MATURITY OF PROJECT SCOPE MANAGEMENT IN MTN SOUTH AFRICA: A GAP ANALYSIS LEADING TO A ROADMAP FOR EXCELLENCE

by

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EXECUTIVE SUMMARY

In the volatile telecommunication industry, innovation is the key to success. Mobile Telephone Network South Africa (MTN SA) needs to launch new products and services consistently to stay on the competitive edge. Consequently, effective project management becomes the key to gaining the competitive advantage by turning new product or service concepts into reality.

According to Nokes and Kelly (2007:153–156), there is a high correlation between project success and effective project scope management. The effectiveness of project scope management can drastically affect the success of projects, as changes to the project scope may severely affect the project value creation, timeline, quality and cost. Accordingly, high project scope management maturity would contribute tremendously to the effectiveness of project management.

The purpose of this present research is to define a roadmap to guide MTN's Business Optimisation (BO) department to project scope management excellence. To meet this aim, the researcher utilises the concept of a Project Management Maturity Model (PMMM), as a guideline for the creation of a project scope management maturity model. The created project scope management maturity model is then utilised to provide an effective means to measure MTN SA's project scope management maturity and identify the gaps prohibiting MTN SA from project scope excellence (Kerzner, 2004:193).

Based on the literature review on the elements of project scope excellence, this paper suggests that there is a general misunderstanding regarding the definition of maturity. Many believe that process rigorousness indicates maturity, and have forgotten the criticality of the organisational culture that fosters an environment for project scope excellence and the effective use of the project scope process.

This research offers a comparative study on the most popular and effective maturity models in the market, to identify the models that truly contribute to project scope management success and excellence. Finally, the research tailors the models to a project scope management focused maturity model, to assess MTN SA's project scope management maturity from all aspects, and proposes a roadmap toward project scope management excellence.

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LIST OF ABBREVIATIONS

$(PM)^2$	Project Management Process Maturity Model
BO	Business Optimisation
BOWOW	Business Optimisation Way of Working
CCTA	Central Computing and Telecommunications Agency
CMM®	Capability Maturity Model
EPM	Enterprise Project Management
EVM	Earned Value Management
HR	Human Resource
IDRC	International Development Research Centre
IFF	IT Flexibility Framework
IS	Information System
ISO	International Organisation for Standardisation
IT	Information Technology
KPI	Key Performance Indicator
LAN	Local Area Network
MTN	Mobile Telecommunication Network
MTN SA	Mobile Telecommunication Network South Africa
MTN SP	Mobile Telecommunication Network Service Provider
OGC	Office of Governance Commerce
OPM3	Organisational Project Management Maturity Model
P-CMM	People Capability Maturity Model
P2MM	PRINCE2 ('PRojects IN Controlled Environments') Maturity Model
PM	Project Management
PMBOK®	Project Management Body of Knowledge
PMI®	Project Management Institution

PMMM	Project Management Maturity Model
PRINCE2	'PRojects IN Controlled Environments'
ProMMM	Project Management Maturity Model
PMO	Project Management Office
RDS	Requirement Definition Specification
ROI	Return On Investment
SBS	SMART (Strategic, Managed, Aligned, Regenerative, Transitional) Breakdown Structure
SE-CMM	Systems Engineering Capability Maturity Model
SEI	Software Engineering Institute
SMART	Strategic, Managed, Aligned, Regenerative, Transitional
SW-CMM	Software Capability Maturity Model
TOR	Terms of Reference
WBS	Work Breakdown Structure

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CHAPTER 1: INTRODUCTION AND PROBLEM STATEMENT

1.1 BACKGROUND

1.1.1 Mobile Telephone Network South Africa (MTN SA)

In the telecommunication industry, innovation is the key to success. The telecommunication business environment is volatile and changes are inevitable. Mobile Telephone Network South Africa (MTN SA) needs to launch new products and services consistently, in order to remain competitive and continuously improve the way the business should be managed.

MTN SA is one of the four main cellular network operators in South Africa. According to MTN Service Provider (MTN SP) (2006:7–8), MTN SA's main business goals are: to build and maintain a robust cellular network infrastructure that supports the cellular technologies in the market, and to develop unique products and services to satisfy South African customers' cellular needs.

In order to satisfy the market needs and to keep up with the rapidly changing telecommunication technologies, time-to-market for innovative products and/or services is critical. Speeding up the cycle to develop new products and services would assist MTN SA in increasing revenue by gaining the first-to-market or first-mover advantage, addressing customers' needs instantly, and responding to competitors' offerings in the shortest time span possible to negate competitors' points of difference.

1.1.2 Business Optimisation (BO)

With products that are promoted using the mass media such as television, radio and newspaper, the deadlines to advertise and deliver the products are fixed, with penalties for late delivery (MTN, 2006; Mahmoud-Jouini, Mildler & Garel, 2004:359). Accordingly, project scope management is playing a major role in managing and sustaining MTN SA's competitiveness. To effectively manage all the business-related projects in MTN SA, a department known as Business Optimisation (BO) was established and has become one of the departments most crucial to the success of the organisation.

According to BO (2007:A3-1), BO is the only department that manages cross-functional projects to deliver new products and services. BO can be regarded as the change agent across different units in the organisation. BO transforms MTN SA's business strategies and/or opportunities into manageable projects, and implements those projects to seize the opportunities in a methodological way.

Since BO's main focus is to manage business projects, there should be a paradigm shift in the way project scopes are managed, as business needs are slightly different from the requirements of Engineering or Information Technology (IT) projects. Delivering on time, meeting the quality standard and remaining within budget are no longer adequate as the only success criteria; the key project scope success criteria should be value creation to the business (Winter, Anderson, Elvin & Levene, 2006:699–708).

1.1.3 Business Optimisation Way of Working (BOWOW)

To ensure the identified business projects are implemented successfully and consistently, BO introduced a customised project management methodology known as Business Optimisation Way of Working (BOWOW). BOWOW is a methodology based on the

Project Management Body of Knowledge (PMBOK)[1]; it follows a similar project management life-cycle and covers the majority (if not all) of the project management knowledge areas as defined by PMBOK.

BOWOW allows project managers and business analysts to systematically analyse the business needs, to specifically design the solutions based on the business needs and requirements identified, to define and manage the project scope, to implement the designed solution, and to communicate the change to the relevant departments (BO, 2007:A3-1&2).

1.1.4 Project scope management

The effectiveness of project scope management would dramatically affect the success of projects, as changes to the project scope may drastically impact on the project value creation, timeline, quality and cost. On the one hand, ineffective project scope control may lead to cost and time overrun, and/or compromised quality. As a result, project scope creep is considered to be the prime category of threat to projects (Nokes & Kelly, 2007:153–156). On the other hand, excessive control may cause loss of opportunities to increase project value creation, as certain scope changes are crucial in order to create more project value and to achieve the full benefits of the project (Olsson, 2005:65).

It is essential to understand that not all scope changes have negative impact on the project, as a majority of the changes suggested are usually sensible and may provide opportunities to increase the project's Return On Investment (ROI) (Nokes & Kelly, 2007:153). Pappas (2006:42) agrees by stating that "change is a natural phenomenon that cannot be avoided. Many project managers mistakenly believe that their role is to create order and prevent

[1] The researcher acknowledges that terms such as "PMBOK", "CMM" and "PMI" (among others) are registered trademarks. However, in the interest of brevity, the ® symbol has not been inserted at each occurrence of these terms.

changes. Rather, project managers are responsible for outcomes, and because change is a necessary element of reaching those outcomes, change management is becoming vital to project management success". Pappas (2006:43) further emphasises that "changes in a project are inevitable in today's fast-paced business environment". Consequently, adaptability should take precedence over efficiency to ensure project scope management success (Deakins & Dillon, 2004:73). Project managers should not avoid changes; they should plan, manage, facilitate and control changes cautiously, to respond and adapt to those changes.

As a result, the researcher believes a vigorous and flexible project change control process is essential for guiding key stakeholders to approve the changes objectively, based on the feasibility and value creation of the changes. Project scope management maturity is thus one of the keys to the success of projects in any organisation. Continuous improvement of the project scope management processes would indeed add tremendous value to the performance of BO.

1.1.5 Project scope management maturity model

To assess project scope management and achieve continuous improvement in the project scope management processes, a project scope management maturity model would be a viable tool for identifying gaps, benchmarking and developing a roadmap to achieve project scope management excellence (Mullaly, 2006:62). Unfortunately, there is currently no maturity model in the market that specialises in project scope management maturity. Hence, to assess project scope management maturity, the researcher is required to convert one or more project management maturity model/s into a project scope management orientated model.

1.2 PROBLEM STATEMENT

The following problem statement specifies the problem that this research project intends to address: *The problem of ineffective management of project scope creeps and changes, caused by the low project scope management maturity in MTN SA.*

The researcher believes that the current BO project scope management maturity has an immense potential for improvement, in order to manage the project scope and adapt to change effectively and efficiently.

BO project managers are currently experiencing numerous challenges in managing project scope effectively and efficiently in MTN SA's environment, as there is a high degree of uncertainty. Many projects are complex and have no precedent, so the project scope is often unclear and the work involved is often unpredictable. Obtaining concrete information to scope the project and move on to the next phase is often a challenge (Thilmany, 2005:50–54). Consequently, project scope changes are often encountered.

To incorporate the scope changes, the project often needs to go through a cumbersome project scope management process, which results in schedule delays and cost overrun. This can lead to many business stakeholders perceiving BO project scope management processes as additional governance that slows down the project, with little or no value to the business.

Certain business stakeholders believe that delivering more than was specified in the project scope would benefit the project, but they have limited understanding of the impact caused by the suggested changes. As a result, changes are not planned and controlled, and no formal assessment of the impact, feasibility and value-add has been done, which often

leads to project failure (Burke, 2000:95; Nokes & Kelly, 2007:144–157; PMI, 2004:103–122; Gray & Larson, 2003:548).

Based on the preliminary investigation on the current BO project scope management, the following gaps were identified:

- Certain project scope management sub-processes are not consistently applied.
- The artefacts produced in the BO change control process are not robust enough to indicate the full change impact and they do not recommend how the change should be managed.
- The project scope management process is considered to be too rigid and unable to satisfy the needs of the volatile telecommunication business environment.
- The project stakeholders are not formally trained or informed regarding the concept of project scope management.

To rectify the above problems, the researcher conducted a literature review to discover the internationally recognised project scope management good practices and maturity models that can be utilised to assess MTN SA's project scope management maturity.

1.3 PURPOSE OF THE RESEARCH

The purpose of the research is to *define a roadmap to guide BO on the path toward project scope management excellence.*

1.3.1 Defining the primary and secondary objectives

The purpose of the research can be broken down into three primary research objectives. These research objectives are:

- To identify the gaps that prohibit BO from achieving project scope management excellence.
- To discover contemporary good practices that may enhance the effectiveness and efficiency of BO project scope management.
- To discover a means to flexibility for managing change more effectively, in order to minimise the loss of value-creation opportunities and to effectively manage scope creep.

The primary research objectives have been broken down into a number of secondary research objectives to provide a systematic method of achieving the overall objective. These secondary objectives are:

- To determine the elements that contribute toward project scope management excellence.
- To understand some of the most popular project management maturity models (PMMMs) in the market.
- To select and tailor PMMMs to meet the needs of the research.
- To discover a structured but flexible approach to managing project scopes.
- To utilise selected and tailored PMMMs as tools to assess BO project scope management maturity level.
- To design a model to assess the degree of structured flexibility in MTN SA.
- To identify and understand the project scope management challenges that BO project managers encounter.
- To develop a roadmap with possible actions that would achieve project scope management excellence in BO.

1.3.2 Research action plan

The action plan below indicates the steps that are to be conducted during the research.

- Conduct an in-depth literature review on project scope management excellence, project

management maturity models, project scope management good practices and structured flexibility.

- Investigate the pros and cons of different project management maturity models and determine how to convert the selected model to assess project scope management maturity.
- Compile structured questionnaires to assess the project scope management maturity and degree of structured flexibility, and to identify the project scope management weaknesses.
- Conduct interviews to verify the results and gain an in-depth understanding of the level of maturity, degree of structured flexibility and project scope management challenges in MTN SA.
- Analyse MTN SA BO's project scope management maturity.
- Identify BO's project scope management strengths and weaknesses.
- Develop action plans and provide recommendations for continuous improvements.

1.3.3 Ethical considerations

According to the International Development Research Centre (IDRC) (2004), any research involving human subjects must comply with high ethical standards. The list below indicates the principles that the researcher complied with during the research process:

- "Before an individual becomes a subject of research, he/she shall be notified of: the aims, methods, anticipated benefits and potential hazards of the research; his/her right to abstain from participation in the research and his/her right to terminate at any time his/her participation; and the confidential nature of his/her replies."
- "No pressure or inducement of any kind shall be applied to encourage an individual to become a subject of research."
- "The identity of individuals from whom information is obtained in the course of the

project shall be kept strictly confidential."

Other research ethical considerations are listed below (Harding, 2007:13; Zikmund, 2003:81–85):

- The researcher must minimise the possibility of data misinterpretation.
- The researcher must minimise the possibility of misleading the data collection results.
- The researcher must ensure there is no plagiarism in the study.
- The researcher must not misrepresent the statistical accuracy of the data gathered.

The researcher must comply with the above aims to protect the dignity and privacy of individuals involved in the research.

1.4 RESEARCH METHODOLOGY

1.4.1 Qualitative and quantitative research

To assess MTN SA's project scope management maturity and structured flexibility, the researcher utilises both qualitative and quantitative research. The researcher conducts the quantitative research to analyse the general effectiveness level of the project scope management. The results gathered from the quantitative research provide tangible measurable statistics for future MTN SA BO benchmarking and continuous improvements.

Once the quantitative research is complete, the researcher conducts the qualitative research to gain an in-depth understanding of the environment and to determine the cause of the problems identified from the quantitative research. Through qualitative research the researcher is able to gain personal interactions with the targeted research participants, in order to gather the primary data from stakeholders who have hands-on experience on MTN SA BO's project scope management and possibly have valuable ideas for improving BO

project scope management.

1.5 LIMITATIONS OF THE STUDY

The credibility of the study may be affected by the factors listed below (Crawford, 2007:18; Zikmund, 2003:392):

- The results of the questionnaires and interviews may be inaccurate, as certain participants may not be comfortable with sharing negative information with the researcher.
- The data gathered from the assessment of the project scope management maturity level may not reflect the truth as certain participants may be subject to a higher level of maturity, and certain participants may be reluctant to admit the weaknesses of the organisation.
- The credibility of the results may be affected by the way that the researcher conducts the interviews, as the researcher may unintentionally lead participants' responses.
- Certain participants may be subjective toward the certain questions, as they may have experienced frustrations regarding the subject discussed.
- Not all of the participants may be available and willing to conduct the survey; hence, the number of participants may be reduced.

1.6 DIVISION OF THE STUDY

The research is divided into four chapters to ensure that the primary and secondary research objectives are comprehensively covered.

Chapter 1 provides overall direction and describes the importance of the research. It consists of the research background, problem statement, research purpose, research

methodology and limitations of the study.

Chapter 2 provides a literature overview on aspects underlying the concepts of project scope management, project scope management maturity, project management maturity models and structured flexibility. Once the literature has been reviewed, the researcher will select and tailor the most feasible project management maturity models to assess MTN SA BO's project scope management.

Chapter 3 conducts a detailed project scope management assessment to determine the existing level of project scope management maturity and degree of structured flexibility.

Chapter 4 develops a roadmap with recommended actions and concepts for achieving the desired level of maturity. Lastly, this chapter concludes the research findings with recommendations to potential future research.

CHAPTER 2: THE KEY ELEMENTS CONTRIBUTING TO PROJECT SCOPE MANAGEMENT EXCELLENCE

2.1 INTRODUCTION

The purpose of Chapter 2 is to conduct a literature review, to investigate the possible key elements that contribute to project scope management excellence, and to determine what has been investigated by other authors already. This chapter starts by defining what excellence is, followed by an investigation of the key concepts in project scope management, project scope management maturity, project management methodology and maturity models. In Chapter 2 the researcher introduces the term 'flexibility' to project scope management, as the researcher strongly believes an organisation's project scope management process can only be mature if there is certain degree of flexibility.

2.2 PROJECT SCOPE MANAGEMENT EXCELLENCE

Currently there is no literature that defines project scope management excellence. To understand what project scope management excellence is, it is first important to understand the definition of project management excellence. The researcher can then define project scope management excellence based on the definition of project management excellence.

According to Kerzner (2006:42), organisations that achieve excellence are "those that create the environment in which there exists a continuous stream of successfully managed projects and where success is measured by what is in the best interest of both the company and the project".

Based on Kerzner's concept of excellence, excellence is achieved in an environment in

which there are continuous successfully managed projects, as illustrated in the figure below:

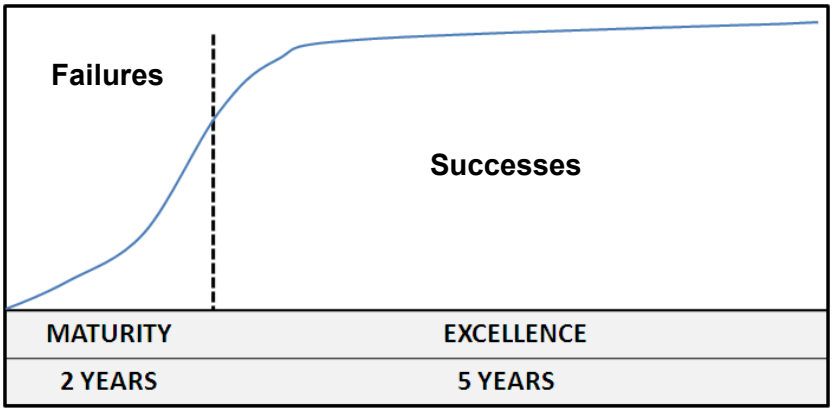

Figure 2.1: The growth of excellence (Kerzner, 2006:57)

Kerzner (2004:43) specifies two preconditions for an organisation to achieve project management excellence. First, excellence in project management requires "a continuous stream of successfully managed projects". However, this does not imply that the projects themselves are successful, as successful project management implementation is not able to guarantee that the outcomes of the projects will be successful. The second precondition requires that "decisions made on individual projects must take into account the best interest of both the project and the company as a whole".

Since project scope management is one of the nine knowledge areas of project management, the researcher believes that for an organisation to be considered excellent in project management, excellence in project scope management is a must. As a result, project scope management excellence is one of the key areas required for an organisation to achieve project management excellence.

The researcher amends Kerzner's definition of project management excellence to define

the project scope management excellence. An organisation that is excellent in project scope management requires the two preconditions. Firstly, it requires a continuous stream of successfully managed project scopes. Secondly, the decision regarding deciding what is included in the project or not and the approval of scope changes must take into account the best interests of both the project and the organisation.

According to Kerzner (2006:57), maturity is a prerequisite for achieving excellence. However, excellence goes well beyond maturity. As illustrated in Figure 2.1, there is positive correlation between maturity and excellence, and to achieve maturity the researcher believes the environment should be structured in a flexible way. Thus, in order to understand and achieve project scope management excellence, it essential to understand the concept of project scope management, project scope management maturity, project scope management, project scope management processes, structured flexibility and project scope management maturity models.

All the elements above must be closely correlated for an organisation to achieve project scope management maturity and excellence.

2.3 PROJECT SCOPE MANAGEMENT

To define project scope management, it is necessary to define both the project and product scope. The definitions below explain the difference and the interrelation between the two types of scopes from the project perspective.

According to PMI (2008:103), product scope is "the feature and functions that characterise a product, service, or result". Kerzner (2006:406) defines project scope as "the work that must be completed to achieve the final scope of the project, namely the products, services,

and end results". In short, project scope defines the work required to deliver the functions and features specified in the product scope (PMI, 2008:103). As a result, changes of the product scope may impact the deliverable defined in the project scope, which may cause schedule and cost overrun.

PMI (2008:103) defines project scope management as "the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully". It primarily includes the definition and control of what is and is not included in the project.

2.4 PROJECT SCOPE MANAGEMENT PROCESSES

To enhance project scope management maturity and to achieve excellence, project scope processes are a necessity. It is essential for an organisation to have an integrated repetitive project scope management process that the organisation can utilise to manage each project scope.

The figure below illustrates the five project scope management sub-processes introduced by PMBOK.

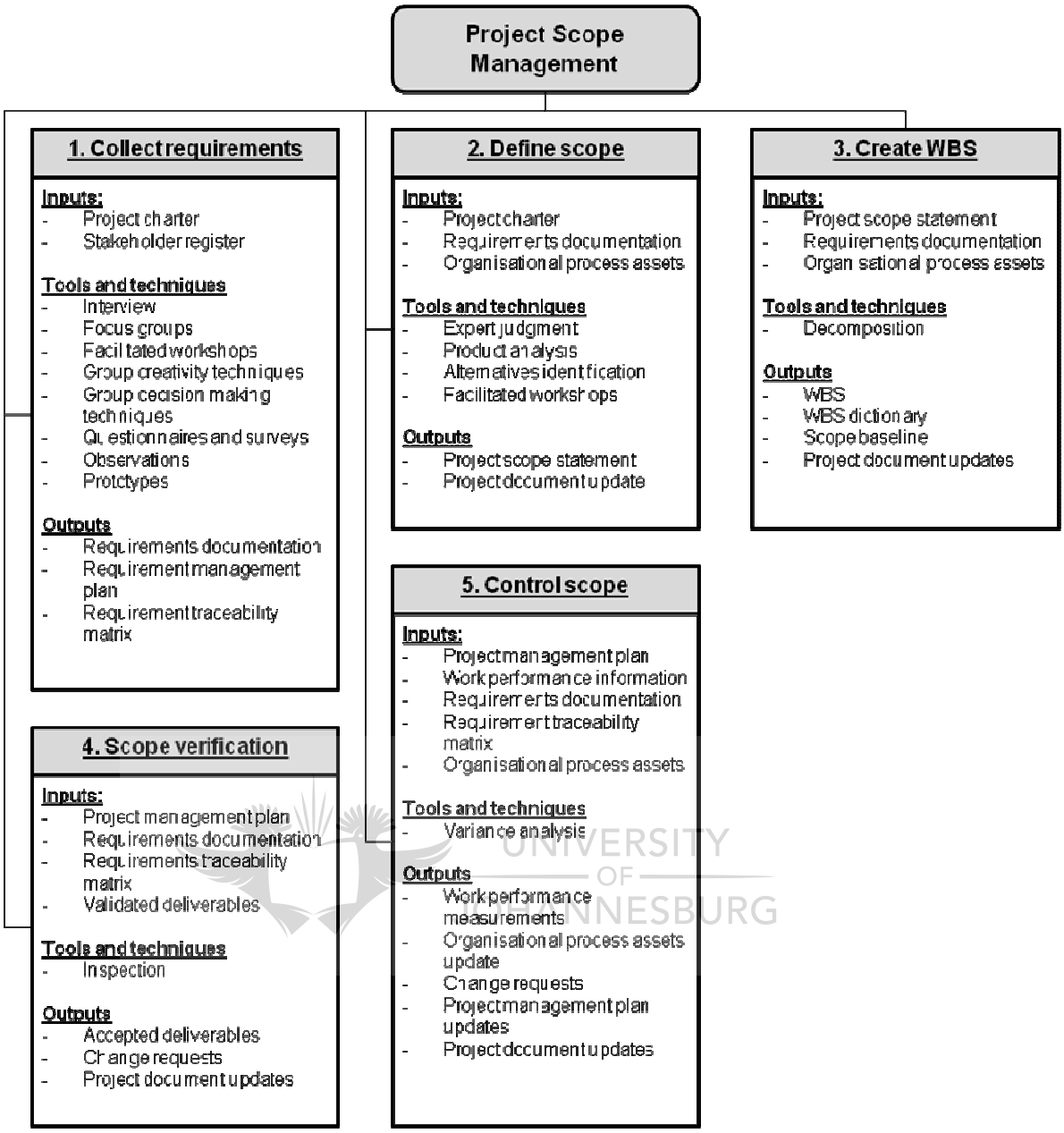

Figure 2.2: Project scope management overview (PMI, 2008:105)

As illustrated above, project scope management consists of five sub-processes, namely: 'collect requirements', 'define scope', 'create WBS' (Work Breakdown Structure), 'verify scope', and 'control scope' processes. Please note that the process names are in a verb-noun format in accordance with the terminology employed in the fourth edition of the PMBOK Guide.

2.4.1 'Collect requirements'

'Collecting requirements' is the process of documenting and gathering the stakeholders' needs to achieve the project objectives. It is a new scope management process that PMI introduced in the fourth edition of the PMBOK Guide. The purpose of this sub-process is to ensure that the requirements are identified and documented upfront before defining the scope, so as to minimise the possibility of unidentified requirements and unexpected changes later in the project.

2.4.2 'Define scope'

PMI (2008:112) defines the scope-definition process as "the process of developing a detailed description of the project and product". It defines what the project and product entails, and what is inside and outside the scope of the project.

2.4.3 'Create WBS'

According to PMI (2008:116), creating WBS is the process of "subdividing project deliverables and project work into smaller, more manageable components". The WBS is "a deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverable, with each descending level of the WBS representing an increasingly detailed definition of the project work. The WBS organises and defines the total scope of the project, and represents the work specified in the current approved project scope statement".

There are numerous ways for a project manager to create a WBS. Due to the continual increase of project complexity, and with business projects often having a different set of project needs, a new type of breakdown structure was introduced by Hartman and Ashrafi

(2003:504–505), known as SMART (Strategic, Managed, Aligned, Regenerative, Transitional) breakdown structure (SBS). SBS is the planning tool within the SMART project planning framework, to ensure clear alignment of the project mission, the project objectives and the defined deliverables. SBS helps project managers to manage and prioritise stakeholders' expectations and requirements more effectively. The list below explains the key aspects of SBS:

- The first level of the SBS is the mission of the project. It clearly defines the problem, need, or opportunity of the project and ensures a clear linkage between the organisational objective and strategy.
- The second level of the SBS is to identify the key stakeholders and their project outcome expectations. It assists a project manager in conducting a detailed stakeholder analysis and providing an environment for the stakeholders to resolve their conflicting expectations and interests upfront in the project.
- The third level and subsequent levels are to identify the tangible deliverables and the work required to meet the expectations identified in the second level.
- There are two additional sections of the SBS, namely the project exclusion and the parking lot. Project exclusion defines what should not be delivered in the project. The parking lot is the list of deliverables that the project team and stakeholders do not know how to deliver at the time SBS take place.

Hartman and Ashrafi (2003:505) believes SBS streamlines a number of connections to enhance the possibility of achieving project success. The first link is between key results; the stakeholders define the expected achievements for the deliverables that they have particular interest in. The second link is that SBS enhances the alignment between the organisational strategy and the project. The third link is the connection between stakeholders and conflicting expectations; SBS allows stakeholders' interests and

conflicting expectations to be resolved in the early phase of the project, by agreeing on the priorities of stakeholders' needs beforehand. The researcher agrees with Hartman and Ashrafi, he believes that the use of the SBS technique means the project scope is more likely to be defined clearly upfront, and the possibility of scope creeps is more likely to be minimised.

2.4.4 'Verify scope'

PMI (2008:123) defines the scope-verifying process as "the process of formalising acceptance of the completed project deliverables. Verifying scope includes reviewing deliverables with the customer or sponsor to ensure that they are completed satisfactorily and obtaining formal acceptance of deliverables by the customer or sponsor".

2.4.5 'Control scope'

According to PMI (2008:125), controlling scope is "the process of monitoring the status of the project and product scope and managing changes to the scope baseline. Controlling the project scope ensures all requested changes and recommended corrective or preventive actions are processed through the integrated change control process".

2.5 FLEXIBILITY

It is imperative to understand that the five project scope management sub-processes introduced by PMBOK are a guideline only, and that the processes should be adjusted for different organisations and different projects because each organisation and project is unique. If an organisation strictly follows the scope management processes with minimum flexibility then cost and schedule overrun can be expected.

For example, the outputs that need to be delivered based on the project scope management

processes introduced by PMBOK are: requirements documentation, requirement management plan, requirement traceability matrix, project scope statement, WBS, WBS dictionary, scope baseline, change requests, work performance measurements, organisational process assets update, project document updates, and project management plan updates. To deliver all the outputs defined above for all types of projects is unnecessary and cumbersome; it may force the organisation to hire more resources, force the project scope to grow, and force the project duration and cost to increase. For example, for a small project that only requires a week's configuration, forcing the project team to deliver all the outputs above would not add value. Hence, the researcher suggests that an organisation should only select the outputs or deliverables that the project requires, agree with the project team on the decided deliverables and only deliver those deliverables.

The researcher believes a strict waterfall approach to project scope management processes would also cause schedule overrun. For example, based on the project scope management processes introduced by PMBOK, some of the inputs for the 'create WBS' process are project scope statement and requirements documentation, so many organisations believe the 'create WBS' process can only start once the project scope statement and requirements documentation are signed off. The researcher disagrees and believes that in an environment such as MTN SA, where new product launches need to occur on a regular basis for the company to remain competitive, the organisation does not have the luxury or time to follow a strict waterfall approach; often many of the project scope management processes need to happen almost in parallel to reduce the project duration.

For this reason, the researcher believes that project scope management inflexibility will cause project failure, and that an organisation's project scope management cannot be mature without flexibility.

Kerzner (2004:125) agrees and believes methodology inflexibility is one of the main causes of project failure. Methodologies or processes based on policies and procedures are often extremely rigid. The ability to tailor the methodology to the needs of specific projects is nonexistent. The researcher is hence further concerned that many organisations have misinterpreted the meaning of project scope management maturity, by assuming that project formality is the road toward maturity. The researcher strongly disagrees and believes that a certain amount of flexibility is necessary for maturity, and that organisations that are excellent in project scope management should understand the value of flexibility. As a result, the researcher believes it is important to define flexibility and would like to introduce flexibility as a new concept to project scope management maturity.

2.5.1 Definition of flexibility

Olsson (2005:67) defines project flexibility as "the capability to adjust the project to prospective consequences of uncertain circumstances within the context of the project". Patten, Whitworth, Fjermestad and Mahinda (2005:2) state that flexibility is the ability to change or meet the needs of the changing turbulent environment and that it should include "the ability to predict and sense environmental change and to respond appropriately". Besides the above definitions, the researcher believes the definition of project flexibility should also cover the ability to tailor project scope management processes to meet the specific needs of all the projects.

In addition to the flexibility discussed above, there is another type of flexibility. This type of flexibility is the ability to customise project deliverables according to each project's needs. This includes tailoring the amount and/or detail of the documentation based on the project; the process is tailored to only deliver the documentation that the project really

needs, to deliver the project more efficiently and cost effectively (Levinson, 2008).

2.5.2 The need for flexibility

During the project implementation phase, the macro- and micro-environments may often change. For example, new technologies may have been introduced; the organisation may be going through a restructuring; a higher-priority project may have been identified and may need the resources from the current project; the organisational strategy may change; or a competitor may have launched a similar product before the organisation. As a result, project scope change is often unavoidable. This is why traditional project scope management that focuses on scope stability has become outdated, as it has become too rigid and bureaucratic for today's turbulent business environment.

Many projects are restrained by the rigidity of the project scope management processes and the strict governance. Those project managers are often largely occupied with the large amount of documentation that needs to be compiled, reviewed, revised and approved. In certain occasions the documentation does not even add value and it can be replaced by a simple request order without going through the troublesome approval process (Levinson, 2008). Charvat (2002) agrees, stating that "superfluous documentation can slow down the entire project by requiring developers to create lengthy, repetitive specifications or test plans instead of spending their time on the actual project".

Gale (2009:36) further emphasises the need for more responsive documentation processes by stating that the "the economy has officially crashed" and indicating that project managers today are forced to deliver projects with less time and smaller budgets. According to Gale (2009:36), the third annual Project Management Network Trends Report indicated that one of the five major business trends that every project manager needs to

face is the 'hyper-efficiency' trend, to counter today's global recession. Project teams should re-evaluate their project scope processes and procedures and eliminate the tasks that are not vital or that create project inefficiency. Gale's (2009:39) study indicated that "some of the greatest gain can be achieved through streamlining sign-off procedures and by putting a single person in charge of all approval processes". Gale (2009:36–39) believes that simplifying the document process will potentially make the project more efficient and allow the organisation to achieve more with fewer resources. In this way, higher efficiency of the 'verify scope' process can be achieved.

Another reason that flexibility is crucial in the business environment is that business stakeholders are often unsure of exactly what their project needs are, or are reluctant to make certain project decisions due to the limited information available. For this reason defining project scope upfront can become a challenge. Forcing the business stakeholders to finalise the scope upfront may cause requirement changes and rework further down the project.

With project scope management inflexibility, organisations often fail to adapt to the environmental changes during the project. Therefore, organisations fail to capture the opportunities to respond to the new market needs on time in order to gain the first-to-market opportunity. Consequently, flexibility has a great potential to increase the owner's value of a project and the researcher believes flexibility is one of the keys to enhancing the effectiveness and efficiency of project scope management today.

2.5.3 Danger of flexibility

However, according to Olsson (2005:69), project scope management flexibility can also be harmful. There is a wide range of studies that indicate that changes during projects are

some of the key reasons for project failures. Changes can cause cost and schedule overrun, and possibly result in a lower quality. The devastating and unpredictable impact that results from changes is the key argument against flexibility. Many studies argue that the project scope should no longer be flexible to changes when the front-end phase is over. Introducing flexibility may have a severe impact on both the organisation and the project scope (Patten et al., 2005:2).

Olsson (2005:69) suggests that flexibility may cause frustration, as scope management flexibility can be used to justify the idea that the decision does not need to be taken or that it can always be revised, which can cause lack of decision making and commitment from the key stakeholders.

Charvat (2002) also comments that formal scope and other project documentations are required to clarify issues the project team may have, to clearly define what the project is and is not, to minimise possible rework, to promote project consistency, and to provide traceability. With a large degree of project scope management and project documentation flexibility, confusion can be caused and chaos may be created, as different stakeholders are more likely to have their own interpretation of the project requirements and to deliver the project without meeting the project objectives.

2.5.4 Structured flexibility

Olsson (2005:67) believes with proper precaution and knowledge, the risks of flexibility may be avoided or reduced. The researcher agrees and believes that organisations should aim towards flexibility in a structured manner, as project scope management formality does not mean project scope management maturity. As organisations mature, the formality of project scope management should be reduced, in order to increase the agility and flexibility

of the project scope management processes (Kerzner, 2006:56).

To gain a clear understanding of the viability of project scope management flexibility, Olsson (2005:67) lists to whom and when project scope management flexibility is beneficial or harmful:

- Flexibility is more valued by the stakeholders who are responsible for the overall profitability and/or benefit of the project, and less valued by those responsible for the schedule and cost of the project.
- Generally flexibility is more likely to be accepted in the front-end project phase.
- Flexibility in the execution phase often reduces efficiency.
- Industrial development projects, business projects and IT development projects benefit more from flexibility than civil engineering projects do.
- Flexibility appears more beneficial in high-uncertainty environments.

Charvat (2002) believes there is a need for project managers to classify projects into different groups in order to define the project documentation that is actually required for the project, as the size and/or complexity of the projects are strongly correlated with the amount of documentation and the level of detail of the documentation that is necessary to complete the projects. Charvat (2002) believes small projects that emphasise speed should also consider project documentation flexibility, where less documentation is required. With complex and large projects, however, formal project scope management is required and more documentation may be required.

The list below illustrates the evaluation criteria suggested by Charvat (2002) and Bowen (2006:3–4) on how the projects should be categorised:

- Estimated cost – The total estimated cost of the project.

- Duration – The estimated duration for the project.
- Level of effort – The expected number of resources that need to be involved.
- Requirements complexity – The complexity of the expected requirements.

An organisation can then use the above evaluation criteria to determine how the project scope management process should be tailored or how to develop another set of project scope management processes. Table 2.1 illustrates an example of how to categorise the project based on the evaluation criteria discussed above.

Table 2.1: Example of the project categorisation evaluation criteria (Bowen, 2006:3–4)

Evaluation factors	**Small size and low complexity project characteristics**	**Medium size and medium complexity project characteristics**	**Large size and high complexity project characteristics**
Estimated cost	< R1 million	R1 million to R3 million	> R3 million
Duration	< 4 months	4 months to 1 year	> 1 year
Level of effort	< 6 resources required	6 – 12 resources required	>12 resources required
Requirements complexity	Standard requirements. No development required, only configuration.	Few unique requirements expected. Small development expected.	Many unique requirements and large development expected.

Once the projects are categorised, an organisation can determine how the project scope management processes can be tailored to meet those project needs.

Each project is unique, so the documentation required may vary. As a result, it is essential for the project scope management processes to be flexible to a reasonable degree, in order to cater to the needs of the projects.

To gain the benefits from both formal and informal (or traditional and agile) project scope management, the researcher believes structured project scope management flexibility is required. Structured project scope management flexibility provides a balance between formal and informal or traditional and agile project management by providing a structure

for project scope management flexibility, to gain the benefits of flexibility while minimising or avoiding risks.

The researcher believes that, in order to determine the balance between structure and flexibility, an organisation needs to consider two factors: the nature of the project and the internal and external environmental factors.

The nature of the project is a factor for consideration because the types of projects can influence the degree of project scope management flexibility. With operational projects that are similar to many other projects and occur frequently, a structured process can be applied. For projects that are complex and involve breakthrough technology development or high innovation, a more flexible project scope process should be considered (Chin, 2004:14–15).

The researcher believes the amount of risk associated with the project can also be a determining factor for the degree of project scope management flexibility. Usually the higher the risk the more structured the project scope process should be. For example, certain electrical engineering projects require a systematic and structured project scope management process to ensure all safety best practices are followed, as a small mistake in the project may cost the lives of many people.

External and internal environments also deserve consideration. External factors are the forces caused by the external environment, such as technological changes, competitors' new market strategies, competitors' market responses, economic recession, new regulation, and even a taxi drivers' strike. An organisation has no control over these external factors and these factors may strongly impact the project. To survive, project scopes often need to

adapt in order to meet the business and project objectives.

Internal factors are factors such as team members' capability, organisational culture, organisational strategy, organisational structure, internal politics, resources and so on. An organisation usually has a certain amount of control over these factors.

The researcher concludes that the external environmental factors determine the need for the degree of project scope management flexibility, while the internal factors determine the difficulty and possible constraints for an organisation to be flexible.

For example, due to the economic recession, a need to reduce the project scope has arisen in many organisations. However, due to the internal politics and rigid project scope procedures, certain units resist the change, making it very difficult for the organisations to be flexible and to be able to respond to the external environment. For this reason organisations can lose millions and have a lower project ROI.

Usually the more unstable the external environment is, the more flexible the project scope management processes should be. In an external environment where change is constant, the project scope process needs to be agile, to quickly sense and respond to change, in order to ensure that project value creation is maximised.

Examples of industries that are usually unstable include the telecommunication, technology, motor and marketing industries. If the external environment is stable the project scope process should incline toward a structured process.

The degree of project scope management flexibility can also be affected by the number of

organisations or departments that are involved. Usually the greater the number of organisations or departments involved, the greater the difficulty in becoming flexible. In such a situation, communication can become less efficient, and multiple organisational subcultures with their own internal politics add to the difficulty of managing the expectations of multiple organisations' stakeholders. In this instance, a more structured approach would be more appropriate. The flexible and agile approach is more likely to succeed in a project where a single organisation or a few organisations are involved, and one where communication is effective and everyone is working toward the same goal (Chin, 2004:17–20).

The organisational culture is another determining factor of the degree of project scope management flexibility in an organisation. The researcher believes the organisation requires seven cultural elements in order for structured project scope management flexibility to succeed (Kerzner, 2004:463–470; Patten, 2005:12). These elements are:

- Trust – Management and project team members need to trust each other, to focus on agility, instead of focusing on how to dodge responsibility and being concerned about getting into trouble. With the right level of trust, the possibility of making the right decisions based on the best interests of the overall business and the project should be improved.
- Empowerment – Relevant project team members need to be empowered with the right level of authority to make certain decisions regarding the project direction and project scope; in this way the red tape can be reduced and the project team will be able to respond to change more efficiently.
- Tolerance – The organisation needs to have a high degree of tolerance, to tolerate a certain number of mistakes when moving toward structured project scope management flexibility. As there is a trade-off between plans and actions, in order to act quickly the

project team may sometimes not have sufficient time for planning. In the process of gaining structured project scope management flexibility, the organisation may become more efficient in responding to change. However, there may be a higher risk of mistakes.

- Communication – An existence of effective informal communication, laterally and vertically, is vital. As formal communication can be costly and time consuming, effective informal interpersonal communication with the team members is a key criterion for agility.
- Recognition – Project teams that are agile should be recognised, to encourage agility, as many team members may fear responding quickly due to the possible risks involved.
- Co-operation and teamwork – The project team members should have a high degree of willingness to work with others to achieve the business and project objectives with limited co-ordination. Many individuals often intend to pass responsibility to others and are unwilling to work due to the possible risks involved; unnecessary project delays are often the result.

The higher the degree of each of the seven elements discussed above, the higher the degree of project scope management flexibility that can be applied.

The researcher believes the degree of project scope management flexibility is also highly dependent on the competency level of the individuals. Usually the more experienced the project teams are the more likely it is that the flexible approach may work. However, the personality of the individuals may also impact the degree of project scope management flexibility, as certain individuals may be unwilling to change.

Sufficient training should be provided to the project team if the organisation wishes to

become more flexible, in order to build up the knowledge for the project team to make decisions based on the best interests of the project and the business, and to have the ability to respond to change promptly.

Another aspect that determines the degree of project scope management flexibility is the organisation's project scope management maturity. The researcher concludes that the organisation should first achieve maturity level three, or close to it, before it provides too much focus on project scope management flexibility. This is because when the organisation's project scope management maturity level is at one and two, basic project scope management structure is still lacking. If the organisation focuses on project scope flexibility while project scope management maturity is low, flexibility may turn into chaos, and negative outcomes such as scope creep and cost and schedule overrun can be expected.

Lastly, the researcher concludes that the main determining factors of the degree of project scope management flexibility should be the external environmental factors and the nature of the project, and not the internal environmental factors. The prerequisite for succeeding and surviving in the volatile business environment is for an organisation to adapt to the external environment, not to resist change and remaining rigid. If the internal environment is the reason that the organisation is not able to be flexible, the organisation should rectify those factors.

2.5.5 Structured flexibility as part of the maturity assessment

Consequently, it is important to define the structured flexibility aspects that are required to design the foundation to assess structured flexibility. To assess structured flexibility comprehensively, the researcher believes each of the four aspects proposed below (anticipation, tailorability, agility and adaptability) should be considered.

2.5.5.1 Aspects of flexibility

To manage flexibility structurally, Patten et al. (2005:3) conclude that flexibility should consist of three aspects: anticipation, agility, and adaptability. Patten et al. (2005:5) propose to incorporate these aspects into the IT Flexibility Framework (IFF) in a continuous cycle, as shown in Figure 2.3, in order for the IT organisation to be more flexible in a structured approach.

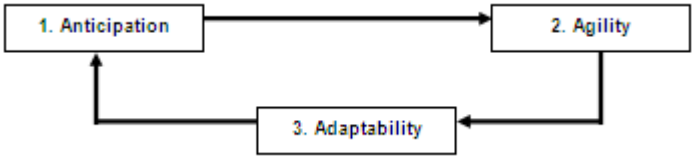

Figure 2.3: IT Flexible Framework (Patten et al., 2005:5)

The researcher believes the same concept can be applied in the project environment with an additional aspect and some adjustment. The researcher has tailored the proposed framework cycle to meet the needs of the project environment and project scope management, as shown in Figures 2.4 and 2.5.

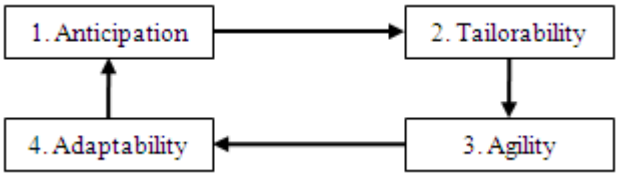

Figure 2.4: Tailored project management flexible framework (Patten et al., 2005:5)

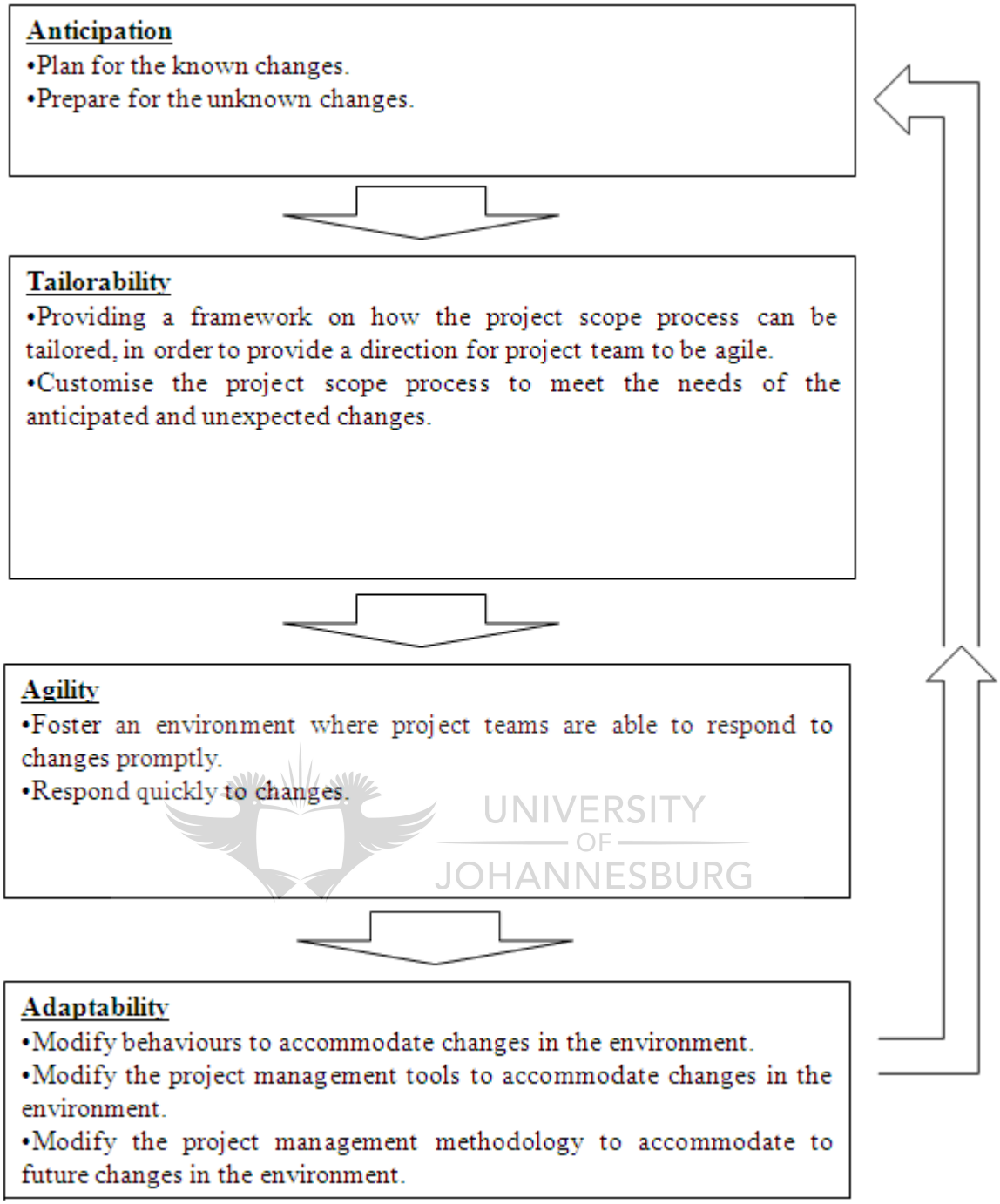

Figure 2.5: Summary of the tailored framework

Each of the aspects is discussed further below.

Anticipation – Patten et al. (2005:3) define anticipation as the "ability to sense, predict, plan, and prepare". It involves planning for the known and preparing for the unknown.

Patten et al. (2005:3) recommend that anticipation should be the first step to becoming more flexible. During anticipation, the organisation should plan for the known and prepare for the unknown. The organisation should conduct environmental scanning, trend analysis, competitor analysis, market analyses and forecasting on continuous basis to predict change and to minimise potential competitive threats. This would also assist an organisation in having a clear view on what the project should deliver.

However, the researcher believes that the anticipation step should mainly be the responsibility of an organisation's strategic management and product management, due to the fact that the function of strategic management and product management should be environmental scanning to identify changes upfront, while project management only gathers that information and determines how those changes could impact the project.

Once the anticipated changes are identified, the project team should brainstorm to identify possible mitigation strategies to manage the known changes more effectively (Patten et al., 2005:9). Since there is always uncertainty and changes are encountered in almost every project, the researcher believes that in order to enhance preparation for the unknown, an organisation should allocate a change and contingency budget.

Tailorability – Another aspect that the researcher believes is strongly correlated to agility and vital for flexibility is tailorability. The researcher believes tailorability should be added to the framework as it provides a direction for the project team to be agile. Tailorability determines the extent to which the project teams should follow the process, or how the projects are executed. For small and simple projects, detailed and excessive documentation may not be necessary, as it creates unnecessary administration, causes delays and drastically increases the cost (Charvat, 2002). For large, high-uncertainty projects, different

project scope process may need to be followed; concepts such as 'late locking' or 'step-by-step locking' may need to be considered, in order to iron out the uncertainties.

For the purpose of this present research, the researcher defines tailorability in project management as the ability to tailor project management methodology to cater for different project needs and project scope changes.

The researcher believes tailorability is an essential requirement for flexibility, as each project is unique. As a result, different sets of project documentation or levels of approval may be required. The ability to tailor the process according to the project needs would contribute to agility.

Agility – Highsmith (2009) defines agility as "the ability to both create and respond to change in order to profit in a turbulent business environment". It is the ability of the project teams to sense change and respond to change effectively and efficiently (Patten et al., 2005:3).

Adaptability – Patten et al. (2005:3) define adaptability as "the capability of the organisation to self-learn and self-organise based on previous experience". Adaptability allows the organisation to move toward continuous improvement. It allows the organisation to learn from its past experience in order to continuously improve the project teams' capability and continuously improve the project management tools and methodologies toward structured flexibility.

According to Patten et al. (2005:5), each aspect is distinct from the other, as an organisation can be agile without anticipation and adaptability, and vice versa. In all cases, flexibility increases.

2.6 MATURITY

Since the concept of project scope management maturity is still new, the researcher decided to first define project management maturity before adapting the project management maturity definition to define project scope management.

Kerzner (2006:56) defines project management maturity as "the implementation of a standard methodology and accompanying processes such that there exists a high likelihood of repeated successes". Project management maturity is an organisational level of achievement utilising a consistent methodology. Maturity includes the foundation of techniques, processes, tools and project management culture in the organisation.

According to Kerzner (Mueller, 2006:33), "the definition of maturity is very subjective. I have seen companies with very simple project management methodologies that were used so effectively that the company achieved better results than those companies that had been using complex methodologies for a longer period of time." The focus of maturity should be on the continuous improvement of the effective use of the methodology.

Hence, the researcher defines project scope management maturity as an effective use of project scope management, where there is a high possibility of project scope management success.

2.7 PROJECT MANAGEMENT MATURITY MODEL

To speed up the process of effectively utilising the project scope management sub-processes, it is appropriate to utilise a project scope management maturity model to facilitate the advancement of an organisation's project scope management maturity.

Assessing project scope management maturity allows an organisation to identify specific areas within project scope management that require improvements, to set benchmarks, and to lead an organisation toward project scope management excellence (Sukhoo, Barnard, Eloff & Van der Poll, 2005:671). However, there is currently no maturity model in the market that is specifically designed for project scope management. Hence, the researcher first conducted a literature review on the existing project management maturity models in the market, then modified the selected project management maturity models to design a project scope management specific maturity model, known as the hybrid multi-dimensional project scope management maturity model.

The researcher then utilised the hybrid multi-dimensional project scope management maturity model as a tool to assess the level of maturity of the project scope management environment and the effective use of the project scope management processes (Mueller, 2006:32–35), in order to provide the roadmap for achieving project scope management excellence (Kerzner, 2004:193; Murray, 2006:2).

2.7.2 Project-related maturity models in the market today

Before the hybrid multi-dimensional project scope management maturity model is designed, the researcher identified a number of project management related maturity models in the market today (Chui, 2007 & Mahata 2004:15). These project management

maturity models are:

- Kerzner Project Management Maturity Model (PMMM)
- Project Management Maturity Model (PMMM), introduced by PM Solutions from the United States
- Software Capability Maturity Model (SW-CMM), Systems Engineering Capability Maturity Model (SE-CMM), People Capability Maturity Model (P-CMM), and Capability Maturity Model Integration (CMMI), introduced by SEI from the United States
- Organisational Project Management Maturity Model (OPM3)
- PRINCE2 Maturity Model (P2MM), introduced by Central Computing and Telecommunications Agency (CCTA) from the United Kingdom
- ProMMM (Project Management Maturity Model)
- Berkeley Project Management Process Maturity $(PM)^2$ Model

To determine which of the above models is viable and can be modified into a project scope management maturity model, it is essential to define the selection criteria, in order to select the models that meet the research needs.

2.7.3 Project management maturity model selection criteria

The researcher tailored Kerzner's (2005:227 & 2006:74) selection criteria and lists the selection criteria below:

- Does the model's project scope management standard fit the organisation's project scope management standard?
- Is the model suitable for the industry?
- Does the model assess the organisational culture?
- Is the model comprehensive enough?

- Does the model assist with the development of a corrective action plan to enable continuous improvement?
- Does the model allow modification without compromising the effectiveness of the assessment?
- Is the model simple to use?
- Does the model assess the effective use of project scope management process?

In the list above, the researcher believes that the most critical factor in really assessing project scope management maturity is how effectively an organisation can use its project scope management process – and to effectively utilise the project scope management process, structured flexibility is required. Consequently, the researcher would like to assess structured flexibility in parallel with the assessment of the project scope management maturity.

2.7.4 Project management maturity model comparison and selection

Each of the maturity models' pros and cons will now be discussed and compared further. When the comparison is complete, maturity models will be selected and tailored to assess MTN SA BO's project scope management maturity.

2.7.4.1 Kerzner Project Management Maturity Model

The Kerzner Project Management Maturity Model (PMMM) comprises five maturity levels – level one: common language; level two: common processes; level three: singular methodology; level four: benchmarking, and level five: continuous improvement. The levels in the Kerzner PMMM are similar to the majority of the maturity models in the market. The researcher believes the key differentiator of the Kerzner PMMM is that it specifies the following:

- Advancement criteria – The model clearly indicates the key actions required to advance to the next level.
- Roadblocks – The model clearly indicates the possible roadblocks an organisation may encounter.
- Risks – The model clearly specify the risks involved in the first three levels.
- Comprehensive – When conducting the assessment, the model provides a wide range of aspects that may impact the maturity level, such as culture, management support, training and education, and behaviour excellence.
- Qualitative and quantitative analysis – The model focuses on both quantitative benchmarking to analyse processes and methodologies and qualitative benchmarking to assess project management applications (Kerzner, 2005:101).

2.7.4.2 OPM3 (Organisational Project Management Maturity Model)

According to the Project Management Institute (PMI, 2003:xiii), organisational project management is "the systematic management of projects, programmes, portfolios in alignment with the achievement of strategic goals". The concept of organisational project management is based on the correlation of an organisation's capability in project management, programme management and portfolio management with its effectiveness in strategy implementation. The OPM3 is a standard developed under the stewardship of PMI. It is an organisational project management maturity model that provides a means to assess the maturity against a comprehensive set of organisational project management good practices. The purpose of the OPM3 is "to provide a way for organisations to understand organisational project management and to measure their maturity against a comprehensive and broad-based set of organisational project management good practices" (PMI, 2003:15).

The OPM3 utilises the good practices to provide the foundation for a roadmap for achieving the organisational goals, provide the basis for measuring organisational project management performance, and serve as a guideline for training and developing employees' organisation project management capabilities.

To assess organisational project management comprehensively, the OPM3 divides organisational project management into the following three domains (PMI, 2003:21):

- Project management
- Programme management
- Portfolio management

Each of the domains constitutes a set of processes as defined in the PMBOK's three process groups, i.e. project management process groups, programme management process groups and portfolio process groups.

These three process groups form the basics of many of the best practices and capabilities within the OPM3. Each of the process groups is then assessed against the OPM3 process improvement stages.

In addition, the OPM3 assessment also focuses on the capability directory. The OPM3 assesses the capabilities associated with each good practice and stores the outcomes in the capability directory, for the purpose of continuous improvement (PMI, 2003:123).

Based on the researcher's study of the model, the researcher believes that the OPM3 is a multi-dimensional model: besides focusing on project management maturity, it also focuses on the programme and portfolio maturity, as they are all interdependent on each

other. The OPM3 places a strong focus on the programme, portfolio and project management process and capability assessment based on PMI's good practices. However, the researcher is of the opinion that the OPM3 is too broad for this present research and believes that maturity should be determined by the effective use of the methodology or processes, and only assessing the good practices specified by PMI may not be sufficient to assess the environmental and the organisational-culture attributes.

2.7.4.3 PM Solutions' Project Management Maturity Model

PM Solutions' PMMM combines the SEI Capability Maturity Model (CMM) measurement and PMI's nine PMBOK knowledge areas. The model utilises the CMM's five distinct levels to assess the organisation's project management maturity against the nine knowledge areas (Crawford, 2007:4–5). Figure 2.3 further explains how PM Solutions utilises the PMBOK knowledge areas and the CMM to examine the maturity.

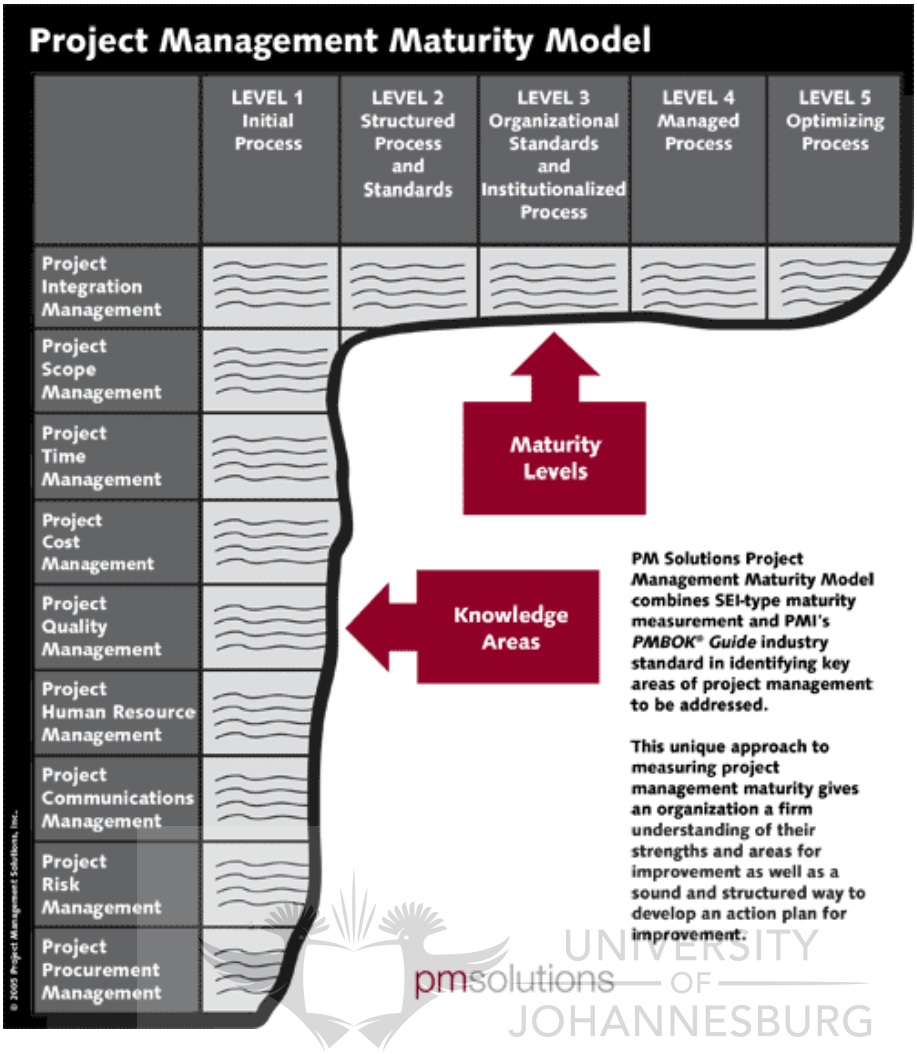

Figure 2.5: PM Solutions' PMMM (Crawford, 2007:4)

Besides the CMM and nine knowledge areas, PM Solutions' PMMM also emphasises three additional components. These components are: project management office (PMO), management oversight and professional development. The key reason for the special attention paid to those three areas is that PM Solutions believes they have significant influence on the adoption of project management practices (Crawford, 2007:9).

Since PM Solutions' PMMM breaks down each of the nine PMBOK knowledge areas and assesses each of the nine knowledge areas individually, it can be utilised to provide specific focus on project scope management maturity. However, the researcher feels that the PM Solutions' PMMM project scope management component is process orientated, not people

and organisational-culture orientated. To ensure the assessment is both process and people orientated, there is a need to tailor the PMMM.

2.7.4.4 PRINCE2 Maturity Model (P2MM)

The P2MM (OGC, 2006:2) is a maturity model that is specially designed to "enable organisations to gauge, by assessment, their maturity in the use of the PRINCE2 project management method".

As per the definition above, the P2MM is specifically utilised to assess an organisation's maturity in the use of the PRINCE2 project management method. However, MTN SA does not follow a PRINCE2 methodology. Consequently, the researcher believes the P2MM is not a viable maturity model for this research.

2.7.4.5 Project Management Maturity Model (ProMMM)

The ProMMM consists of four levels of maturity aimed at assessing the project management capability. The four levels defined in the ProMMM framework are naïve, novice, normalised and natural project management organisation. The ProMMM assesses the organisation utilising four attributes, to gain in-depth understanding of the project management maturity from different aspects. These four attributes are (Hillson, 2003:302):

- Culture – The culture attribute determines the organisation's project scope management mindset, ethos and belief.
- Process – The process attribute determines how the organisation manages project scope.
- Experience – The experience attribute determines the extent of training and knowledge that the organisation has in terms of project scope management.
- Application – The level of effectiveness and practicability of the process.

The table below further explains what each of the attributes and four levels entail.

Table 2.2: Attributes of ProMMM levels (Hillson, 2003:304)

	Level 1: Naïve	Level 2: Novice	Level 3: Normalised	Level 4: Natural
Summary Definition	• Unaware of the need for project management. • No structured approach to manage projects. • Minimum or no attempt to learn from the past project experiences or to prepare for the future.	• Experimenting with project management through a number of individuals. • No generic structured project management approach in place. • Aware of the potential benefits of project management. • Ineffective project implementation.	• Project management incorporated into routine business processes. • Generic project management processes formalised. • Project management benefits understood from all organisational levels.	• Project-orientated culture developed with proactive approach to manage projects from all aspects of the business. • Utilise project information actively to continuously improve business processes to gain competitive advantage.
Culture	• No awareness of the benefits of project management. • Reluctant to change. • Tendency to continue with existing processes.	• View project processes as additional overhead with a number of benefits. • Project management not widely used.	• Project management policy has been created and accepted. • Project management benefits recognised and expected. • Prepared to commit resources to gain the benefits identified.	• Top-down commitment to project management, with leading by example. • Proactive project management is encouraged and rewarded.
Process	• No formal project management processes developed.	• No generically accepted formal processes. • Process effectiveness strongly dependent on the skills of the project team.	• Generic processes accepted and applied to most or all projects. • Quality system incorporated in the processes. • Effectively allocate and manage project budgets at all levels. • Limited needs for external project management support.	• 'Total project management' embedded in the entire business at all levels. • Continuously update and improve the processes. • Routine project metrics with constant feedback for improvements.
Experience	• No experience and understanding of project principles.	• Minimum individuals who have little or informal project management training.	• Individuals formally trained in basic skills. • Experience in development of specific processes and tools.	• All individuals have experience in project management and utilise the basic skills. • Continuous learning from past experiences. • Regular external training to enhance skills.
Application	• No structured application. • No dedicated resources. • No project tools.	• Inconsistent application. • Variable availability of individuals. • Ad hoc collection of tools and methods.	• Routine and consistent application to all projects. • Committed resources. • Integrated set of tools and methods.	• Effective applications applied to all activities. • Project-based reporting and decision making. • Continuous improvements of tools and methods.

The researcher believes the ProMMM consists of a number of valuable attributes that provide the ability to assess project management maturity from the culture, process, experience and application perspectives. The researcher believes this model focuses on the

human aspects more than the other models and should be viable for the present research. Unfortunately, the ProMMM does not specifically assess the maturity of project scope management. Hence, modification to the model is required, in order to assess the project scope management maturity in BO.

2.7.4.6 Berkeley Project Management Process Maturity $(PM)^2$ Model

Kwak and Ibbs (2000:2) define the $(PM)^2$ model as "a fully integrated maturity model to measure, locate, and compare an organisation's current project management level". The table below tabulates the characteristics of the Berkeley $(PM)^2$.

Table 2.3: Characteristics of the Berkeley $(PM)^2$ (Kwak & Ibbs, 2000:5)

	Industries / organisations	Collected information	Graphical presentation	Deliverables	Contributions
The Berkeley project management process management model	- Any industries	- 9 Project management knowledge areas - 5 project management processes - Various project performance data - Percentage of project management spending in the organisation - Financial data to calculate order of magnitude Return On Investment of PM (PM/ROI)	- 5 level Berkeley $(PM)^2$ model - PM maturity verse project performance model - PM/ROI calculation model	- PM maturity assessment - General statistical analysis - Correlation analysis - Regression analysis - PM/ROI calculations	- Better understanding of the financial and organisational benefits of using PM tools and practices in various organisations - Promote PM practices and processes as a major business management discipline

As shown in the table above, in addition to the nine PMBOK knowledge areas and utilising the CMM's concept to provide a project management maturity assessment, the Berkeley $(PM)^2$ Model also provides an assessment to analyse the correlation between project management maturity and the Return On Investment (ROI). The table below shows the project management levels included in the Berkeley $(PM)^2$ Model.

Table 2.4: Levels of project management process maturity (Kwak & Ibbs, 2000:5)

Maturity level	Key project management processes
Level 5 (Sustained stage)	- PM processes are continuously improved - PM processes are fully understand - PM data are optimised and sustained
Level 4 (Integrated stage)	- Multiple project management - PM data and processes are integrated - PM processes data are quantitatively analysed, measured, and stored.
Level 3 (Managed stage)	- Formal project planning and control system is managed - Formal PM data are managed
Level 2 (Defined stage)	- Informal PM processes are defined - Informal PM problems are identified - Informal PM data are collected
Level 1 (Ad hoc stage)	- No PM processes or practices are consistently available - No PM data are consistently collected or analysed

The Berkeley $(PM)^2$ Model is the only maturity model that the researcher found that analyses the correlation between the project management maturity and ROI. This is a major advantage as in today's economic crisis, ROI is the key focus for most organisations and if the maturity model is able to demonstrate its financial value to the top management, there is a higher possibility that top management support can be provided. Unfortunately, due to the confidentiality of financial data, the researcher is unable to perform the assessment to determine correlation between project scope management maturity and ROI. The researcher also suspects that the model is slightly outdated.

The selection of the maturity models is based on the selection criteria determined previously. Table 2.5 summarises the researcher's chosen selection criteria and compares

the maturity models according to those criteria based on the researcher's understanding.

Table 2.5: Comparison of the short-listed maturity models

	Kerzner PMMM	**PM Solutions' PMMM**	**CMM**	**OPM3**	**P2MM**	**ProMMM**	**Berkeley $(PM)^2$ Model**
Suitable for BO environment?	Yes	Yes	No. Not specifically designed for project management.	Yes	No. PRINCE2 project management standard does not fit BO.	Yes	Yes
Assesses the human factor?	Unclear	Unclear	No	Unclear	Unclear	Yes	No
Assesses culture?	Yes	No	No	No	No	Yes	No
Measures the effective use of BOWOW?	Unclear	No	No	No	No	Yes	No
Can be utilised specifically for project scope management only?	Unclear	Yes	No	Unclear	No	No	Yes
Assesses structured flexibility?	No	No	No	No	No	No	No
Simple to use?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Based on the comparison, the researcher concluded that the following maturity models are not viable for the research: the CMM, OPM3, P2MM, and Berkeley $(PM)^2$ models. As shown in the table above, none of these maturity models assess structured flexibility and completely satisfy the research needs. Based on the researcher's investigation, the researcher suspects that the Kerzner PMMM is incompatible with other PMMMs, because forcing it to combine the data provided may mean it will no longer be analytical.

The researcher decided to combine and tailor the PM Solutions' PMMM, and ProMMM, and to incorporate the concept of structured flexibility to design a new hybrid maturity model, in order to assess not only the process, but also the culture and the actual application of the process.

2.8 CHAPTER 2: CONCLUSION

Based on the literature review that was conducted, the researcher has identified the key elements that he believes are vital to the road of project scope management excellence. In the process of conducting the literature review, the researcher introduced a concept known as structured flexibility to project scope management maturity. The researcher strongly believes that an organisation cannot be mature without structured flexibility; that organisations that have complex and rigid project scope management process do not represent maturity; and that maturity should be defined as how effectively an organisation can use its project scope management process. In order to use the project scope management process effectively, structured flexibility is imperative.

In Chapter 2, the researcher conducted an analysis on many of the project management maturity models in the market. Thereafter, the researcher conducted a comparative analysis among those models, and built the foundation to design a project scope management maturity and provide a roadmap on how to analyse project scope management maturity.

CHAPTER 3: ASSESSMENT OF MTN SA PROJECT SCOPE MANAGEMENT MATURITY

3.1 INTRODUCTION

In Chapter 3 the researcher designs a project scope management specific maturity model. Based on the designed model the researcher conducts project scope management maturity assessment and structured flexibility assessment for MTN SA, to determine the level of MTN SA's project scope management maturity and the degree of structured flexibility. The results from the assessments pinpoint the strengths and weaknesses of MTN SA's project scope management, and identify the improvement areas.

3.2 HYBRID MULTI-DIMENSIONAL PROJECT SCOPE MANAGEMENT MATURITY MODEL

This section explains in detail on how the project scope management maturity model is created. The researcher has combined the concepts from both the ProMMM and PM Solutions' PMMM, to design a hybrid two-dimensional project scope management maturity model in order to determine the project scope maturity level multi-dimensionally.

The researcher divided the hybrid two-dimensional project scope management maturity model into five levels based on the concept of PM Solutions' PMMM five project scope management maturity levels.

Each level is then further divided by ProMMM's four attributes and the five project scope management sub-processes, as illustrated in Figure 3.1. The five project scope management maturity levels tailored by the researcher are (Crawford, 2007:61–73): initial, structured, defined, managed, and optimised, as shown in Figure 3.2.

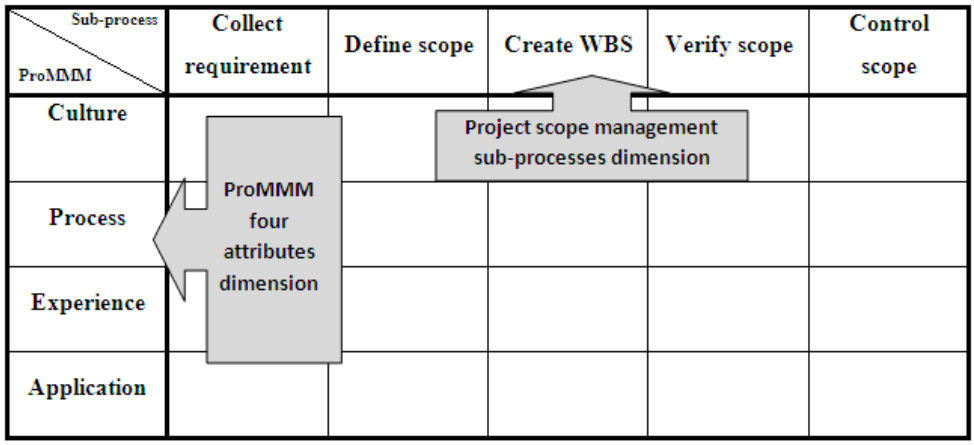

Figure 3.1: Hybrid multi-dimensional project scope management maturity assessment (Crawford, 2007:4 & Hillson, 2003:304)

Figure 3.1 illustrates the two dimensions that MTN SA's project scope management maturity is assessed against. It allows the researcher to gain an understanding of the ProMMM attributes for each of the project scope management sub-processes.

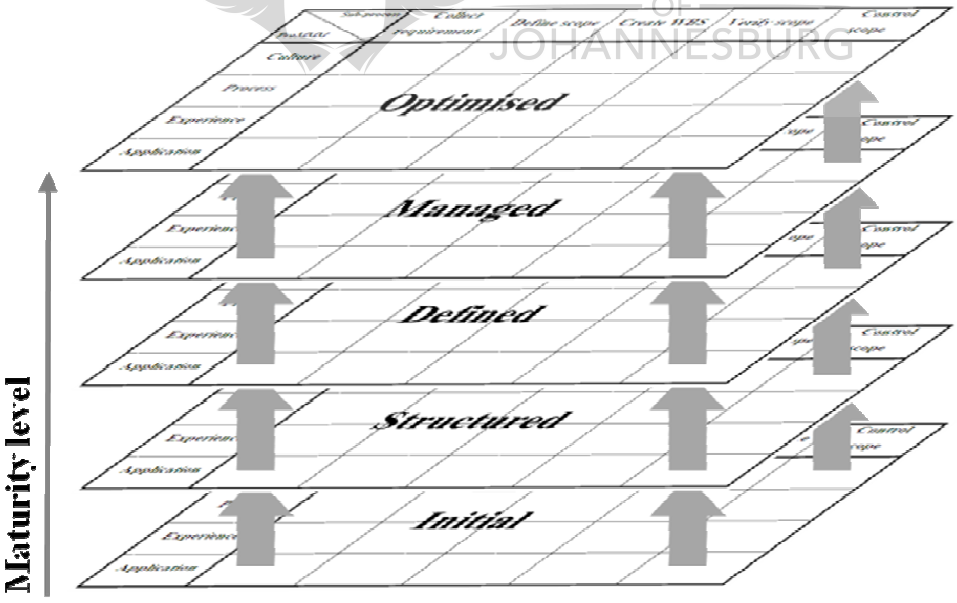

Figure 3.2: Multi-dimensional project scope management maturity levels (Crawford, 2007:4 & Hillson, 2003:304)

Figure 3.2 illustrates the correlation among the project scope management sub-processes dimension, ProMMM's four attributes dimension, and the hybrid multi-dimensional project scope management maturity levels.

3.2.1 Maturity levels from the ProMMM four attributes dimension

The characteristics of the maturity levels from the ProMMM dimension are discussed below.

3.2.1.1 Initial: Project scope management maturity level one

Culture – The organisation and management has limited understanding of the benefits of project scope management. The organisation may assume that project scope management is an additional overhead. Therefore, there is lack of management's support and the support of other areas in the project scope management.

Process – There are no formal project scope management processes and standards. The business requirements are not formally documented and scope is not formally defined. Scope change control is very loose and ad hoc. The success and failure of project scope management is totally dependent on the ability of the project team.

Experience – The project team has limited or no understanding of and experience in project scope management principles. No training is provided to enhance the project team's capability.

Application – Effectiveness in applying the project scope management process is low, possibly due to the insufficient tools provided, poor project scope management process, lack of resource availability, and low buy-in from stakeholders.

3.2.1.2 Structured: Project scope management maturity level two

Culture – Only some stakeholders buy in, recognise and/or get involved with the project scope management process. The majority of the managers are only involved in the high-priority and/or more visible projects. Not all relevant areas are involved in or apply the project scope management process.

Process – A basic project scope management process is in place. Many of the projects are following the standard project management process to manage project scope. The success or failure of project scope management is still highly dependent on the project teams.

Experience – Some individuals have informal training. Project teams' knowledge is still lacking and ability in project scope management is still low. However, the majority of the project teams have some project scope management experience.

Application – Effectiveness in applying the project scope management process is still slightly low. Again, this is possibly due to some of the tools not being available to support the project team; resources having to work on numerous projects and operation work; and medium to low buy-in from stakeholders.

3.2.1.3 Defined: Project scope management maturity level three

Culture – Project scope management benefits are well recognised and expected. Management commits to the project scope management process by providing committed resources to support the project, and actively approving the key decisions and all necessary project scope documentation.

Process – A detailed, comprehensive project scope management process is documented and followed. The majority of the projects follow the process, if not all. The project scope process actively involves the customer and the key project members.

Experience – Individuals have been trained formally. They have the basic skills and experience to follow the process.

Application – Effectiveness in applying the project scope management process is moderate. The majority of the tools are available to support the project team, resources are more dedicated to the projects, and there is a moderate degree of buy-in from stakeholders.

3.2.1.4 Managed: Project scope management maturity level four

Culture – There is top-down commitment with leading by example. The organisation encourages and rewards proactive project scope management. Resources are well committed to achieve the project objectives. The projects are managed at the 'right level'.

Process – All value-adding project scope management processes are in place. Quality assurance processes are officially incorporated to ensure the quality of the project scope management outputs. There is an 'organisational view' on all projects, in order to leverage from other projects while minimising the impact on other projects, systems and areas.

Experience – All individuals have experience in project scope management and are familiar with the basic project scope management skills. Training is provided regularly to up-skill the individuals.

Application – The practicability and effectiveness of the project scope management process is relatively high. There are sufficient project tools available to support the project team, resources are dedicated to the projects, and there is a relatively high degree of buy-in from

stakeholders.

3.2.1.5 Optimised: Project scope management maturity level five

Culture – There is a complete top-down commitment, and the 'right level' of management is actively involved in determining the project scope and making decisions regarding approval of scope changes. Learning culture is fostered. The organisation encourages, commits to, believes in and rewards continuous improvement.

Process – The project scope process is embedded in the entire business at all levels. There is continuous process updating and improvement. The process also has a strong focus on the project value creation and the Earned Value Management (EVM); scope changes are evaluated based upon the value creation versus the impact on the earned value.

Experience – Regular training is provided to ensure all members are aware of the improvement introduced and to keep individuals up to date with the latest project scope management concepts. The project team also has extensive experience regarding project scope management.

Application – The organisation has almost achieved a continuous stream of successfully managed project scope. There are sufficient project tools available to support the project team, resources are dedicated to the projects, and there is a relatively high degree of buy-in from stakeholders.

The score of different attributes may vary and an organisation may portray characteristics from different levels of maturity at any given time. The overall maturity is calculated by taking the average of all the attributes and sub-processes (Hillson, 2003:302–304).

3.2.2 Maturity levels from the project scope management sub-processes dimension

The characteristics of the maturity level for each of the project scope management sub-processes are discussed below.

3.2.2.1 Initial: Project scope management maturity level one

Collect requirements – There is no existence of a requirement-collecting process. Requirements are stated in a few sentences. The requirements collected are very vague and only state what they think their needs are.

Define scope – The scope-defining process does not exist. The project deliverables that need to be produced are not defined. There is no or limited agreement on what is inside and outside the project scope.

Create WBS – The WBS consists of a very basic set of identified work to be delivered. The project may have a schedule, but the schedule does not clearly specify the work to be performed and there are no guidelines as to how the schedule should be developed.

Verify scope – The scope-verification process does not exist. There is no formal acceptance of the completed project deliverables and there is no formal review of the completed deliverables.

Control scope – There is no scope change control process. Project managers seldom document the changes and scope changes are communicated in an ad hoc manner.

3.2.2.2 Structured: Project scope management maturity level two

Collect requirements – A basic requirement-collecting process exists. The requirements are documented and management sign-offs are needed to approve the requirements collected.

Define scope – A basic scope-defining process exist. The project team has a basic agreement on what is inside and outside the scope.

Create WBS – A basic WBS-creation process is created. There is a WBS template to at least the third level available. Management approves each of the new project WBSs that are created. The WBS is used as a communication vehicle.

Verify scope – There is a basic scope-verifying process in place. There is a formal acceptance of the majority of the deliverables and formal acceptance applies to all high-priority projects.

Control scope – A basic scope change control process exists, but not all projects follow this process. There is management support for the process and a high degree of compliance with the process.

3.2.2.3 Defined: Project scope management maturity level three

Collect requirements – There is a detailed, documented process in place to explain the steps for collecting requirements. All stakeholders buy in to the process and there are management, technical and customer sign-offs.

Define scope – A detailed process specifying the steps for defining the scope is in place. There is a proper scope-defining sign-off process with management and the customers. The

product acceptance criteria, assumptions, constraints and risks are also clearly defined.

Create WBS – The WBS is always determined and documented by the fully integrated project team. Management is involved with the development and approval of the WBS.

Verify scope – A detailed process is in place to specify the steps required to verify scope. Formal management acceptance applies to all deliverables and reasons for non-acceptance are documented.

Control scope – The project team is compliant with the scope change control system and with the reporting and analysis processes. Scope changes are evaluated, managed and communicated. A performance measurement process is developed to assess the project scope status and take corrective actions.

3.2.2.4 Managed: Project scope management maturity level four

Collect requirements – Requirements are fully documented by the project team with careful consideration of the existing functions, systems and other active projects. Due to changes to the requirements, change control analysis exists and must be followed to assess the impact on existing functions and other active projects.

Define scope – There is an organisational view of all the project scopes, to ensure there is no overlap among the projects, to identify possible opportunities for leverage from other projects, and/or to reduce the conflicts among different projects.

Create WBS – The WBS is included in the change control process. Changes to the WBS are approved by the appropriate level and with comprehensive understanding of the

changes' impact on the WBS.

Verify scope – The appropriate level of approval is required to ensure that the deliverable produced does not impact other projects, systems and functions. Requested changes are generated and reviewed via an integrated change control process, to ensure that they do not affect other functions.

Control scope – All change control processes are in place, documented and being utilised. The scope change control system is integrated with the organisation's control systems, integrated with the risk management process and integrated with the monitoring programme process. All changes go through an integrated change control process to minimise the possible impact on other systems, projects and/or functions.

3.2.2.5 Optimised: Project scope management maturity level five

Collect requirements – Any business rules or system changes initiated by the project need to be fully understood and documented, with the appropriate level of management approval. Quality assurance is incorporated within the requirement-collection process. There is a continuous quality improvement process in place. Requirement changes, modifications, and/or improvements should only be incorporated if the value creation is justified and if it exceeds the risks.

Define scope – A continuous improvement process is in place. Lessons learnt are captured and utilised to improve the process. Quality assurance is incorporated within the scope-definition process. Scope is determined based upon the quantitative metrics that clearly quantify the value creation.

Create WBS – The WBS process is regularly examined to incorporate the lessons learnt

regarding the process improvements. The recommended process improvements are carefully evaluated based on the value propositions, before being incorporated to the WBS.

Verify scope – A continuous improvement process is in place, with lessons learnt being captured and utilised to improve the process. Deliverables are inspected to ensure the proposed value can be achieved.

Control scope – A continuous improvement process is in place, with lessons learnt being captured and utilised to improve the process. Decisions for scope changes should be based upon the value proposition, i.e. revenue versus time and cost impact. Value metrics are in place for making the scope change decisions, to quantitatively analyse the impact on the scope variance in terms of project effectiveness and efficiency (Crawford, 2007:61–73).

As may be seen from the discussion above, the researcher has assessed both dimensions to determine the project scope maturity for MTN SA.

3.3 PROJECT SCOPE MANAGEMENT MATURITY ASSESSMENT

Before the actual assessments begin, it is beneficial to design how the research will be conducted, in order to achieve maximum result. Hence, the researcher has to select the samples, define the target population, and select a sampling frame and data collection methods thoughtfully.

3.3.1 Sampling frame

To ensure all sampled participants can contribute to the research, the selected participants must all meet the following conditions:

- The participants must currently work in MTN SA.

- The participants must have BO project management experience and/or must be the project stakeholders who have strong interests in or are directly affected by the project.

3.3.2 Methods of data collection

The researcher decided to utilise both qualitative and quantitative methods to gather data, in order to meet the research objectives, as different secondary research objectives and research questions may require different data-gathering methods.

The data-gathering methods selected are both primary data collection methods. The two methods are listed and discussed below:

- *Questionnaire method* – The researcher has designed two questionnaires for the purpose of the research. The first questionnaire is designed to quantitatively assess the project scope management maturity in MTN SA. The researcher combined the concepts from both the ProMMM and PM Solutions' PMMM, and then tailored their concepts to design a project scope management maturity specific questionnaire. The second questionnaire is designed to assess the degree of structure flexibility in MTN SA's project scope management; the design of the second questionnaire is based on the concept of the tailored project management flexibility framework discussed earlier.
- *Interview method* – Once the researcher has received the majority of the questionnaire responses, the researcher randomly selected a few participants and conducted semi-structured interviews. Before the interviews began, the researcher went through their questionnaire responses; based on those responses the researcher outlined a set of areas or queries that he would like to explore. The researcher then utilised the outline designed as a guideline and initiated the interviews.

3.3.3 Defining the target population

The potential target population relevant to the quantitative research population consists of approximately 50 participants. These participants fall into the following categories:

- Project owners from different business units – These participants are basically the customers of MTN SA BO. They have the understanding of the business's needs and the business's perception of the definition of project success.
- BO programme and project managers – These participants have hands-on experience with BO project scope management.
- Other project team members that are involved in and affected by the project scope management – These stakeholders, such as business analysts, business requirement acceptance testers, functional architects and system architects. These participants are usually affected by the project scope management.

3.3.4 Actual sample population

Once the target population was defined, the researcher designed the quantitative research questionnaires, based on the designed maturity model's standards. The actual quantitative research then began. The researcher started the quantitative research by conducting a pilot study on the questionnaires, to ensure the questionnaires were participant-friendly and to ensure the data gathered were reliable. During the pilot study the researcher sent the drafted questionnaires to a few selected participants and monitored their responses. Once the pilot was completed the questionnaires were updated and sent to the broad audience.

In total the questionnaires were sent to approximately 50 candidates. Out of the 50 participants, 32 participants responded.

The project roles for the participants are categorised in the table below:

Table 3.1: Project role demographic (Smith, 2009)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	project manager	11	33.3	34.4	34.4
	project owner	4	12.1	12.5	46.9
	project sponsor	2	6.1	6.3	53.1
	business analyst	9	27.3	28.1	81.3
	functional architect	2	6.1	6.3	87.5
	system architect	2	6.1	6.3	93.8
	other	2	6.1	6.3	100.0
	Total	32	97.0	100.0	
Missing	System	1	3.0		
Total		33	100.0		

As tabulated above, approximately one third of the participants are project managers. Other participants consist of business analysts, functional architects, system architects, programme managers and test analysts. The participants were selected from different areas of the organisation, in order to keep the research results as objective as possible.

3.3.5 High-level project scope management maturity analysis

The Cronbach's Alpha reliability tests were conducted, to ensure the data gathered were consistent and reliable. Based on the reliability test results, all defined areas of the project scope management maturity assessment are consistent and reliable, as all statistics are above 0.70 (please refer to Appendix 3 for detail regarding the reliability statistics).

The maturity scores/levels are ranged from one to five; one being the lowest and five being the highest. The table below tabulates the average maturity score for each of the defined areas.

Table 3.2: Maturity score for each of the defined areas (Smith, 2009)

Areas / Attributes	Collect requirement	Define scope	Create WBS	Verify scope	Scope control	Average
Culture	3.12	3.03	2.86	3.09	2.86	**2.99**
Process	3.19	2.97	2.90	2.84	2.78	**2.93**
Experience	2.68	2.34	2.58	2.43	2.28	**2.46**
Application	2.90	2.67	2.84	2.90	2.65	**2.79**
Average:	**2.97**	**2.75**	**2.80**	**2.82**	**2.64**	**2.80**

As shown above, the overall project scope management maturity level for MTN SA is 2.80. The 2.80 maturity score means the MTN SA project scope management maturity level is at level two reaching level three, which indicates that the research results should mainly contain characteristics of the project scope management maturity levels two and three.

3.3.6 ProMMM dimension's detailed analysis

A detailed quantitative and qualitative analysis was performed on each of the ProMMM attributes. Figure 3.3 illustrates the variances and scores for each of the attributes.

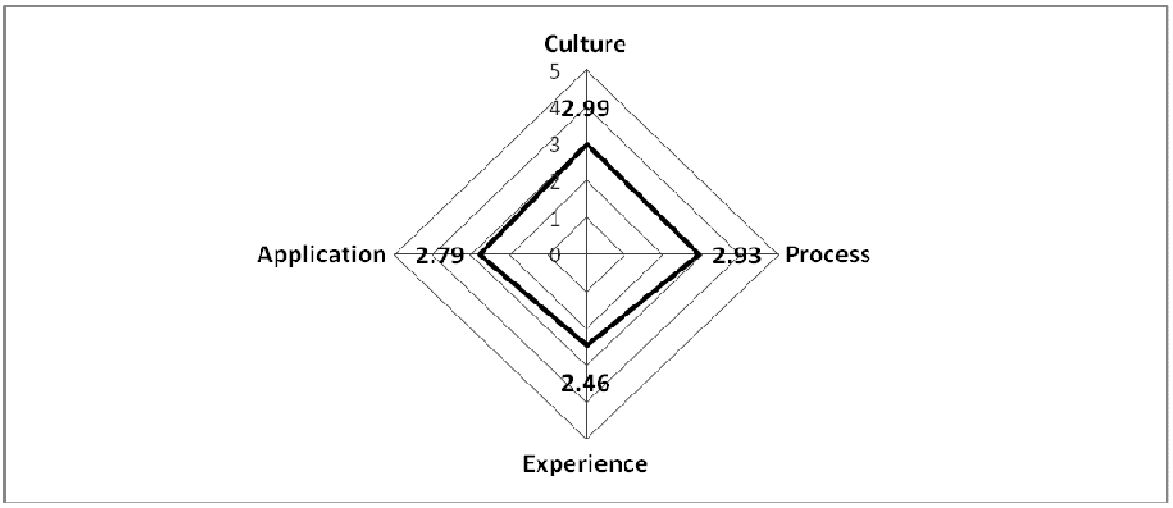

Figure 3.3: ProMMM four attributes maturity score (Smith, 2009)

The higher culture and process scores indicate that MTN SA is aware of the importance of project scope management and there is a reasonable project scope management process in

place. However, overall the project teams' competency is low, which results in a low application score. Due to this, the researcher believes that the project teams' competency level should be one of MTN SA's project scope management priorities, and that there is a need for MTN SA to concentrate on providing training and enhancing the skill levels of the project teams.

3.3.6.1 Culture

Figure 3.3 illustrates that the culture attributes scored the highest among all attributes. A detailed comparative analysis of all the other attributes indicates that there is reasonable top management support for project scope management and generally stakeholders recognise the benefits of project scope management. However, stakeholders' overall commitment to project scope management is slightly lower than the top management support and the recognition of project scope management.

To verify the result, interviews were conducted with MTN SA's project managers, functional architects, business analysts and project owners. Based on the information gathered from the interviews the researcher discovered that, generally, there is moderate support from management. However, the stakeholders' commitment is inconsistent: there is lack of commitment from certain areas. This is especially true for the scope-verifying process, as many stakeholders do not verify the scope on time and this often affects the delivery dates.

In the marketing environment, certain marketing stakeholders do not fully buy into the importance of documentation and project scope management processes. Some of them often do not understand the existence of certain project scope management processes and presume those project scope management processes are causing a delay, which may cause

the project to miss the deadline and lose the competitive edge. As a result, the project managers and business analysts are often pressured to go through the processes in a limited time frame, resulting in compromised project scope management quality.

3.3.6.2 Process

As illustrated in Figure 3.3, the maturity level for process is 2.93, which is higher than the experience and application attributes. The analysis indicates that the project scope management process has generally been applied to the majority of the visible projects and the project scope management process satisfies the needs of the projects to a moderate degree.

However, the analysis indicates that the process is still not thoughtful enough; often the project scope management success is highly dependent on the ability of the project team. The interviews with the project managers and business analysts further pinpoint the problem, by indicating that the majority of the projects have to go through a large number of iterations, or a number of addenda are required in order to complete the scope management processes successfully.

3.3.6.3 Experience

As illustrated in Figure 3.1, experience attributes scored the lowest among all the attributes. A detailed analysis indicates that project teams' experience in following the process is low; the majority of the project team members have not been formally trained regarding the project scope management process; and there is lack of training provided in MTN SA to enhance project teams' knowledge regarding the process. Hence, a strong need to emphasise training has been highlighted.

Based on the interviews conducted, the researcher has discovered that a large number of contracted business analysts and project managers have been retrenched due to the recession. This has also affected the overall knowledge and experience, as some of the project team members are new to the MTN SA's environment and project scope management process.

The demographic result for the number of years worked in MTN SA indicated that 66.7% of the participants worked fewer than two years. This shows that there is a high turnover in MTN SA BO and the researcher suspects that the high turnover has a negative impact on MTN SA's experience score.

Table 3.3: Number of years worked in MTN SA (Smith, 2009)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 6 months	2	6.1	7.4	7.4
	6 mnths to 1 year	6	18.2	22.2	29.6
	1-2 years	10	30.3	37.0	66.7
	2-3 years	3	9.1	11.1	77.8
	3-4 years	1	3.0	3.7	81.5
	6-10 years	3	9.1	11.1	92.6
	over 10 years	2	6.1	7.4	100.0
	Total	27	81.8	100.0	
Missing	System	6	18.2		
Total		33	100.0		

3.3.6.4 Application

The detailed analysis indicates that the availability of the stakeholders is generally low. Based on the information gathered from the interview, there were 200 projects registered in 2009. As a result, the availability of the project teams was negatively impacted, as the majority of the project managers are managing three to eight projects and the majority of the resources are working on at least two projects concurrently. As a result, the project scope management applicability has been impacted drastically. Many times the project teams are unable to focus on the details when delivering the process outputs; this often

causes back-and-forth communication and project delay. Recently, the number of projects has dropped down to 80, as MTN SA has realised that, in order to remain competitive during the recession, there is a need to only focus on the priority projects and projects that generate high revenue. However, due to the recession many contracted resources have been retrenched in order to reduce the cost, so the situation has not improved as drastically as planned.

The researcher believes that low availability is one of the main obstacles preventing MTN SA from achieving project scope excellence, as it is practically impossible for MTN SA to achieve excellence with its current workload.

Based on the investigation, the performance of many contractors is affected due to their inconsistent access to the tools. The reason for the inconsistent access to the tools is that MTN SA BO's contract process is generally poor: most of the time there are delays when renewing contracts or acquiring a new contractor, and without the contracts being renewed or approved, the contractors have no access to the printers, emails, Local Area Network (LAN) and other project tools.

Surprisingly, participants generally believe that project scope management processes are slightly more than moderately successful. This is possibly due to the amount of top-down commitment from the management to ensure the processes are completed successfully, or the synergy created within the team and among the different departments.

3.3.7 Project scope management processes analysis

The other dimension that the researcher assessed is the project scope management sub-processes. Figure 3.4 illustrates the maturity level for each of the project scope

management sub-processes.

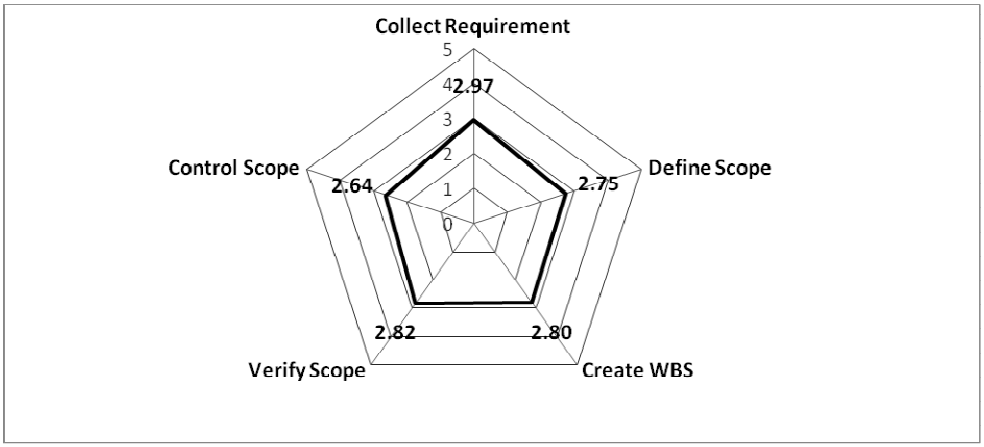

Figure 3.4: Project scope management sub-processes maturity score (Smith, 2009)

As illustrated in Figure 3.4, the requirement-collection process has the highest maturity. It indicates that requirement collection is MTN SA's main focus in project scope management. Figure 3.4 also illustrates that scope control is the weakest project scope management sub-process. The low control scope maturity indicates that there is a high degree of scope creeps and that the scope control process is not applied consistently to all projects.

3.3.7.1 Collect requirements

Collect requirements has the highest score (2.97) among all the project scope management sub-processes. This is possibly due to the fact that there is strict governance so that the development does not start unless the requirements are clearly collected and approved, in order to reduce the amount of rework.

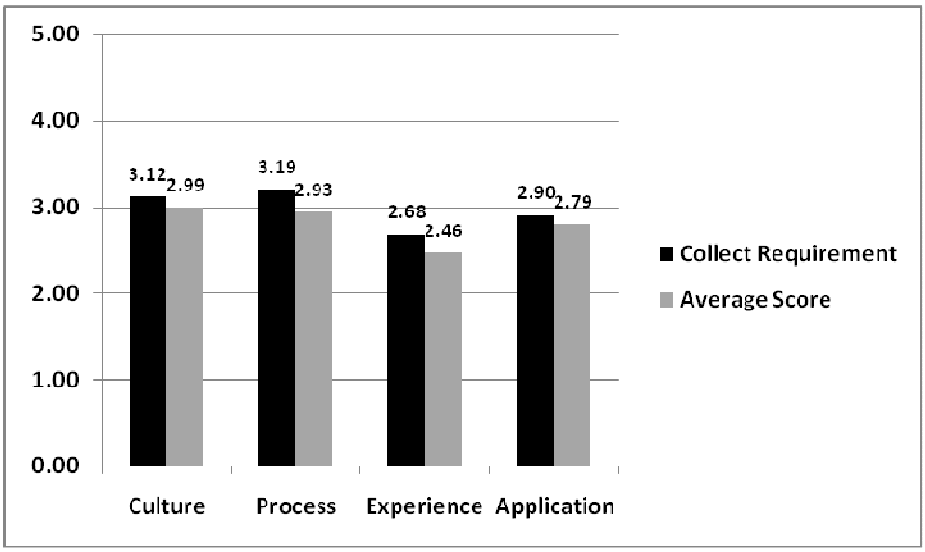

Figure 3.5: Collect requirements ProMMM attributes maturity score (Smith, 2009)

Figure 3.5 illustrates the four attributes' scores within the requirement-collection process. Based on the analysis, the culture and process attributes in the requirement-collection area is above 3, indicating the stakeholders' buy-in into the process and there is a comprehensive requirement-collection process in place, which involves all relevant stakeholders from business, technical, and other supporting units.

An MTN SA programme manager suggested that there is currently a need to set more standards and guidelines on the content of the requirements gathered, to guide the project teams on how to successfully compile the RDS (requirement definition specification), as the current success and quality of requirement collection is still highly dependent on the project team.

3.3.7.2 Define scope

Based on the overall define scope maturity score (2.75) and the information gathered from the interviews, it seems that there is a basic scope-defining process in place. Relevant project team members have an agreement on what is inside and outside the project scope;

there is a sign-off process with management and customers; and the scope defines the basic assumptions, constraints and risks.

The analysis based on Figure 3.6 indicates that the stakeholders mainly recognise the value of defining scope and there is a reasonable process in place. However, there is a lack of experience and training regarding the scope-definition process.

MTN SA BO utilises Terms of Reference (TOR) to define the project scope. The information gathered from the interviews indicates that previously, project teams used to start defining the scope with limited understanding of what the project was and/or without a full understanding of the project benefits, as the feasibility study had not been conducted.

Possibly due to the recent economic crises and the lessons learnt from previous projects, it is noticeable that the organisation has started to focus strongly on benefit realisation before the project starts and before the project scope is defined. Due to increased focus on benefit realisation, the quality of business-case input to the scope definition has improved drastically. Consequently, the quality of the output for scope definition has improved in correlation.

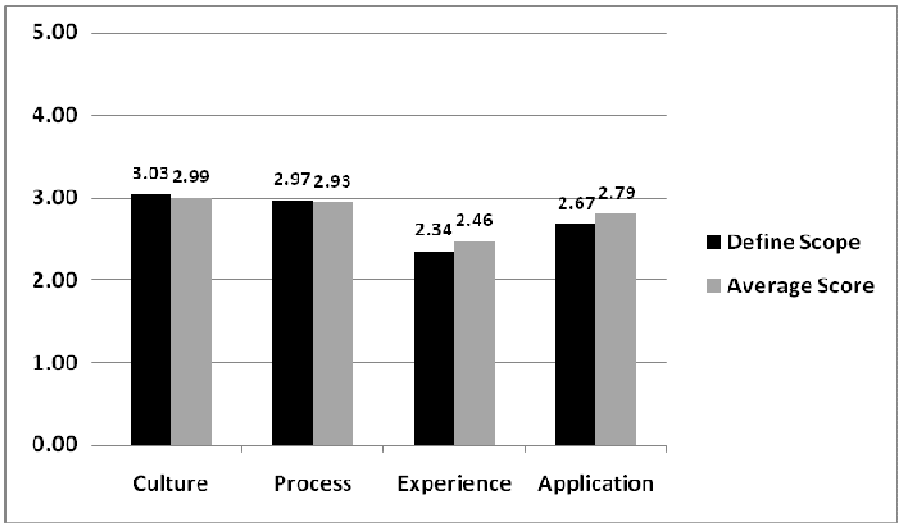

Figure 3.6: Define scope ProMMM attributes maturity score (Smith, 2009)

However, Figure 3.4 indicates that the define scope applicability is slightly lower than MTN SA's average application score, and there is a strong need for scope-definition training to enhance the knowledge on how to define the project scope.

3.3.7.3 Create WBS

Based on the create WBS overall maturity score (2.80) and the information gathered from the interviews, it appears that there is a WBS process in place and a WBS template available that breaks the project down to the third level.

Based on the interviews, the WBS has started to become a communication medium among the project team members and management has started to approve the WBS. However, often the WBS is not determined by the fully integrated project team and there is an inconsistent management involvement in the creation of the WBS.

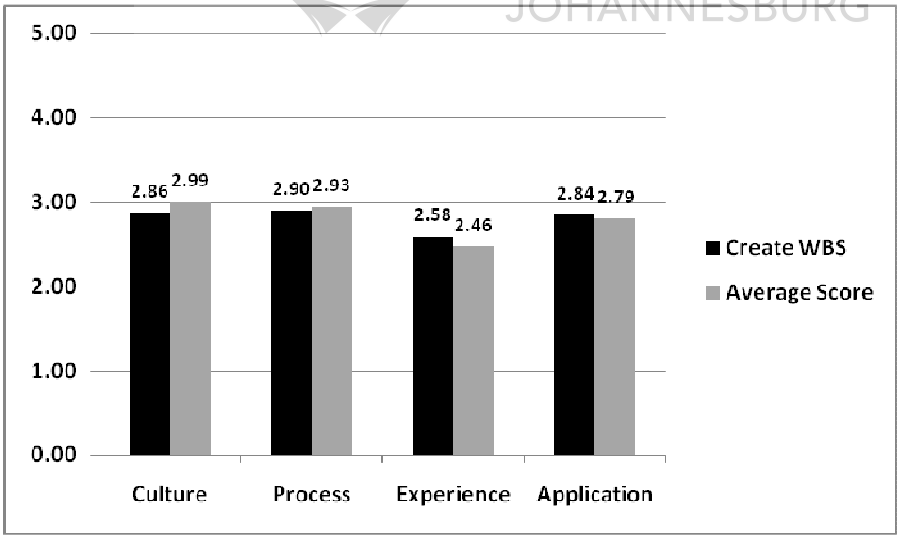

Figure 3.7: Create WBS ProMMM attributes maturity score (Smith, 2009)

Figure 3.7 illustrates that the create WBS culture (score: 2.86) is lower than the average culture (score: 2.99). This indicates that the stakeholders value the importance of creating

WBS to a lesser extent; as a result there is less support from the stakeholders for creating WBS.

3.3.7.4 Verify scope

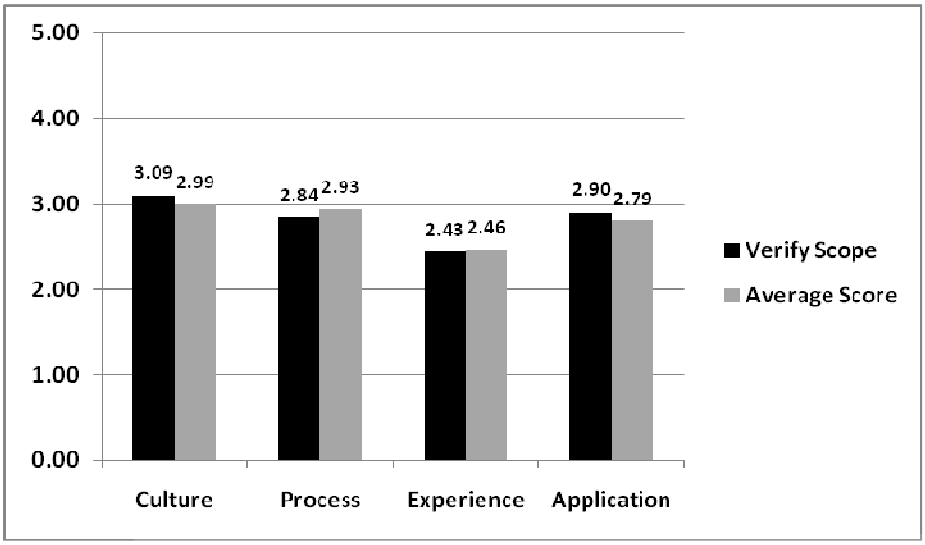

Figure 3.8: Verify scope ProMMM attributes maturity score (Smith, 2009)

Based on the analysis of Figure 3.8, even though the overall verify scope's score (2.82) is slightly higher than the average score (2.80), the process maturity is beneath the average. This indicates that in certain areas the scope-verifying process do not exist, or only a basic process exists. For example, in MTN SA an RDS needs to go through a BO architecture and process review, a business review, and a technical review; however, scope verification for report development does not exist, so the delivered reports often do not meet the business needs and the report acceptance requirements.

3.3.7.5 Control scope

The control scope process maturity has scored the lowest (2.64) of all the sub-processes. In MTN SA there is a basic process for scope control and the change requests raised need to be signed off by both the business and technical units. However, not all projects follow the

process.

During the project implementation phase the MTN SA project teams often experience business requirements changes, as the business owners have gained a better understanding of what they want, hence new ideas have risen and scope creeps have occurred. Based on the investigation, the majority of the projects have to compile an RDS addendum to document the additional requirements.

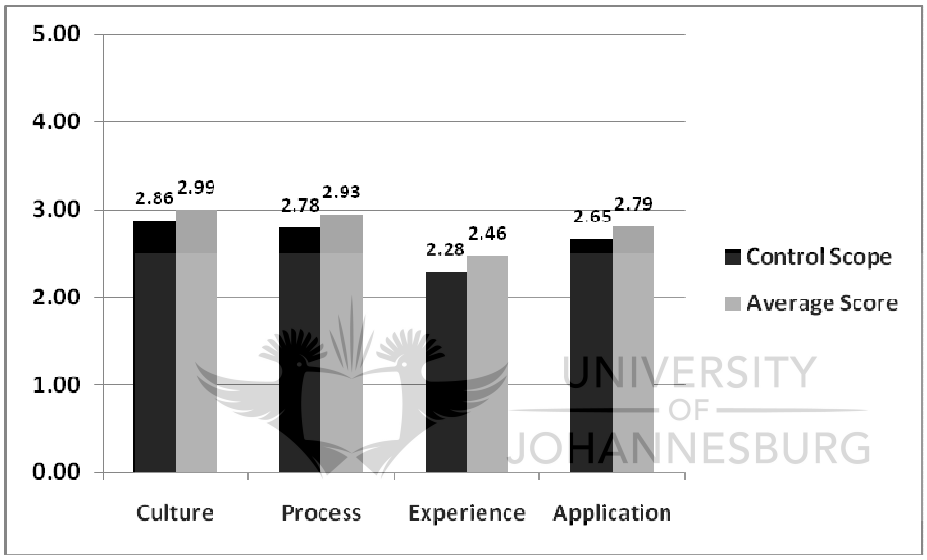

Figure 3.9: Control scope ProMMM attributes maturity score (Smith, 2009)

Figure 3.9 indicates that scope control has scored the lowest of all the attributes, which means there is poor support, process and experience in scope control. As a result, there is a poor scope change management.

Overall there is a trend showing that MTN SA BO's project scope management maturity has been improving compared to the past few years. However, there are still some fundamental challenges that remain to be implemented, and that prevent MTN SA BO from achieving higher maturity.

3.4 ASSESSMENT OF THE DEGREE OF STRUCTURED FLEXIBILITY

The researcher has assessed the degree of structured flexibility in conjunction with the project scope management maturity assessment, to ensure that MTN SA BO's project scope management does not become too rigid on the road toward maturity and to ensure that the project scope management process is flexible enough to cater to the needs of all types of projects, so that BO is able to efficiently respond to both internal and external environmental changes. The degree of structured flexibility has been grouped into five levels, one being the lowest and five being the highest. Figure 3.10 illustrates the degree to which MTN SA BO applies structured flexibility.

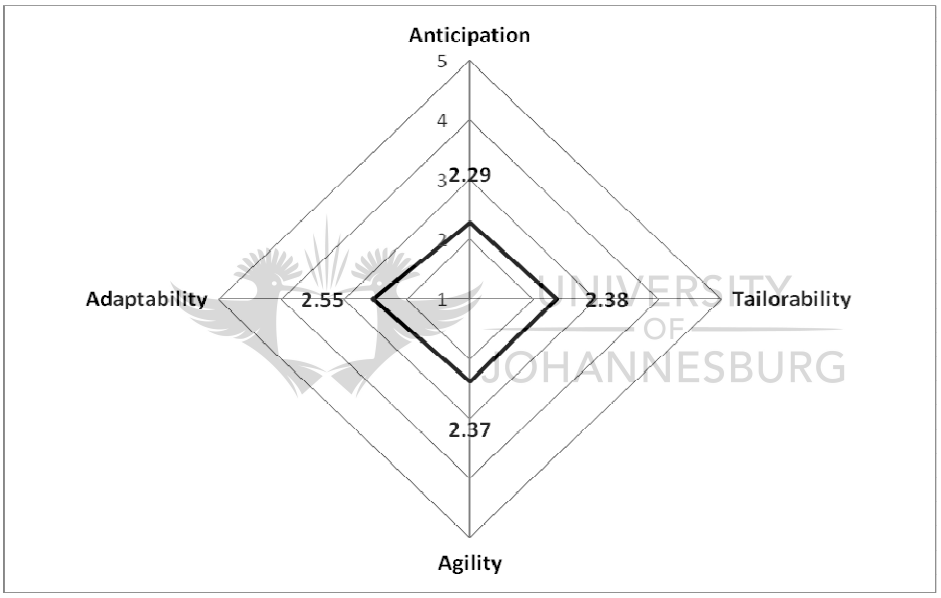

Figure 3.10: MTN SA BO's application of structured flexibility (Smith, 2009)

As illustrated above, MTN SA BO has a low score across all four aspects: anticipation, tailorability, agility and adaptability. The highest score among the four is the adaptability and the lowest is anticipation; this indicates that MTN SA is more reactive rather than being proactive when managing scope changes. Each of the aspects is discussed further below.

Anticipation – The low score in anticipation indicates that there is limited environmental scanning and planning involved in identifying change upfront and minimising the possibility and impact of scope changes. There is also lack of contingency and change funding to ensure that there is enough funding for when the scope changes.

Tailorability – The low score in tailorability indicates that the current project scope management process cannot be tailored easily and it provides limited guidelines on how to tailor the processes based on the nature of the project. Based on a comment by one of the interviewees, it appears that the current project scope management process cannot be tailored officially; to tailor the process project managers often have to deviate from the process and governance in order to be flexible and meet the project needs.

Agility – The low agility indicates that MTN SA BO is unable to respond to changes efficiently. Based on the information gathered, one of the main causes of the low agility is the low resource capacity. With the current capacity of MTN SA's Information System (IS) department, it is forecasted that IS may not even be able to deliver a quarter of the market and business demands; this means the agility has been drastically affected.

Adaptability – The degree of adaptability has scored the highest in comparison to the other aspects in the structured flexibility assessment, indicating that MTN SA BO has been continuously learning from its past experience. Based on the investigation, once the project is complete project managers need to compile a project closure report to document the lessons learnt. However, once the project closure reports have been approved and stored, the lessons learnt are not being used for future projects and to future improvements.

Based on the researcher's investigation, the researcher believes a high degree of flexibility should be applied to MTN SA, due to the fact that the telecommunication industry is one of the fastest-changing industries. As a result, it is imperative to focus on flexibility, in order to gain the competitive edge in this fast-changing environment.

3.5 CHAPTER 3: CONCLUSION

In Chapter 3, the researcher was able to gather many valuable primary data and highlight many MTN SA project scope management strengths and weaknesses. Based on the data gathered, the researcher is able to develop a roadmap that focuses on improving MTN SA's current maturity and guides MTN SA toward project scope management excellence.

CHAPTER 4: ROADMAP TOWARD PROJECT SCOPE EXCELLENCE

4.1 INTRODUCTION

In this section of the research report, the researcher formulates a vision for the roadmap; divides the roadmap into three phases with a number of goals, objectives, improvement plans; and suggests an ongoing plan in order to develop a roadmap with a clear direction and as a step-by-step guide toward project scope management excellence.

4.2 PROJECT SCOPE MANAGEMENT ROADMAP

The roadmap's vision provides a clear direction to ensure stakeholders in an organisation work towards the same goals. The vision formulated by the researcher is for MTN SA to become one of the first organisations in South Africa to reach project scope excellence.

The researcher divides the initiative into three phases to achieve the vision in a systematic manner. Each of the phases covers the four ProMMM attributes and has its own goal, objectives and improvement plan.

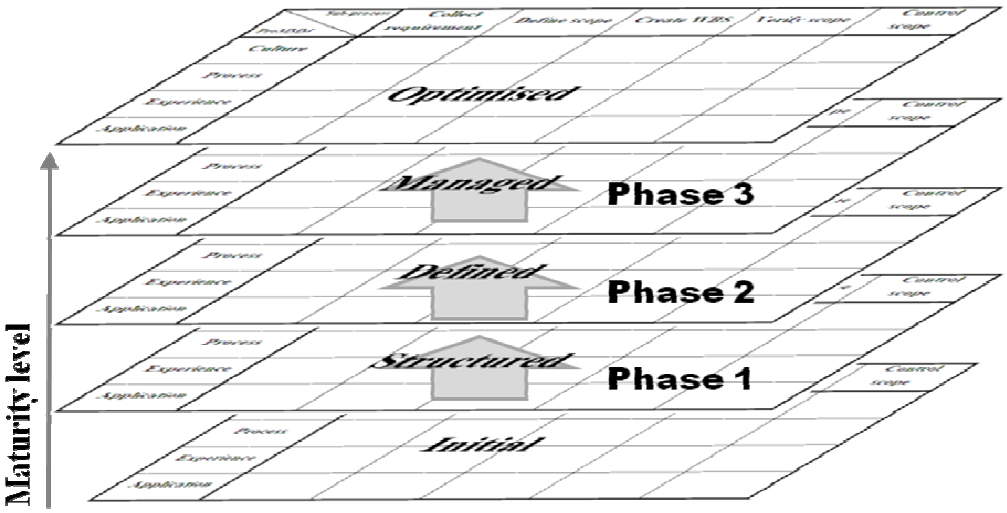

Figure 4.1: Project scope management maturity roadmap (Crawford, 2007:4 & Hillson, 2003:304)

As illustrated in Figure 4.1, the goal for Phase 1 is to move from maturity level two (structured) to level three (defined). The goal for Phase 2 is to move from maturity level three (defined) to maturity level four (managed). The goal for Phase 3 is to move from maturity level four (managed) to level five (optimised).

4.2.1 Phase 1: Moving toward project scope management maturity level three

The goal for Phase 1 is to achieve project scope management maturity level three, as indicated in Figure 4.2. All the objectives below should be achieved in the first six months after the initiative has been started.

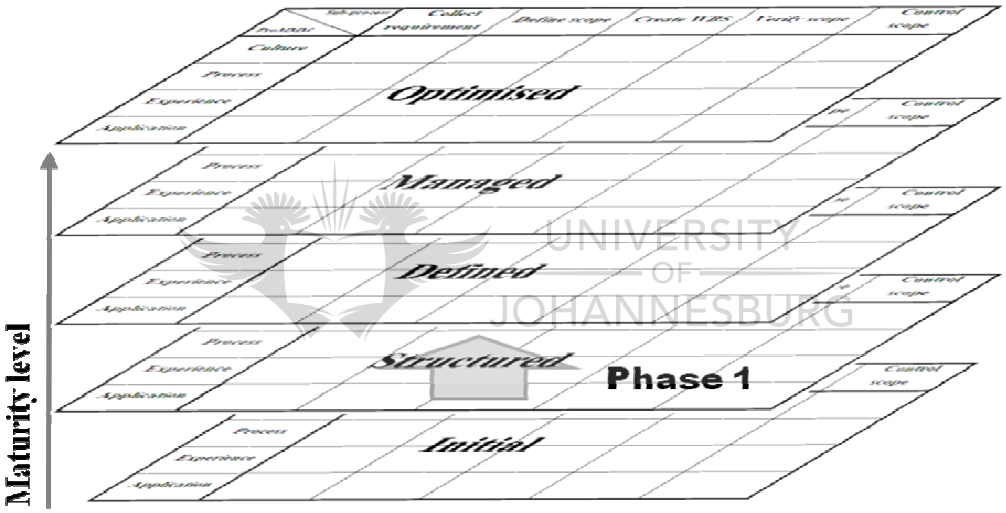

Figure 4.2: Phase 1: Moving toward project scope management maturity level three (Crawford, 2007:4 & Hillson, 2003:304)

The objectives and improvement plans are formulated as follows.

4.2.1.1 Phase 1: Cultural objective

The Phase 1 cultural objective is:

- To gain top-down commitment from all business, supporting and technical units to support each of the project scope management processes: collect requirements, define

scope, create WBS, verify scope, and control scope.

Top-down commitment means that top management should be actively involved with the projects by actively taking ownership of the projects, attending the project board meetings, actively approving project documentation, actively making project decisions, and assigning dedicated resources to be actively involved with the projects.

4.2.1.2 Phase 1: Cultural objective improvement plan

To achieve the Phase 1 cultural objective, the following improvement actions are recommended:

- Clearly communicate the benefits of project scope management and how it contributes to project success.
- Clearly communicate and explain top management's project role and its areas of project scope management accountabilities and responsibilities.
- Redesign top management's Key Performance Indicators (KPIs), to ensure top management KPIs are correlated with project scope management performance.

Achieving the Phase 1 cultural objective would enable MTN SA BO to operate in a project-friendly environment where project stakeholders are more willing to co-operate and work as a team.

4.2.1.3 Phase 1: Process objective

The Phase 1 process objective is:

- To develop a rigorous standardised project scope management process that involves all the relevant project stakeholders.

The project scope management process includes the collect requirements, define scope, create WBS, verify scope, and control scope processes. Rigorous means that the project scope management process should systematically involve relevant management through the decision points, systematically involve the relevant management when the project scope deviates from the baseline, and actively involve the relevant stakeholders to participate in the project scope management process.

A standardised project scope management process means that the process is accepted and utilised for all projects and throughout the organisation.

4.2.1.4 Phase 1: Process objective improvement plan

To achieve Phase 1 process objectives, it is essential to focus on all five project scope management sub-processes. The improvement actions are therefore categorised into general (which applies to all five sub-processes), collect requirements, define scope, create WBS, verify scope, and control scope.

General improvement action:

- Clearly communicate the defined project scope management process to all relevant stakeholders, including stakeholders outside MTN SA BO, to gain their acceptance of the process and to ensure they are aware of who needs to be involved, why they need to be involved, when they need to be involved, and what they need to do.

Collect requirements:

- Document the process with quality standards and step-by-step guidance.

Define scope:

- Ensure there is consensus among the business, support and technical units on the project boundary.
- Ensure the TOR and RDS clearly specify the product acceptance criteria, in order to clearly define what is required from the business.
- Ensure project risks, assumptions and constraints are clearly defined and communicated to manage expectations.

Create WBS:

- Ensure the WBS is always determined by the fully integrated project team.
- Ensure there is consistent management involvement regarding development and approval of the WBS.
- Ensure the WBS or project schedule is used as communication for all the stakeholders.

Verify scope:

- Ensure scope verification is consistently applied to all project deliverables.

Control scope:

- Ensure scope change control systems, analyses and reporting processes are in place.
- Scope change status must be evaluated, managed and reported.

Achieving the Phase 1 process objective would allow MTN SA to break down the communication gaps between different units and manage project scope more effectively.

4.2.1.5 Phase 1: Experience objective

The Phase 1 experience objective is:

- To enhance project teams' basic skills level, and to ensure all team members have the relevant basic knowledge and skill to follow the project scope management process.

The team members from the business, technical and support units need to be trained in the basic skills for them to perform their project role optimally. The skill sets that need to be trained will vary, depending on the team members' project roles and responsibilities. For example, business stakeholders should gain the basic skill of clearly explaining their project business needs and requirements.

4.2.1.6 Phase 1: Experience objective improvement plan

To achieve the Phase 1 experience objective, the following improvement actions are recommended:

- Provide basic skills training to all stakeholders.
- Reduce the employee turnover to minimise the amount of knowledge loss by improving the working environment. This can be done via employee recognition programmes, employee involvement programmes, improving the current contract processes and other initiatives such as BO's current Fun Committee.

The researcher believes that no matter how vigorous an organisation's project scope management processes are, without the project scope management knowledge the organisation would not be able to achieve project scope excellence. Hence, providing the basic training and aiming to retain the employees would definitely contribute to MTN SA's project scope management maturity.

4.2.1.7 Phase 1: Application objective

The Phase 1 application objective is:

- To have a consistent and routine application across all projects.

The objective above means that MTN SA BO's project scope success should be consistent and routine through effective processes, effective tools and techniques, sufficient capacity, and supportive culture. The practicability of project scope management should have minimum dependency on the ability of the individuals.

4.2.1.8 Phase 1: Application objective improvement plan

To achieve the Phase 1 application objective, the following improvement actions are recommended:

- Improve the resource capacity of planning and recruitment processes across the organisation, in order to meet the project demands.
- Alternatively, the organisation can further reduce the number of projects to approximately 50 top-priority and/or highest-ROI projects.
- Effectively utilise the resource-levelling function of Enterprise Project Management (EPM, a project management software tool introduced by Microsoft) in order to determine the resource capacity constraint and to identify resources that have higher availability.
- Introduce new tools to enhance project managers' performance – such as project quality plans to clearly specify business quality expectation, acceptance criteria, and the standards that need to be met – in order to enhance the probability of project scope management success.

The aim for the Phase 1 application objective is to increase the project resource capacity, in order to enhance the applicability for MTN SA to apply the project scope management processes, knowledge and tools.

4.2.1.9 Phase 1: Structured flexibility objectives

The Phase 1 structured flexibility objectives are:

- Anticipation

  – Enhance the ability to sense, predict plan, and prepare for change to anticipation level four.

- Tailorability

  – Develop a framework to categorise the projects according to projects' nature, size, cost and complexity.

  – Map additional project scope management processes to meet the unique needs of projects that fit into other project categorisations.

The aim of the anticipation objective above is to improve MTN SA's ability to proactively manage change instead of being reactive. The aim of the tailorability objectives is to create flexibility within the process to reduce the amount of documentation and effort required when managing a simple project.

4.2.1.10 Phase 1: Structured flexibility improvement plan

- Anticipation

  – Create an environment for relevant project stakeholders to conduct environmental scanning on a regular basis.

  – Incorporate environmental scanning into the early phase of MTN SA's project

methodology, in order for the project owners to gain a better understanding of what the market needs are and what they would like to achieve with the projects, as well as to enable them to predict and sense change early. It is essential to communicate the result gathered from the environmental scanning to all the relevant project stakeholders, to improve the effective use of the result.

- Tailorability

  – Develop a set of evaluation criteria to determine the level of complexity scale appropriate to each project.

  – Clearly define how the project scope management processes can be tailored based on the scale of the projects.

Enhancing the level of anticipation would enable MTN SA to predict, sense and proactively manage change, while gaining clarity on the project scope; thus it would reduce uncertainty and reduce the possibility of scope change.

4.2.2 Phase 2: Moving toward project scope management maturity level four

The goal of Phase 2 is to move MTN SA BO's project scope management maturity one level higher to achieve maturity level four, as shown in Figure 4.2, in order to move one step closer to project scope management excellence.

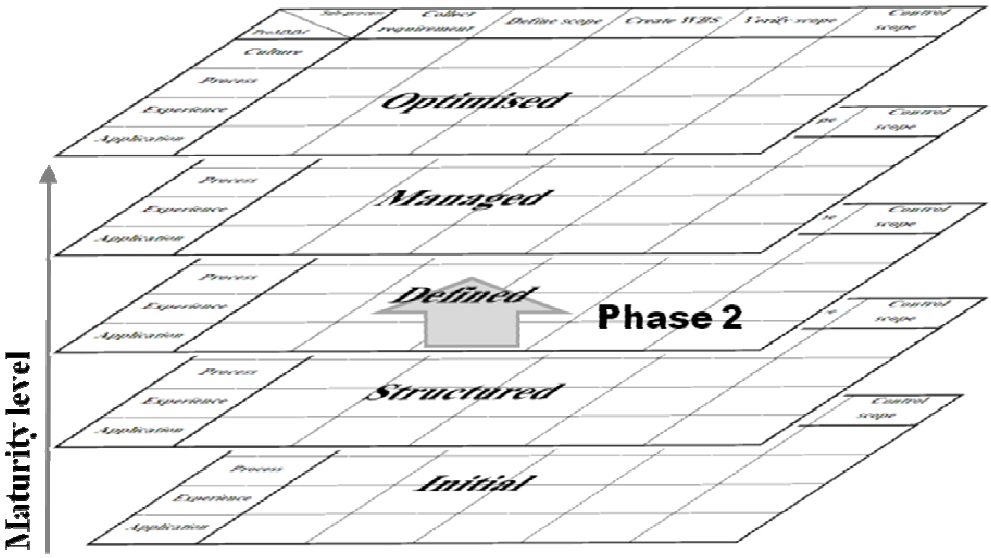

Figure 4.3: Phase 2: Moving toward project scope management maturity level four (Crawford, 2007:4 & Hillson, 2003:304)

The objectives set to achieve the goal are discussed further below.

4.2.2.1 Phase 2: Cultural objective

The Phase 2 cultural objective is:

- To ensure that resources from all relevant areas commit to deliver the project scope management outputs.

The project scope management outputs include the outputs from all five project scope management sub-processes.

4.2.2.2 Phase 2: Cultural objective improvement plan

To achieve the Phase 2 cultural objective, the following improvement actions are recommended:

- Build a reward system and/or align project team members' KPIs to motivate them to commit to the project scope management process.

- Clearly communicate to all project team members across the organisation regarding the project scope management roles they play.

Achieving the Phase 2 cultural objective would motivate project team members to commit to project scope management excellence.

4.2.2.3 Phase 2: Process objectives

The Phase 2 process objectives are:

- To incorporate quality assurance into the project scope management process.
- To gain an 'organisational view' on all projects when going through the project scope management process.

The first objective aims to embed the quality assurance process into the current project scope management process, to ensure all project scope management outputs have reached the customer acceptance standards.

The second objective aims to allow the project managers and other relevant stakeholders to have an 'organisational view' on all projects within the organisation; this includes having access to the other projects' documentation.

4.2.2.4 Phase 2: Process objective improvement plan

To achieve the Phase 2 process objectives, the improvement actions are categorised into general (which applies to all five sub-processes), collect requirements, define scope, create WBS, verify scope, and control scope.

General:

- Ensure the current quality assurance processes are applied consistently across all project scope management processes, not only select processes.

Collect requirements:

- Impact analysis on the existing functions must be a prerequisite before the approval of the RDS.

Define scope:

- Impact analysis on the active project must be a prerequisite before the approval of the TOR.

Create WBS:

- The approval of the WBS changes must be at the 'right level'. The 'right level' means the approval can be delegated to a lower level when the impact is minimum, but when the impact is drastic the changes need to be approved by higher level.

Verify scope:

- The scope verification must be conducted at the 'right level'.

Control scope:

- Integrate the project scope change control process with the organisation's control process, to determine the impact on the organisational level.

Implementing the above improvement actions would enable higher management to save time and assist MTN SA in identifying projects that have conflicting objectives. This would enable them to learn from other similar projects, to identify existing functionalities

that the project can leverage, to reduce the amount of redundant work, and to utilise the resources more effectively.

4.2.2.5 Phase 2: Experience objective

The Phase 2 experience objective is:

- To ensure that all relevant project stakeholders have the essential knowledge and skills to perform their project scope management roles.

4.2.2.6 Phase 2: Experience objective improvement plan

To achieve the Phase 2 experience objective, the following improvement actions are recommended:

- Provide regular training on the project scope management processes updates.
- Ensure that advanced project management topics and project management essential training are mandatory and available for project managers.
- Ensure that knowledge of project management essentials is mandatory for certain key project stakeholders.

The aim of the improvement plan is to ensure that all project stakeholders are competent in project scope management.

4.2.2.7 Phase 2: Application objective

The Phase 2 application objective is:

- To ensure that there is high practicability to the project scope management process.

High practicability means the application score reaches four and there is high performance when the project teams are applying the process.

4.2.2.8 Phase 2: Application objective improvement plan

To achieve the Phase 2 application objective, the following improvement actions are recommended:

- Allocate dedicated resources to support and deliver the project scope management process.
- Maintain a database of all project managers and team members with their availability, experience and skill set; when a new project needs to be managed, the organisation is thus able to identify the best fit project team members.
- Enhance the effective use of the current EPM tool. This can be done by providing selected managers with access to other projects' documentation and providing a search tool for these managers to search for similar projects, in order to piggyback on the previous projects.

By improving the maturity from other attributes, the application maturity should improve in correlation.

4.2.2.9 Phase 2: Structured flexibility objective

The Phase 2 structured flexibility objective is:

- To improve the efficiency to create and respond to change, and achieve agility level four.

4.2.2.10 Phase 2: Structured flexibility improvement plan

To achieve the Phase 2 structured flexibility objective, the following improvement actions are recommended:

- Introduce the concept and benefits of informal project management to top management, in order to gain their buy-in.

- Develop an informal culture that consists of the trust, communication, co-operation and teamwork elements.

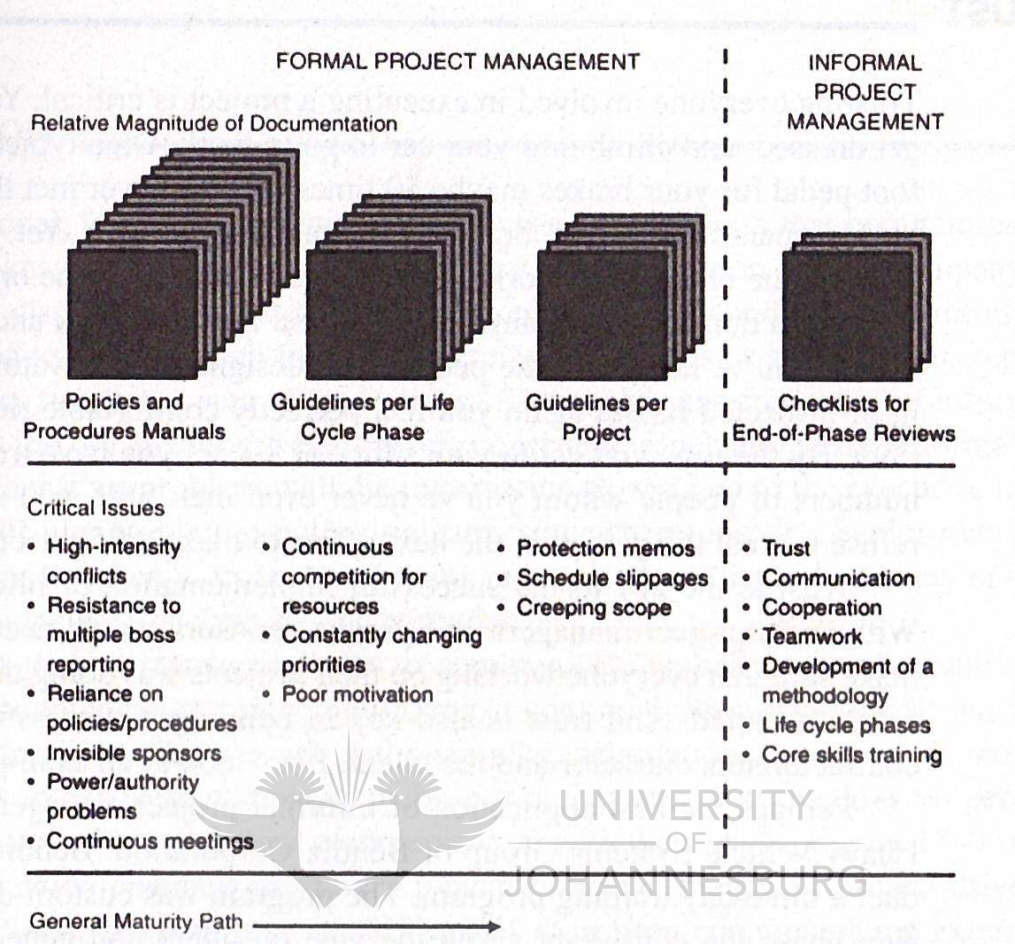

Figure 4.4: Evolution of project formality (Kerzner, 2004:463)

Figure 4.4 illustrates the project management formality trend, showing that in the move toward informality the amount of documentation and number of meetings would decrease. As a result, informality reduces the time to deliver a project and contributes to an organisation's agility.

4.2.3 Phase 3: Achieve project scope management maturity level five

The goal of Phase 3 is to achieve maturity level five. The aim of Phase 3 is to foster a learning culture, ensure the organisation is adaptable towards change, and develop a structure to support continuous improvement, as shown in Figure 4.5.

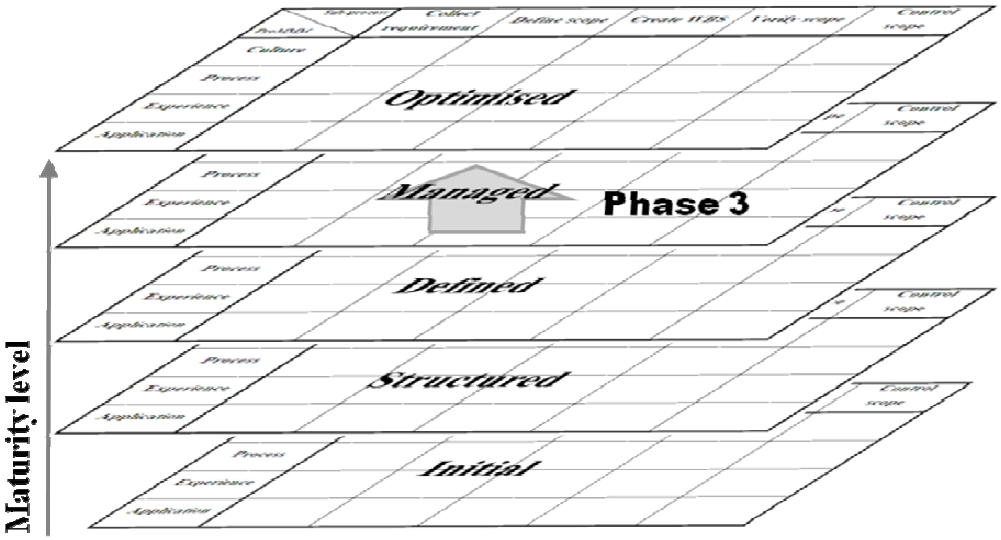

Figure 4.5: Phase 3: Moving toward project scope management maturity level five (Crawford, 2007:4 & Hillson, 2003:304)

The objectives are discussed below.

4.2.3.1 Phase 3: Cultural objective

The Phase 3 cultural objective is:

- To foster a learning culture to support continuous improvement.

This involves the development of an environment where team members learn from past experience and are willing to share their knowledge with each other.

4.2.3.2 Phase 3: Cultural objective improvement plan

To achieve the Phase 3 cultural objective, the following improvement actions are recommended:

- Develop a vision to provide a direction toward becoming a learning organisation and to incentivise the team members.

- Allocate a strong leader to lead the organisation toward being a learning organisation.
- Build a reward system and/or align project team members' KPIs to guide MTN SA toward being a learning organisation.
- Encourage team members to share their knowledge on how to continuously improve performance of the project scope management.

Developing a learning culture would foster the norm and behaviour of continuous learning, and a learning culture would be invaluable for MTN SA in achieving project scope management excellence.

4.2.3.3 Phase 3: Process objectives

The Phase 3 process objectives are:

- To make project value creation the main focus of the project scope management process.
- To continuously improve the project scope management process.

The first objective above means that the project scope is defined, verified and controlled based on the project value creation versus time and cost. The second objective focuses on continuous improvement.

4.2.3.4 Phase 3: Process objective improvement plan

To achieve the Phase 3 process objectives, the improvement actions are categorised into general (which applies to all five sub-processes), collect requirements, define scope, create WBS, verify scope, and control scope.

General:

- Utilise the concept of Six Sigma to identify the process improvement opportunities.

- Arrange periodic 'lessons learnt' sessions to improve the project scope management process.
- Send the lessons learnt from the project closure report to the responsible stakeholders for process improvement.

Collect requirements:

- Categorise the project requirements into different components and evaluate the value creation for each component, in order to remove any requirements from the scope that add little or no value.

Define scope:

- Design an effective and efficient requirement prioritisation system to assist in decisions regarding the scope of the project.

Create WBS:

- Ensure the WBS is regularly examined for continuous process improvement. Proposed changes to the WBS need to be carefully evaluated based upon value propositions before changes are made.

Verify scope:

- Regularly inspect the verify scope process to improve its efficiency.

Control scope:

- Ensure management's choice of scope change is based upon the analysis of the scope, cost and schedule variances.

The focus of the Phase 3 process improvement plan is mainly on the enhancement of Earned Value Management (EVM) and continuous improvement in the project scope management processes.

4.2.3.5 Phase 3: Experience objectives

The Phase 3 experience objectives are:

- To ensure that project managers and project stakeholders are competent in all the areas that they are involved in.
- To ensure that all relevant project stakeholders are aware of the latest changes introduced to the process.
- To ensure that project managers are up to date with the latest project management concepts in the market.

4.2.3.6 Phase 3: Experience objective improvement plan

To achieve the Phase 3 experience objectives, the following improvement actions are recommended:

- Utilise performance management tools, such as a 360-degree project management competency assessment, to determine competency development areas and training requirements. Once process changes have been made, training and communication should be offered to the relevant stakeholders.
- Provide training based on the identified competency development areas.
- Make the latest project management concepts available to project stakeholders and project managers.

The aim of the improvement plan is to provide training and create an environment that facilitates continuous learning.

4.2.3.7 Phase 3: Application objectives

The Phase 3 application objectives are:

- To make project scope management 'second nature' to project stakeholders.
- To ensure continuous improvement on the project tools.
- To ensure there is a project performance tool available to analyse performance variances and to identify areas for future improvements.
- To ensure that project tools are integrated with the organisational systems.

4.2.3.8 Phase 3: Application objective improvement plan

To achieve the Phase 3 application objectives, the following improvement actions are recommended:

- Periodically assess the project tools to identify areas for improvement.
- Regularly incorporate lessons learnt back into the tools.
- Design a tool to assess the project earned value.
- Integrate EPM with the MTN SA Human Resources (HR) system, procurement system and accounting system for effective HR management, budgeting and cost reporting.

The applicability and adaptability of project scope management should be enhanced as the maturity of the other attributes improves. Therefore, the improvement actions above are mainly focused on the improvement of the project tools.

4.2.4 Ongoing improvement plan: Benchmarking

The researcher believes benchmarking is a means to conduct gap analysis to support continuous improvement of project management and to lead an organisation to excellence.

It is a tool that should be incorporated in the project management maturity models to achieve continuous improvement.

For this reason, the researcher recommends that MTN SA BO conduct project management benchmarking on an ongoing basis, to compare MTN SA BO project scope management maturity with a set of internationally recognised good practices such as PMBOK practices, prior assessment results and competitors' maturity.

4.3 CONCLUSION

In today's global economic recession, the unemployment rate has drastically risen; many projects are cancelled or have a reduced budget; every rand is scrutinised and many project managers are forced to compress project schedules to accelerate ROI, with minimum resources and budget (Gale, 2009:36). As a result, schedule and cost overrun has become more and more intolerable. Eliminating waste from the projects and project scope management processes has become imperative for survival.

Today, projects need to focus only on the work that is value-adding and required, to compress project schedule and reduce project costs. Thus, the maturity of project scope management and level of structured flexibility need to be enhanced, to eliminate the waste from the project scope and project scope management processes, while having the flexibility and agility to seize the opportunities that are lucrative.

Based on the interviews with many of the project managers and business analysts in MTN SA, the researcher discovered that MTN SA is also severely impacted by the current

economic crisis. More than 100 projects were cut and many of the contracted employees were forced to resign, resulting in an enormous impact on the project environment.

The researcher personally suspects that during the period of favourable economic conditions, there was a lack of focus on achieving the project scope management excellence. Hence, as the economy deteriorated, MTN SA was taken by surprise at not being able to keep up with the economy and was forced to make drastic changes.

To become immune to and survive the economic crisis, it is necessary for MTN SA to move toward project scope excellence irrespective of the economic conditions, in order to continuously improve the effectiveness and efficiency of project delivery and prepare the organisation for any economic situation.

To achieve project scope management excellence, the researcher conducted a detailed gap analysis on MTN SA's project scope management maturity. The results of this analysis pinpointed that scope control is the key project scope management weakness for MTN SA, as project scope creeps are experienced in almost every project. In order to bridge the gap to excellence, a roadmap has been developed, to provide action plans that continuously improve MTN SA's culture, process, project teams' competency and application of project scope management.

If the roadmap is successfully implemented, the researcher predicts that project scope management excellence should be achieved. From then on, launching new products and services on time with higher quality should become a norm. This would enable MTN SA to gain the competitive edge among the other main cellular network operators in SA, leading

to a higher customer satisfaction, greater ROI, immunity against the economic crisis and the conversion of MTN SA's mission statement into reality.

4.4 FUTURE RESEARCH

According to survey-based research conducted by Yazici (2009:14–21), project management maturity contributes significantly to business performance, such as ROI, increased market shares and competitive position. However, it offers minimum contribution to project performance, such as delivering on time, staying within budget, meeting customer expectations and increasing team satisfaction.

The survey-based research further provides evidence that organisational culture and other organisational factors are the main attributes contributing to project performance, and not the project management maturity defined by the PM Solutions' PMMM. Therefore, the researcher identifies the need to further determine the attributes and each of their correlating contributions to both business and project performances. Once the attributes are identified, there is also a need for further research to develop a new project management maturity model that focuses on each of the attributes identified.

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APPENDIX

Appendix 1: Questionnaire

1	**Collect Requirement** – to document and gather the stakeholders' needs to achieve the project objectives (the process to document the RDS and RDS addendum).	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
1.1	Top-down commitment to support the collect requirement process.	1	2	3	4	5
1.2	Collect requirement process benefits are recognised.	1	2	3	4	5
1.3	Resources from all areas (Marketing, Finance, BO, IS, NWG, and etc) are commited to facilitate the collect requirement process.	1	2	3	4	5
1.4	The collect requirement process effectiveness is dependent on the ability of the project team.	1	2	3	4	5
1.5	The collect requirement process is accepted and applied to all projects.	1	2	3	4	5
1.6	The collect requirement process caters the needs for all projects.	1	2	3	4	5
1.7	The project team is experienced in the collect requirement process.	1	2	3	4	5
1.8	Training is provided to enhance skills in the requirement collection process.	1	2	3	4	5
1.9	The project team has been trained to facilitate the collect requirement process.	1	2	3	4	5
1.10	Sufficient tool/s are provided to facilitates the collect requirement process.	1	2	3	4	5
1.11	Project stakeholders are available to facilitate the collect requirement process.	1	2	3	4	5
1.12	The collect requirement process successfully document the stakeholders' requirements.	1	2	3	4	5

2	**Define scope** - defines what the project and product entails, what is inside and outside the scope of the project (e.g. the TOR process)	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
2.1	Top-down commitment to support the define scope process.	1	2	3	4	5
2.2	Define scope process benefits are recognised.	1	2	3	4	5
2.3	Resources from all areas (Marketing, Finance, BO, IS, NWG, and etc) are commited to facilitate the define scope process.	1	2	3	4	5
2.4	The define scope process effectiveness is dependent on the ability of the project team.	1	2	3	4	5
2.5	The define scope process is accepted and applied to all projects.	1	2	3	4	5
2.6	The define scope process caters the needs for all projects.	1	2	3	4	5
2.7	The project team is experienced in the define scope process.	1	2	3	4	5
2.8	Training is provided to enhance skills in the define scope process.	1	2	3	4	5
2.9	The project team has been trained to facilitate the define scope process.	1	2	3	4	5
2.10	Sufficient tool/s are provided to facilitates the define scope process.	1	2	3	4	5
2.11	Project stakeholders are available to facilitate the define scope process.	1	2	3	4	5
2.12	The define scope process clearly defines the scope of the project.	1	2	3	4	5

3	**Create WBS** - Subdividing project deliverables and project work into smaller, more manageable components.	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
3.1	Top-down commitment to support the create WBS process.	1	2	3	4	5
3.2	Create WBS process benefits are recognised.	1	2	3	4	5
3.3	Resources from all areas (Marketing, Finance, BO, IS, NWG, and etc) are commited to facilitate the create WBS process.	1	2	3	4	5
3.4	The create WBS process effectiveness is dependent on the ability of the project team.	1	2	3	4	5
3.5	The create WBS process is accepted and applied to all projects.	1	2	3	4	5
3.6	The create WBS process caters the needs for all projects.	1	2	3	4	5
3.7	The project team is experienced in the create WBS process.	1	2	3	4	5

3.8	Training is provided to enhance skills in the create WBS process.	1	2	3	4	5
3.9	The project team has been trained to facilitate the create WBS process.	1	2	3	4	5
3.10	Sufficient tool/s are provided to facilitates the create WBS process.	1	2	3	4	5
3.11	Project stakeholders are available to facilitate the create WBS process.	1	2	3	4	5
3.12	The create WBS process clearly breakdown the project into manageable activities.	1	2	3	4	5

4	**Verify scope** - formalising the acceptance of the completed project deliverables. It includes the reviewing of the completed deliverables with the customers or the project owner to ensure that the deliverables are completed satisfactory and obtaining formal acceptance (i.e. sign off).	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
4.1	Top-down commitment to support the verify scope process.	1	2	3	4	5
4.2	Verify scope process benefits are recognised.	1	2	3	4	5
4.3	Resources from all areas (Marketing, Finance, BO, IS, NWG, and etc) are commited to facilitate the verify scope process.	1	2	3	4	5
4.4	The verify scope process effectiveness is dependent on the ability of the project team.	1	2	3	4	5
4.5	The verify scope process is accepted and applied to all projects.	1	2	3	4	5
4.6	The verify scope process caters the needs for all projects.	1	2	3	4	5
4.7	The project team is experienced in the verify scope process.	1	2	3	4	5
4.8	Training is provided to enhance skills in the verify scope process.	1	2	3	4	5
4.9	The project team has been trained to facilitate the verify scope process.	1	2	3	4	5
4.10	Sufficient tool/s are provided to facilitates the verify scope process.	1	2	3	4	5
4.11	Project stakeholders are available to facilitate the verify scope process.	1	2	3	4	5
4.12	The verify scope process ensures deliverables are completed satisfactory.	1	2	3	4	5

5	**Control scope** - monitoring the status of the project and product scope and managing changes to the scope baseline. Controlling the scope ensures all requested changes and recommended corrective actions are processed through the integrated change control process.	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
5.1	Top-down commitment to support the control scope process.	1	2	3	4	5
5.2	Control scope process benefits are recognised.	1	2	3	4	5
5.3	Resources from all areas (Marketing, Finance, BO, IS, NWG, and etc) are commited to facilitate the control scope process.	1	2	3	4	5
5.4	The control scope process effectiveness is dependent on the ability of the project team.	1	2	3	4	5
5.5	The control scope process is accepted and applied to all projects.	1	2	3	4	5
5.6	The control scope process caters the needs for all projects.	1	2	3	4	5
5.7	The project team is experienced in the control scope process.	1	2	3	4	5
5.8	Training is provided to enhance skills in the control scope process.	1	2	3	4	5
5.9	The project team has been trained to facilitate the control scope process.	1	2	3	4	5
5.10	Sufficient tool/s are provided to facilitates the control scope process.	1	2	3	4	5
5.11	Project stakeholders are available to facilitate the control scope process.	1	2	3	4	5
5.12	The control scope process successfully manage scope changes.	1	2	3	4	5

General comment/s: _____

1	**Anticipation** (Definition - The ability to sense, predict, plan, and prepare for project scope and needs change.)	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
1.1	MTN SA's project management methodology allows for the planning and considering of possible future project scope changes.	1	2	3	4	5
1.2	MTN SA project teams identify possible project scope changes early during the project life cycle in order to minimise the possible impact of such changes.	1	2	3	4	5
1.3	MTN SA project teams prepare contingency plans to cope with possible scope changes in order to manage such changes effectively.	1	2	3	4	5
1.4	MTN SA's management allows the allocation of contingency funds to cover the possible budget impacts of project scope changes.	1	2	3	4	5

2	**Tailorability** (Definition - The ability to tailor organizational and project management processes to cater for project scope and needs changes.)	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
2.1	MTN SA supports the value of tailoring the project management methodology to cater for project scope and needs changes.	1	2	3	4	5
2.2	The current MTN SA project management methodology can easily be tailored to cater for all project scope and project needs change.	1	2	3	4	5
2.3	The MTN SA guidelines for determining what, when and how the tailoring of the project management methodology is to be done are clear.	1	2	3	4	5
2.4	MTN SA project teams have the experience to tailor project management methodology to cater for all project scope and needs changes.	1	2	3	4	5

3	**Agility** (Definition - The capability to respond quickly and effectively to project scope and environmental change.)	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
3.1	MTN SA project teams recognise the value of rapid response to project scope changes.	1	2	3	4	5
3.2	The current MTN SA project management methodology is able to respond to project scope change requests rapidly.	1	2	3	4	5
3.3	The current MTN SA project management methodology is able to respond to project scope changes effectively to ensure all resulting impacts are managed correctly.	1	2	3	4	5
3.4	MTN SA project teams have the agility to respond to project scope and needs changes effectively and efficiently.	1	2	3	4	5

4	**Adaptability** (Definition - The capability of the organisation to self-learn and self-organise based on past experiences.)	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
4.1	MTN SA project teams recognise the value of learning from past experience in order to adapt and be more flexible in future projects.	1	2	3	4	5
4.2	MTN SA project teams adapt their behaviour based on the past experience to ensure flexilibility in a constantly changing project environment.	1	2	3	4	5
4.3	MTN SA project management methodology allows for adaptability and flexibility based on lessons learned from past experiences.	1	2	3	4	5
4.4	In MTN SA, the lessons learnt and adaptions made are communicated effectively to all stakeholders to ensure an improve flexibility.	1	2	3	4	5

General comment/s:_____

Appendix 2: Sample questionnaire

Section I: Personal Information (all information is confidential, all information will be used for study purpose only)

1 What is your age group?

- ○ 19 or under
- ○ 20 - 24
- ○ 25 - 29
- ✓ 30 - 34
- ○ 35 - 39
- ○ 40 - 44
- ○ 45 - 49
- ○ 50 - 54
- ○ 55 - 59
- ○ 60 or older

2 Gender:

- ✓ Male
- ○ Female

3 What is your highest educational level?

- ○ High school (up to Grade 11)
- ✓ High school (Matric)
- ○ Bachelor Degree
- ○ Honours Degree
- ○ Master Degree
- ○ Doctor Degree

Please list any other qualification / training you have for this job:

4 What is your project role in MTN SA?

- ○ Project admin
- ○ Project manager
- ○ Project owner
- ○ Project sponsor
- ✓ Business analyst
- ○ System analyst
- ○ Test analyst
- ○ System developer
- ○ Process architect
- ○ Functional architect
- ○ System architect
- ○ Other. Please specify_____

5 What is the number of years you have been working in MTN SA?

- ○ Less than 6 months
- ○ 6 months - 1 year
- ✓ 1 - 2 years
- ○ 2 - 3 years
- ○ 3 - 4 years
- ○ 4 - 5 years
- ○ 6 - 10 years
- ○ Over 10 years

Please kindly provide your name and contact details for follow up interview (optional).

Name: _____

Email address: _____

Section II: Scope Management Maturity Assessment
Please indicate the degree to each of the following occur in MTN SA.

1	**Collect Requirement** - to document and gather the stakeholders' needs to achieve the project objectives (the process to document the RDS and RDS addendum).	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
1.1	Top-down commitment to support the collect requirement process.	1	2	3	4	5
1.2	Collect requirement process benefits are recognised.	1	2	3	4	5
1.3	Resources from all areas (Marketing, Finance, BO, IS, NWG, and etc) are commited to facilitate the collect requirement process.	1	2	3	4	5
1.4	The collect requirement process effectiveness is dependent on the ability of the project team.	1	2	3	4	5
1.5	The collect requirement process is accepted and applied to all projects.	1	2	3	4	5
1.6	The collect requirement process caters the needs for all projects.	1	2	3	4	5
1.7	The project team is experienced in the collect requirement process.	1	2	3	4	5
1.8	Training is provided to enhance skills in the requirement collection process.	1	2	3	4	5
1.9	The project team has been trained to facilitate the collect requirement process.	1	2	3	4	5
1.10	Sufficient tool/s are provided to facilitates the collect requirement process.	1	2	3	4	5
1.11	Project stakeholders are available to facilitate the collect requirement process.	1	2	3	4	5
1.12	The collect requirement process successfully document the stakeholders' requirements.	1	2	3	4	5

2	**Define scope** - defines what the project and product entails, what is inside and outside the scope of the project (e.g. the TOR process)	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
2.1	Top-down commitment to support the define scope process.	1	2	3	4	5
2.2	Define scope process benefits are recognised.	1	2	3	4	5
2.3	Resources from all areas (Marketing, Finance, BO, IS, NWG, and etc) are commited to facilitate the define scope process.	1	2	3	4	5
2.4	The define scope process effectiveness is dependent on the ability of the project team.	1	2	3	4	5
2.5	The define scope process is accepted and applied to all projects.	1	2	3	4	5
2.6	The define scope process caters the needs for all projects.	1	2	3	4	5
2.7	The project team is experienced in the define scope process.	1	2	3	4	5
2.8	Training is provided to enhance skills in the define scope process.	1	2	3	4	5
2.9	The project team has been trained to facilitate the define scope process.	1	2	3	4	5
2.10	Sufficient tool/s are provided to facilitates the define scope process.	1	2	3	4	5
2.11	Project stakeholders are available to facilitate the define scope process.	1	2	3	4	5
2.12	The define scope process clearly defines the scope of the project.	1	2	3	4	5

3	**Create WBS** - Subdividing project deliverables and project work into smaller, more manageable components.	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
3.1	Top-down commitment to support the create WBS process.	1	2	3	4	5
3.2	Create WBS process benefits are recognised.	1	2	3	4	5
3.3	Resources from all areas (Marketing, Finance, BO, IS, NWG, and etc) are commited to facilitate the create WBS process.	1	2	3	4	5
3.4	The create WBS process effectiveness is dependent on the ability of the project team.	1	2	3	4	5
3.5	The create WBS process is accepted and applied to all projects.	1	2	3	4	5
3.6	The create WBS process caters the needs for all projects.	1	2	3	4	5
3.7	The project team is experienced in the create WBS process.	1	2	3	4	5

Section III: Structure flexibility
Please indicate the degree to each of the following occur in MTN SA.

1	**Anticipation** (Definition - The ability to sense, predict, plan, and prepare for project scope and needs change.)	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
1.1	MTN SA's project management methodology allows for the planning and considering of possible future project scope changes.	1	2	3✓	4	5
1.2	MTN SA project teams identify possible project scope changes early during the project life cycle in order to minimise the possible impact of such changes.	1	2✓	3	4	5
1.3	MTN SA project teams prepare contingency plans to cope with possible scope changes in order to manage such changes effectively.	1	2✓	3	4	5
1.4	MTN SA's management allows the allocation of contingency funds to cover the possible budget impacts of project scope changes.	1	2	3✓	4	5

2	**Tailorability** (Definition - The ability to tailor organizational and project management processes to cater for project scope and needs changes.)	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
2.1	MTN SA supports the value of tailoring the project management methodology to cater for project scope and needs changes.	1	2	3✓	4	5
2.2	The current MTN SA project management methodology can easily be tailored to cater for all project scope and project needs change.	1✓	2	3	4	5
2.3	The MTN SA guidelines for determining what, when and how the tailoring of the project management methodology is to be done are clear.	1✓	2	3	4	5
2.4	MTN SA project teams have the experience to tailor project management methodology to cater for all project scope and needs changes.	1	2	3✓	4	5

3	**Agility** (Definition - The capability to respond quickly and effectively to project scope and environmental change.)	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
3.1	MTN SA project teams recognise the value of rapid response to project scope changes.	1	2✓	3	4	5
3.2	The current MTN SA project management methodology is able to respond to project scope change requests rapidly.	1✓	2	3	4	5
3.3	The current MTN SA project management methodology is able to respond to project scope changes effectively to ensure all resulting impacts are managed correctly.	1	2✓	3	4	5
3.4	MTN SA project teams have the agility to respond to project scope and needs changes effectively and efficiently.	1	2✓	3	4	5

4	**Adaptability** (Definition - The capability of the organisation to self-learn and self-organise based on past experiences.)	Not at all	To a small degree	To a moderate degree	To a large degree	Completely
4.1	MTN SA project teams recognise the value of learning from past experience in order to adapt and be more flexible in future projects.	1	2	3✓	4	5
4.2	MTN SA project teams adapt their behaviour based on the past experience to ensure flexibility in a constantly changing project environment.	1	2	3✓	4	5
4.3	MTN SA project management methodology allows for adaptability and flexibility based on lessons learned from past experiences.	1	2	3✓	4	5
4.4	In MTN SA, the lessons learnt and adaptions made are communicated effectively to all stakeholders to ensure an improve flexibility.	1	2✓	3	4	5

General comment/s:_____

Appendix 3: Reliability statistics

Please note: Section II: Scope management maturity assessment's 1.4, 2.4, 3.4, 4.4, and 5.4 questions and results are excluded from the analysis, due to poor question design and the low correlation among the other questions.

Appendix Table 3.1: ProMMM four attributes dimension reliability statistics (Smith, 2009)

Scale	Cronbach's Alpha	Number of items
Culture	.907	15
Process	.863	10
Experience	.927	15
Application	.924	15

Appendix Table 3.2: Project scope management sub-processes dimension reliability statistics (Smith, 2009)

Scale	Cronbach's Alpha	Number of items
Collect requirement	.869	11
Define scope	.878	11
Create WBS	.934	11
Verify scope	.897	11
Control scope	.901	11

Appendix Table 3.3: Structured flexibility reliability statistics (Smith, 2009)

Scale	Cronbach's Alpha	Number of items
Anticipation	.750	4
Tailorability	.768	4
Agility	.817	4
Adaptability	.861	4