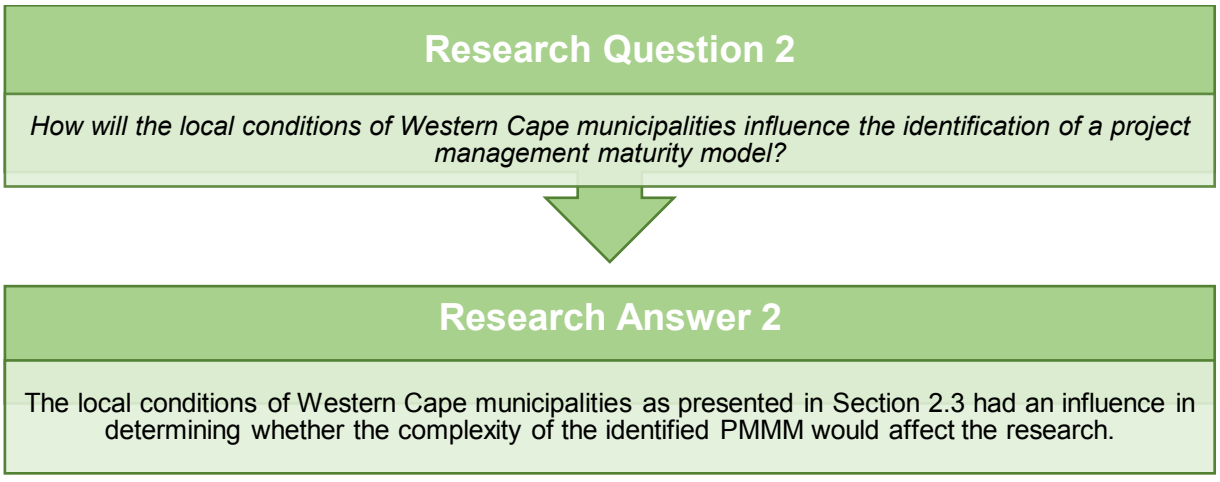


Figure 7.3: Answer to research question 2

7.2.1.3 Answer to Research Question 3

Chapter 3 was dedicated to answering research question 3. This chapter described in detail the available project management maturity models and their application in some studies. The chapter further included an analysis section that considered the answers to research questions 1 and 2 as informants to finally select an appropriate PMMM for this research study.

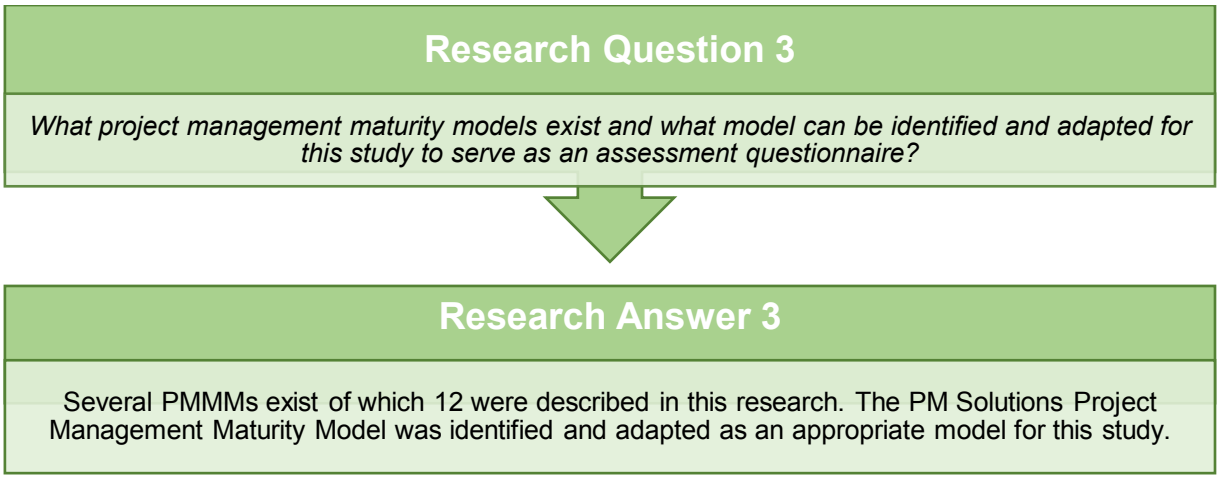


Figure 7.4: Answer to research question 3

The above three research questions collectively achieved objective 1 as further demonstrated in the figure below.

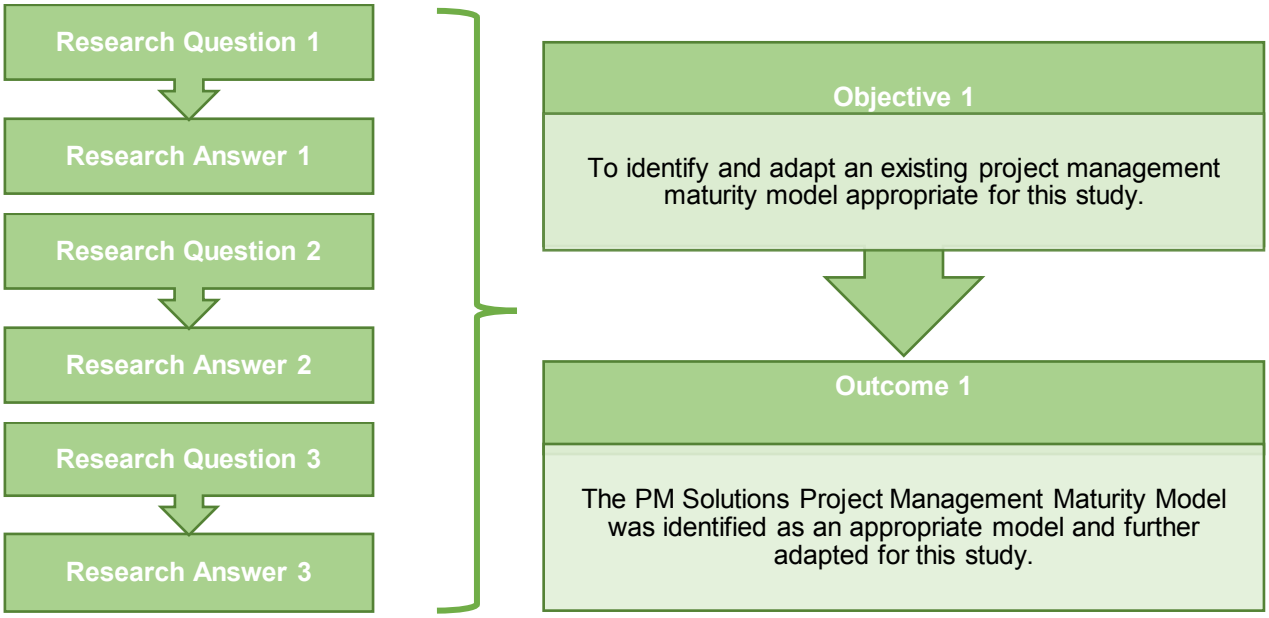


Figure 7.5: Representation of how outcome 1 was achieved

As indicated in the above figure, objective 1 was successfully met and resulted in the first outcome of this research, restated below:

Outcome 1: *The PM Solutions Project Management Maturity Model was identified as an appropriate model and further adapted for this study*

7.2.2 Outcome 2

Outcome 2 is based on objective 2, which was to assess what level of project management capability Western Cape municipalities have through the application of the identified and adapted PMMM. In order to meet this objective, one research question had to be answered, which is restated below, with its respective research answer.

7.2.2.1 Answer to research question 4

The answer to question 4 was presented in Chapter 5. This chapter presented the quantitative results of the study which mainly consisted of the results obtained from the project management maturity assessment conducted in the sampled municipalities.

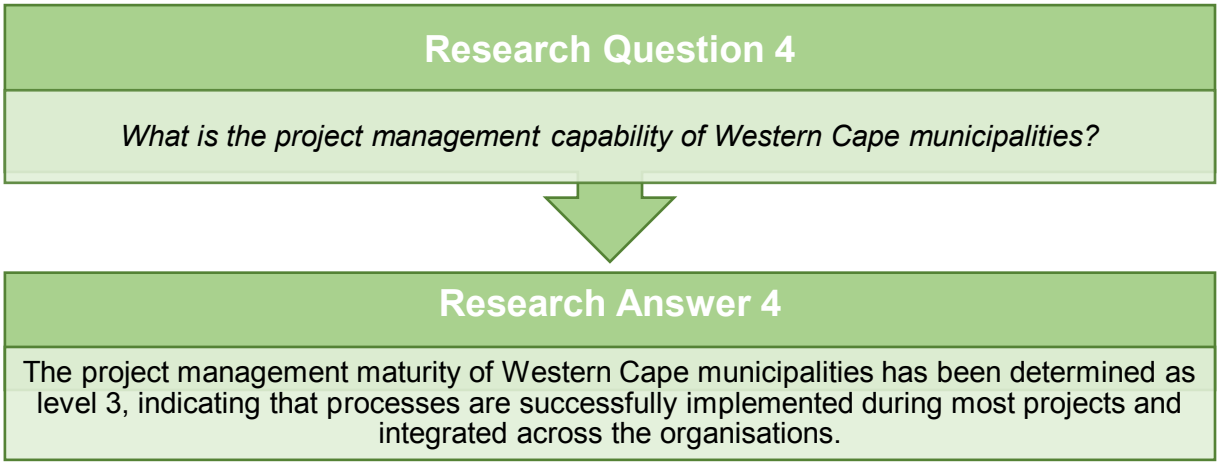


Figure 7.6: Answer to research question 4

As mentioned above, only this one research question contributed to meeting objective 2, as shown the figure below:

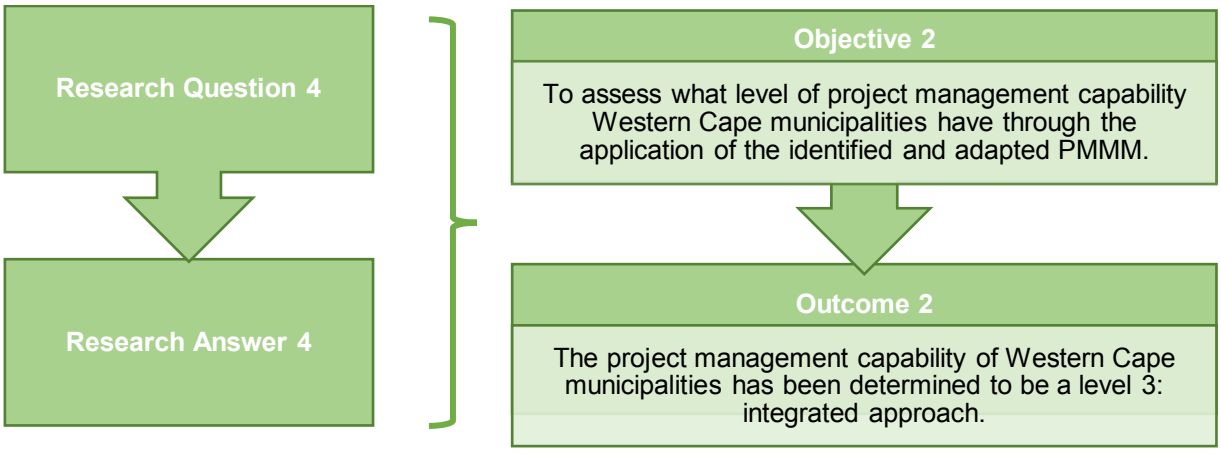


Figure 7.7: Representation of how outcome 2 was achieved

As indicated in the above figure, objective 2 was successfully met and resulted in the second outcome of this research, restated below:

- ***Outcome 2:*** *The project management capability of Western Cape municipalities has been determined to be a level 3: integrated approach*

The level 3 maturity of Western Cape municipalities means that processes are successfully implemented during most projects and integrated across the organisations. This result was higher than expected based on the literature discussed in this thesis that suggested most government department maturity is low and/or poor.

7.2.3 Outcome 3

Outcome 3 is based on objective 3, which was to determine how Western Cape municipalities can improve their capability. In order to meet this objective, two research questions had to be answered, which are restated below, with their respective research answers.

7.2.3.1 Answer to research question 5

The answer to reach question 5 was presented in Chapter 6. This chapter presented the challenges municipalities experience that limit their project management maturity improvement.

Research Question 5

What are the main challenges that limit the improvement of project management capability in municipalities?

Research Answer 5

Five themes of challenges were formulated, including human capacity constraints, inadequate stakeholder management, poor leadership and management, funding constraints, and legislative requirements

Figure 7.8: Answer to research question 5

7.2.3.2 Answer to research question 6

The second part of Chapter 6 presented the proposals which were made towards improving project management maturity in municipalities. This part provided the answer to this research question.

Research Question 6

What ideas and interventions can be proposed towards improving the current levels of maturity that exist in the municipalities

Research Answer 6

Five themes of improvement interventions were formulated, which included improving human capacity; strengthening stakeholder management; enhancing leadership and management; addressing funding constraints; and enhancing procurement legislation.

Figure 7.9: Answer to research question 6

The above two research questions collectively achieved objective 3 as further demonstrated in the below figure

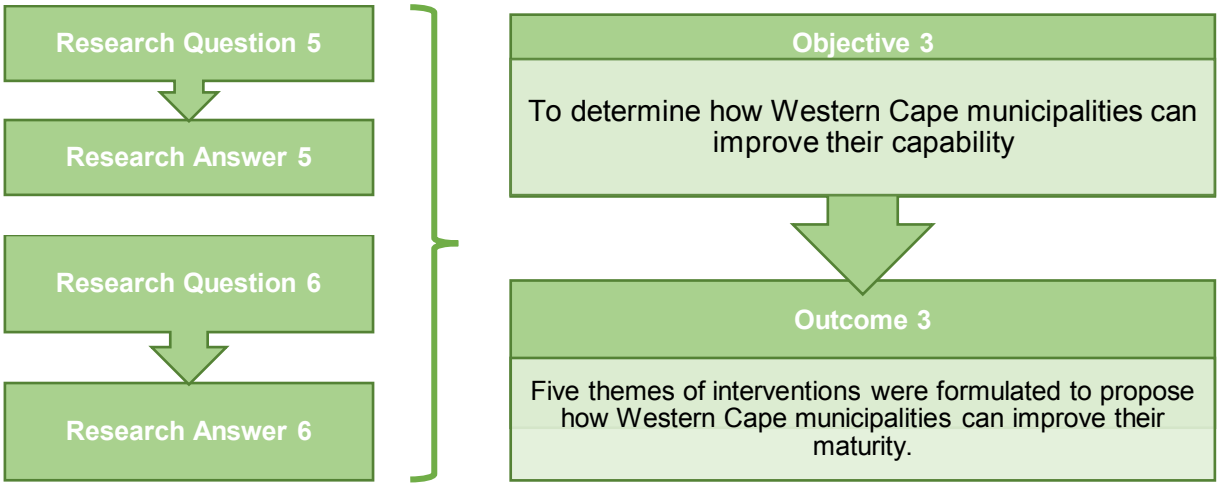


Figure 7.10: Representation of how outcome 3 was achieved

As indicated in the above figure, objective 3 was successfully met and resulted in the third outcome of this research, restated below:

- ***Outcome 3:*** *Five themes of interventions were formulated to propose how Western Cape municipalities can improve their maturity.*

7.3 Reflection on Research Aim and Research Problem

In Chapter 1 it was stated that the research problem would be addressed if the research aim was achieved. It was further indicated that three objectives were derived from the research aim in order to guide the researcher through the study and assist with logically reaching the research aim. To further advance the research process, several research questions were developed for the different objectives.

The previous section reflected on to what extent the objectives were met and research questions were answered. This section reflects on the research aim and ultimately whether this research study addressed the problem that was defined upon commencement.

7.3.1 Achieving the Research Aim

As stated before three objectives and six research questions were defined to assist with achieving the overall aim of this research. The figure below depicts this logical process.

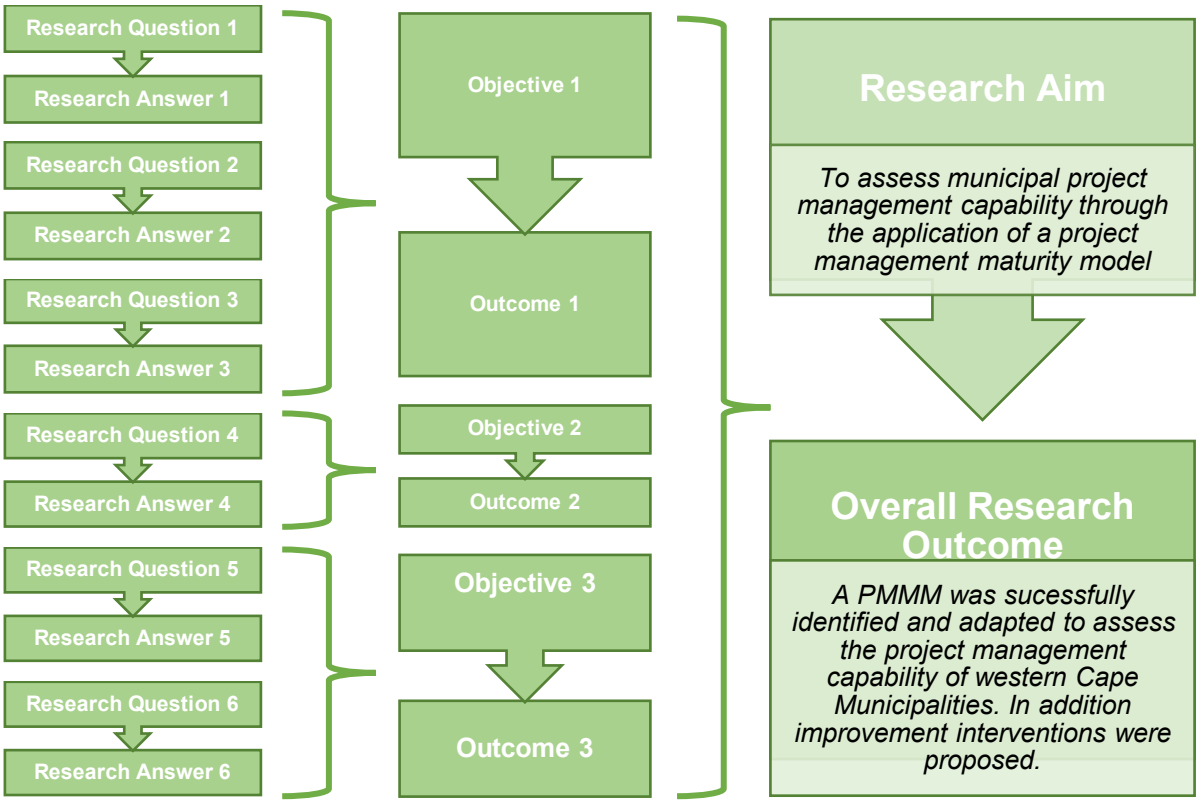


Figure 7.11: Representation of how research aim was achieved

7.4 Concluding Remarks

This research study commenced with the identification of a research-worthy problem, followed by the formulation of a research aim, objectives and research questions. The objectives were achieved and the research questions were answered through the respective chapters of the thesis as confirmed in the previous two sections.

The reader is reminded of the research problem as defined in Chapter 1:

> *Poor infrastructure project performance is still prevalent within municipalities. Although a wide range of options exists to assess project management capabilities and define improvement strategies, these are not widely used in the Western Cape, South Africa, due to a lack of research and awareness.*

Having successfully answered all the research questions, meeting the objectives, and ultimately achieving the research aim, it can be concluded that the research problem was indeed addressed. Given the successful application of a PMMM to assess maturity in Western Cape municipalities, it can now be used as a blueprint and basis for future similar studies in other provinces and potentially all municipalities in South Africa. The new analysis of project

management maturity models within the South African municipal context of the 12 most frequently used models could aid such future research studies.

This research also provided a deep understanding of the project management capabilities that exist within municipalities in the Western Cape, South Africa, including the specific knowledge areas that require improvements. The research further proposed five themes of interventions for improving project management maturity. This can assist municipalities to improve their capability to successfully implement infrastructure projects that will enhance service delivery, economic growth, and development.

7.5 Recommendations

As mentioned in the introduction of this chapter, two sets of recommendations are provided. Firstly, recommendations that flows from this research study are proposed for the specific project management industry, and secondly, recommendations for future studies are made.

7.5.1 Key Recommendations from this Study

The following recommendations are proposed based on the results and outcomes of this study:

- It is proposed that municipalities continuously assess their project management maturity through the application of the PM Solutions PMMM as adapted in this study;
- It is further proposed that municipalities develop specific improvement action plans based on the results of the PMMM assessment;
- It is proposed that municipalities assess the challenges that may limit their improvements by reflecting on the five themes of challenges identified through this study;
- Lastly, it is proposed that municipalities develop their own improvement strategies, considering the five themes of interventions proposed in this study.

7.5.2 Recommendations for future studies

Considering the limitations and delineation of this specific study, the following is proposed for the consideration of future researchers within this area of study:

- Similar studies are proposed for the other eight provinces in South Africa.
- As more assessments are done in other provinces, comparative studies are proposed between such provinces;

- In-depth, qualitative studies are proposed to further investigate the reasons contributing to the challenges as identified in this study;
- The themes of improvement as proposed in this study can be practically tested in municipalities and their impact reported.

7.6 Chapter Summary

This chapter concluded the thesis by reflecting on to what extent the research aim and objectives have been met and to what extent the research questions have been answered. The chapter further suggested recommendations flowing out the research and recommendation for future studies.

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APPENDICES

APPENDIX A: INTERVIEW QUESTIONNAIRE

Interview Questionnaire

Introduction

My name is Denvor Cloete, and I am currently completing the Master of Engineering (MEng) course in Civil Engineering (100% Research Thesis) at Cape Peninsula University of Technology (CPUT). I have decided on the following research topic: 'Municipal infrastructure project performance: an assessment of municipal capability through the application of a project management maturity model'.

Your municipality was selected through a scientific sampling process. I have previous requested permission to collect research data through an interview with yourself, which was granted by the Municipal Manager. As noted in the initial letter, the research is going to be conducted strictly according to the CPUT ethics guidelines, which include principles of informed consent, privacy, confidentiality, anonymity, voluntary participation, and protection from any harm.

The purpose of the interview questionnaire is to firstly assess what level of project management capability your municipality has, and secondly to determine how you should improve your capability. A selected maturity model, i.e., PM Solutions PMMM, was used as a framework for the development of this questionnaire. The questionnaire was further divided into three parts, namely, Part 0: Demographics; Part 1: Capability Assessment; Part 2: Improvement Strategy.

Interview Questionnaire Part 0: Demographics

The purpose of this part of the questionnaire is to collect general data regarding yourself. During the ethics application process, it was confirmed that your personal information will not be recorded or used in the research. This section therefore only collects data related your qualification and experience as well as information regarding the quantity and quality of projects implemented by your municipality.

IQ 0.1. What is your highest qualification?

National Diploma		B-Degree		H-Degree		M-Degree		PhD	

IQ0.2. What is length of your project management experience?

<3 years		4–6 years		7–9 years		10–12 years		13+ years	

IQ0.3. How many infrastructure projects do you normally implement during a financial year?

1–5		6–10		11–15		16–20		21 +	

IQ0.4. What is value of your annual infrastructure budget?

<R16m		R16–30m		R31–45m		R46–60m		R61m +	

Interview Questionnaire Part 1: Capability Assessment

The purpose of this part of the questionnaire is to determine the project management maturity of your municipality.

The development of the questionnaire therefore consisted of the formulation of specific questions related to identified processes from each project management knowledge area as described in the *PMBOK*. Your response to each of these processes will be assessed and analysed to determine the project management capability of your municipality. Questions are in the form of a statement describing a process within a knowledge area. Kindly rate to what extent each process is implemented within your organisation. The ratings are described as follows:

Level	Description	
Level 1	Process Exists	The process is only implemented on an ad hoc basis.
Level 2	Structured Approach	The process is implemented in structured manner during some individual projects.
Level 3	Integrated approach	The process is implemented during most projects and integrated across the organisation.
Level 4	Managed Approach	The process is fully implemented during all projects and managed across organisation by the PMU
Level 5	Optimised Approach	The process is continuously improved and measured against best practices.

No	Process Description	Level (as per above description)				
		1	2	3	4	5
Project Integration Management						
IQ1.1.	Develop project charter: This includes developing a document that authorizes the existence of a project					
IQ1.2.	Develop project management plan: The process of defining, preparing and coordinating all components of the main project plan					

IQ1.3.	Monitoring and control project work: Includes tracking, reviewing, and reporting project performance and progress					
IQ1.4.	Close project or phase: Finalising all activities within the project or phase					
Project Scope Management						
IQ1.5.	Plan scope management: The process of creating a document that will define, validate, and control the project scope.					
IQ1.6.	Define scope: Process of detailing and describing the project.					
IQ1.7.	Create WBS: Includes the subdividing of project deliverables or scope into smaller components or activities					
IQ1.8.	Control scope: The process monitoring the progress and manage changes to the scope					
Project Schedule Management						
IQ1.9.	Plan schedule management: Includes the establishment of policies, and procedures to plan, develop, manage, execute, and control the schedule.					
IQ1.10.	Define and sequence activities: The processes of identifying activities and documenting how they relate to each other.					
IQ1.11	Estimate activity durations and develop schedule: The processes of estimating how long each activity will take to complete with aim of developing a schedule.					
IQ1.12	Control schedule: The process of monitoring the status of the project, updating the schedule when necessary, and managing changes to the schedule					
Project Cost Management						
IQ1.13	Plan cost management: The process of defining the methods of estimating cost, budgeting, and managing, monitoring, and controlling the cost.					

IQ1.14.	Estimate cost and determine budget: Determining the approximate monetary resources for each activity and aggregate this estimated cost of each activity to establish an authorised cost baseline.					
IQ1.15.	Control cost: To monitor the status of the project and manage cost changes					
Project Quality Management						
IQ1.16.	Plan quality management: To identify quality standards for the project and define how compliance will be measured.					
IQ1.17	Control quality: Includes the monitoring of results in executing quality activities and assessing performance in line with expectations					
Project Resource Management						
IQ1.18	Plan resource management: The process of defining how resources will be acquired and managed on the project.					
IQ1.19	Estimate activity resources: Includes the estimation of team resources, such as the type and quantity of material, equipment, and supplies to complete the project.					
IQ1.20.	Acquire resource: The process of obtaining people, equipment, materials, and other supplies required for the project.					
IQ1.21.	Develop and manage team: To improve the competencies of team members and to track performance, providing feedback, and manage changes with the team.					
IQ1.22.	Control resources: The process of ensuring resources assigned to the project are available at the right time and to monitor the actual use of resources against the plan					
Project Communications Management						

IQ1.23.	Plan communication management: Consists of developing an approach and plan for communicating during the project.					
IQ1.24	Manage communications: The process of ensuring timely collecting, creating, distributing, storing, retrieving, managing, monitoring, and disposing of information.					
IQ1.25.	Monitor communications: Process of ensuring the communication plan is implemented					
Project Risk Management						
IQ1.26.	Plan risk management: The process of defining how the risk management activities will be conducted.					
IQ1.27	Identify risks: The process of identifying project risks, sources of such risks, and describing them.					
IQ1.28	Perform risk analysis: The analysis of prioritised risks by assessing their probability of occurring and potential impact.					
IQ1.29.	Plan risk responses: The process of developing options and agreeing on actions to address project risks.					
IQ1.30.	Implement risk responses: The process of implementing agreed responses to project risks.					
IQ1.31.	Monitor risks: To monitor the implementation of agreed responses, track identified risks, identify new risks, and evaluate the effectiveness of responses					
Project Procurement Management						
IQ1.32.	Plan procurement management: To document project procurement decisions, specify the approach to procurement, and identify sellers.					

IQ1.33.	Conduct procurement: The process to obtain seller responses, select a seller, and award a contract.					
IQ1.34.	Control procurement: The process of managing relationships, monitoring performance, change control, and closing contracts					
Project Stakeholder Management						
IQ1.35.	Identify stakeholders: The process of identifying stakeholders and documenting appropriate information about them.					
IQ1.36	Plan stakeholder engagement: Developing approaches to involve and engage stakeholders, based on their requirements and expectations					
IQ1.37	Manage and monitor stakeholder engagements: The process of communicating with stakeholders to meet their requirements and expectations and to monitor these relationships.					

Interview Questionnaire Part 2: Improvement Strategy

The purpose of this part of the questionnaire is to solicit your opinions to assist in developing an improvement strategy for the municipality to enhance its project management capability.

This part of the questionnaire therefore consists of questions designed to obtain your opinions regarding i) the challenges you experience within the knowledge areas that limits the improvement of your project management capability and ii) the proposed solutions towards addressing identified challenges.

IQ2.1. What are the main challenges that limit your improvement in terms of project management capability as it relates to the processes assessed in part 1 of this interview? You may list up to 5 challenges.

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IQ2.2. Are there any other challenges that you think may limit the improvement in terms of project management capability of municipalities in Western Cape in general? You may list up to 3 additional challenges.

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IQ2.3. What interventions can you propose to address the challenges you identified in IQ2.1?

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IQ2.4. What interventions can you propose to address the challenges you identified in IQ2.2?

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APPENDIX B: Interview Transcripts

Cape Peninsula University of Technology

MUNICIPAL INFRASTRUCTURE PROJECT PERFORMANCE: AN ASSESSMENT OF MUNICIPAL CAPABILITY THROUGH THE APPLICATION OF A PROJECT MANAGEMENT MATURITY MODEL

Interview Questionnaire
Municipality A

Introduction

Dear Interviewee

My name is Denvor Cloete, and I am currently completing the Masters of Engineering (M.Eng) course in Civil Engineering (100% Research Thesis) at Cape Peninsula University of Technology (CPUT). I have decided on the following research topic: Municipal infrastructure project performance: an assessment of municipal capability through the application of a project management maturity model.

Your Municipality was selected through a scientific sampling process. I have previous requested permission to collect research data through an interview with yourself, which was granted by the Municipal Manager. As noted in the initial letter, the research is going to be conducted strictly according to the CPUT Ethics guidelines, which includes principles of informed consent, privacy, confidentiality, anonymity, voluntary participation, and protection from any harm.

The purpose of the interview questionnaire is to firstly assess what level of project management capability your municipality has, and secondly to determine how you could improve your capability. A selected maturity model, i.e., PM Solutions PMMM was used as a framework for the development of this questionnaire. The questionnaire was further divided into three parts, namely, Part 0: Demographics; Part 1: Capability Assessment; Part 2: Improvement Strategy.

Interview Questionnaire Part 0: Demographics

The purpose of this part of the questionnaire is to collect general data regarding yourself. During the ethics application process, it was confirmed that your personal information will not be recorded or used in the research. This section therefore only collects data related your qualification and experience as well as information regarding the quantity and quality of projects implemented by your Municipality.

IQ 0.1. What is your highest qualification?

National Diploma		B-Degree	x	H-Degree		M-Degree		PhD	

IQ0.2. What is length of project management experience?

<3 years		4 - 6 years		7 - 9 years		10 - 12 years		13+ years	x

IQ0.3. How many infrastructure projects do you normally implement during a financial year?

1 – 5		6 - 10		11 - 15	x	16 - 20		21 +	

IQ0.4. What is value of your annual infrastructure budget?

<R16m		R16 – 30m		R31 – 45m	x	R46 – 60m		R61m +	

Interview Questionnaire Part 1: Capability Assessment

The purpose of this part of the questionnaire is to determine the project management maturity of your municipality.

The questionnaire therefore consists of specific questions related to identified processes from each project management knowledge area as described in the PMBOK. Your response to each of these processes will be assessed and analysed to determine the project management capability of your municipality. Questions are in the form of a statement describing a process within a knowledge area. Kindly rate to what extent each process is implemented within your organization. The ratings are described as follows:

Level	**Description**	
Level 1	Process Exist	The process is only implemented on an **ad-hoc** basis.
Level 2	Structured Approach	The process is implemented in structured manner during **some** individual projects.
Level 3	Integrated Approach	The process is implemented during **most** projects and integrated across the organization.
Level 4	Managed Approach	The process is fully implemented during **all** projects and managed across organization by the PMU
Level 5	Optimized Approach	The process is fully implemented during **all** projects is continuously improved and measured against best practises by senior management.

No	Process Description	Level (as per above description)				
		1	2	3	4	5
Project Integration Management						
IQ1.1.	Develop project charter: This includes developing a document that authorizes the existence of a project		X			
IQ1.2.	Develop project management plan: The process to define, prepare and coordinate all components of the main project plan			X		
IQ1.3.	Monitoring and control project work: Includes tracking, reviewing, and reporting project performance and progress				X	
IQ1.4.	Close project or phase: Finalizing all activities within the project or phase				X	
Project Scope Management						

IQ1.5.	Plan scope management: The process to create a document that will define, validate, and control the project scope.			X		
IQ1.6.	Define scope: Process of detailing and describing the project.			X		
IQ1.7.	Create WBS: Includes the subdividing of project deliverables or scope into smaller components or activities			X		
IQ1.8.	Control scope: The process to monitor the progress and manage changes to the scope			X		
Project Schedule Management						
IQ1.9.	Plan schedule management: Includes the establishment of policies, and procedures to plan, develop, manage, execute, and control the schedule.				X	
IQ1.10.	Define and sequence activities: The processes to identify activities and document how they relate to each other.			X		
IQ1.11	Estimate activity durations and develop schedule: The processes of estimating how long each activity will take to complete with aim of developing a schedule.			X		
IQ1.12	Control schedule: The process to monitor the status of the project, updating the schedule when necessary, and managing changes to the schedule			X		
Project Cost Management						
IQ1.13	Plan cost management: The process of defining the methods to estimate cost, to budget, and to manage, monitor, and control the cost.				X	
IQ1.14.	Estimate cost and determine budget: Determining the approximate monetary resources for each activity and aggregate this estimated cost of each activity to establish an authorized cost baseline.				X	
IQ1.15.	Control Cost: To monitor the status of the project and manage cost changes				X	
Project Quality Management						
IQ1.16.	Plan quality management: To identify quality standards for the project and define how compliance will be measured.				X	
IQ1.17	Control quality: Includes the monitoring of results in executing quality activities and assessing performance in line with expectations				X	

Project Resource Management						
IQ1.18	Plan resource management: The process to define how resources will be acquired and managed on the project.			X		
IQ1.19	Estimate activity resources: Includes the estimation of team resources, such as the type and quantity of material, equipment, and supplies to complete the project.			X		
IQ1.20.	Acquire resource: The process of obtaining people, equipment, materials, and other supplies required for the project.			X		
IQ1.21.	Develop and manage team: To improve the competencies of team members and to track performance, providing feedback, and manage changes with the team.			X		
IQ1.22.	Control resources: The process to ensure resources assigned to the project are available at the right time and to monitor the actual use of resources against the plan			X		
Project Communications Management						
IQ1.23.	Plan communication management: Consists of developing an approach and plan for communicating during the project.				X	
IQ1.24	Manage communications: The process to ensure timely collecting, creating, distributing, storing, retrieving, managing, monitoring, and disposing of information.				X	
IQ1.25.	Monitor communications: Process of ensuring the communication plan is implemented			X		
Project Risk Management						
IQ1.26.	Plan risk management: The process of defining how the risk management activities will be conducted.				X	
IQ1.27	Identify risks: The process to identify project risks, sources of such risks, and describing them.				X	
IQ1.28	Perform risk analysis: The analysis of prioritized risks by assessing their probability of occurring and potential impact.				X	

IQ1.29.	Plan risk responses: The process of developing options and agreeing on actions to address project risks.			X		
IQ1.30.	Implement risk responses: The process of implementing agreed responses to project risks.				X	
IQ1.31.	Monitor risks: To monitor the implementation of agreed responses, track identified risks, identify new risks, and evaluate the effectiveness of responses				X	
Project Procurement Management						
IQ1.32.	Plan procurement management: To document project procurement decisions, specify the approach to procurement and identify sellers.				X	
IQ1.33.	Conduct procurement: The process to obtain seller responses, select a seller, and award a contract.				x	
IQ1.34.	Control procurement: The process of managing relationships, monitoring performance, change control, and closing contracts			X		
Project Stakeholder Management						
IQ1.35.	Identify stakeholders: The process of identifying stakeholders and documenting appropriate information about them.			X		
IQ1.36	Plan stakeholder engagement: Developing approaches to involve and engage stakeholders, based on their requirements and expectations				X	
IQ1.37	Manage and monitor stakeholder engagements: The process to communicate with stakeholders to meet their requirements and expectations and monitor these relationships.			X		

Interview Questionnaire Part 2: Improvement Strategy

The purpose of this part of the questionnaire is to solicit your opinions to assist in developing an improvement strategy for the municipality to enhance its project management capability.

This part of the questionnaire therefore consists of questions designed to obtain your opinions regarding i) the challenges you experience within the knowledge areas that limit the improvement of your Project Management capability and ii) the proposed solutions towards addressing identified challenges.

IQ2.1. What are the main challenges that limit your improvement in terms of project management capability as it relates to the processes assessed in part 1 of this interview? You may list up to 5 challenges.

- The current organogram does not make sufficient provision for the staff required to ensure an effective PMU. This is further exacerbated by salary budget cuts leading to unfunded vacant posts The resultant cause is that officials within the PMU are often overworked, which may impact the quality of their work.

- Inadequate training and education of staff involved with project management. While staff members are qualified with their basic tertiary qualifications, there is often a lack of further training and development in order to stay abreast with the latest developments.

- The Silo approach leads to projects being identified and conceptualized before the PMU gets involved. In our Municipality projects are identified by the department responsible for the respective services, such as water or roads. The PMU department is only involved once there is a need for external funding. In some instances, it becomes a challenge to manage projects that you weren't involved with from the beginning.

IQ2.2. Are there any other challenges that you think may limit the improvement in terms of the project management capability of municipalities in the Western Cape in general? You may list up to 3 additional challenges.

I have observed an increase in contractors' claims being submitted during the construction phase, which often leads to additional time and/or budget. This affects the successful

completion of projects and further impact the professional relationship between contractors and consultant due to perceptions that form as a result of frivolous claims.

There is also poor enforcement of contract legislation. The implementation of projects is governed by several regulations and laws, but these are not effectively enforced in the industry.

IQ2.3. What interventions can you propose to address the challenges you identified in IQ2.1?

- Management should ensure the further training of officials within the PMU so that they stay up to date within the industry.
- The establishment of a PMU forum that can assist with knowledge sharing.

IQ2.4. What interventions can you propose to address the challenges you identified in IQ2.2?

- There should be the necessary will at the management level to address the shortcomings within the sector and to ensure adequate expertise within the PMU department.

Cape Peninsula University of Technology

MUNICIPAL INFRASTRUCTURE PROJECT PERFORMANCE: AN ASSESSMENT OF MUNICIPAL CAPABILITY THROUGH THE APPLICATION OF A PROJECT MANAGEMENT MATURITY MODEL

Interview Questionnaire
Municipality B

Introduction

Dear Interviewee

My name is Denvor Cloete, and I am currently completing the Masters of Engineering (M.Eng) course in Civil Engineering (100% Research Thesis) at Cape Peninsula University of Technology (CPUT). I have decided on the following research topic: Municipal infrastructure project performance: an assessment of municipal capability through the application of a project management maturity model.

Your Municipality was selected through a scientific sampling process. I have previous requested permission to collect research data through an interview with yourself, which was granted by the Municipal Manager. As noted in the initial letter, the research is going to be conducted strictly according to the CPUT Ethics guidelines, which includes principles of informed consent, privacy, confidentiality, anonymity, voluntary participation, and protection from any harm.

The purpose of the interview questionnaire is to firstly assess what level of project management capability your municipality has, and secondly to determine how you could improve your capability. A selected maturity model, i.e., PM Solutions PMMM was used as a framework for the development of this questionnaire. The questionnaire was further divided into three parts, namely, Part 0: Demographics; Part 1: Capability Assessment; Part 2: Improvement Strategy.

Interview Questionnaire Part 0: Demographics

The purpose of this part of the questionnaire is to collect general data regarding yourself. During the ethics application process, it was confirmed that your personal information will not be recorded or used in the research. This section therefore only collects data related your qualification and experience as well as information regarding the quantity and quality of projects implemented by your Municipality.

IQ 0.1. What is your highest qualification?

National Diploma		B-Degree	x	H-Degree		M-Degree		PhD	

IQ0.2. What is length of project management experience?

<3 years		4 - 6 years		7 - 9 years		10 - 12 years	x	13+ years	

IQ0.3. How many infrastructure projects do you normally implement during a financial year?

1 – 5		6 - 10		11 - 15	x	16 - 20		21 +	

IQ0.4. What is value of your annual infrastructure budget?

<R16m		R16 – 30m		R31 – 45m		R46 – 60m		R61m +	x

Interview Questionnaire Part 1: Capability Assessment

The purpose of this part of the questionnaire is to determine the project management maturity of your municipality.

The questionnaire therefore consists of specific questions related to identified processes from each project management knowledge area as described in the PMBOK. Your response to each of these processes will be assessed and analysed to determine the project management capability of your municipality. Questions are in the form of a statement describing a process within a knowledge area. Kindly rate to what extent each process is implemented within your organization. The ratings are described as follows:

Level	**Description**	
Level 1	Process Exist	The process is only implemented on an **ad-hoc** basis.
Level 2	Structured Approach	The process is implemented in structured manner during **some** individual projects.
Level 3	Integrated Approach	The process is implemented during **most** projects and integrated across the organization.
Level 4	Managed Approach	The process is fully implemented during **all** projects and managed across organization by the PMU
Level 5	Optimized Approach	The process is fully implemented during **all** projects is continuously improved and measured against best practises by senior management.

No	Process Description	Level (as per above description)				
		1	2	3	4	5
Project Integration Management						
IQ1.1.	Develop project charter: This includes developing a document that authorizes the existence of a project	X				
IQ1.2.	Develop project management plan: The process to define, prepare and coordinate all components of the main project plan			X		
IQ1.3.	Monitoring and control project work: Includes tracking, reviewing, and reporting project performance and progress				x	
IQ1.4.	Close project or phase: Finalizing all activities within the project or phase				X	
Project Scope Management						

IQ1.5.	Plan scope management: The process to create a document that will define, validate, and control the project scope.			X		
IQ1.6.	Define scope: Process of detailing and describing the project.				X	
IQ1.7.	Create WBS: Includes the subdividing of project deliverables or scope into smaller components or activities				X	
IQ1.8.	Control scope: The process to monitor the progress and manage changes to the scope				X	
Project Schedule Management						
IQ1.9.	Plan schedule management: Includes the establishment of policies, and procedures to plan, develop, manage, execute, and control the schedule.		X			
IQ1.10.	Define and sequence activities: The processes to identify activities and document how they relate to each other.		X			
IQ1.11	Estimate activity durations and develop schedule: The processes of estimating how long each activity will take to complete with aim of developing a schedule.			x		
IQ1.12	Control schedule: The process to monitor the status of the project, updating the schedule when necessary, and managing changes to the schedule			X		
Project Cost Management						
IQ1.13	Plan cost management: The process of defining the methods to estimate cost, to budget, and to manage, monitor, and control the cost.		X			
IQ1.14.	Estimate cost and determine budget: Determining the approximate monetary resources for each activity and aggregate this estimated cost of each activity to establish an authorized cost baseline.			X		
IQ1.15.	Control Cost: To monitor the status of the project and manage cost changes				X	
Project Quality Management						
IQ1.16.	Plan quality management: To identify quality standards for the project and define how compliance will be measured.				X	
IQ1.17	Control quality: Includes the monitoring of results in executing quality activities and assessing performance in line with expectations				x	

Project Resource Management						
IQ1.18	Plan resource management: The process to define how resources will be acquired and managed on the project.				x	
IQ1.19	Estimate activity resources: Includes the estimation of team resources, such as the type and quantity of material, equipment, and supplies to complete the project.			x		
IQ1.20.	Acquire resource: The process of obtaining people, equipment, materials, and other supplies required for the project.			X		
IQ1.21.	Develop and manage team: To improve the competencies of team members and to track performance, providing feedback, and manage changes with the team.			x		
IQ1.22.	Control resources: The process to ensure resources assigned to the project are available at the right time and to monitor the actual use of resources against the plan			X		
Project Communications Management						
IQ1.23.	Plan communication management: Consists of developing an approach and plan for communicating during the project.	X				
IQ1.24	Manage communications: The process to ensure timely collecting, creating, distributing, storing, retrieving, managing, monitoring, and disposing of information.			X		
IQ1.25.	Monitor communications: Process of ensuring the communication plan is implemented			X		
Project Risk Management						
IQ1.26.	Plan risk management: The process of defining how the risk management activities will be conducted.		X			
IQ1.27	Identify risks: The process to identify project risks, sources of such risks, and describing them.			X		
IQ1.28	Perform risk analysis: The analysis of prioritized risks by assessing their probability of occurring and potential impact.			X		

IQ1.29.	Plan risk responses: The process of developing options and agreeing on actions to address project risks.			X		
IQ1.30.	Implement risk responses: The process of implementing agreed responses to project risks.			X		
IQ1.31.	Monitor risks: To monitor the implementation of agreed responses, track identified risks, identify new risks, and evaluate the effectiveness of responses				X	
Project Procurement Management						
IQ1.32.	Plan procurement management: To document project procurement decisions, specify the approach to procurement and identify sellers.				X	
IQ1.33.	Conduct procurement: The process to obtain seller responses, select a seller, and award a contract.				X	
IQ1.34.	Control procurement: The process of managing relationships, monitoring performance, change control, and closing contracts				X	
Project Stakeholder Management						
IQ1.35.	Identify stakeholders: The process of identifying stakeholders and documenting appropriate information about them.			X		
IQ1.36	Plan stakeholder engagement: Developing approaches to involve and engage stakeholders, based on their requirements and expectations					X
IQ1.37	Manage and monitor stakeholder engagements: The process to communicate with stakeholders to meet their requirements and expectations and monitor these relationships.				X	

Interview Questionnaire Part 2: Improvement Strategy

The purpose of this part of the questionnaire is to solicit your opinions to assist in developing an improvement strategy for the municipality to enhance its project management capability.

This part of the questionnaire therefore consists of questions designed to obtain your opinions regarding i) the challenges you experience within the knowledge areas that limit the improvement of your Project Management capability and ii) the proposed solutions towards addressing identified challenges.

IQ2.1. What are the main challenges that limit your improvement in terms of project management capability as it relates to the processes assessed in part 1 of this interview? You may list up to 5 challenges.

- Scope Change or Scope Creep. There are often stakeholders such as councillors that will request additional works that did not form part of the approved scope of works during the construction of specific projects or within the budget.
- Stakeholder expectations are sometimes unrealistic This is often the case with communities expecting more job opportunities than is possible.
- The quality of contractors has regressed over time. Even if the employer's agent does good monitoring, we often still observe poor workmanship. This is also impacted by contractors who do not have the financial means or resources to complete the projects they started.

IQ2.2. Are there any other challenges that you think may limit the improvement in terms of the project management capability of municipalities in the Western Cape in general? You may list up to 3 additional challenges.

Lengthy procurement timelines for infrastructure projects. Projects are often delayed due to the extensive regulatory requirements related to the procurement of consultants and contractors. The funding for projects is also most of the time allocated for one financial year, which then becomes a challenge to implement if the procurement process takes too long.

IQ2.3. What interventions can you propose to address the challenges you identified in IQ2.1?

Training of Councillors and stakeholders on the principles of tenders and construction projects to ensure that expectations are managed and that the impact of unnecessary delays is understood.

Skills development programs for contractors, with dedicated government funding to up-skill contractors.
The Construction Industry Board should have more strict policies in place related to the performance of contractors. This should include performance reviews by clients on the performance of contractors.

IQ2.4. What interventions can you propose to address the challenges you identified in IQ2.2?

The procurement process should be streamlined within municipalities. SOP can assist with ensuring a uniform approach within the organization. Supply Chain officials should further be made aware of the importance of specific projects and the impact if they are delayed. Management to facilitate a culture of working together.

Cape Peninsula University of Technology

MUNICIPAL INFRASTRUCTURE PROJECT PERFORMANCE: AN ASSESSMENT OF MUNICIPAL CAPABILITY THROUGH THE APPLICATION OF A PROJECT MANAGEMENT MATURITY MODEL

Interview Questionnaire
Municipality C

Introduction

Dear Interviewee

My name is Denvor Cloete, and I am currently completing the Masters of Engineering (M.Eng) course in Civil Engineering (100% Research Thesis) at Cape Peninsula University of Technology (CPUT). I have decided on the following research topic: Municipal infrastructure project performance: an assessment of municipal capability through the application of a project management maturity model.

Your Municipality was selected through a scientific sampling process. I have previous requested permission to collect research data through an interview with yourself, which was granted by the Municipal Manager. As noted in the initial letter, the research is going to be conducted strictly according to the CPUT Ethics guidelines, which includes principles of informed consent, privacy, confidentiality, anonymity, voluntary participation, and protection from any harm.

The purpose of the interview questionnaire is to firstly assess what level of project management capability your municipality has, and secondly to determine how you could improve your capability. A selected maturity model, i.e., PM Solutions PMMM was used as a framework for the development of this questionnaire. The questionnaire was further divided into three parts, namely, Part 0: Demographics; Part 1: Capability Assessment; Part 2: Improvement Strategy.

Interview Questionnaire Part 0: Demographics

The purpose of this part of the questionnaire is to collect general data regarding yourself. During the ethics application process, it was confirmed that your personal information will not be recorded or used in the research. This section therefore only collects data related your qualification and experience as well as information regarding the quantity and quality of projects implemented by your Municipality.

IQ 0.1. What is your highest qualification?

National Diploma		B-Degree	x	H-Degree		M-Degree		PhD	

IQ0.2. What is length of project management experience?

<3 years		4 - 6 years		7 - 9 years		10 - 12 years		13+ years	x

IQ0.3. How many infrastructure projects do you normally implement during a financial year?

1 – 5		6 - 10		11 - 15		16 - 20		21 +	x

IQ0.4. What is value of your annual infrastructure budget?

<R16m		R16 – 30m		R31 – 45m		R46 – 60m		R61m +	x

Interview Questionnaire Part 1: Capability Assessment

The purpose of this part of the questionnaire is to determine the project management maturity of your municipality.

The questionnaire therefore consists of specific questions related to identified processes from each project management knowledge area as described in the PMBOK. Your response to each of these processes will be assessed and analysed to determine the project management capability of your municipality. Questions are in the form of a statement describing a process within a knowledge area. Kindly rate to what extent each process is implemented within your organization. The ratings are described as follows:

Level	**Description**	
Level 1	Process Exist	The process is only implemented on an **ad-hoc** basis.
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Level 3	Integrated Approach	The process is implemented during **most** projects and integrated across the organization.
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Level 5	Optimized Approach	The process is fully implemented during **all** projects is continuously improved and measured against best practises by senior management.

No	Process Description	Level (as per above description)				
		1	2	3	4	5
Project Integration Management						
IQ1.1.	Develop project charter: This includes developing a document that authorizes the existence of a project		x			
IQ1.2.	Develop project management plan: The process to define, prepare and coordinate all components of the main project plan				x	
IQ1.3.	Monitoring and control project work: Includes tracking, reviewing, and reporting project performance and progress				x	
IQ1.4.	Close project or phase: Finalizing all activities within the project or phase				x	
Project Scope Management						

IQ1.5.	Plan scope management: The process to create a document that will define, validate, and control the project scope.				x	
IQ1.6.	Define scope: Process of detailing and describing the project.				x	
IQ1.7.	Create WBS: Includes the subdividing of project deliverables or scope into smaller components or activities			x		
IQ1.8.	Control scope: The process to monitor the progress and manage changes to the scope				x	
Project Schedule Management						
IQ1.9.	Plan schedule management: Includes the establishment of policies, and procedures to plan, develop, manage, execute, and control the schedule.				x	
IQ1.10.	Define and sequence activities: The processes to identify activities and document how they relate to each other.				x	
IQ1.11	Estimate activity durations and develop schedule: The processes of estimating how long each activity will take to complete with aim of developing a schedule.				x	
IQ1.12	Control schedule: The process to monitor the status of the project, updating the schedule when necessary, and managing changes to the schedule				x	
Project Cost Management						
IQ1.13	Plan cost management: The process of defining the methods to estimate cost, to budget, and to manage, monitor, and control the cost.			x		
IQ1.14.	Estimate cost and determine budget: Determining the approximate monetary resources for each activity and aggregate this estimated cost of each activity to establish an authorized cost baseline.			x		
IQ1.15.	Control Cost: To monitor the status of the project and manage cost changes				x	
Project Quality Management						
IQ1.16.	Plan quality management: To identify quality standards for the project and define how compliance will be measured.				x	
IQ1.17	Control quality: Includes the monitoring of results in executing quality activities and assessing performance in line with expectations				x	

Project Resource Management						
IQ1.18	Plan resource management: The process to define how resources will be acquired and managed on the project.				x	
IQ1.19	Estimate activity resources: Includes the estimation of team resources, such as the type and quantity of material, equipment, and supplies to complete the project.			x		
IQ1.20.	Acquire resource: The process of obtaining people, equipment, materials, and other supplies required for the project.				x	
IQ1.21.	Develop and manage team: To improve the competencies of team members and to track performance, providing feedback, and manage changes with the team.			x		
IQ1.22.	Control resources: The process to ensure resources assigned to the project are available at the right time and to monitor the actual use of resources against the plan				x	
Project Communications Management						
IQ1.23.	Plan communication management: Consists of developing an approach and plan for communicating during the project.			X		
IQ1.24	Manage communications: The process to ensure timely collecting, creating, distributing, storing, retrieving, managing, monitoring, and disposing of information.				x	
IQ1.25.	Monitor communications: Process of ensuring the communication plan is implemented			X		
Project Risk Management						
IQ1.26.	Plan risk management: The process of defining how the risk management activities will be conducted.			x		
IQ1.27	Identify risks: The process to identify project risks, sources of such risks, and describing them.				x	
IQ1.28	Perform risk analysis: The analysis of prioritized risks by assessing their probability of occurring and potential impact.			x		

IQ1.29.	Plan risk responses: The process of developing options and agreeing on actions to address project risks.				x	
IQ1.30.	Implement risk responses: The process of implementing agreed responses to project risks.				x	
IQ1.31.	Monitor risks: To monitor the implementation of agreed responses, track identified risks, identify new risks, and evaluate the effectiveness of responses				x	
Project Procurement Management						
IQ1.32.	Plan procurement management: To document project procurement decisions, specify the approach to procurement and identify sellers.				x	
IQ1.33.	Conduct procurement: The process to obtain seller responses, select a seller, and award a contract.				x	
IQ1.34.	Control procurement: The process of managing relationships, monitoring performance, change control, and closing contracts				x	
Project Stakeholder Management						
IQ1.35.	Identify stakeholders: The process of identifying stakeholders and documenting appropriate information about them.			x		
IQ1.36	Plan stakeholder engagement: Developing approaches to involve and engage stakeholders, based on their requirements and expectations				x	
IQ1.37	Manage and monitor stakeholder engagements: The process to communicate with stakeholders to meet their requirements and expectations and monitor these relationships.				x	

Interview Questionnaire Part 2: Improvement Strategy

The purpose of this part of the questionnaire is to solicit your opinions to assist in developing an improvement strategy for the municipality to enhance its project management capability.

This part of the questionnaire therefore consists of questions designed to obtain your opinions regarding i) the challenges you experience within the knowledge areas that limit the improvement of your Project Management capability and ii) the proposed solutions towards addressing identified challenges.

IQ2.1. What are the main challenges that limit your improvement in terms of project management capability as it relates to the processes assessed in part 1 of this interview? You may list up to 5 challenges.

- Limited time to complete all the processes required for the planning and execution of projects.
- The municipality also has limited resources in the form of both human and financial to for the projects.
- Continuous changing legislation. The regulations and legislation pertaining to infrastructure development, including procurement, frequently changes which impact on the planning of projects.
- There is often extensive price differences between cost estimates at planning stage and the actual construction cost. This may be due to instability within the South African economy.

IQ2.2. Are there any other challenges that you think may limit the improvement in terms of project management capability of municipalities in Western Cape in general? You may list up to 3 additional challenges.

- No further challenges to add

IQ2.3. What interventions can you propose to address the challenges you identified in IQ2.1?

- The development of a project management system to be utilized throughout the municipality that will assist with planning and efficient scheduling limited resources.

IQ2.4. What interventions can you propose to address the challenges you identified in IQ2.2?

- None

Cape Peninsula University of Technology

MUNICIPAL INFRASTRUCTURE PROJECT PERFORMANCE: AN ASSESSMENT OF MUNICIPAL CAPABILITY THROUGH THE APPLICATION OF A PROJECT MANAGEMENT MATURITY MODEL

Interview Questionnaire
Municipality D

Introduction

Dear Interviewee

My name is Denvor Cloete, and I am currently completing the Masters of Engineering (M.Eng) course in Civil Engineering (100% Research Thesis) at Cape Peninsula University of Technology (CPUT). I have decided on the following research topic: Municipal infrastructure project performance: an assessment of municipal capability through the application of a project management maturity model.

Your Municipality was selected through a scientific sampling process. I have previous requested permission to collect research data through an interview with yourself, which was granted by the Municipal Manager. As noted in the initial letter, the research is going to be conducted strictly according to the CPUT Ethics guidelines, which includes principles of informed consent, privacy, confidentiality, anonymity, voluntary participation, and protection from any harm.

The purpose of the interview questionnaire is to firstly assess what level of project management capability your municipality has, and secondly to determine how you could improve your capability. A selected maturity model, i.e., PM Solutions PMMM was used as a framework for the development of this questionnaire. The questionnaire was further divided into three parts, namely, Part 0: Demographics; Part 1: Capability Assessment; Part 2: Improvement Strategy.

Interview Questionnaire Part 0: Demographics

The purpose of this part of the questionnaire is to collect general data regarding yourself. During the ethics application process, it was confirmed that your personal information will not be recorded or used in the research. This section therefore only collects data related your qualification and experience as well as information regarding the quantity and quality of projects implemented by your Municipality.

IQ 0.1. What is your highest qualification?

National Diploma		B-Degree	x	H-Degree		M-Degree		PhD	

IQ0.2. What is length of project management experience?

<3 years		4 - 6 years		7 - 9 years		10 - 12 years		13+ years	x

IQ0.3. How many infrastructure projects do you normally implement during a financial year?

1 – 5		6 - 10	x	11 - 15		16 - 20		21 +	

IQ0.4. What is value of your annual infrastructure budget?

<R16m		R16 – 30m		R31 – 45m	x	R46 – 60m		R61m +	

Interview Questionnaire Part 1: Capability Assessment

The purpose of this part of the questionnaire is to determine the project management maturity of your municipality.

The questionnaire therefore consists of specific questions related to identified processes from each project management knowledge area as described in the PMBOK. Your response to each of these processes will be assessed and analysed to determine the project management capability of your municipality. Questions are in the form of a statement describing a process within a knowledge area. Kindly rate to what extent each process is implemented within your organization. The ratings are described as follows:

Level	**Description**	
Level 1	Process Exist	The process is only implemented on an **ad-hoc** basis.
Level 2	Structured Approach	The process is implemented in structured manner during **some** individual projects.
Level 3	Integrated Approach	The process is implemented during **most** projects and integrated across the organization.
Level 4	Managed Approach	The process is fully implemented during **all** projects and managed across organization by the PMU
Level 5	Optimized Approach	The process is fully implemented during **all** projects is continuously improved and measured against best practises by senior management.

No	Process Description	Level (as per above description)				
		1	2	3	4	5
Project Integration Management						
IQ1.1.	Develop project charter: This includes developing a document that authorizes the existence of a project		X			
IQ1.2.	Develop project management plan: The process to define, prepare and coordinate all components of the main project plan			X		
IQ1.3.	Monitoring and control project work: Includes tracking, reviewing, and reporting project performance and progress			X		
IQ1.4.	Close project or phase: Finalizing all activities within the project or phase			X		
Project Scope Management						

IQ1.5.	Plan scope management: The process to create a document that will define, validate, and control the project scope.			x		
IQ1.6.	Define scope: Process of detailing and describing the project.			X		
IQ1.7.	Create WBS: Includes the subdividing of project deliverables or scope into smaller components or activities			X		
IQ1.8.	Control scope: The process to monitor the progress and manage changes to the scope				x	
Project Schedule Management						
IQ1.9.	Plan schedule management: Includes the establishment of policies, and procedures to plan, develop, manage, execute, and control the schedule.			x		
IQ1.10.	Define and sequence activities: The processes to identify activities and document how they relate to each other.				x	
IQ1.11	Estimate activity durations and develop schedule: The processes of estimating how long each activity will take to complete with aim of developing a schedule.			x		
IQ1.12	Control schedule: The process to monitor the status of the project, updating the schedule when necessary, and managing changes to the schedule				x	
Project Cost Management						
IQ1.13	Plan cost management: The process of defining the methods to estimate cost, to budget, and to manage, monitor, and control the cost.			x		
IQ1.14.	Estimate cost and determine budget: Determining the approximate monetary resources for each activity and aggregate this estimated cost of each activity to establish an authorized cost baseline.			x		
IQ1.15.	Control Cost: To monitor the status of the project and manage cost changes				x	
Project Quality Management						
IQ1.16.	Plan quality management: To identify quality standards for the project and define how compliance will be measured.				x	
IQ1.17	Control quality: Includes the monitoring of results in executing quality activities and assessing performance in line with expectations				x	

Project Resource Management						
IQ1.18	Plan resource management: The process to define how resources will be acquired and managed on the project.			x		
IQ1.19	Estimate activity resources: Includes the estimation of team resources, such as the type and quantity of material, equipment, and supplies to complete the project.			x		
IQ1.20.	Acquire resource: The process of obtaining people, equipment, materials, and other supplies required for the project.				x	
IQ1.21.	Develop and manage team: To improve the competencies of team members and to track performance, providing feedback, and manage changes with the team.			x		
IQ1.22.	Control resources: The process to ensure resources assigned to the project are available at the right time and to monitor the actual use of resources against the plan			x		
Project Communications Management						
IQ1.23.	Plan communication management: Consists of developing an approach and plan for communicating during the project.			X		
IQ1.24	Manage communications: The process to ensure timely collecting, creating, distributing, storing, retrieving, managing, monitoring, and disposing of information.			x		
IQ1.25.	Monitor communications: Process of ensuring the communication plan is implemented			X		
Project Risk Management						
IQ1.26.	Plan risk management: The process of defining how the risk management activities will be conducted.			x		
IQ1.27	Identify risks: The process to identify project risks, sources of such risks, and describing them.				x	
IQ1.28	Perform risk analysis: The analysis of prioritized risks by assessing their probability of occurring and potential impact.		x			

IQ1.29.	Plan risk responses: The process of developing options and agreeing on actions to address project risks.			x		
IQ1.30.	Implement risk responses: The process of implementing agreed responses to project risks.			x		
IQ1.31.	Monitor risks: To monitor the implementation of agreed responses, track identified risks, identify new risks, and evaluate the effectiveness of responses			x		
Project Procurement Management						
IQ1.32.	Plan procurement management: To document project procurement decisions, specify the approach to procurement and identify sellers.			x		
IQ1.33.	Conduct procurement: The process to obtain seller responses, select a seller, and award a contract.				x	
IQ1.34.	Control procurement: The process of managing relationships, monitoring performance, change control, and closing contracts				x	
Project Stakeholder Management						
IQ1.35.	Identify stakeholders: The process of identifying stakeholders and documenting appropriate information about them.			x		
IQ1.36	Plan stakeholder engagement: Developing approaches to involve and engage stakeholders, based on their requirements and expectations			x		
IQ1.37	Manage and monitor stakeholder engagements: The process to communicate with stakeholders to meet their requirements and expectations and monitor these relationships.				x	

Interview Questionnaire Part 2: Improvement Strategy

The purpose of this part of the questionnaire is to solicit your opinions to assist in developing an improvement strategy for the municipality to enhance its project management capability.

This part of the questionnaire therefore consists of questions designed to obtain your opinions regarding i) the challenges you experience within the knowledge areas that limit the improvement of your Project Management capability and ii) the proposed solutions towards addressing identified challenges.

IQ2.1. What are the main challenges that limit your improvement in terms of project management capability as it relates to the processes assessed in part 1 of this interview? You may list up to 5 challenges.

- The instability of the municipal council is a big challenge in this municipality. There are frequent changes in the key positions such as Mayor and Speaker that result in delayed decision-making impacting projects.
- Due to the above, there is poor management and administration. The municipality does not have an appointed municipal manager who can provide the necessary leadership, but only acting incumbents for the last year or so.
- The Municipality is reliant on grants for the funding of their infrastructure projects.
- Due to the remoteness of the municipality, it is sometimes a struggle to attract the correct skilled and qualified professional service providers and contractors to implement projects.

IQ2.2. Are there any other challenges that you think may limit the improvement in terms of project management capability of municipalities in Western Cape in general? You may list up to 3 additional challenges.

Procurement regulations and supply chain processes often delay project implementation.

IQ2.3. What interventions can you propose to address the challenges you identified in IQ2.1?

- The National government should implement regulations and legislation that will contribute to stabilizing municipal councils.

- Provincial Government should employ qualified officials with the required experience that can be deployed to municipalities where and if urgent vacancies such as that of municipal manager exist.
- Municipalities should receive more support on local economic development and revenue enhancement strategies to grow their own finances

IQ2.4. What interventions can you propose to address the challenges you identified in IQ2.2?

- Review of procurement regulations to align better with infrastructure development

Cape Peninsula University of Technology

MUNICIPAL INFRASTRUCTURE PROJECT PERFORMANCE: AN ASSESSMENT OF MUNICIPAL CAPABILITY THROUGH THE APPLICATION OF A PROJECT MANAGEMENT MATURITY MODEL

Interview Questionnaire
Municipality E

Introduction

Dear Interviewee

My name is Denvor Cloete, and I am currently completing the Masters of Engineering (M.Eng) course in Civil Engineering (100% Research Thesis) at Cape Peninsula University of Technology (CPUT). I have decided on the following research topic: Municipal infrastructure project performance: an assessment of municipal capability through the application of a project management maturity model.

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The purpose of the interview questionnaire is to firstly assess what level of project management capability your municipality has, and secondly to determine how you could improve your capability. A selected maturity model, i.e., PM Solutions PMMM was used as a framework for the development of this questionnaire. The questionnaire was further divided into three parts, namely, Part 0: Demographics; Part 1: Capability Assessment; Part 2: Improvement Strategy.

Interview Questionnaire Part 0: Demographics

The purpose of this part of the questionnaire is to collect general data regarding yourself. During the ethics application process, it was confirmed that your personal information will not be recorded or used in the research. This section therefore only collects data related your qualification and experience as well as information regarding the quantity and quality of projects implemented by your Municipality.

IQ 0.1. What is your highest qualification?

National Diploma	x	B-Degree		H-Degree		M-Degree		PhD	

IQ0.2. What is length of project management experience?

<3 years		4 - 6 years	x	7 - 9 years		10 - 12 years		13+ years	

IQ0.3. How many infrastructure projects do you normally implement during a financial year?

1 – 5	x	6 - 10		11 - 15		16 - 20		21 +	

IQ0.4. What is value of your annual infrastructure budget?

<R16m	x	R16 – 30m		R31 – 45m		R46 – 60m		R61m +	

Interview Questionnaire Part 1: Capability Assessment

The purpose of this part of the questionnaire is to determine the project management maturity of your municipality.

The questionnaire therefore consists of specific questions related to identified processes from each project management knowledge area as described in the PMBOK. Your response to each of these processes will be assessed and analysed to determine the project management capability of your municipality. Questions are in the form of a statement describing a process within a knowledge area. Kindly rate to what extent each process is implemented within your organization. The ratings are described as follows:

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Level 4	Managed Approach	The process is fully implemented during **all** projects and managed across organization by the PMU
Level 5	Optimized Approach	The process is fully implemented during **all** projects is continuously improved and measured against best practises by senior management.

No	Process Description	Level (as per above description)				
		1	2	3	4	5
Project Integration Management						
IQ1.1.	Develop project charter: This includes developing a document that authorizes the existence of a project		X			
IQ1.2.	Develop project management plan: The process to define, prepare and coordinate all components of the main project plan			X		
IQ1.3.	Monitoring and control project work: Includes tracking, reviewing, and reporting project performance and progress			X		
IQ1.4.	Close project or phase: Finalizing all activities within the project or phase		X			
Project Scope Management						

IQ1.5.	Plan scope management: The process to create a document that will define, validate, and control the project scope.		X			
IQ1.6.	Define scope: Process of detailing and describing the project.			x		
IQ1.7.	Create WBS: Includes the subdividing of project deliverables or scope into smaller components or activities		X			
IQ1.8.	Control scope: The process to monitor the progress and manage changes to the scope			x		
Project Schedule Management						
IQ1.9.	Plan schedule management: Includes the establishment of policies, and procedures to plan, develop, manage, execute, and control the schedule.			x		
IQ1.10.	Define and sequence activities: The processes to identify activities and document how they relate to each other.		X			
IQ1.11	Estimate activity durations and develop schedule: The processes of estimating how long each activity will take to complete with aim of developing a schedule.			x		
IQ1.12	Control schedule: The process to monitor the status of the project, updating the schedule when necessary, and managing changes to the schedule			x		
Project Cost Management						
IQ1.13	Plan cost management: The process of defining the methods to estimate cost, to budget, and to manage, monitor, and control the cost.			x		
IQ1.14.	Estimate cost and determine budget: Determining the approximate monetary resources for each activity and aggregate this estimated cost of each activity to establish an authorized cost baseline.			x		
IQ1.15.	Control Cost: To monitor the status of the project and manage cost changes				X	
Project Quality Management						
IQ1.16.	Plan quality management: To identify quality standards for the project and define how compliance will be measured.			X		
IQ1.17	Control quality: Includes the monitoring of results in executing quality activities and assessing performance in line with expectations			X		

Project Resource Management						
IQ1.18	Plan resource management: The process to define how resources will be acquired and managed on the project.			X		
IQ1.19	Estimate activity resources: Includes the estimation of team resources, such as the type and quantity of material, equipment, and supplies to complete the project.		X			
IQ1.20.	Acquire resource: The process of obtaining people, equipment, materials, and other supplies required for the project.			X		
IQ1.21.	Develop and manage team: To improve the competencies of team members and to track performance, providing feedback, and manage changes with the team.		X			
IQ1.22.	Control resources: The process to ensure resources assigned to the project are available at the right time and to monitor the actual use of resources against the plan		X			
Project Communications Management						
IQ1.23.	Plan communication management: Consists of developing an approach and plan for communicating during the project.			X		
IQ1.24	Manage communications: The process to ensure timely collecting, creating, distributing, storing, retrieving, managing, monitoring, and disposing of information.				X	
IQ1.25.	Monitor communications: Process of ensuring the communication plan is implemented			X		
Project Risk Management						
IQ1.26.	Plan risk management: The process of defining how the risk management activities will be conducted.		X			
IQ1.27	Identify risks: The process to identify project risks, sources of such risks, and describing them.		X			
IQ1.28	Perform risk analysis: The analysis of prioritized risks by assessing their probability of occurring and potential impact.		X			

IQ1.29.	Plan risk responses: The process of developing options and agreeing on actions to address project risks.		X			
IQ1.30.	Implement risk responses: The process of implementing agreed responses to project risks.		X			
IQ1.31.	Monitor risks: To monitor the implementation of agreed responses, track identified risks, identify new risks, and evaluate the effectiveness of responses		X			
Project Procurement Management						
IQ1.32.	Plan procurement management: To document project procurement decisions, specify the approach to procurement and identify sellers.		X			
IQ1.33.	Conduct procurement: The process to obtain seller responses, select a seller, and award a contract.				X	
IQ1.34.	Control procurement: The process of managing relationships, monitoring performance, change control, and closing contracts			X		
Project Stakeholder Management						
IQ1.35.	Identify stakeholders: The process of identifying stakeholders and documenting appropriate information about them.			x		
IQ1.36	Plan stakeholder engagement: Developing approaches to involve and engage stakeholders, based on their requirements and expectations		X			
IQ1.37	Manage and monitor stakeholder engagements: The process to communicate with stakeholders to meet their requirements and expectations and monitor these relationships.		X			

Interview Questionnaire Part 2: Improvement Strategy

The purpose of this part of the questionnaire is to solicit your opinions to assist in developing an improvement strategy for municipality to enhance their project management capability.

This part of the questionnaire therefore consists of questions designed to obtain your opinions regarding i) the challenges you experience within the knowledge areas that limits the improvement of your Project Management capability and ii) the proposed solutions towards addressing identified challenges.

IQ2.1. What are the main challenges that limits your improvement in terms of project management capability as it relates to the processes assessed in part 1 of this interview? You may list up to 5 challenges.

The in several capacity constraints in the unit. This is because the PMU department of the municipality not only focuses on the implementation and execution of infrastructure projects but is also responsible for other functions including building control, town planning, environmental management aspects, and other day-to-day activities in the Municipality.

Another challenge is the time management of staff due to capacity constraints as noted above.
The Municipality is further 100% reliant on external grants to fund its infrastructure projects.

IQ2.2. Are there any other challenges that you think may limit the improvement in terms of project management capability of municipalities in Western Cape in general? You may list up to 3 additional challenges.

No Additional

IQ2.3. What interventions can you propose to address the challenges you identified in IQ2.1?

The municipal Structure should be aligned with the mandate and purpose of PMU. Dedicated staff to be allocated to the Unit that will only focus on the planning and implementation of infrastructure projects.

IQ2.4. What interventions can you propose to address the challenges you identified in IQ2.2?

None to propose

Cape Peninsula University of Technology

MUNICIPAL INFRASTRUCTURE PROJECT PERFORMANCE: AN ASSESSMENT OF MUNICIPAL CAPABILITY THROUGH THE APPLICATION OF A PROJECT MANAGEMENT MATURITY MODEL

Interview Questionnaire
Municipality F

Introduction

Dear Interviewee

My name is Denvor Cloete, and I am currently completing the Masters of Engineering (M.Eng) course in Civil Engineering (100% Research Thesis) at Cape Peninsula University of Technology (CPUT). I have decided on the following research topic: Municipal infrastructure project performance: an assessment of municipal capability through the application of a project management maturity model.

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Interview Questionnaire Part 0: Demographics

The purpose of this part of the questionnaire is to collect general data regarding yourself. During the ethics application process, it was confirmed that your personal information will not be recorded or used in the research. This section therefore only collects data related your qualification and experience as well as information regarding the quantity and quality of projects implemented by your Municipality.

IQ 0.1. What is your highest qualification?

National Diploma		B-Degree	x	H-Degree		M-Degree		PhD	

IQ0.2. What is length of project management experience?

<3 years		4 - 6 years		7 - 9 years		10 - 12 years	x	13+ years	

IQ0.3. How many infrastructure projects do you normally implement during a financial year?

1 – 5		6 - 10	x	11 - 15		16 - 20		21 +	

IQ0.4. What is value of your annual infrastructure budget?

<R16m		R16 – 30m	x	R31 – 45m		R46 – 60m		R61m +	

Interview Questionnaire Part 1: Capability Assessment

The purpose of this part of the questionnaire is to determine the project management maturity of your municipality.

The questionnaire therefore consists of specific questions related to identified processes from each project management knowledge area as described in the PMBOK. Your response to each of these processes will be assessed and analysed to determine the project management capability of your municipality. Questions are in the form of a statement describing a process within a knowledge area. Kindly rate to what extent each process is implemented within your organization. The ratings are described as follows:

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No	Process Description	Level (as per above description)				
		1	2	3	4	5
Project Integration Management						
IQ1.1.	Develop project charter: This includes developing a document that authorizes the existence of a project		X			
IQ1.2.	Develop project management plan: The process to define, prepare and coordinate all components of the main project plan			X		
IQ1.3.	Monitoring and control project work: Includes tracking, reviewing, and reporting project performance and progress			X		
IQ1.4.	Close project or phase: Finalizing all activities within the project or phase				x	

Project Scope Management						
IQ1.5.	Plan scope management: The process to create a document that will define, validate, and control the project scope.		X			
IQ1.6.	Define scope: Process of detailing and describing the project.			x		
IQ1.7.	Create WBS: Includes the subdividing of project deliverables or scope into smaller components or activities			x		
IQ1.8.	Control scope: The process to monitor the progress and manage changes to the scope				x	
Project Schedule Management						
IQ1.9.	Plan schedule management: Includes the establishment of policies, and procedures to plan, develop, manage, execute, and control the schedule.			x		
IQ1.10.	Define and sequence activities: The processes to identify activities and document how they relate to each other.			x		
IQ1.11	Estimate activity durations and develop schedule: The processes of estimating how long each activity will take to complete with aim of developing a schedule.			x		
IQ1.12	Control schedule: The process to monitor the status of the project, updating the schedule when necessary, and managing changes to the schedule				x	
Project Cost Management						
IQ1.13	Plan cost management: The process of defining the methods to estimate cost, to budget, and to manage, monitor, and control the cost.			x		
IQ1.14.	Estimate cost and determine budget: Determining the approximate monetary resources for each activity and aggregate this estimated cost of each activity to establish an authorized cost baseline.				x	
IQ1.15.	Control Cost: To monitor the status of the project and manage cost changes				X	
Project Quality Management						
IQ1.16.	Plan quality management: To identify quality standards for the project and define how compliance will be measured.			X		

IQ1.17	Control quality: Includes the monitoring of results in executing quality activities and assessing performance in line with expectations				x	
Project Resource Management						
IQ1.18	Plan resource management: The process to define how resources will be acquired and managed on the project.		x			
IQ1.19	Estimate activity resources: Includes the estimation of team resources, such as the type and quantity of material, equipment, and supplies to complete the project.			x		
IQ1.20.	Acquire resource: The process of obtaining people, equipment, materials, and other supplies required for the project.			X		
IQ1.21.	Develop and manage team: To improve the competencies of team members and to track performance, providing feedback, and manage changes with the team.				x	
IQ1.22.	Control resources: The process to ensure resources assigned to the project are available at the right time and to monitor the actual use of resources against the plan				x	
Project Communications Management						
IQ1.23.	Plan communication management: Consists of developing an approach and plan for communicating during the project.			X		
IQ1.24	Manage communications: The process to ensure timely collecting, creating, distributing, storing, retrieving, managing, monitoring, and disposing of information.				X	
IQ1.25.	Monitor communications: Process of ensuring the communication plan is implemented				x	
Project Risk Management						
IQ1.26.	Plan risk management: The process of defining how the risk management activities will be conducted.			x		
IQ1.27	Identify risks: The process to identify project risks, sources of such risks, and describing them.			x		
IQ1.28	Perform risk analysis: The analysis of prioritized risks by assessing their probability of occurring and potential impact.		x			

IQ1.29.	Plan risk responses: The process of developing options and agreeing on actions to address project risks.			x		
IQ1.30.	Implement risk responses: The process of implementing agreed responses to project risks.		x			
IQ1.31.	Monitor risks: To monitor the implementation of agreed responses, track identified risks, identify new risks, and evaluate the effectiveness of responses			x		
Project Procurement Management						
IQ1.32.	Plan procurement management: To document project procurement decisions, specify the approach to procurement and identify sellers.			x		
IQ1.33.	Conduct procurement: The process to obtain seller responses, select a seller, and award a contract.				X	
IQ1.34.	Control procurement: The process of managing relationships, monitoring performance, change control, and closing contracts			X		
Project Stakeholder Management						
IQ1.35.	Identify stakeholders: The process of identifying stakeholders and documenting appropriate information about them.			x		
IQ1.36	Plan stakeholder engagement: Developing approaches to involve and engage stakeholders, based on their requirements and expectations		X			
IQ1.37	Manage and monitor stakeholder engagements: The process to communicate with stakeholders to meet their requirements and expectations and monitor these relationships.				x	

Interview Questionnaire Part 2: Improvement Strategy

The purpose of this part of the questionnaire is to solicit your opinions to assist in developing an improvement strategy for the municipality to enhance its project management capability.

This part of the questionnaire therefore consists of questions designed to obtain your opinions regarding i) the challenges you experience within the knowledge areas that limit the improvement of your Project Management capability and ii) the proposed solutions towards addressing identified challenges.

IQ2.1. What are the main challenges that limit your improvement in terms of project management capability as it relates to the processes assessed in part 1 of this interview? You may list up to 5 challenges.

Procurement regulations and policies aren't always geared toward effective infrastructure development. The is also a silo approach between supply chain officials and the infrastructure departments.
Project funding provided through grants sometimes does not align with the project timelines. Funding comes with strict milestones and requirements, which means that when municipalities can't stick to these requirements, funding is stopped, which then negatively impacts the projects.
The municipality has capacity challenges with qualified and skilled staff members. Due to the size of the municipality, it is difficult to attar qualified engineers and technicians.

IQ2.2. Are there any other challenges that you think may limit the improvement in terms of the project management capability of municipalities in the Western Cape in general? You may list up to 3 additional challenges.

Specific procurement regulations to be introduced for infrastructure projects
Management should focus on the development and training of internal staff members thereby ensuring career growth and a proper staff retention strategy.

IQ2.3. What interventions can you propose to address the challenges you identified in IQ2.1?

None

IQ2.4. What interventions can you propose to address the challenges you identified in IQ2.2?