**Doctoral Dissertation:**

# Project Management Maturity: A Framework for Success in Sub-Saharan Centres of Excellence?

Written by: Albin Michael Jacobs

ISM THE INTERNATIONAL SCHOOL OF MANAGEMENT

PARIS • NEW YORK • SHANGHAI • NEW DELHI • SÃO PAULO • CAPE TOWN

# DETAILS

**Author Name:** Albin Michael Jacobs, DBA

**Year**: 2020

**Title:** Project Management Maturity: A Framework for Success in Sub-Saharan Centres of Excellence?

**Document type:** Doctoral dissertation

**Institution:** The International School of Management (ISM)

**URL:** https://ism.edu/images/ismdocs/dissertations/jacobs-dba-dissertation-2020.pdf

17, boulevard Raspail
75007 Paris France

**+33 (0)1 45 51 09 09**
**info@ism.edu**
**www.ism.edu**

# PROJECT MANAGEMENT MATURITY: A FRAMEWORK FOR PROJECT SUCCESS IN SUB-SAHARAN HIGHER EDUCATION INSTITUTIONS CENTRES OF EXCELLENCE

Dissertation

Submitted to the International School of Management

In Partial Fulfilment of the Requirements of the Degree

DOCTORATE OF BUSINESS ADMINISTRATION

Project Management

By Albin Michael Jacobs

Paris, France

September 2020

Dissertation Advisor: Professor Tobias J De Coning

**Abstract**

There is a challenge in illuminating the relationship between project management maturity and project success.

The logical conceptualisation of a linear relationship between project management maturity and project success inhibits the alternative contextualisation of this relationship.

Critical realism offers such an alternative, three-dimensional view of reality. Critical realism (CR) looks at the causal relationships between mechanisms that interact to produce the relationships and the outcomes that manifest as project success.

This relationship was investigated in the context of certain Centres of Excellence in universities in Sub-Saharan Africa. Such Centres are struggling with achieving project success.

The approach to investigating this problem was to use a mixed-method research methodology. The quantitative investigation was conducted using a structured survey, based on the Kerzner Project Management Maturity Model (KPM$^{3)}$, to establish a baseline of the project management knowledge and the maturity of the knowledge. This was followed by a qualitative structured interview, based on a structured questionnaire to investigate the perceptions of staff, working in these centres, around project management knowledge and the maturity thereof.

Combining the KPM$^3$ and the CR Methodology provides insight into the alternative conceptualisation and contextualisation of the relationship between project management maturity and project success.

Project management maturity is built on project management knowledge. The important thing is how project management knowledge is built in organisations and how project management knowledge is applied towards maturity. If the relationship between project management maturity and project success is a three dimensional relationship the knowledge that support this relationship must also be constructed three dimensionally.

**Acknowledgements**

I would like to thank my supervisor Professor Tobias De Coning, for all his advice and support.

I would like to express my sincere gratitude to all the staff at International School of Management for making my studies a memorable experience.

I could not have done this without the support of my wife Melinda Maasdorp for the sacrifices she had to make, to make all of this possible for me. My children Albe and Kayle Jacobs, for supporting me through this process. All the little things they did to show their support.

To my eldest brother Franciscus Jacobs, your faith in my abilities exceeds my own.

Lastly, I would like to thank my mother, Agnes Jacobs, for her undying love and support over the years.

## TABLE OF CONTENTS

**List of Tables**



**List of Figures**



**List of Graphs**

**List of Abbreviations**

| | | |
|---|---|---|
| ACE-(Impact) | - | IMPACT - AFRICAN CENTRES OF EXCELLENCE FOR DEVELOPMENT IMPACT |
| ACE | - | AFRICAN CENTRE OF EXCELLENCE |
| AE | - | AFRICAN EXCELLENCE |
| CA | - | COMPETITIVE ADVANTAGE |
| CMM | - | CAPABILITY MATURITY MODEL |
| CMMI | - | CAPABILITY MATURITY MODEL INSTITUTE |
| CMP | - | CAPABILITY MATURITY PROCESSES |
| COE | - | CENTRE OF EXCELLENCE |
| CR | - | CRITICAL REALISM |
| CSF'S | - | CRITICAL SUCCESS FACTORS |
| DAAD | - | GERMAN ACADEMIC EXCHANGE SERVICES |
| DOD | - | DEPARTMENT OF DEFENCE |
| EBSCO | - | ELTON B. STEPHENS COMPANY |
| ERP | - | ENTERPRISE RESOURCE PLANNING |
| GQM | - | GOAL QUESTIONS METRICS |
| $H_o$ | - | NUL HYPOTHESIS |
| $H_a$ | - | POSITIVE HYPHOTHESIS |
| HEI | - | HIGHER EDUCATION INSTITUTIONS |
| ICT4D | - | INFORMATION AND COMMUNICATION TECHNOLOGIES FOR DEVELOPMENT |
| IFC | - | INTERNATIONAL FINANCE CORPORATION |
| IPS | - | IMPROVEMENT PROJECTS |
| KAT | - | KERZNER ASSESSMENT TOOL |
| KM | - | KNOWLEDGE MANAGEMENT |
| $KPM^3$ | - | KERZNER'S PROJECT MANAGEMENT MATURITY MODEL |
| MM | - | MIXED METHODS |
| $OPM^3$ | - | ORGANISATIONAL PROJECT MANAGEMENT MATURITY MODEL |
| P3M3 | - | PROGRAMME AND PROJECT MANAGEMENT MATURITY MODEL |
| PM | - | PROJECT MANAGEMENT |
| PMBoK | - | PROJECT MANAGEMENT BODY OF KNOWLEDGE |
| PMI | - | PROJECT MANAGEMENT INSTITUTE |
| PMM | - | PROJECT MANAGEMENT MATURITY |
| PMMM | - | PROJECT MANAGEMENT MATURITY MODELS |
| SEI | - | SOFTWARE ENGINEERING INSTITUTE |
| SPC | - | STATISTICAL PROCESS CONTROL |
| SPSS | - | STATISTICAL PACKAGE FOR SOCIAL SCIENCES |
| TQM | - | TOTAL QUALITY MANAGEMENT |
| US | - | UNITED STATES |

# CHAPTER ONE

## 1.1 INTRODUCTION

*"It takes a long time to bring excellence to maturity." — Publilius Syrus*

Growing a project management body of knowledge while advancing the capabilities of project managers to deal with resources are crucial to projects success. The influence of projects can be substantial, and at the same time the benefits of project management knowledge on society and industry are on the increase. Global challenges like recessions has turned it into an urgent matter. In parallel, the amount of money spend on projects are massive while the interest in project management and operations as an ancillary body of knowledge is not keeping up (Tabassi, Bryde, Kamal, & Dowson, 2018).

Seehofer and Graf (2018) postulate that poor project management is responsible for about a 12% waste on all investments. The economic impact of such waste, particularly in developing countries, can be very severe. The reality is that the effects of this kind of failure and the importance of project management only reach the public's awareness once they hear about some large public project that failed. This failure usually happens in spectacular fashion and drives the public narrative around project management's failure. This perceived failure of project management potentially represents a severe threat to the development opportunities of developing countries.

In response to this threat, according to Niklas (2019) numerous Centres of Excellence are set up in universities in Sub-Saharan Africa, mandated to develop highly qualified future professionals. These centres contribute to the development of African universities by facilitating quality and relevance of selected disciplines. In addition, it supports the development of networks across African universities around the creation of research capacities in partnership with research institutes, and other international partners. The perception about such collaborations is that there are no alternatives to create similar capacity in developing

countries. The idea is that these initiatives should facilitate the development of conducive environments for long term economic cooperation. The Centres of Excellence should help to mitigate the lack of qualified personnel and accelerate the elimination of critical investment obstacles to Africa.

Some examples of such initiatives are the Africa Higher Education Centres of Excellence for Development Impact (ACE-Impact) (The World Bank, 2020) and the German Academic Exchange Services (DAAD) with the establishment of 'Centres of African Excellence' (DAAD, 2012). These initiatives create centres of excellence in African universities and connect them through regional specialisation and collaboration. These projects align well with Africa's economic challenges. Programmes of this magnitude and complexity could facilitate cooperation through skills and knowledge transfers across partner institutions both regionally and internationally as well as vertically and horizontally. To stimulate and sustain cooperation under these complicated circumstances, a standard project management methodology, repetitively and consistently tested, could have produced a higher likelihood of project success (Vaskimo, 2015). Such standardisation processes could benefit from the introduction of Project Management Maturity (PMM) models as a critical instrument towards assessing the project management capabilities within partner organisations (Świętoniowska, 2013).

In the literature (Dietrich, Eskerod, Dalcher, and Sandhawalia, as cited in Bond-Barnard, Fletcher, & Steyn, 2018) indicate that the concepts of "collaboration and cooperation are interchangeable". They define the terms as recursive processes where individuals or businesses cooperate in an intersection of common goals through the sharing of knowledge, learning, and developing a common understanding. In such a framework, collaboration is possible between people, organisations or between an organisation and its various stakeholders.

"The purpose of project management is to ensure the success of the projects" (Berssaneti, de Carvalho, & Muscat, 2012). The potential for an organisation to profit from a project management competence, is significant, such competence can constitute a critical project management success factor (Seelhofer & Graf, 2018). In an attempt to create conducive conditions to facilitate projects' success, a growing number of organisations are taking up the practice of assessing project management maturity. Salamon, Da Silva, & Aguair (2012) define 'Project Management Maturity as the implementation of a standardised methodology and supporting processes, to such an extent that a high likelihood of repeated successes develops.

The available literature, does not provide empirical evidence in support of a relationship between project success and PMM (Katane & Dube, 2017). This assumption developed from a perceived linear relationship between PMM and project success. This assumption, in turn, grows from the logical premise that project management knowledge in particularly mature project management knowledge should support more consistent project management success.

As current research does not support the existence of such a relationship, alternative methods of investigating such a relationship warrant exploration. CR postulates such an alternative "philosophical view that human knowledge is an achievement of correspondence to the actual structure of the world. The achievement of this knowledge nonetheless acknowledges the contingent, disciplinary, and social factors in its attainment" (Allen, 2017).

Sustainable success cannot be without reason or based on chance, therefore, project-oriented organisations are not exempted from reaching their goals through alternative ways. In order for organisations to develop project management in their organisations they must apply project management processes. This should be supported by the evaluation of project management maturity and the slow alignment of processes (Eshtehardian & Saeedi, 2016).

To enhance the chances of project success in these collaborative projects "Ex-ante" evaluations can be applied in assessing the Project Management Maturity (PMM) competencies of all partner institutions (Kerzner, 2001). This could be particularly valuable to African partner institutions, to establish a baseline for measuring their project management competencies against the development indicators of their project management capabilities.

## 1.2 THEORETICAL FRAMEWORK

### 1.2.1 RESEARCH PROBLEM

*"Thomas and Fernández, equate the notion of project success to the capturing of Proteus, the mythical sea god of the elusive sea change. The popularity of this topic in academic literature is evidence of the protean nature of project success" (as cited in Henriques & Tanner, 2020).*

Conceptualising and contextualising the relationship between project management maturity and project success is essential for improved project success. Project management maturity can make a significant contribution to the understanding of project successes. Project management maturity assessment provides a critical baseline. The baseline provides the required information to determine project management maturity levels in African Universities at a given point in time. This baseline provides the foundation for the development of a project management maturity improvement plan.

### 1.2.2 PURPOSE OF THE STUDY

The purpose of the study is to investigate Project Management Maturity through selected Centres of Excellence, in Universities in Sub-Saharan Africa, and its auxiliary relationship to project success.

### 1.2.3 SIGNIFICANCE OF THE RESEARCH

*"Project success is a social phenomenon subjectively and intersubjectively constructed by individuals and groups of individuals"* (McLeod, Doolin, & MacDonell, 2012).

The significance of the study is to investigate the application of an alternative methodology in researching the relationship between project management maturity and project success. This investigation will focus on alternative routes for project management knowledge to move across project management maturity to project success.

In order for project management to progress as a field, it will require the development of an explicit theoretical base, for understanding project management. Thus providing an opportunity to understand the underlying assumptions of project management practice, questioning its appropriateness, and then consciously make alternative choices, if and when appropriate (Belatreche & Benharrat, 2017).

The perception of a linear relationship between project management maturity and project success has a severe impact on the demand for and the development of project management knowledge. Failure to empirically prove this relationship between project management maturity and project success impedes the development of and demand for project management knowledge maturity.

The perceived lack of a relationship between project management maturity and project success does not imply there is no relationship between these concepts. If the relationship is not a linear relationship, alternative methodologies need to be investigated to elucidate alternative relationships between project management maturity and project success. Project success is a strategic element for the competitive advantage of project organisations.

This research aimed at highlighting alternative theoretical and methodological approaches studying the relationship between project management maturity and project success to in order to create new ways of comprehending this relationship.

### 1.2.4 LIMITATIONS OF THE STUDY

The following are considered limitations of this study:

- The study is not a longitudinal study. However, the current study could be used to set a baseline for future analysis of trends;
- It focuses on the development and application of contextualised PMM to the Centres of Excellence identified as being part of African Higher Education Institutions;
- It is limited to one particular industry, the Higher Education Industry;
- It only looks at the partners in Africa and not those in other parts of the world (such a comparative study could be beneficial to future research);
- It was conducted across institutions in Africa, with potentially application in future planning
- The research looked at the application of the model in Centres of Excellence at different higher education institutions in Sub-Saharan Africa, but it excluded the interaction between these institutions.

In striving to overcome the limitations of the study, the researcher compared the findings of the research with similar research undertaken in the same field to denote possible congruence and or deviations.

### 1.2.5 TITLE

Project Management Maturity: A framework for project success in Sub-Saharan Higher Education Institutions Centres of Excellence.

### 1.2.6 RESEARCH QUESTIONS

The principal research question is, “Do project management maturity levels in the respective Centre of Excellence relate to project success”?

In investigating the principal research question, the following investigative research outcomes were formulated:

1. To assess the current Project Management Maturity (PMM) levels and the perceptions about project management in Sub-Saharan Centres of Excellence;

2. To evaluate the features of the project management processes and practices in the Centres of Excellence; and

3. To assess the relationship between PMM and project success.

The third question will be tested employing the following hypotheses:

$H_0$: Levels of PMM have no influence on centre project success

$H_a$: Levels of PMM have an influence on centre project success

### 1.2.7 BACKGROUND TO THE RESEARCH PROBLEM (JUSTIFICATION OF STUDY)

*"Common sense suggests that organisations are more likely to deliver successful projects if they have systems in place that reflect a mature project environment based on a culture of continuous improvement"* (Langston & Ghanbaripour, 2016).

When the Centres of Excellence are established, the assumption is that all partner institutions possess the necessary project management capabilities. Thus, no assessment is done to determine the project management maturity levels in any of these institutions. Therefore, it seems that the synergies around project management capabilities and the maturity of those abilities across participating institutions are not explored from the onset (Fernandes, Ward, & Araújo, 2014). Such an exploratory process would highlight the strengths and weaknesses across partner institutions in relation to their project management maturity (Kerzner, 2001). According to Austin, Haas, Kenyatta, & Zulueta, (2013) this exercise is necessary, particularly in Higher Education Institutions, where project management methodologies are poorly applied. Centres of Excellence also have to operate within the

broader framework of the institutions that house them, demanding that they must adhere to the functional rules and regulations of these institutions.

The implementation of the PMM framework at the selected African Centres of Excellence can determine the maturity of the project management capabilities and its contribution towards the successful implementation of projects. Determining or assessing PMM levels between and within Centres of Excellence would provide the foundation for systematic and sustained improvement efforts, toward project management maturity and success.

### 1.2.8 KEY OPERATIONAL DEFINITIONS

The following key definitions apply to the study:

According to (Merriam-Webster, 2020) the word maturity "is the state or condition of being mature, ripe, fully developed and approaching perfection". Therefore, project management maturity can be viewed as "the progressive development of an enterprise-wide project management approach, methodology, strategy, and decision-making process" according to the PMI (2003). Ofori and Deffor (2013) define maturity as 'developing from existing best practices, into optimal ways recognized currently in industry to achieve goals and objectives as outlined'.

Project management maturity refers to the application of standardised processes, learned lessons and best practices towards the improvement of continuous project management processes (Neverauskas & Railaite, 2013). The maturity level of an organisation – could determine its future performance within a given discipline or industry. Accordingly, Söderberg and Bengtsson, define "the maturity level evolutionary scale of process improvement, across five levels: initial level, repeatable level, defined level, managed level and optimizing level" (as cited in Păunescu & Acatrinei, 2012). Project management maturity refers an organisations ability to implement projects successfully and efficiently, based on predetermined targets and

environmental limitations. Strictly speaking, project management maturity refers to the maturity of a project organisation to perform project management (Guo, 2018).

"Project management - the application of knowledge, skills, tools and techniques to activities within a project to meet or exceed stakeholders' needs and expectations" (Simangunsong & Da Silva, 2013).

"Project knowledge management - comprises of processes that aim to generate, utilise and distribute the macro knowledge necessary for project execution and processes applicable to the macro knowledge of people at all organisational levels" (Gasik, 2011). "Integration Management, Scope Management, Time Management, Cost Management, Quality Management, Human Resource Management, Procurement Management, Risk Management, Communication and Stakeholder Management" (Perrin, 2017); (Project Management Institute, 2017); constitute the key project management knowledge areas.

Centres of Excellence – "are developed to build capacity for regional training institutions to offer education and training programmes in critical and specialized areas and thereby increase the quality and quantity of trained personnel in the region" (Lekorwe, 2010).

Project success – "a matter of paying attention to the outcome criteria of budget, schedule, performance and client satisfaction" (Pinto & Slevin, 1988).

Stakeholders are defined as individuals or groups with interest, or rights, or ownership in the project. Stakeholder contribute to a project through knowledge and support. The critical element of stakeholders is that they can impact on or can be impacted on by, the project, its work or outcomes (Bourne, 2005; Walker, Bourne, & Rowlinson, 2008; Walker & Rowlinson, as cited in Bourne, 2008).

The term pilot study can have 'two different applications in social science research, referring to feasibility studies which are "small scale version[s], or trial run[s], done in preparation for the major study" or referring to pilot studies which can also be the pre-testing

or 'trying out' of a particular research instrument' (Baker, as cited in Van Teijlingen & Hundley, 2001).

## 1.3 SUMMARY

Project management maturity is a key indicator in determining organisational capability around project management. If organisations know their project management maturity level, they will be aware of their weaknesses and strengths. This will allow them to capitalise on their strengths and develop those capabilities where they lack capacity.

When organisations engage other organisations in cooperative relationships, knowing the project management maturity level of each partner will allow stakeholders to develop more realistic objectives and expectations from one another.

Project management maturity assessment should become part of the due-diligence process for cooperation. The knowledge gaps emerging from such an assessment should be addressed as part of the knowledge transfer strategy of the project. To facilitate the transfer of such knowledge, partners receiving the knowledge must be capacitated and receptive to such knowledge.

# CHAPTER TWO

## 2.1 LITERATURE REVIEW

### 2.1.1 INTRODUCTION

*"Universities, more than ever, play the role of creators, using knowledge for the production of knowledge. This supports systematic and consistent development and innovation" (Burganova, as cited in Yureva, Yureva, & Burganova, 2016).*

Universities are expected to make contributions to knowledge for social, cultural, and economic development, but also need to commercially engage industry and enhance entrepreneurship in society. In short, universities are supposed to make a contribution to the broader society in different forms (Pažur Aničić & Divjak, 2020).

Higher Education Institutions now need to look at developing mechanisms that can elucidate meta-knowledge as a competitive strategic advantage for the institutions. Consistently implementing standardised project management methodologies as a strategic management approach, across its business processes, could cultivate such a dynamic, innovative mechanism. Contrary to this dynamic environment, "university personnel are perceived as reluctant to accept changes in the operational management of the university itself" (Rourke & Brooks, 1966). "Knowledge is permeable: technology is universal; universities are impermeable; the universities regulator is set in concrete", something has to change (Goddard, as cited in Rowley, 2000). Such intrinsic contradictions inhibit the potential use of project management competencies. Strategic management structures should be applied more creatively to improve project success (Law & Chuah, 2004; Maqsood et al., 2006, as cited in Akhavan & Zahedi, 2014).

In order to succeed in a competitive market Higher Education Institutions need to have management systems in place that can drive continuous improvement and development, they need to innovate because therein lies their competitive advantage (Ganushchak-Yefimenko,

Shcherbak, & Nafitova, 2017). Such an innovation process requires a systematic approach. "A process of studying and adapting best practices of competing structures or organisations to strengthen the improvement of their own performance" (Stapenhurs, as cited in Ganushchak-Yefimenko, Shcherbak, & Nafitova, 2017) and the common advancement of those that can contribute to and or benefit from this knowledge (Krolevetskaya, et al., 2019) through benchmarking. This process can support higher education institution administrators in making better decisions, prioritise resources better and improve the alignment of projects processes with desired strategic outcomes (Bartholomew, 2017). Project based organisations can use this methodology to strengthen their position in the market by increasing their reaction speed in relation to environmental factors. Through this, organisations differentiate themselves by capturing best practices to access knowledge easily and to support the emergence of project management structures. Thus, supporting the development of a project management methodology. Organisations need to develop their own methods to improve on these practices, to satisfy the demand for continuous improvement and innovation of project management methodologies (Ranf D. , 2018).

Birkinshaw & Mol (2006) argue that there are management innovations underway all the time in organisations. Many such innovations fail, some work and only a few make history. Over time, the innovations that adds the most value to the organisation are copied and are applied throughout industries. This constitutes non-technological innovation in management processes, as an example innovation in services and structures, business models, and enterprise. This incorporates competitive and integrative processes; new management practices, processes, initiatives, and structures towards achieving strategic organisational goals and objectives. Allahar (2019) argues that "Project-based management can be considered such a management innovation approach. It contains distinct features such as a special focus on achieving scope, cost, time, and customer and business goals; concurrently supplementing

existing organisational structures with temporary structures, organisation-specific tools and best practices; and improved distribution of project responsibilities within the organisation".

Once the supporting processes have been extracted through benchmarking, they are incorporated as best practices into the new management practices of the organisation, setting formal rules as guidelines for employees and activities, and operationalising this new business process. This is espoused through work instructions, guidelines, manuals, and work procedures and thus constitutes the new standardised process. Such an approach should support efficiency and effectiveness, based on the best available knowledge in the organisation and or sector. It formalises routines and outlines repetitive patterns for interdependent organisational actions and processes. Control, coordination and knowledge transfer is enhanced and endowed with structure for sequencing work processes, reducing the element of uncertainty (Nissinboim & Naveh, 2018).

## 2.2 HIGHER EDUCATION INSTITUTIONS; CURRENT STATUS OF PROJECT MANAGEMENT

*"Project Management is prevalent in many industries but is seemingly overlooked in higher education"* (Austin, Haas, Kenyatta, & Zulueta, 2013).

Sahay (2010) is of the opinion that Institutions of Higher Education should realise that projects are not implemented in a vacuum inside the institution. Higher education institutions increasingly become exposed to marketplace pressures like any other businesses. This exposure includes rapid and complex changes in their organisational environment. In order to retain their competitive advantage, organisations will have to be innovative in realigning their businesses processes with strategic objectives (Świętoniowska, 2013). However, innovating in the higher education arena poses many challenges. It requires a consistent and structured implementation strategy to be adopted in the early stages in order to maintain sustainability

(Hudson, Farmer, Weston, & Bushnell, 2015) and elevate organisational synergies supporting the development of a model for managing current and future activities (Vaskimo, 2015).

Project implementation provides supplementary budgetary resources, supporting ancillary teaching, learning and research activities. Project management has permeated many fields of study and application. However, its implementation in public higher education institutions is considered relatively recent. Public higher education institutions are mandated and committed to cooperatively generate social development and to create new knowledge. This includes researchers, students and civil servants alike in teaching, research and extension projects and programmes (de Oliveira, de Almeid Jurach, Pinto , & Kerchirne, 2017).

This is important since cooperation demands a mature, comparative project management methodology across partner institutions (De Oliveira, Moraes & Laurindo, 2013). Each project partner institution needs to understand its causal relationship to specific project management reference points, within an agreed-upon project management methodology. This defines the maturity of its project management capabilities (Cooke-Davies & Arzymanow, as cited in Backlund, Chronéer, & Sundqvist, 2014).

The maturity of the project management competencies of an organisation is measured as they move across the five levels of maturity. Within this conceptual framework, the model should be able to identify and prioritise those project management capabilities that need to be enhanced to advance through the levels based on the ten knowledge management areas of project management (Rasid, Ismail, Mohammad, & Long, 2014).

Knowledge management and project management are both based on cycles. Therefore, as project management knowledge moves through the knowledge management cycle, it is filtered to enhance and create new project management knowledge, maturing that knowledge. The parallel development of these fields creates the synergy required in the current

environment. Knowledge management provides a structured framework for reusing and generating new project management knowledge (Ranf & Herman, 2018).

Villa (2010) suggests that PMM models can be used to identify those knowledge areas and the related capabilities required for carrying out projects successfully and projects can now become a source of knowledge. Higher Education Institutions can now define, assess and improve their project management capabilities through PMM models**.** Processes must be put in place to extract the knowledge from the project implementation process. Maturity can now formally be considered and integrated, as well as all other project management central themes.

The challenge is that, like most organisations, higher education institutions do not realise how limited their project management skills are. Aubry & Hobbs (2011) state that, "organisations will adopt project management only if it can be shown to generate value". This problem is exacerbated when such institutions become engaged in cooperation programmes with each other.

Once organisations realise the importance of PMM models in achieving strategic goals, project management maturity need to be sustained to support incremental learning towards attaining excellence in PMM (Kerzner, as cited in Gharaibeh, 2012). This could enhance the competitive advantage of the individual partners as well as the partnership. This is especially true in complex projects, where understanding project knowledge management becomes critical as a primary success factor (Desouza & Evaristo, 2004) ; (Morris, as cited in Gasik, 2011).

Although project management methodologies are applied in many industries, they are only applied "to a minimal extent in Higher Education Institutions" (Blenchard & Cook, as cited in Demir & Kocabas, 2010). It is particularly applicable to Higher Education Institutions where project managers are mostly selected for their technical expertise in a particular field of study and not necessarily based on their project management competencies (Darrell, Baccarini,

& Love, 2010). Higher Education Institutions should perceive project management as growing in importance across the entire organisational management system, coupled with its strategic and tactical management (Neverauskas & Railaite, 2013). "This links PMM to the achievement of organisational strategic goals through project management success" (Kerzner, as cited in Neverauskas & Railaite, 2013).

According to Kerzner (2000), Any project-based organisation has as its strategic goal, repetitive project success. One way of achieving this could be through developing a specific project management methodology. This could provide specific guidelines and tools from procedural to policy level. Such a methodology needs to retain some elasticity to remain adaptable and relevant to variable projects. This makes change more acceptable under the influence of the shortcomings of traditional perceptions of project management (Ciric, et al., 2019).

Yen, Peng & Gee (2016) posit that to stay ahead of the competition and to manage projects more efficiently, organisations need to know if they are following the right methodology. As such, project management maturity levels are essential to project performance. Organisations should understand the importance of assessing their project management maturity periodically, to support continuous improvement. "Repetitive processes and systems do not guarantee success; they simply increase the probability of success" (Yen, Peng, & Gee, 2016).

### 2.2.1 KNOWLEDGE MANAGEMENT

*According to Foucault (1980) "it is impossible for knowledge not to engender power" as it is "not possible for power to be exercised without knowledge" (as cited in Bilginoğlua, 2019).*

Knowledge is a unique asset. It can define and differentiate its holder. Knowledge bestows power upon those who hold it. Both individuals and organisations must realise that their competitive advantage is rooted in their causal relationship, around the knowledge they

share and the power it generates. Only by managing the sum of their knowledge can they enhance their competitive advantage. This complexity of knowledge management is rooted in its inherent power equations. Facilitating the voluntary contribution of individual knowledge to the sum of the organisational knowledge requires a process and agreement on the management of this common resource (Bilginoğlua, 2019).

Organisations are continuously in search of strategies to differentiate themselves as a way of sustaining their competitive advantage. Knowledge management can provide such an approach. The way and organisation generates, exploits and transfers critical knowledge through its activities is clarified by a knowledge based management strategy (Ranf & Herman, 2018). When individuals are considered holding legitimate knowledge or as trustworthy, it enhances the existing sources of power. Therefore, "authority, legitimacy, and knowledge constitute crucial sources of "ideational" power, allowing an stakeholder's power to increase in relation to the power of others. Knowledge becomes more powerful when it gets linked to legitimacy, and stakeholders tend to be perceived as more legitimate when they invoke certain kinds of knowledge" (Fritz & Binder, 2020).

Knowledge in reference to processing information constitutes another hypothetical source of power. Being attentive to the contextual nature of knowledge requires the acknowledgement that the different stakeholders conceptualise what is considered as trustworthy knowledge, fact, or even the truth (Fritz & Binder, 2020).

Organisations learn by acquiring knowledge that has the potential to improve or maintain performance. Research indicates a reciprocal influence on the relationship between learning and the maturity of organisations (Wang, Alashwal, Asef, Abdul-Rahman, & Wood, 2018).

The flow and absorption of knowledge in the organisation is facilitated through the dissemination of knowledge. This occurs as existing internal or external knowledge is

absorbed by individuals across the organisation. Acquisition, assimilation, transformation, and exploitation of knowledge are defined as the four components for knowledge management. The absorptive capacity describes an organisation's capacity to acquire external knowledge and to disseminate it within the organisation (Seidel-Sterzik, Mclaren, & Garnevska, 2018).

Organisations gain competitive advantage through their inherent knowledge and the application of such knowledge, the speed with which it can know new things, and how efficient it applies this knowledge to constantly improve its value proposition to stakeholders (Carlucci, 2016). This process demands formal structures, methods and ancillary processes to manage its most valued intangible asset – knowledge (Mthembu & du Plessis, 2018).

Project managers either need all the knowledge they require to deliver projects or they need to have the core project competencies around which they can build new knowledge from experience in any environment. A lack of knowledge represents a significant risk to any project. Only through an integrated process, looking at lack of knowledge and related risk, can the causal relationships be determined. It must be clearly understood by those working in projects that project management knowledge gaps presents a deep-seated risk, and only knowledge creation can mitigate or eliminate it (Paver & Duffield, 2019).

"Knowledge never is capability, and capability never is knowledge". The question to understand is whether 'knowledge' creates capability or the other way around. 'Knowledge' implies knowing something, whether it is actively or passively. On the other hand, capability, is about having the knowledge to convert 'knowledge' into desired outcomes. In other words, determining alternative ways of conceptualising and getting things done based on the given 'knowledge'. This is not an automated process, knowing about something does not imply capability (Ranganathan, 2011).

Mao, Liu, Zhang & Deng (2016) define "Knowledge Management Capability as the process-based ability of the organisation to mobilise and deploy knowledge-based resources to gain competitive advantage".

Organisations that are performing poorly pays little or no attention to project management capabilities and accordingly experience a lack of project success. Poor project management results in low business benefits and low output quality, leading to increased project costs and failed scheduling. If such an organisation wants to know how far its goals are achieved, it needs to measure its performance. PMM is one of the factors affecting project management performance. PMM illuminates project performance areas for improvement. It becomes critical for the organisation to continuously evaluate all the project management processes, facilitating the enhancement of project management maturity (Putri, Pratami, Tripiawan, & Rahmanto, 2019).

### 2.2.2 EXCELLENCE IN HIGHER EDUCATION

*"It is generally accepted that excellence is not easy to be evaluated or measured"* (Raharjo, et al., 2015).

The shift from quality to excellence in the international arena on Higher Education quality has increasingly started to dominate the debate. This shift prompted higher education systems to restructure themselves, aimed at reshaping higher education systems (Rostan & Vaira, 2011), converting excellence in education into a multidimensional construct. It encompasses elements such as method, outcome and objective. The method defined through instructional elements, coupled with teaching methodologies, assessment, and responses. At the same time, it provides excellent integration of teaching and research through these assets. Inherently excellence also contains less tangible elements, scholarly engagement, academic freedom and parity. Performance measurement along with stakeholder satisfaction or social responsibility explains product excellence. Therefore, excellence remains the central goal

aligning future plans in higher education institutions partially to their to their own definition of teaching (García-Jiménez, 2016).

This process of alignment underscores the process of institutionalising excellence in higher education. The more stakeholders talk about excellence and interact with the concept the more the concept is legitimated and institutionalised as a process. In this way it facilitates growing levels of legitimation and almost instinctive acceptance of the construct by stakeholders (Rostan & Vaira, 2011). Through such a process excellence should support the development of convergence in higher education systems, thus representing an innate value of higher education, with convergence as an external attribute. If each education institution perceived excellence differently, convergence would standardise measures of discipline, synchronisation and conformity (Ghinea, Dima, & Hadad, 2017).

## 2.3 CENTRES OF EXCELLENCE

Excellence and innovation has increasingly become the focus of funding agencies in research centres. The Managed Healthcare Executive Report (2018) defines a Centre of Excellence (CoE) broadly as "a specialized department of interdisciplinary experts that focus on a specific issue". Centres of Excellence are considered new units or long-term projects (Borlaug & Gulbrandsen, 2018). Such centres are staffed with leaders in their respective fields, with a core group that can provide governance structures, prioritise, record, and communicate processes, and set the strategic direction. Project management provides a strategic asset to such a CoE in developing the required project management competencies in support of the methodology that will serve as the foundation for the knowledge development of the entire Centre. Therefore, it becomes foundational to assess the project management knowledge of staff members in a centre. If the centre applies a project management approach, this will form the foundation of its competitive advantage as a centre. Such an evaluation of the Centres of

Excellence serves to enhance the quality and impact of knowledge in support of sustainable development (Kettunen, 2011).

Centres of Excellence are mandated to build new knowledge; this knowledge must be applied in pursuit of capacity development in a particular field of knowledge. Simultaneously, there is the expectation that a Centres of Excellence will build new knowledge to enhance its management strategy, project management, as an organisational asset. Such knowledge will augment its new project management capabilities and should be disseminated throughout all stakeholder organisations in support of its strategic assets (Managed Healthcare Executive, 2018).

Centres of Excellence in developing countries are managed based on 'best practice' models developed in other parts of the world. These models are 'pushed' by international donors in a type of 'ideas aid'. Integrating such knowledge with local knowledge can give rise to several challenges. The ability or inability of a CoE to apply such knowledge sets limits to purposefully integrate international knowledge (Adelle, Elema, Chakauya, & Benson, 2018).

Organisational character, strategic function, expected service, and its governance, have become harmonised globally. Contextually, Centres of Excellence emerges as an essential element in the construct of the policy framework, driving the achievement of research sector goals in higher education. Alternatively, Centres of Excellence are conceptualised as topic neutral instruments, an instrument to pursue research per se and not limited to a specific field. This view eliminates other benefits (Hellstrom, 2018). Higher education institutions are driven to change through constant improvement, technology changes, measurement and evidence-based results, all of which requires either overt or covert emphasis on all areas of quality improvement (Jacob, Xiong, & Ye, 2015).

Therefore, conceptualising Centres of Excellence within the Higher Education arena becomes vital towards comprehending the challenges that a Centres of Excellence is exposed

to in relation to project management knowledge and project success (Hellstrom, 2018). A CoE has become a standard research policy instrument in several countries in the last two decades (Borlaug & Langfeldt, 2019). Centres of Excellence constitute organisational environments striving for and succeeding in developing high standards of conduct in fields of research, innovation or learning. Therefore, they have the inherent ability to absorb and generate new knowledge. In an ideal situation, this new knowledge will be disseminated and applied, generating new capacity in its field, be it research results, innovations, or talent (Hellstrom, 2018). This implies a one-model-fits all approach.

'Centres of Excellence' and 'Centres of Excellence in Research and Innovation' in particular have become widespread temporary structures. The expectation for these centres being to produce research to facilitate future economic benefits, contributing to resolving the challenges that plague society (Borlaug & Gulbrandsen, 2018).

Such Centres emerge in both established and incipient research areas alike. This process is characterised by a high degree of incompatibility or conflict between different institutional logics (Borlaug & Langfeldt, 2019). According to Borlaug & Gulbrandsen (2018) "an institutional logic is a set of material practices and symbolic constructs which constitutes its organising principles and which is available to organisations and individuals to elaborate". Institutional logics contextualises the contribution to identity, legitimacy, and a sense of order for stakeholders. Stakeholders require a conceptual framework for interpreting and functioning within social environments. Organisations are often exposed to multiple conflicting logics. Universities, as an example, can be exposed to the influence of institutional logics of the inherent diversity in academic professions, government and the market. The degree and plurality of the tensions herein contained generate challenges and tensions to those exposed to them. The functioning of the organisation is influenced by its exposure to the compatibility between the logics and their influence over it.

According to Rice (2012), it is not a surprise that participants in Centres of Excellence perceive it as a successful construct. Funding secured through these Centres ensures economic sustainability for them, which stimulates the environment for doing more and better research. Benchmarking against those centres in the same field of research and innovation internationally, rather than locally or institutionally, drives the globalisation of these centres (Larsen, 2019).

The problem is that most of these Centres seem to focus only on their research outputs as a project. They are losing sight of their institutional logics and the importance of documenting the methodologies that sustained their projects success. This process is about decision-making within an organisational field, guided by shared beliefs and practices. The implication is that such practices are organisationally structured, politically defended, and technically and materially constrained. However, of particular interest, is how different logics are revealed and discussed within organisational settings. The study of organisational practices', of how organisations generate and disseminate organisational narratives as well as their formative events is of longstanding interest (Larsen, 2019).

Centres of Excellence will enhance the harmonisation of organisational logics through improved governance and management and serve as role models for other higher education institutions. "The Africa Centres of Excellence initiative is creating synergies in higher education across the sub-region by optimising limited resources and deepening cooperation between countries while equipping young people with highly relevant skills and knowledge" (MacGregor, 2016). This clearly defines a centre as a project, undertaking project activities, demanding the application of a project management methodology. This should elevate project management to the strategic level, the chosen strategy determining the structure and method governing the achievement of goals for this endeavour or construct. "Suddenly the how you

did it becomes more important than what you did" (World Bank, 2019), (Gosling & Turner, 2015).

## 2.4 PROJECT MANAGEMENT

*"Project management is receiving an increasing amount of recognition as a means to improve a firm's competitive position, however, academic literature has focused primarily on operational aspects, and the competitive advantage that can be obtained from the project management process is relatively understudied"* (Mathur, Jugdev, & Fung, 2014).

Project management has been around for some time. Until the 20th century construction projects were generally managed by innovative professionals working in construction, such as architects, engineers, and master builders themselves. During the 1950s, the application of project management tools and technique in a systematic manner to complex engineering projects emerged (Kwak, 2005). Project management itself is an emerging and dynamic research area, research in the field is growing fast and produces new knowledge applicable across other fields of study (Abyad, 2019).

### 2.4.1 DEFINITIONS

#### 2.4.1.1 PROJECT

*"A project is any series of activities and tasks that have a specific objective to be completed within certain specifications; has a defined start and end date; has funding limits; consumes money, people and equipment; and is multifunctional"* (Kerzner, 2013).

"Organisations undertake projects as the driving force to achieve the organisational business objective in a competitive business environment, and thus project success is a key factor for business survival" (Hepworth, Misopoulos, Manthou, Fyer, & Michaelides, 2017).

A project is "a temporary organisation and process set up to achieve a specified goal under constraints of time, budget and other resources and project management as the managerial activities needed to lead a project to a successful end" (Abyad, 2019).

Economic globalisation poses the biggest challenge to organisations. It creates a highly competitive environment that demands strategic innovation amidst tough competition. The required supporting innovation strategy should stimulate the organisational economy towards sustainability. A principal invention in this regard for many organisations includes a change to their strategic business management model. Project-based management has become a preferred choice. The main reason is that projects are perceived as the primary approach for extracting business value and profits for organisations. (Putri, Pratami, Tripiawan, & Rahmanto, 2019)

"Projects are defined as a temporary endeavour undertaken to create a unique product, service or result". (Project Management Institute, 2017). Projects are time based and this time-based nature of projects implies a distinct start and ending (Cole, 2019).

"Projects are influenced by the environment in which they are realised. At the same time, they also contribute to the change in the same environment. Projects are based on temporary endeavours that consume resources to deliver beneficial objectives" (Armenia, Dangelico, Nonino, & Pompei, 2019).

Projects represent discrete, yet multidimensional activities facilitating change, fostering a return on investments organisations make towards enhancing their internal processes and competitive advantage. Projects are unique, purposefully designed to bring about constructive change. "The management of project goals and business benefits underpin all aspects of successful projects" (Bento, Gomes, & Romão, 2019).

#### 2.4.1.2 PROJECT MANAGEMENT

"Project management is defined as the disciplined application of knowledge, skills, tools and techniques to project activities to meet the project requirements" (Project Management Institute, 2013), (Muller & Turner, 2007).

Organising work as projects has become one of the preferred ways for many businesses. The prevailing literature recognises the role of project management towards building company success (Sadkowska, Ciocoiu, Totan, & Priotesa, 2020).

"The goal of project management is to make the invisible visible, managing shortcomings before they cause failure in a project" (Ochungo & Odinga, 2019).

Project management is two dimensional, containing an inherent human and technical dimension. The technical side contains the systems or processes central to project management; in parallel the human dimension contains the people controlling the methodology and their capability. For this reason, organisational culture exerts a strong influence over the project team, therefore as far as projects go "it is people who get things done" (Cooke-Davies & Arzymanowc, 2003).

According to Abyad (2018) "project management is the business process of creating a unique product, service or result" and "a project is a finite endeavour having specific start and completion dates undertaken to create a quantifiable deliverable". Projects progressively get elaborated through predictable incremental steps linked to standards, milestones and timelines. The primary concern of project management the achievement of the project goals as outlined in the planning phase of projects. This happens in the context of classical project constraints such as time, cost, scope and quality. At least three of the four constraints should be adhered to.

Hutson (1997), 'sees project management as essentially "a direct outcome of the required scope of work and its implementation success". Contemporary demand for project management, and its contribution as a structured methodology, across industries, sectors or disciplines is well documented. Project management emerged as a critical activity in both organisational management and success' (Langston & Ghanbaripour, 2016).

"Project management is planning, organisation, monitoring and control of all aspects of the project, with the motivation of all including the achievement of project goals in a safer manner, within the agreed schedule, budget and performance criteria. It is clear from the definition of project management that it has a focus on project performance, regarding short-term dimensions of project success – adherence to criteria of time, cost and quality" (Radujković & Sjekavica, 2017).

Project success involves project management process integration, these individual processes, activities, or practice, have corresponding input descriptions, deliverables and methods (PMI, 2008, as cited in (Abyad, 2018). "Project management creates both tangible and intangible benefits" (Radujković & Sjekavica, 2017). "This includes less tangible items such as stakeholder appreciation, fit for use, and contributing to the higher project goals" (Nijhuis, Vrijhoef, & Kessels, 2018).

Knutzon and Bitz's, (1999) view 'project management as "a set of required principles, skills, methods, knowledge, tools, and techniques for the effective management of objective-oriented work". This gets contextualised in a particular and distinctive organisational environment (as cited in Ozguler, 2016), through a project cycle, guided towards project completion (Keshk , Maarouf , & Annany, 2018).

Project governance is defined as "the use of systems, structures of authority, and processes to allocate resources and coordinate or control activity in a project" (Pinto, as cited in Joslin & Müller, 2015) potentially influencing the effective of use of PMM towards the achievement of project success.

"Project management is a management method aiming to effectively reach the project objective within the specified time and a fixed budget" (Trojanowska & Dostatni, 2017).

Projects facilitates the integration and management of efforts of activities across organisations or departments. Put differently; projects success is a requirement for a competitive advantage over competitors (Farrokh & Mansur, 2013).

Projects certainly include processes, while the implementation of a new business process in itself may constitute a project, a project cannot replace processes. Project management and process management are mutually exclusive (Söderlund, as cited in Abyad, 2018).

### 2.4.1.3 PROJECT MANAGEMENT METHODOLOGIES

Belatreche & Benharrat, (2017) define a project management methodology as "a framework and a set of structured tasks, tools, and techniques to conceive, define, plan, schedule, budget, track, control, and closeout projects". This framework gets applied across all projects across the organisation and is managed and performed within in a standardised methodology.

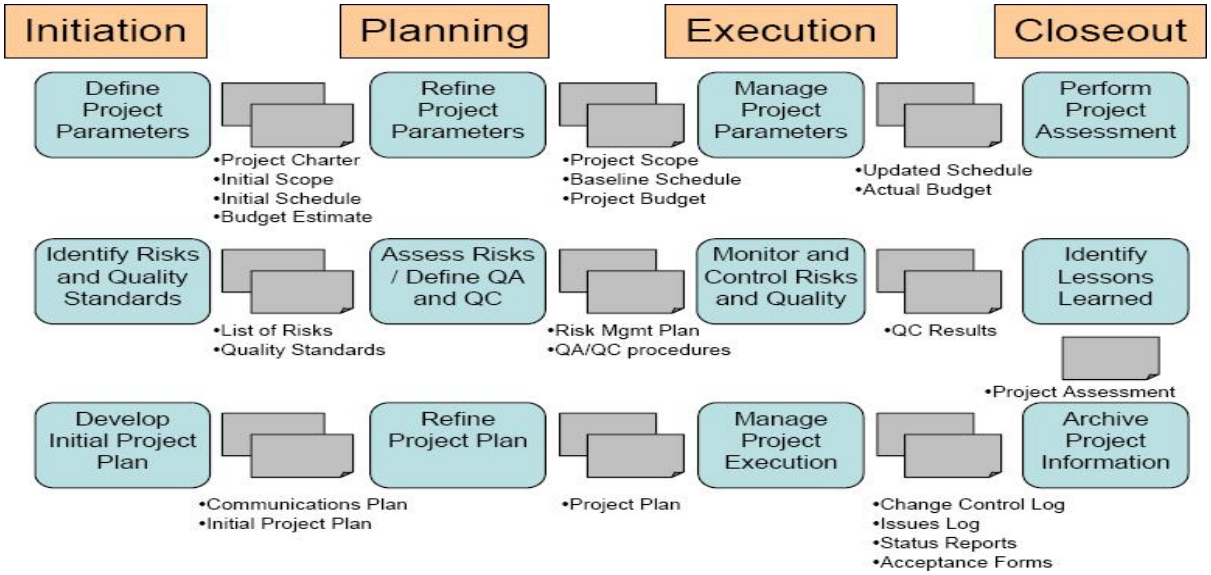



**Figure 2.1: Project Management Cycle**

Source: (Blake, 2004)

The one size fits all approach to the application of these methodologies presents several problems. Different structural mechanisms applied to the organisation of project organisations present critical differences and requires different methodologies to manage in such

environments. The project management methodology should be determined taking into consideration the peculiarities of a project type, as well as the organisational culture and management philosophy (Besner & Hobbs, as cited in Jovanović & Berić, 2018).

The success of projects depends on "the effective management for planning, monitoring and scheduling project activities, and taking necessary actions to accelerate the completion of project activities" (Keshk , Maarouf , & Annany, 2018).

Aligning projects with the organisational strategy will steadily improve project success (Ozguler, 2016). Shenhar and Dvir, (as cited in Bond-Barnard, Fletcher, & Steyn, 2018) argues that projects are a strategic management asset for an organisation, thus project success should link to the strategic and operational view of the business. This is achieved by evaluating how well the project is doing, how it impacts on customer satisfaction, its impact on the team and future preparedness of the business.

#### 2.4.1.4. PROJECT MANAGEMENT AND LESSONS LEARNT

The lessons learned processes and its underlying efficiencies are ignored Duffield & Whitty, 2015; Patton, 2001). Logic dictates that learning from past experiences will enhance project planning processes (Burr, 2009; Shergold, 2015). Notwithstanding, a lack of learning from project management implementation remains a serious impediment to project management professionals and their ability to deliver on project management goals (Atkinson et al., 2006; Keegan & Turner, 2001; Kerzner, 2009; Klakegg et al., 2010; Milton, 2010; Schindler & Eppler, 2003; Shergold, 2015; Williams, 2008; Paver & Duffield, 2019).

Ajmal et al. (2010) argue that project organisations tend not to learn from their past experiences. This happens despite the organisations exposure to lessons learned processes and spending significant resources on such processes. Therefore, even if the organisation creates new knowledge through projects, they lack the processes to extract the lessons learned from their project experiences to facilitate learning from it. A lack of standardisation across such

processes seemingly further exacerbates this situation, where organisation fail to learn from their experiences and entangles themselves in a cycle of reinventing their learning processes all the time. Project management - lessons learned, becomes the topic that everyone knows needs to be discussed, but does not get discussed Milton (2010) indicates that this failure to discuss this topic needs to be acknowledged and discussed to facilitate a process to identify lessons learned from projects, towards improving project management systems and towards project success (as cited in Paver & Duffield, 2019).

Portfolio and project management requires the right organisational strategy in support of project objectives, to achieve a competitive advantage in a globalised, multicultural and competitive environment (Ozguler, 2016).

Business process change management can be facilitated through projects. Changing the way things are done in an organisation, invariably demands a change in the supporting processes. Accordingly, the analysis of the project outputs and changes and or advancement of the relevant processes will be required. This introduces a continuous process-management review for business processes; the one-off project business activity now requires constant management. "Fundamentally process management stems from a continuous process of how things are done and can be contained within a project or be outside; whereas project management is about bringing about change within a finite scope" (Söderlund, as cited in Abyad, 2018).

#### 2.4.1.5 PROJECT SUCCESS

*"Project success factors are "defined as those elements contributing to the successful implementation of a project and are of critical importance to the organisation seeking to deliver value through temporary initiatives"* (Pace, 2019).

Projects are getting recognised as a mechanism to translate corporate strategies into actions; consequently, project success becomes vital. Project success is one of the themes that

stimulate a lot of debate but remains contentious. Researchers, practitioners, and academics alike seemingly agree-to-disagree on the topic of project success, thus, shrouding the concept in a veil of fuzziness (Frefer, Mahmoud, Haleema, & Almamlook, 2018), (Henriques & Tanner, 2020).

The concept of project success means different things to different stakeholders. From a customer's perspective, a project might be deemed a success, while the contractor might have experienced the same project as a failure. Each stakeholder has their own interests in a project, and the perception of success varies across stakeholders dependent on having those interests satisfied (Bento, Gomes, & Romão, 2019).

Conceptualising success within a project framework is two dimensional, including Project Success and Project Management Success. These concepts are mutually inclusive success factors, you can't have one without the other (Radujković & Sjekavica, 2017). There is a distinction between a projects processes and that of its product (McLeod, Doolin, & MacDonell, 2012).

| **PROJECT SUCCESS** | **PROJECT MANAGEMENT SUCCESS** |
|---|---|
| Measured against the overall objectives of the project | Measured against the traditional measures of the elements of the "iron triangle" |
| More fluid, perceived, and subjective concept | Proper management of the three dimensions of the iron-triangle, |
| Deals with goals and purpose | Deals with inputs and outputs |
| Focus on long-term objectives | Focus on short-term objectives |
| Must be noted that absolute success cannot exist for a project, only perceived success | |

**Figure 2.2: Project Success Vs Project Management Success**

*Derived from:* (Radujković & Sjekavica, 2017), (Frefer, Mahmoud, Haleema, & Almamlook, 2018), (Bond-Barnard, Fletcher, & Steyn, 2018), (Henriques & Tanner, 2020).

Examining the alignment of project success with strategic organisational objectives is the best way to illuminate it. Project management success and project success both require the

identification of project success criteria and critical success factors (CSF'S) right at the initial project stage (Frefer, Mahmoud, Haleema, & Almamlook, 2018). It is not effective project management that ensures project success; it is weak project management that typically results in project failure (PIM, as cited in Adzmi & Hassan, 2018).

Although projects are reported based on time, cost and scope, project decision-makers on the other hand contextualises subjective measures in determining project success. This contradictions according to a study by Thomas and Fernández (2008) hampers the extraction of a single definition of the concept (as cited in Henriques & Tanner, 2020).

It must be borne in mind that "it is people who deliver projects, not processes and systems" (Bond-Barnard, Fletcher, & Steyn, 2018). Therefore, the perceptions of people remain important for determining project success conceptually and contextually.

#### 2.4.1.6 PROJECT MANAGEMENT IN A DEVELOPING COUNTRY CONTEXT

The projected growth rate for emerging economies are projected at triple the growth rate of mature economies. This projected growth has captured the interest of organisations worldwide (Boumphrey & Bevis, 2013; Rapoza, 2011, as cited in Bond-Barnard & Steyn, 2015).

The International Finance Corporation (IFC) shows a 50 per cent project failure rate in Africa, with many other agencies posting similar experiences (Ika, 2012). Yet, project management continues to expand and develop in many developing countries as a professional practice, described as the best practices in optimising project activities towards improved performance (Kissi & Ansah, 2014). Projects remain the preferred instruments for policymakers, governments and international development partners across Africa as an instrument to facilitate economic development (Ika, 2012), (Ofori & Deffor, 2013). Project management principles are continuously used in developing countries by project organisations

to enhance projects implementation (Lyles 2014; Peltier, Zahay & Lehmann 2013, as cited in Wang, Alashwal, Asef, Abdul-Rahman, & Wood, 2018).

The activation of cooperation and collaborative processes affects performance through the increase of trust between project team members, based on quality communication. Trust becomes functional through the predictability and expectations of the behaviour of team members or a belief in their competencies. The increased collaboration, in turn, drives project management success (Tyler, 2003), (Chiocchio et al., as cited in Bond-Barnard, Fletcher, & Steyn, 2018). Project success is based on perceptions with a positive relationship between (CSF'Ss) and project success, (Khang and Moe, as cited in Bond-Barnard & Steyn, 2015).

Project management remains relevant in weak institutional settings. As a programme approach project management requires some level of maturity, particularly so in the case where international development projects are funded by International Development Agencies. Stakeholder incompatibility and a lack of implementation capacity across partners may manifest as institutional challenges. Whatever the development challenge in any developing country in the world, project management has the potential to make delivery on the goals set around such challenges a reality (Ika, 2012).

The perception is that developing nations lack adequate capacity and capability for effective project planning and implementation. This exposes these nations to "project management traps such as the one size fits all trap, the accountability for results trap, the lack of project management capacity trap and the cultural trap" (Rondinelli, as cited in Ika, 2012). Project management remains a critical need because most of the benefits of project management principles are not practised since "even where there are a lot of good project managers who are certified, most companies have an immature project management approach" (Guarina & Dirkie, 2014). Project management only seems to be appreciated in hindsight.

A lot of people are opening their eyes to project management and what it can achieve (Elton, 2017).

#### 2.4.1.7 CRITICAL SUCCESS FACTORS (CSF's)

*"Whereas there are 51 CSF'Ss, the most frequent factors cited from 2000 to 2013 are: top management support and commitment, training and education, project management, clear vision and objectives of the ERP system, careful change management and interdepartmental communication to the successful implementation of ERP systems" (Tarhini, and Tarhini, as cited in Al-Had & Al-Shaibany, 2017).*

The identification of CSF's is crucial in addressing the archetypal problems encountered by projects in emergent economies. Communication, trust and collaboration between the project team members and between stakeholders are considered as three of the primary CSF's to project success in emerging economies (Chiocchio et al., 2011; Diallo and Thuillier, 2004; Othman, 2013; Tyler, 2003, as cited in Bond-Barnard & Steyn, 2015). "The ability to work collaboratively is recognised as a core competency of a learning organisation or team, but trust determines the dynamic of this collaboration" (Bond-Barnard, Fletcher, & Steyn, 2018).

African project environments do not create or evaluate tools and skills for more efficient project management. "Lack of planning, poor quality control, inadequate risk management, inefficient organisational structure, and breakdowns in communication have been associated with long-term project failure" (Al-Had & Al-Shaibany, 2017), (Odiaka, et al., 2018).

The systematic and qualitative assessment of CSF'Ss is required to enhance the understanding of the contribution of CSF'Ss to project success, in anticipation of potential impact, and facilitating the identification of appropriate methods to deal with it (Frefer, Mahmoud, Haleema, & Almamlook, 2018).

A link is suggested between trust and collaboration in relation to project success. The required trust between project team members emerges from repetitive communication across various communication channels which implies some process reliability (Lesko and Hollingsworth, 2010) (Bond-Barnard & Steyn, 2015), (Bond-Barnard, Fletcher, & Steyn, 2018). Cooperation between project team members contributes to the total variance of CSF'Ss. This cooperation must be evident throughout the project and at all levels. Communication remains a significant critical success factor, as a lack of communication will put constraints on project performance (Mba & Agumba, 2018).

Co-operation between the members is a significant contributor to the sum of variances of CSF's. Collaboration between cooperation partners must be evident from project start to finish. Communication is a critical success factor between cooperation partners. A lack of communication could be seen as constraining project performance. Effective communication at all levels of the projects become vital to reduce misunderstandings and suspicion between the project partners (Mba & Agumba, 2018). In this framework coordination, communication and delayed decision-making become factors for delays (Islam & Trigunarsyah, 2017).

## 2.5 PROJECT MANAGEMENT STANDARDISATION

"Process management emphasises improved "repeatability" of the tasks, efficiency (decreasing time needed, reducing cost), increasing quality (including consistency in quality)". On the other hand, it focuses on getting things done, achieving the final outcomes. Achieving increased efficiency presents a lot more challenges, potentially requiring customised methodologies only developed if the project management methodology was converted into a recurring process (Abyad, 2018).

"The Project Management Body of Knowledge (PMBoK) is an example of a standardized project management approach and not a methodology. It is a body of knowledge that collects best practices which are useful across several methods" (Joslin & Müller, 2015).

The PMBoK differs from a methodology, as it is a systematic application of practices, techniques, procedures, and rules applied by stakeholders from a particular discipline. It provides a platform, guiding organisations in creating methodologies and policies as well as life cycle phases required for practising project management (Project Management Institute, 2017).

"The perfect is the enemy of the good." In an attempt to continuously improve on processes, the PMBoK's added, more complexity with little value addition. It is about using the timeless principles of project management, whether they are included in the PMBoK or not. "The real challenge in project management is not identifying the common sense things to do, but having the individual or organisational discipline to do the common sense thing" (Abyad, 2018).

Over the last 20 years or so PM best practices have been identified, expounded and encouraged. 'PMBOK represents the widest and most rooted reference of best practices, congregated around key processes leveraged across markets and sectors' (Abyad, 2018). Organisations have invested in managing their activities and failures better, and most of them have been adopting project management practices to gain a competitive advantage. Here, the value of a methodology is recognised by practitioners of project management, as it is through this proactive management that benefits are obtained for the projects. In order for organisations to know if their methodologies are appropriate, benchmarking of existing practices must be considered based on certain indicators (Bento, Gomes, & Romão, 2019).

Project management must be tailored to project needs. Project management standards and the guide are underscored by explanatory rather than rigid practices. In project management the standard identifies the processes considered consistently as good practices across a cross section of projects. The standard also identifies the resources applied to, and

products usually associated with, those processes. There is not requirement for the application of any process based on the standards (Project Management Institute, 2017).

Project management methodologies are compendia of diverse methods, instruments, patterns and practices. It involves the compilation and codification of project management activities towards consistent project success (Pace, 2019). 'The intent behind any project management methodology remains the enhancement of probable project success' (Vaskimo, 2015), (Joslin & Müller, 2015), (Pace, 2019).

Standardisation is identified by Milosevic and Patanakul (2005) as a factor in project success. PM instruments, control and methods constitute the most influential factor, while flexibility also appears to be a significant factor (Brookes & Clark, 2009). The issue is that although standard processes are put in place, there must be flexibility to allow for growth and development of appropriate processes where required.

The competitive advantage of an organisation has a strong link to efficient PM. Therefore, PMM is applied as a tool by organisations in an endeavour to assess and standardise the rigidity of their project management methodology and capability. Several PMMM emerged for assessing PMM of the organisations (Farrokh & Mansur, 2013). Once organisations start to implement standard project management methodology, and they achieve success with it, they can begin to use this methodology more consistently. This will allow their staff to develop more trust in the process as well as more confidence in their own knowledge around these processes. This will enhance both the maturity of the project team members PM knowledge and that of the methodology.

Organisations own specific capabilities that provide them with a competitive advantage. Each of these capabilities is built on a particular area of knowledge that is held by the organisation. The organisational knowledge, in turn, is held by individuals or by groups of individuals.

## 2.6 PROJECT MANAGEMENT MATURITY

*"Organisations are considered more likely to deliver successful projects if they have systems in place that reflect a mature project management environment based on a culture of continuous improvement" (Crawford, as cited in Langston & Ghanbaripour, 2016).*

Organisations need to mature in the knowledge and capabilities of project management to coordinate and direct project implementation to organisational strategy (de Souza Scotelano, da Conceição, da Costa Leonídio, & de Jesus, 2017).

"Maturity is defined as a path that an organisation and/or processes go through, along with getting experiences" (Klaus-Rosińska & Betta, 2017). Learning maturity levels depends on the individual and organisational preparedness to interrogate expectations, standards, practices and measures (Probst and Buchel, as cited in McClory, Read, & Labib, 2017).

PMI defines project management maturity as "the degree to which any organisation practices organisational project management". It is proposed that project success plays a pivotal role in maintaining organisational Competitive Advantage (CA), improving project management practices, like project management maturity, will do the same (Farrokh & Mansur, 2013). Maturity thus demands a consistent development of the processes for more efficient and effective project implementation. It becomes a continuous process to sustain the competitive advantage that efficiency and effectiveness bring to the organisation.

Mature organisational systems and processes are essential for the development of consistent project management excellence. Maturity is often perceived as a subjective concept. The conceptual underpinnings of maturity models stem from basic components defining a progressive path for the enhancement of abilities and preferably outlining organisational methodologies that could be implemented in support of a more mature state. Logic dictates that the more mature an organisation is in project management, based on continuous improvement, the more likely it is to achieve project success. "Maturity improvements require a concerted

effort of continuous review and reflection at an organisational management level" (Langston & Ghanbaripour, 2016).

Organisational maturity is defined as "operations that are in perfect synergy to achieve strategic objectives" (Silva et al., 2014). Maturity models represents instruments simulating capability, or rather specific elements thereof, and define the quality of the attributes that exemplify competence at a particular performance levels (Demir & Kocabas, 2010). This develops learning capabilities in adaptive organisations, based on their best practices and past experiences, capacitating them to take corrective measures, simultaneously improving operational methods (Machado et al., as cited in Wang, Alashwal, Asef, Abdul-Rahman, & Wood, 2018).

The development of scientific knowledge is facilitated through projects and the increase in the number of projects. This is to increase potential funding for research projects, raise the standing of the institution and the need to capacitate staff. Klaus-Rosińska and Zabłocka-Kluczka, (2014) identified difficulties in project management in the university environment as:

- rigid organisational structures that are unsuitable for the implementation of the project;
- lack of formal authority for projects and their managers;
- poor internal and external communication;
- inadequate or overly formalized project documentation;
- inadequate or poorly designed mechanisms of project quality management; and
- lack of qualified project personnel, (as cited in Klaus-Rosińska & Betta, 2017).

Organisations are expected to continually improve their project management performance. This must be achieved through managing their capabilities. Alternatively, applying management maturity measurements needed to achieve the factors influencing project performance. Organisations must know what their project management capabilities is capable of. Therefore, they must assess current organisational PMM levels. The assessment should be

based on the PMBoK. The application of the PMMM framework enables organisations to enhance the performance of Project Procurement Management through identified best practice (Putri, Pratami, Tripiawan, & Rahmanto, 2019).

"Project management maturity is the position in which the organisation finds itself regarding the project management processes. Based on this, maturity models seek to quantify the ability of the organisation to manage projects successfully" (Kostalova & Tetrevova, 2018).

Maturity is the foundation for excellence in any environment. To achieve excellence, the knowledge, skills and capabilities required to develop and sustain that excellence must be available (Tatnall & Webb, 2017).

Organisational project management maturity is perceived as the organisation's receptiveness to project management (Seelhofer & Graf, 2018). Maturity is often associated with stepped stages schema, presented in the organisational management practices that make it possible to achieve project success. Predictably, the concept of maturity has also infiltrated the field project management. Diverse perceptions exist about maturity in relation to project management. These diverse perceptions are an attempt to depict mature project management practices. These approaches are based on the assumptions that increasing maturity will result in more consistent projects success (Bento, Gomes, & Romão, 2019).

Business face several complex challenges on a daily basis. These challenges require the implementation of modern management methods and disciplines. This is to improve organisational efficiency and effectiveness. Project management implementation is a requirement for the efficient execution of various projects and initiatives. The expansion of project implementation is linked to the expansion of project management knowledge. On the other hand, the expansion of project management knowledge connects to available

methodologies proposed and implemented in the project management practice (Jovanović & Berić, 2018).

Albrecht & Spang (2014) explain that since project management structures at lower maturity levels are considered "informal" in several PMMM, higher maturity levels logically correlate to higher formalisation of project management. Both favourable effects are revealed by the literature, like improved organisational culture, increased transparency of organisational structures, or improved customer satisfaction and unfavourable effects, like the unhappiness of the project staff (particularly the project manager), or constraints on creativity and innovation. Balancing the positive and negative was also stressed by Milosevic and Patanakul (2005).

This is validated by the comparison of literature on the drivers of project complexity. The complexity of organisations demands for certain levels of formalisation (and hence maturity) of the project management execution. Therefore, it might be viewed as a construct facilitating the relationship between PMM and its contributions at project level (Albrecht & Spang, 2014).

PMM is a well-defined level of complexity assessing an organisation's project management practices and processes at a given point in time (Kwak & Ibbs, 2002).

"Maturity itself is measured along three dimensions:

- Knowledge (capability to carry out different tasks);
- Attitudes (willingness to carry them out); and
- Actions (actually doing them)" (Andersen & Jensen, 2003).

This is in line with the three-dimensional model supported by CR as a theoretical model. The impact of each of these dimensions on project success is essential because it will determine the solutions to the related challenges with project management in a specific environment.

Belatreche & Benharrat (2017) refers to the Oxford Advanced Learner's Dictionary's definition of 'maturity' as "the state of being fully grown or developed". Applying this to a project, implies a situation where organisations have methodologies in place facilitating

reaching its objectives. Mature organisation is capable to deal efficiently and consistently with projects.

This demonstrates variability between industries, a different conclusion from that of Grant and Pennypacker (2006). Those industries more inclined to use project management, such as engineering-based industries, demonstrate higher PMM levels (Brookes & Clark, 2009).

Models defined as "theoretical representations simulating the behaviour or activity of systems, processes or phenomena", by theoretically collating all possible progressive improvements into a scale, a model can be generated that surmises' the capability maturity of organisations, constituting a capability maturity model (CMM). This represents a scale of progressive improvements, from less to more maturity / effective levels. Importantly different organisational units could exhibit variable levels of capability maturity in dealing with a particular issue. The capabilities of the strategies applied to address a particular issue may vary among the units (Clarke, Stoodley, & Nelson, 2013).

"Capability is an indication of how well a process used by an organisation does what it is designed to do. At the same time, maturity is an indication of the collective impact of the capabilities on a given aspect of that organisation" (Rosemann & de Bruin, 2005). Maturity sets standards in the sense that maturity is measurable on a scale (Iversen, Nielsen & Norbjerg, 1999) and an organisation can move up or down on the scale (Clarke, Stoodley, & Nelson, 2013). All knowledge including project management knowledge cannot reach a level of full maturity. Dynamic environments require continuous innovations. In this way, it becomes like excellence in that it is something to strive towards continuously.

### 2.6.1 PROJECT MANAGEMENT MATURITY MODELS (PMMM)

*"Maturity models are a proven tool in the creation of collections of knowledge of practices and processes about a particular domain"* (Jansen & Yang, 2020).

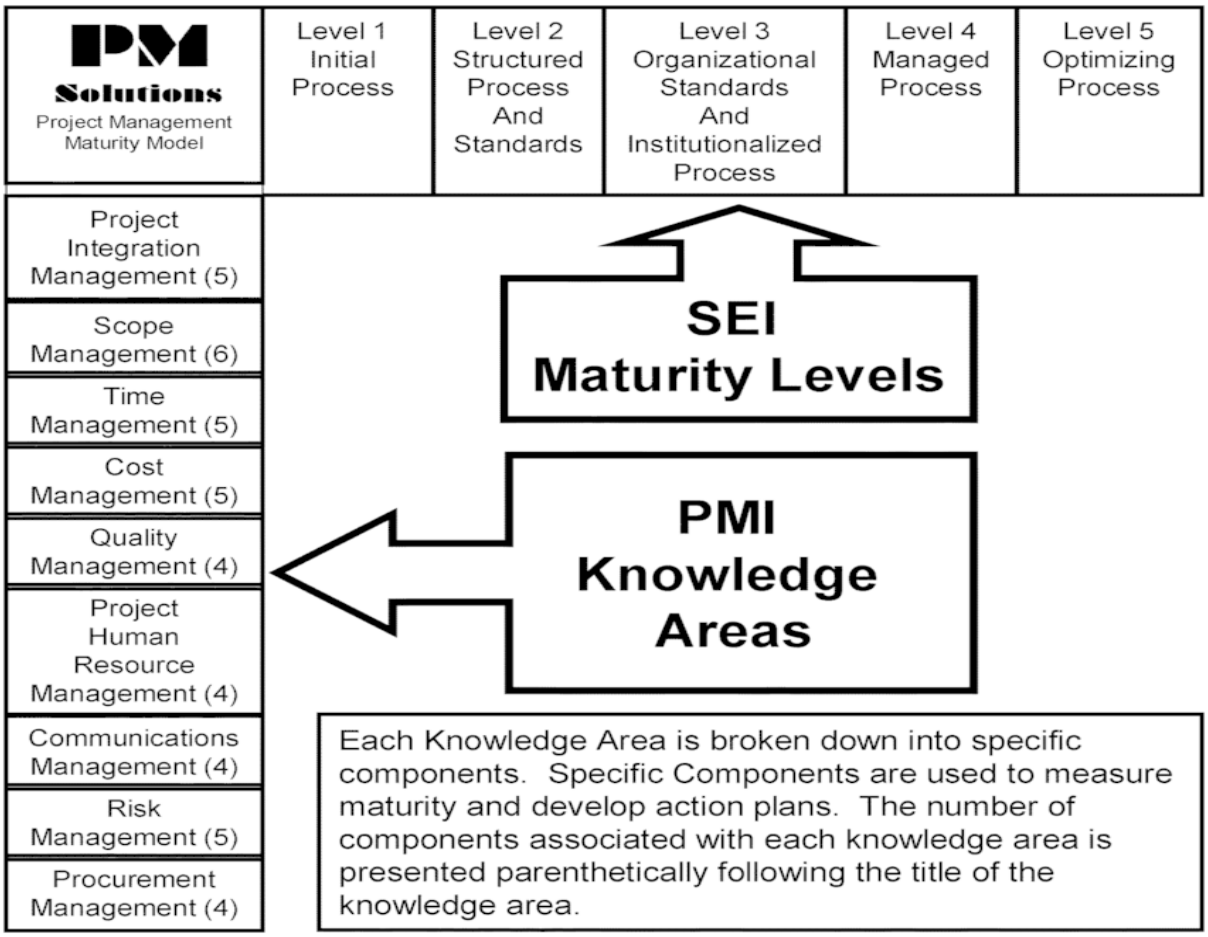



**Figure 2.3: Project Management Maturity Model**

Source: (Grant & Pennypacker, 2006)

Project success has become a source of organisational competitive advantage, therefore, it is becoming a concern for more and more organisations to assess and improve their project management capabilities. To this end, "organisations require PMM's in commensuration to the additional information of which Project Management Maturity Models will assist in helping them to gain competitive advantage" (Farrokh & Mansur, 2013). The application of such models to assess PMM in project management develops more competitive organisations in the competitive market (de Souza Scotelano, da Conceição, da Costa Leonídio, & de Jesus, 2017).

There are several maturity models operating in a range of business management fields, and particularly in project management. Mature organisation are characterised by inter-group

communication and coordination, consistent methodologies, distinct roles and responsibilities, and formal management commitment (Langston & Ghanbaripour, 2016).

Flexible decision-making process is a required in projects for sustainable performance. Ad hoc decision-making might be limited to certain circumstances and situations that do not merit project processes or does not an influence other areas. It appears organisations are more successful with projects and decision-making processes when moving up on the maturity scale (Hepworth, Misopoulos, Manthou, Fyer, & Michaelides, 2017).

"Achieving efficiency for different processes and practices of organisations requires the adoption of project management maturity models" (Brusoni & Rosenkranz, as cited in Wang, Alashwal, Asef, Abdul-Rahman, & Wood, 2018). The PMM position the underlying capabilities against each other on a matrix. The position of capabilities on a maturity matrix depicts the different maturity levels. "To guide the organisation in the incremental development of the functional domain, improvement actions are associated with the capabilities" (Jansen & Yang, 2020).

Project Management constitute 'a general-purpose management tool to facilitate successful projects completion. This must be based on stakeholder satisfaction within the traditional constraints, scope, quality, cost, and a schedule' (Hutson, as cited in Demir & Kocabas, 2010). PMM evaluation is traditionally based on models used to evaluate management in general (Kostalova & Tetrevova, 2018). PMM has been achieved across various types of organisations, and is increasingly acknowledged as contributing to enhanced shareholder value. Some PMMM claim to facilitate the comprehension of organisational project management; and the application as an instrument towards assisting with strategic project management planning, in addition to seeking maturity and excellence (Špundak & Štriga, 2010).

When using any tool, it is important to consider its purpose, PMMM, is defined as 'to provide a focus on an organisation and its ability to implement strategy through projects' (Brookes & Clark, 2009). The model should enable the organisation to identify the necessary steps needed for improving practice. Determining the PMM level of an organisation at a given point in time is of little or no value unless it can be utilised to identify actions to improve their PMM level.

Organisational improvement cannot be reckless nor random. It must be a purpose-driven process. Before an organisation embarks on a significant improvement process, it needs to understand where it is in relation to where it wants to be (Grant & Pennypacker, 2006). PMMM offers a comprehensive methodology to enhance organisational project management capabilities strategically (Albrecht & Spang, 2014).

PMMM provide capability assessment and development frameworks, facilitating benchmarking of project implementation and execution to competitors and or best practice and providing a systematic approach to improvement (Schlichter and Skulmoski, 2000; Hillson, 2001; Foti, 2002, as cited in Seelhofer & Graf, 2018).

PMM is a critical element for strategic planning, providing a methodology, determining and condensing the gaps on resources and quality. As suggested, "you have to be pragmatic about what degree of maturity is required" (Yazici, 2009). "Assessment is identified as the first step towards improvement; one can't improve what one can't measure; formally or informally" (Demchig, 2015).

Maturity models represent theories based on assumptions of predictable patterns, about the staged development of organisational capabilities evolving along an predictable, anticipated, or rational path to maturity (Solli-Sæther and Gottschalk, as cited in Pöppelbuß & Röglinger, 2011) (Röglinger, Pöppelbuß, & Becker, 2012), (Mthembu & du Plessis, 2018).

Khoshgoftar & Osman (2009) define "project management maturity models as frameworks built on top of the project management body of knowledge". Adopting a PMMM allows institutions to methodically plan its project management capabilities and compare it against the performance of its competition and standards set by industry. PMMM elucidate strengths and weaknesses while providing information for benchmarking purposes. This makes PMMM essential professional assessment tools. Organisational performance measurement and the identification of organisational weaknesses and strengths are determined in relation to organisational requirements and goals and also serve as features of the models.

Maturity models are applied to determine the maturity level of an organisation at a given point in time, to determine priorities for improvement and control of the improvement process (Iversen et al., as cited in Pöppelbuß & Röglinger, 2011).

PMMM's provides guidelines to organisations as how to they can move up across the maturity levels in a systematic way, efficient and effective way. By focusing on a specific method within an organisation, allows the organisation to leverage its resources for improvement activities, while getting the support of the organisation behind certain goals. 'Following an objective assessment like this, organisation can prepare its objectives to enhance the capability of its processes' (De Bruin, Freeze, Kaulkarni, & Rosemann, 2005), (Crowford, 2015).

In general, maturity models are linked to PM reference frameworks, such as the Guide to the Project Management Body of Knowledge (PMBOK). "Maturity models provide companies with the necessary mechanisms to identify the key areas of opportunities for improvement in project management tasks. Additionally, they serve to develop comparative indicators for the application of project management practices and techniques across organisations which operate in the same business environment or sector" (Bento, Gomes, & Romão, 2019).

A maturity model serves a to explain how to apply assessments of maturity in a given point in time. It systematically informs on the identification of desirable future maturity levels and guides the implementation of improvement activities. "A maturity model serves a comparative purpose if it allows for internal or external benchmarking" (Röglinger, Pöppelbuß, & Becker, 2012). Internal benchmarking is crucial, particularly in Higher Education Institutions (HEIs). Higher Education Institutions are complex in the sense that you have various schools and faculties, together with different centres and various administrative departments. Project-based management is a challenge to implement right across all the department/centres of the institution. These departments are further divided between administration and academia.

Thus, the organisation will first have to determine which departments have the potential to be project-based departments/centres. Then they need to assess the current capabilities across all these centres/departments. This will allow the organisation to benchmark these departments/centres against each other in terms of their project management capabilities. From this baseline, the institution will be able to move forward in terms of identifying the appropriate methodology that can capitalise on the existing best practices across all these departments/centres. Next, they need to get the buy-in from all stakeholders to move forward. Lastly, they need to ensure they deal with all deficiencies across all these departments/units to level the capabilities. The hardest part will be to make sure that everyone adheres to this new methodology. Once this process is in place, intermittent assessments will have to be done to determine the growth, and then benchmarking with external stakeholders can start to ensure that growth to industry levels can be sought. All this needs to be well-coordinated and will require a dedicated department with the right structure and authority to enforce this new model (Derenskaya, 2017). This will require a mechanism to continuously coordinate and integrate all of this as well as align it to the strategic goals of the organisation.

In summary, project management methodologies and its supporting practices are recognised as a tool to achieve organisational objectives. PMMM's is applicable to the development of organisational capabilities in project management. These models provide guidance to organisations on how to improve on their maturity. This should be the foundation for decisions on investment in project management training, practices and methodologies (Viana & Mota, 2016).

Project success rates are related to project management maturity and the use of suitable project management methodologies. Increased project management knowledge in an organisation is a critical factor for improving project management processes. To develop competencies for improved project management processes, PMM requires the establishment of a baseline to identify the weaknesses, to focus on for enhancing the competencies and improved methods (Kostalova & Tetrevova, 2018).

Many such project maturity models have emerged and became instruments to assess organisations' capabilities at a given point in time and guiding their path to improved maturity (Bento, Gomes, & Romão, 2019). These models will be discussed below.

#### 2.6.1.1 CAPABILITY MATURITY MODEL (CMM)

The origins of the CMM are rooted in a study conducted by the Software Engineering Institute (SEI) in the mid-1980s about the capability of software developers. This led to the development of a new framework which is a software CMM for software. According to Albliwi, Anthony, & Arshed, (2014) "Maturity Models (MM) have their roots in the CMM developed in 1991 by the Software Engineering Institute (SEI), at Carnegie Mellon University and was sponsored by the US Department of Defence (DoD)". The purpose of the model was to meet the needs and features of governmental organisations. Khraiwesh, (2020) defines CMM as "a reference [process] model of mature practices in a specified discipline, used to improve and appraise a group's capability to perform that discipline". The (CMMI) framework

was introduced through the collaboration of the software industry. CMMI provides a comprehensive structure and is frequently employed to improve project methodologies, to produce products of high quality (Bento, Gomes, & Romão, 2019).

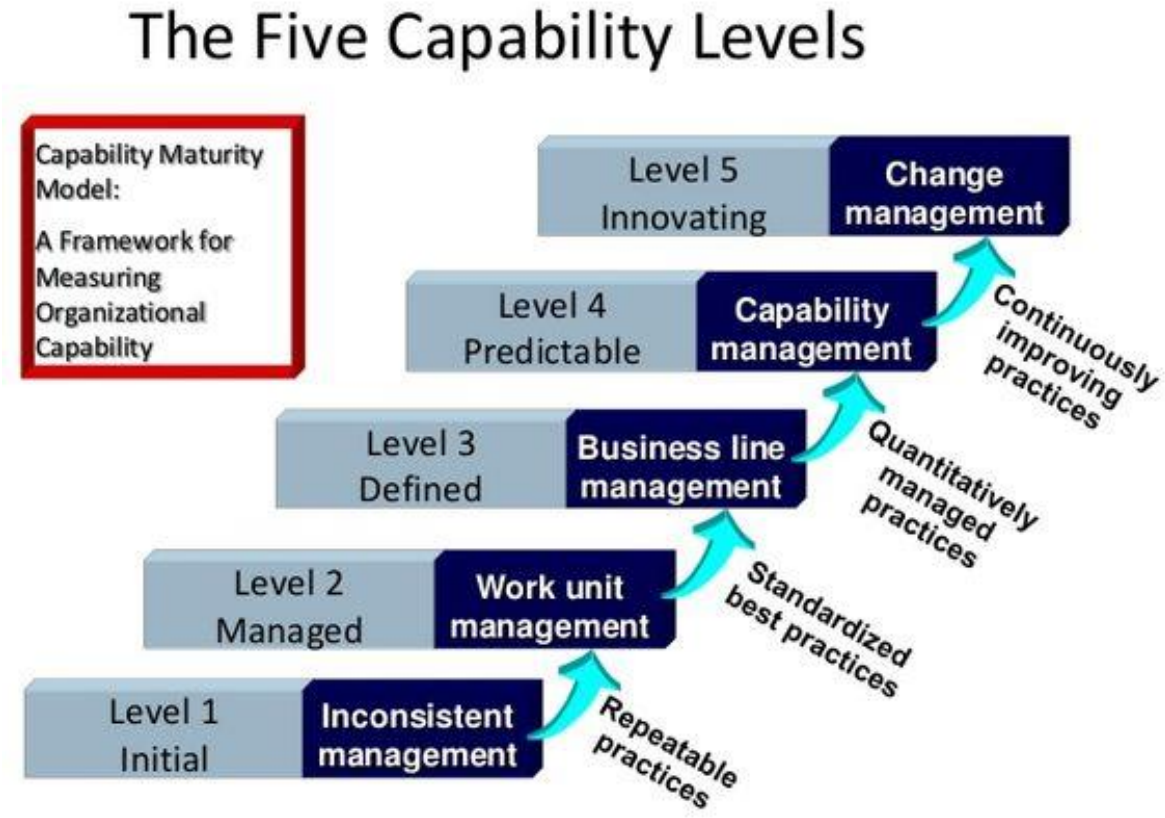



**Figure 2.4: Capability Maturity Model**

Source: (https://i.pinimg.com/564x/ba/4c/93/ba4c9347907a48ac187776f977244777.jpg)

The Software Engineering Institute conducted extensive research on improving the quality of the software development processes. This resulted in CMM being developed as a progressive standard to facilitate the continuous enhancement of project processes in organisations (Paulk et al., as cited in Kwak & Ibbs, 2002).

In the development of the first version, many engineers in computers, electronic, electrical, and mechanical systems participated. CMM implementation significantly improves project performance. The cost of and time spent on detection and correction of defects reduced and the number of defects dropped dramatically. Therefore, "CMMs can be considered not

only as a tool of process optimisation, but also as an instrument of quality improvements" (Titov, Bubnov, Guseva, Lyalin, & Brikoshina, 2016).

"Process maturity has its roots in the Total Quality Management (TQM) movement. The application of statistical process control (SPC) techniques in this movement showed that improving the maturity of any technical process leads to two things: a reduction in the variability inherent in the process, and an improvement in the mean performance of the process" (Cooke-Davies & Arzymanowc, 2003).

The purpose of CMM was the assessment of maturity levels in software development organisations. This was done based on a five-stage scale, and benchmark applicable practices to a standard criterion to develop and maintain their products. CMM are staged support to organisations in prioritising investment decisions, while each stage serves as a stepping stone for the next level of improvement. It should be borne in mind that CMM is focused on software engineering organisations and is not so much applicable to other industries and businesses (Bento, Gomes, & Romão, 2019).

The model identifies five levels through which an organisation must advance: initial level, repeatable level, defined level, managed level and optimising level. To move through the levels and organisation must apply an ordinal scale for measuring their maturity in software process and for evaluating its software process capability. This facilitates the prioritisation of the organisation's improvement activities. The ‘‘prize for advancing through these stages is an increasing software process capability" (Cooke-Davies & Arzymanowc, 2003) and improved software productivity.

The CMM is an interdisciplinary approach to system engineering and was developed by a group of industry, administration and software experts from the Institute of Software Engineering (SEI) of the University of Carnegie-Mellon, United States of America. The model describes the framework of 5 evolutionary phases or levels of capability and maturity of

development processes in an organisation. The model "supports the integration of traditional, independent organisational functions, setting process improvement objectives and priorities, providing guidance on quality processes, and a benchmark for assessing current processes." (Cristescu & Stancu, 2018).

Maturity models is designed provide guidance through maturity levels and a systematic maturation paths. As such, a maturity models can be applied as both a benchmarking and managerial tool' (Pažur Aničić & Divjak, 2020).

"This model relies on the fact that an organisation can achieve a target maturity level only after the implementation of several phased steps" (Albliwi, Anthony, & Arshed, 2014).

The literature on Capability Maturity Processes (CMP) is focused on software process improvements, but finds application in project management (Paulk, Curtis, et al., 1993; Paulk, Weber, et al., 1993, as cited in Pažur Aničić & Divjak, 2020). "The Goal Questions Metrics (GQM) paradigm was further applied in the organisational training process area in CMM. It was applied to defining the measures of specific goals and their specific practices" (Khraiwesh, 2020).

CMM's are popular in many engineering companies. It is used to assess process productivity, to elaborate the programme of business process improvement and to prioritise optimisation efforts across the company. Managerial frameworks that improve efficiency and effectiveness of organisational processes are highly sought after to facilitate organisational change (Titov, Bubnov, Guseva, Lyalin, & Brikoshina, 2016).

There are several maturity models in existence, but typical these models contain sequential maturity levels for essential processes of the organisation to move through. It starts with the initial state where the business processes are performing at its poorest. On the other end, the highest maturity level is characterised by best practices and business processes performing at its peak. CMM's, can help the management of the organisations to define areas

for improvement, prioritise such areas and put a strategy in place to improve the business process, while at the same time monitoring the implementation of such a strategy (Titov, Bubnov, Guseva, Lyalin, & Brikoshina, 2016).

CMM is accepted globally, high maturity scores on the model became a key requirement for due-diligence in off-shore partnerships (De Bruin, Freeze, Kaulkarni, & Rosemann, 2005). The main reason behind the staged model is to provide a systematic process that facilitates measurement and control of the process. 'The approach also allows for easy benchmarking of both the methodology and the management systems' (Špundak & Štriga, 2010).

#### 2.6.1.2 ORGANISATIONAL PROJECT MANAGEMENT MATURITY MODEL (OPM$^3$)

Another important model used in the project management discipline is OPM$^3$. The model was developed by volunteers from the PMI, it is focused on building and construction. It aims to determine the maturity levels of project processes and practices; it applies best practices as a method to assessment maturity. It provides a framework for developing improved capabilities to underpin projects, programmes and portfolios and support organisations in realising strategic goals through project success (PMI, 2013; Silva et al., 2014, as cited in Langston & Ghanbaripour, 2016).

The PMI developed the OPM3 in an attempt to assist organisations in contextualizing their current levels of PMM. "This model was recognised as one of the most notable maturity models in project management and construction management" (Cooke-Davies 2004; Willis & Rankin 2012). Different aspects of project management like risk management is incorporated into the model (PMI, as cited in Wang, Alashwal, Asef, Abdul-Rahman, & Wood, 2018).

| Maturity Level | Key Point | Performance | Effective Span | Key PM Focus | Planned Deliverables |
|---|---|---|---|---|---|
| 5 Optimizing | Integration within business strategy & operations | Continuously improving | Enterprise | PM Center of Excellence Continuous Improvement | • Improvements<br>• Knowledge base additions |
| 4 Refining PM Process | Solidify gains & expand | Comprehensive; high Quality; high customer satisfaction | Multiple Business Units | Committing to a project management culture | • Performance measurement & improvement<br>• Knowledge base (e.g., estimating data) |
| 3 Standardizing PM Process | Macro-level Change | Integrated; positive value-added results | Multiple Project | Implementing PM processes for Governance & multi-project management | • Move to project-based (matrix) organization<br>• Program management |
| 2 Controlling Projects | Stabilize Performance | Local consistency; Short term positive results | Single Project | Introducing a structured PM approach<br>Portfolio controls | • PM Methodology & tools<br>• Measurement<br>• Central project repository<br>• PM Training |
| 1 Defining PM (Common Process) | Acknowledge negative impact | Ad hoc; heroes, inconsistent results | Pilot projects; single business area | Using inconsistent PM processes | • PM Framework<br>• Development methods<br>• PM Training<br>• Executive orientation<br>• Common language |

**Figure 2.5: ORGANISATIONAL PROJECT MANAGEMENT MATURITY MODEL (OPM3)**
Source: (https://www.humanwareonline.com/project-management/center/opm3-project-management-maturity-model/)

OPM3 creates and promotes a critical link between strategy and project success. The model is considered as the most sophisticated maturity model in the field of project management, but also the most resource intensive. It is rooted in the PMBOK and benchmark organisational activities against many standardised best practices. This is done by measuring best practices in project environments through the examination of capabilities and related achievements. The model only classifies organisations into four levels of maturity development, compared to the five levels in most other models (Pinto and Williams, as cited in Langston & Ghanbaripour, 2016).

OPM$^3$ looks at the organisations capability to select and manage projects towards the most efficient achievement of strategic goals. Maturity levels can be improved through knowledge management, project control, and documenting project implementation (Derenskaya, 2017). The fact that the model is based PMBOK, provides a solid underlying theoretical base with the capacity to assess organisational maturity at all levels. It is the only

PMMM that is considered multidimensional; it has the capability to assess project, programme and portfolio management maturity in all organisation types. The logic behind the multi-dimensional nature of the model is that it enables organisation that work in multiple project environments to conceptualise project management as a holistic method spanning the entire organisation. Thus, allowing organisations to address all the project management domains, in relation to the organisations needs and capacity (Farrokh & Mansur, 2013). When project management methodologies are implemented across the institution, it will have to be able to deal with different layers of project implementation, from the programme level to the project level. The consistency that comes with such an approach will ensure that uncertainty is dealt with.

Following the CMM approach, most of the Mixed Methods (MM) has a five-stage scale. This schema guarantees the visualisation of the maturity, from their immature Project Management (PM) realisation to a more structured level needed to support projects, i.e. through best practices (Bento, Gomes, & Romão, 2019).

'Best practices extracted from the Prince2, along with capabilities, outcomes, and key performance indicators, narrative explanations, and navigational guidelines best describe the $OPM^3$ (Khoshgoftar & Osman, 2009). This is a clear example of where industry pressure facilitated the emergence of a specific model that is applicable to the broader industry. Such a model could be possible for universities in developing countries, to create a university project management methodology and develop maturity in all institutions based on that model.

If an organisation plans to improve its maturity, $OPM^3$ is designed to assist in determining the specific capabilities required to reach their goals around best practices. The model also provides a sequential process that will support efficiency (Khoshgoftar & Osman, 2009). This might allow universities in Sub Saharan Africa to be in a better position to negotiate project implementation modalities with donors or clients if they can show that they

have specific capabilities and that these capabilities are assessed and certified. Donors and clients will then have to take on more responsibilities in terms of making sure that they provide all the required resources to fit within this framework. The efficiencies from such a system will add value to the competitive advantage of universities in Africa because they will be able to compete for international tenders with this level of competency. If the system is built to the extent that all universities can share their best practices on an annual basis, the system can be improved continuously, and maturity benchmarks can be set continually.

According to Jugdev and Thomas (2002) maturity models are designed to identify project or organisational strengths and weaknesses and to provide the required information for comparison of processes (Khoshgoftar & Osman, 2009).

$OPM^3$ as a model bridges the gap between the strategy and the project implementation. The model is able to realise this through a series of iterative assessments focusing jointly on management at three organisation levels, namely: projects, programmes and portfolios, as well as concentrating on organisational strategies. The $OPM^3$ also assesses the PMM of the organisations through the following four stages of process improvement:

- The possibility for organisations to know which are the best practices in their industry and market;
- The balance between reputation and best practices, implementation of improvement plans and evaluation to be continued;
- Reducing the variability of project performance and increasing its predictability; Improving management and stakeholder satisfaction; and
- The focus of project efforts on strategic goals (Bento, Gomes, & Romão, 2019).

OPM3 is implemented through a three-phase process: knowledge - understanding the model and its implementation; assessment - benchmarking current PM infrastructure to PM best practices; improvement – prioritising changes required and implementing such changes

(Bento, Gomes, & Romão, 2019). The three dimensional characteristic of this model lends itself to fit into the theoretical framework, CR, that will be used in the research.

The OPM$^3$ offers a more efficient and effective method to identify and terminate projects not tied to the organisations strategic goals and to improve cost saving cost saving (Bento, Gomes, & Romão, 2019). The link of projects to strategic level goals and objectives of the organisation is critical. It is one of those elements that are challenging for many project-based organisations that implement projects for clients. When Centres of Excellence implement projects that are sponsored by donors, they need to make sure that they understand the strategic importance of the success of that project for the donor as well as for their own organisation. These objectives will have to be harmonised to some extent to ensure that project success is perceived from the same angle. Donor projects are often hailed as a success by donors while the local partner institution does not feel the same way. How many centres have been established across African universities and died the minute the donor funding ended? This could be an indication that it was not tied to the strategic goals of the host institution, and therefore, the institution did not deem the centre fit for institutionalisation.

Among the project managers interviewed, the opinion regarding the improvements provided by the adoption of OPM3 for their projects was not consensual. Some of the interviewees had the opinion that the single use of OPM3 did not guarantee improvement in the projects, as in their opinion, the results depended much more on the capabilities of the project managers than on the methodology adopted. What happened was that the model only provided recommendations for the organisations in the form of useful PM practices, and it was up to the project managers to implement them in the best possible way to obtain the necessary improvements (Bento, Gomes, & Romão, 2019). This implies that the maturity of the project managers' project management knowledge is critical. For this reason, it is essential that the PMM of the project managers needs to be assessed to determine project management

capabilities of the project team. The project management maturity of the whole project team needs to be brought to similar levels for that matter. If the methodology is applied continuously and consistently, the entire team will need to be on the same level. This might be one of the challenges in academic environments where too much of the required knowledge is held in individuals and not enough of this knowledge is shared to a point where it can impact the operations of the whole centre or department. As indicated earlier, communication and trust are some of the critical elements that can improve project success. These elements can only be built through transparency, engagement and communication.

In the end, each model will have to be carefully studied to determine which model is suitable for a particular organisation or industry.

#### 2.6.1.3 KERZNER'S PROJECT MANAGEMENT MATURITY MODEL (KPM$^3$)

*Kerzner (2017) states in (de Souza Scotelano, da Conceição, da Costa Leonídio, & de Jesus, 2017) that, "despite the importance of defining a project management methodology, it does not guarantee its success in terms of performance during its execution."*

Project maturity is described by Kerzner (2001) as "gradual progress from a basic knowledge of the nine knowledge areas and a single process of project management to a singular methodology across the company". The organisation qualifies at Level 3 by achieving this. Levels 3, 4 and 5 are repetitive, creating a continuous benchmarking process (Level 4) and improvement (Level 5) of the singular methodology (Level 3). PMM is not an end on its own, but a means towards excellence (Grobler & Steyn, 2006).

PMMM becomes an essential strategic tool allowing an organisation to benchmark its capabilities with its competitors. PMM assessment models provide a tool for pursuing project management excellence, which is a building block for project success. PMMM provides a measure of an organisations effectiveness to deliver projects and a tool to compare project

management capabilities organisations require to reach particular project management capabilities. Kerzner expands a little more on the maturity model and its value to organisations. Importantly he indicates that it is a tool for establishing excellence in project management practices in an organisation (Khoshgoftar & Osman, 2009).

Despite some of the criticisms against KPM$^3$, namely that the model is easy and does not include the assessment of portfolio management processes. The author selected the model because it was designed to meet the needs of a broad array of industries and cultures, especially for the different nature of the Centres in this thesis. Furthermore, customising the model is acceptable. KPM$^3$ is based on process management maturity assessment developed to assess Business Process Management implementation. Importantly, KPM$^3$ assessment is designed for an organisation to empirically identify opportunities and challenges in relation to their project management practices. The five levels model elucidates areas for improvement where the most value can be added towards the organisation achieving implementation goals. This model is selected based on its simplicity, and it real-life application. The instrument has also been validated within several international organisations (Yen, Peng, & Gee, A case study assessment of project management maturity level in the Malaysia's IT industry, 2016). The same model will be used in this research for similar reasons. The project management knowledge levels across the various centres of excellence and institutions are assumed to be very different. Therefore, a simple tool was chosen. The instrument has been used across many industries and will allow for better benchmarking of the findings across other industries if required. Kerzner's model comes with an assessment tool and analysis model for the instrument.

KPM$^3$ is a good model for the measurement of project management maturity, which creates a strategic plan for moving project management forward in an organisation, as well as agreeing how a company can achieve superior levels of project management maturity (Yen,

Peng, & Gee, 2016). The model is designed to take an organisation through the whole process of maturity from t assessment to strategies to implement to achieve higher levels of maturity.

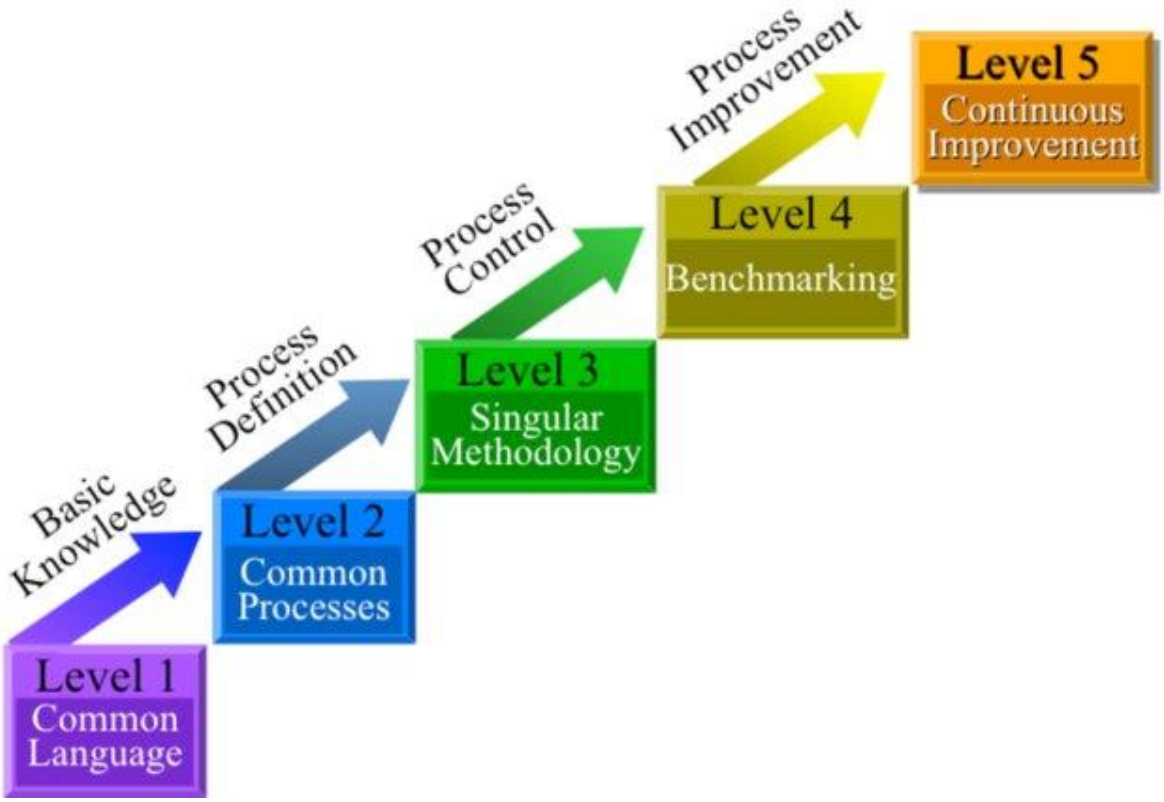



**Figure 2.6: Kerzner's Project Management Maturity Model (KPM$^3$)**
Source: (Kerzner, 2001)

"Collaboration and cooperation are interchangeable terms which are defined as a recursive process where people or organisations work together in an intersection of common goals by sharing knowledge, learning, and building consensus" (Dietrich et al., 2010); in (Bond-Barnard & Steyn, 2015). KPM$^3$ can assist in facilitating the pursuit of these common goals. The maturity model can assess the levels of maturity across the various partners to ensure that they are at comparative levels of maturity in terms of their project management capabilities. This will make cooperation/collaboration much more manageable since the common understanding of the project management process will make it easier. Organisations can learn from one another while building common knowledge. If partners are not at the same

level of maturity, building common knowledge will be challenging, particularly if they are not aware that they are not at the same level. If they are aware of the differences in levels and still decide to cooperate, then they know that one partner will have to assist the other in building those capabilities during the cooperation.

Kerzner emphasises effective communication, effective cooperation, effective teamwork and trust as the four critical elements that facilitate project management excellence (as cited in Morales, 2014). Communication has been identified as a CSF for project success across all models and is supported by literature in the field. The same goes for trust and teamwork, which in turn are essential for cooperation.

"The value in a generic methodology lies in the ability to develop a model that is highly generalisable and enables standardisation" (De Bruin, Freeze, Kaulkarni, & Rosemann, 2005).

## 2.7 SUMMARY

Learning from projects and managing the knowledge that is created through projects seems to be a challenge. If you want to learn from projects it means you have to collect the data, you have to develop a process to convert that to information, and you have to convert that information into knowledge. After all of this, processes must be developed that will allow you to disseminate the knowledge to all relevant stakeholders in a medium appropriate to their learning style. Then you need to continuously measure if the learning took place and if the knowledge has an impact on the performance of the Centre. There must be a process in place that can measure the maturing of the knowledge in the organisation.

The improvement of processes and maturity must be part of the improvement projects (IPs), not only seeking to maintain but to improve processes quality, products or service excellence (Maciel-Monteon, et al., 2020).

The education sector is also interested in achieving continuous improvement in its processes, so they must examine what is being done in other sectors. Continuous quality

improvement is attained when organisations apply problem-solving and problem mitigation strategies. IPs comprise these strategies, as they encompass systematic improvement actions that can be executed through different methodologies (Maciel-Monteon, et al., 2020).

In the end, it is about making sure that project management is the right methodology for you. Secondly, it must be determined which project management methods is the best suited for the project, to serve as a cornerstone for developing one's own methodology. There are no one size fits all; the best project management methodologies are the ones that can harmonise the organisational knowledge and experiences with the project-specific environment to come up with the best possible solution.

This is a lesson that donor agencies can learn from industry. They will have to start to assess the capabilities of their proposed development partners to determine the weakness and strengths of these partners. The current system of assuming that these partners have the right capabilities creates a very negative image about most of the development partners in developing countries when they fail. The reality seems to be that they are expected to perform way above their capabilities. Very little is done to improve their capabilities during the project implementation itself. When the project fails, they are blamed. The literature is littered with statements about how in particular organisations in Africa do not have the capabilities to implement projects. The question is what is being done about it? Why can't donor agencies not spend a bit of time and money on assessing the capabilities of partners first and assisting them to attain appropriate competence levels during the implementation of the project? In that way, the partner will be sustainably capacitated for the next round of funding or the next cooperation engagement. All the money that is wasted on failed projects can be invested on building the capacity of partners in developing countries. If one looks at many of these funding programmes creating Centres of Excellence across universities in Africa, one critical element missing is a CoE focusing on Project Management, a centre that focuses on project

management in each round of funding from each donor. Such a centre could have the responsibility to assess the capacity of all the other centres and to build the capacity of these centres throughout engagement with a specific donor.

The next chapter will look at the design methods and procedures pre-empting the empirical part of the study.

# CHAPTER THREE

## 3.1 THE DESIGN METHODS AND PROCEDURES

### 3.1.1 INTRODUCTION

This chapter will look at the theoretical methodology and the research approach. The Critical Realist Methodology will be applied to the research. The approach will be accentuated by concepts such as uncertainty and looped learning.

## 3.2 METHODOLOGY FOR LITERATURE REVIEW

The methodological approach to the literature review included the use of specific search engines including EBSCO, Web of Science, SCRIBD, ACADEMIA, Research Gate and Mendeley. These search engines contributed most articles that were used.

All the searches were started with a discipline first, and based on the focus of the study, this was predominantly project management. This was followed by keywords that would include maturity, higher education, success factors and knowledge management.

The top 50 articles were considered by reading the abstracts to determine relevance, trends, use and popularity by the number of citations. As a rule of thumb only articles with a citation rating of more than 20 would be used unless it is a very new article or an article that might be considered relevant in terms of supporting a trend.

All abstracts were read to determine the focus of the article and how the article relates to the central concepts subsumed in the topic. The empirical evidence would then be considered and then correlated with how it corresponds or differs from the arguments and ideas in this study.

The articles that were read fully would be considered for gaps that they expose or future directions that they might identify.

What emerged from this process is that the key focus areas of the study, project management maturity in Higher Education has low research levels, since only about 6 articles

were found. Secondly, looking at the theoretical approach, which is (CR), minimal research exists in relation to CR being applied to project management research, and only one article could be found. This should increase the chances of this study contributing to the field of project management and the concept of maturity.

There was also a focus on articles from and relating to project management in developing and emerging economies. The reason being that this is where a lot of the challenges relating to project management maturity are experienced. The idea being that these should shed some light on the current debates about project management maturity.

## 3.3 RESEARCH APPROACH AND DESIGN

Research is about making choices, about what elements of a reality to emphasise and the postulations underscoring such a reality. These postulations are in turn used as the building blocks for theories, espousing a specific reality. Such a reality is knowledge viewed from a particular angle, contextualising reality. To paint a complete picture of a reality, individually contextualised knowledge must interact with how others view the same reality, to fuse into a common reality. The ignorance, indeterminacy and incommensurability that is inherent to knowledge must be dealt with through developing a common knowledge, a common language and a common measurement framework around such knowledge. Clarity is required about how reality can be known, through the criteria for judging the truth of a statement about reality (Huckle, 2019). This process will create consensus between the explicit and implicit postulations organisations apply towards interpreting the world and the society within which it operates (ontology) and the nature of their reality in relation to how the knowledge about that reality that underpins those postulations is created (epistemology) (Sorrell, 2018). Through such ontological postulations knowledge is conceived and by necessity, the investigation of phenomena is systematised (Wikgren, 2005). This determines what is possible to know, the reality that exists and how it does so (Huckle, 2019).

Reality is, therefore, extracted from a melange of both tacit and explicit knowledge. This creates a multi-dimensional framework; researching in such a framework demands a research method allowing for both the exploration and confirmation of knowledge, transcending the tacit and explicit realities (Mason, 2006). “Tacit knowledge is personal know-how and is primarily acquired through education, training and experience” (Addis, 2016), it is part of the individuals experiences, involving intangible factors such as personal beliefs, perspectives, and values. Explicit knowledge is 'readily available'; but it must rely on being tacitly understood and contextualised (Addis, 2016); it can be codified and structured in a way that makes the knowledge easily transmissible. In the case of project management most of the project knowledge that is useful, however, is in people’s heads: it is tacit. It is argued that when this knowledge is converted from tacit to explicit knowledge it is diluted (Morris, 2002). Explicit knowledge forms only a small part of the knowledge that is applied in projects. Explicit knowledge only exists where tacit knowledge sources intersect to create a common reality (Addis, 2016).

Traditional paradigms of research do not really accommodate the use of multiple research methods from different methodological approaches. As the field develops, theoretical frameworks have emerged that provide practical guidance for mixed methods (MM) research design. “Among the most prominent is that of CR. Critical realism, is often seen as a middle way between empiricism/positivism on the one hand, and anti-naturalism/interpretivism on the other, thus introducing a more nuanced version of realist ontology” (Zachariadis, Scott, & Barrett, 2013).

When research is both exploring and confirming knowledge, it will require, by its nature. the utilisation of both qualitative and quantitative data. Such a research method, in turn, requires a theoretical framework capable of guiding mixed-method research designs. “CR embraces various methodological approaches from different philosophical positions taking a

critical stance towards the necessity and validity of current social arrangements without following the extant paradigms assumptions at face value" (Zachariadis, Scott, & Barrett, 2013). This makes CR particularly attractive for the study of project management, which is considered as consisting of both art and science. Much of what is valuable management knowledge and project management knowledge, is thus inherently not scientific, unless and until it becomes explicit and can be addressed according to scientific practice (Morris, 2002). The knowledge must be tried and tested and should support processes that allow for the repetitive application of that knowledge towards success.

"For this reason, when the critical realist theoretical framework is applied to research, mixed-method research is often recommended. While quantitative data helps in uncovering observable patterns" (Tsang, 2014), qualitative data, helps in exposing the mechanisms that emerge from the elements of a physical and social structure to produce the events of interest and yields rich data. However, the critical realist perspective also recognises that each event is not only dependent on the causal powers at work within a social structure but also on the continuously changing contextual conditions and the evolving properties of the structure. Therefore, a causal explanation in CR accounts for a set of existing and enacted mechanisms, along with the impact of any structural factors and contextual conditions that generated the outcome being studied (Wynn and Williams, 2012), (as cited Saxena, 2019).

To deal with this multidimensional nature of reality, in CR ontology, reality is stratified into three levels: the real, the actual and the empirical.

## 3.4 CRITICAL REALISM (CR)

### 3.4.1 INTRODUCTION

*"Importantly, both the generative or causal mechanisms of the real and the events of the actual are not necessarily reflected in the experiences of the empirical. Therefore, one cannot rely on the empirical to reveal the causal effect of phenomena. Seeing or naming*

*something creates more confidence that it exists, it does not mean that if we cannot see or name it, that it does not exist. One of the most distinctive features for realism is its acceptance of causal criterion. Therefore, the reasoning for the existence of something unobservable can be made, by seeing the effects of it"* (Lindley & Lotz-Sisitka, 2019).

The open systems view taken by CR is one that does not provide for causal mechanisms that operate in the same way at all times and in all contexts. Still, it does develop an understanding of causality. As Njihia and Merali (as cited in Heeks & Wall, 2018) explain, CR "should tell us with good reason why things are as they are now and where they could be heading, based on the causal tendencies of identified generative mechanisms".

Since it is impossible to control an event as an independent manifestation, the only rationale is to try and control the underlying causal interactions of mechanisms, structures and agents.

### 3.4.2 CRITICAL REALIST (CR) METHODOLOGY

Realist researchers seek to explicate the underlying "cause" or mechanisms that generate observed occurrences. Realists see the reality as consisting of strata of reality, these layers can interact with other layers to produce new mechanisms (Eastwood, et al., 2018). "It seeks research to be values-driven: driven explicitly by the values of emancipation. This means recognising how the social structures and mechanisms of the real domain can sometimes serve to generate events and processes that are oppressive and outcomes that are unequal" (Heeks & Wall, 2018).

Stigendal & Novy (2018) surmise that CR claims that 'there are not only signifiers (e.g. words) and "signifieds" (concepts) but also referents. This means that knowledge differs from what it refers to. One way of making sense and creating the meaning of reality is by producing knowledge. Knowledge is produced with references as a foundation. References, in turn, are based on unities of signifiers (words) and "signifieds" (concepts), from which we make sense

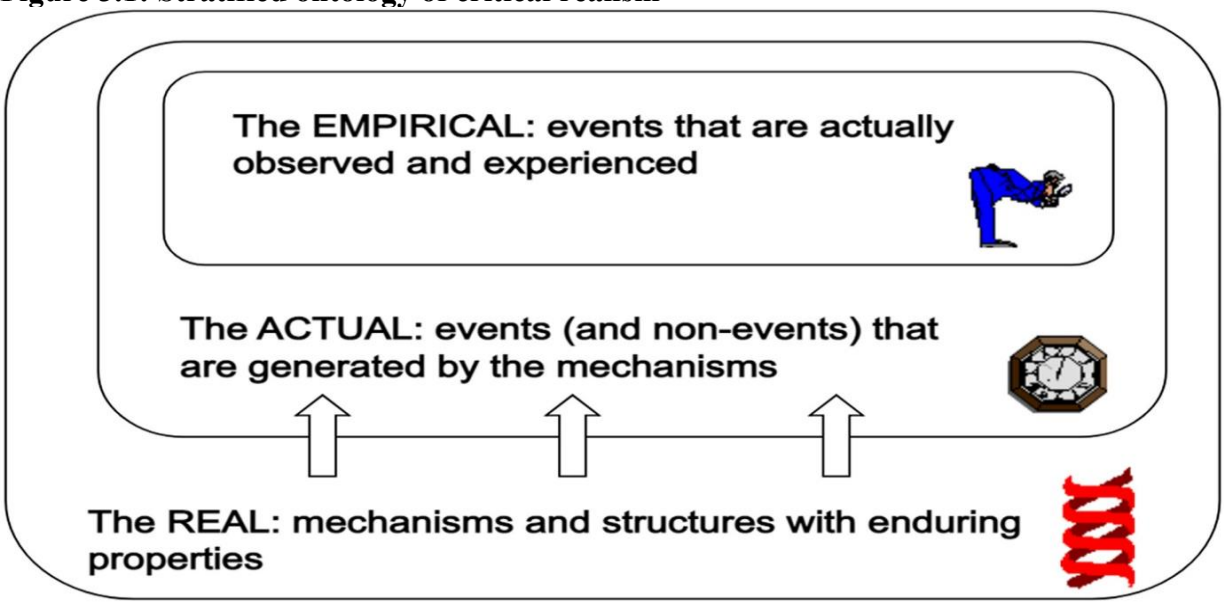
of, creating referents. Referents can be both observable and non-observable objects. These objects that we focus on determine real phenomena. As observable objects, referents belong to the level of reality that CR calls the empirical.

"If successful, knowledge becomes a reference, thus, also meaning that it is reproduced as a referent, (referents are the raw material that knowledge production aims to make sense of and improve the understanding of, unities of signifiers (words) and "signifieds", (concepts), that can be both observable and non-observable objects" (Stigendal & Novy, 2018).

CR works 'at the empirical level (conceptualisation and contextualisation) and the actual level (the actual things, individuals, events and engagements that we sense/observe). It also investigates and considers most importantly, the origins, workings and explanations found at the third deeper unseen real level: powerful influences and causal mechanisms that are only captured through effects' (Alderson, 2020).

CR ontology is stratified into three dimensions, the real, the actual and the empirical. This allows for the researcher to break down the research across these dimensions, looking at the mechanisms involved, the interaction of the mechanisms, the outcomes of those interactions and the events produced by those relationships. This provides depth to the research.

**Figure 3.1: Stratified ontology of critical realism**




Source: (Heeks & Wall, 2018)

"Project management presents a complex activity with many factors and participants which often lead to unpredictable obstacles and uncertainty" (Bach, Zoroja, & Čeljo, 2017). This research seeks to investigate the path of project management knowledge through the complexities of project management the methodology and practice, with project management success as the final destination, using the critical realist approach as a map to move through the dimensions of reality.

#### 3.4.2.1 EMPIRICAL

*'Critical realism's understanding of the empirical domain allows for different perceptions of common events. This legitimises an observed reality: that different individuals and groups will express different views'* (Chib, Ale, & Lim, 2012).

'The third layer of the critical realist dimensions', the empirical layer emerges from these events, which essentially is the realm of human experiences and observations. The empirical is known as the transitive, or changing world and consists of multiple and varied socially determined conceptions of reality' (Lindley & Lotz-Sisitka, 2019). Within the actual realm, human experiences and observations of the events are generated. CR hypothesises that because of the underlying, intransitive structures and mechanisms of the real domain, humans do not experience things directly, but just images of things in the real world; hence, they cannot be measured directly by research. Thus, what is seen is only a part of the bigger picture (Bhaskar, 1975; Saunders et al., 2007, as cited in Biedenbach & Muller, 2011). "There is consensus that the world can only be known partly and fallibly, and that progress in knowledge involves working towards, though never reaching, final truths about it" (Alderson, 2020).

The rest of empirical reality is contained within the actual and the real. Therefore, the context of any experience shapes the experience: it is not objective but contingent (causal) and transient. Different observers will give alternative accounts of events depending on, for

example, own historical experiences and positioning within social structures (Dobson, as cited in Heeks & Wall, 2018).

Lindley and Lotz-Sisitka (2019) explain that since the domain of the empirical is defined by what is experienced, the knowledge and information available in the agent or structures determines a response to the manifestations of the objects and or the events they engender, although these events need not be observed or experienced as real. The impact or manifestation of the outcome of a project might be experienced, although the actual project might not be experienced. For involvement in a project it is not required to experience its impact. Knowledge about a project that took place is not a requirement to experience its impact.

The empirical / observed level is the realm of events. It is understood as a subset of the actual. It consists of experiences of events via sense, perception and observation, and or actualisation through measurement. As mentioned previously, the knowledge and information underlying this experience are critical for this process. Knowledge is sequentially built on information and data. Measurement requires standards for comparison (benchmarking) to deal with the incommensurability - a lack of common measurement, for evaluation (Bird, 2008), (Gupta, 2015).

> *"Knowledge is a fluid mix of framed experience, values, contextual information, expert insight, and grounded intuition that provides an environment and framework for evaluating and incorporating new experiences and information. It originates and is applied in the mind of the knowers, tacit knowledge. In organisations, it often becomes embedded not only in documents or repositories but also in organisational routines, practices and norms."* (helpjuice.com, 2020).

Events are observed and the changes in the environment are sensed. Measuring such changes requires a framework and parameters. A methodology should support this - an

ancillary set of rules and procedures consistently applied to guide research and inquiry (Huckle, 2019) into such an event.

The change brought about by this process itself can manifest as an event. At this level, events or the manifestation thereof can be measured empirically and are often explained through 'common sense'. Still, these events are always mediated through the filter of human experience and interpretation. If different agents in the same structure measure the same event differently, they will create different understandings of the same event or potentially perceive two different events altogether. This is the transitive level of reality, where social ideas, meanings, decisions, and actions occur – but, importantly, these can be causal (Alderson, 2020).

The "CR debate draws together and appreciates the complexity of each concept or phenomenon within their relations to larger totalities. CR connects continuity and change, besides many other seemingly irresolvable dichotomies, in constant dynamic interaction" (Alderson, 2020).

Events cannot be controlled in the empirical dimension. In this dimension, events are only observed and experienced. Influence can only be exerted over events in the actual or the real dimensions, where the mechanisms that interact exert their power to create the events.

#### 3.4.2.2 ACTUAL

*While we make sense of these impressions and experiences, we can understand them as expressing a specific non-observable content associated, in turn, with the second level of reality, called the actual* (Stigendal & Novy, 2018).

The domain of the actual is impregnated with events, "specific happenings resulting from causal mechanisms enacted in some social and physical structural context" (Williams & Karahanna, 2013). However, CR rejects linear notions of causality between mechanisms and events. It takes an open systems view of the world in which multiple mechanisms intersect,

thus creating a "contingent causality" that is context-dependent (Smith, as cited in Heeks & Wall, 2018).

'The intersection of these mechanisms extract the second layer of reality, the dimension of the actual. It is the reality of events that happen when (and if) generative mechanisms of the real are activated. As per generative mechanisms, events must occur independently of the experiences within which they are captured' (Lindley & Lotz-Sisitka, 2019).

In this sense, the observable and measurable outcomes of a project will manifest as an event constituting the layer of the actual, the middle level, but these actual events and outcomes may not be observed by humans. At this level, there is no filter of human experience. Events occur whether or not humans experience or interpret them, and these true occurrences are often different from what is observed at the empirical level (Volkoff & Strong, 2013); (Poirier, Forgues, & Staub-French, 2016); (Fletcher, 2017).

The domain of the actual in turn is considered a subset of the real and includes the events as an outcome that occurs owing to the enactment of the causal powers of structures and mechanisms. The domain of the actual is comprised of events that take place when these structures and powers are activated. The causal relationship between project knowledge and project success is about the causal interaction between all the structures and stakeholders that are involved with a project and the outcomes these interactions produce (Volkoff & Strong, 2013), (Poirier, Forgues, & Staub-French, 2016), (Fletcher, 2017). This happens in an uncertain environment since there is no way to determine how other stakeholders will react to our actions – indeterminacy (Spender, 2014). When a project is being planned and implemented all the models, facts, techniques and stakeholders come into play in a structured manner.

### 3.4.2.3 REAL

*"The realist understanding of how the world is ontology includes the notion of a hidden or "real" domain where mechanisms generate forces that result in the phenomena which we observe"* (Eastwood, et al., 2018).

These mechanisms are both founded and created by social structures within the dimension of the real. The real contains generative mechanisms – these causative structures stimulate the development of observable events. These mechanisms have an "intransitive" independent reality, detached from human thought or belief: they are not merely social constructions. An example, project-related mechanism could be a project management methodology that attracts users and supports the development of mechanisms around them (Heeks & Wall, 2018).

> *"The real is whatever exists, whether are aware of it or not. The real is known as an intransitive or unchanging world, which is made up of generative mechanisms such as structures with properties and causal powers. CR facilitates a deeper understanding of the structural, generative mechanisms at the level of the real. That gave rise to deep-seated and long-standing contradictions, events and empirical experiences of such events as found in the organisation"* (Lindley & Lotz-Sisitka, 2019).

'In addition, by referring to the mechanisms of the real domain, CR allows for an rationalisation of why those differences occur' (Heeks & Wall, 2018). CR provides exciting predictions in shifting attention toward the real problems that are faced and their underlying causes and away from a focus on data and methodologies (Mingers, Mutch, & Willcocks, 2013).

Critical realism contextualises issues; it requires an investigation of context because the domain of the real represents context. Only within CR is context an integral and required component. This coerces the involvement with context to focus on what is present in an

organisation - relations, systems, ideas, and resources, rather than conceiving contexts solely in terms of lack or absence (Njihia & Merali, as cited in Heeks & Wall, 2018).

The domain of the real constitutes a world independent of its conceptualisation and includes the entities, the structures and the causal powers inherent to them. It is the realm of the intransitive object, and the structures and the power such an object exerts. An object that is not necessarily linked to anything else, but it is supported by models, theories, facts and techniques and it exerts power over reality. This power is derived from knowledge. This challenges our ignorance as "we can seek to reduce what is unknown, without imagining that the task will ever be finally completed" (Tourish, 2012). If applied to project management, the question is what is it that needs to be known about projects and the supporting project management methodologies to influence its reality.

Furthermore, the stratified ontology of CR identifies the third level, called the real, not only embracing empirical and actual objects but also non-observable and potentials described above. 'Potential-oriented' is the signifier, while the signified is a concept for potential-oriented forms of collaboration. As a term, 'potential-oriented' appeals to those who want to transform existing situations. The real is whatever exists, and that indeed includes knowledge, whether it exists as a potential or as actualised and expressed in an analysis. Thus, knowledge can be both a reference and a referent. The referent exists regardless of what each individuals thinks about it. In order to be able to use it, however, it needs to be made clear to all involved what the knowledge is about (Stigendal & Novy, 2018).

There are two main reasons for ascribing power to knowledge. "The way knowledge is constructed and evaluated, with its underlying concepts and methods of thinking, is seen as a reliable undisputed powerful guide; and then politically, when knowledge is seen to be used by mechanisms or to control access to those mechanisms" (Alderson, 2020).

Project management methodologies could be an example. Project management methodologies can stand on their own. "Project management can be leveraged as a source of competitive advantage for a firm" (Mathur, Jugdev, & Fung, 2014). Through research, these structures and powers that are in play and that shape the world are uncovered. At this level causal structures or 'causal mechanisms,' exist. These are the inherent properties in an object or structure that act as causal forces to produce events (i.e. those appearing at the empirical level). It is the primary goal of CR to explain social events through reference to these causal mechanisms and the effects they can have throughout the three-layered 'iceberg' of reality. "It is to be able to say this inter alia, that we need to distinguish the domains of the real, the actual and the empirical." (Bhaskar, 2008), (Volkoff & Strong, 2013), (Poirier, Forgues, & Staub-French, 2016), (Fletcher, 2017), (Saxena, 2019).

This would allow the research to start firstly by looking at the positive or successful elements of projects as perceived by project staff. Secondly, to look at the events that were responsible for the successful elements of the projects and finally to look at the structures that were in play and the powers these structures had to exert to create the events and the subsequent impact on project success. Maybe in this manner, a stronger relationship between the successful elements of project management and the knowledge of project management can be traced, because by starting with the successful elements and moving back retroductively, the place where knowledge and project success interact could be revealed. The objective of inquiry, therefore, remains to increase what is known and reduced and what is not known (Tourish, 2012) about the relationship between project management maturity and project success. Therefore, critical realist studies explain what is experienced as an event by investigating the underlying structures and relationships that produce the event if they were to be activated under specific conditions (Saxena, 2019).

There are different project management models or frameworks, and each of them is built on different epistemologies and ontologies. Therefore, it becomes cumbersome to compare these frameworks and to compare projects with each other, which are using these different frameworks. Because we are using different measurement frameworks and tools, it becomes complicated, if not impossible, to determine how successful a project was compared to another if different frameworks were applied to these projects (Hsieh, 2016). At the same time, it makes it more difficult to forecast the results of the interaction between the different structures that have to engage in order to create the desired project outcomes - incommensurability (Spender, 2014). The concept of incommensurability is derived from the field of mathematics. It was metaphorically transplanted to mean "no common language " for no "common measure" (Gupta, 2015).

Indeterminacy postulates that uncertainty and the availability of relevant information are directly correlated: in the absence of information, uncertainty is high - when information is made available, uncertainty decreases (Samset, 1998), (Spender, 2014). Indeterminacy is an independent constant in every complex environment. Projects by their nature are complex. Therefore, indeterminacy becomes an inevitable factor in most projects. Indeterminacy is an inherent deficiency in the various structures and elements of a project, such as the contextual information, the underlying processes, explanation of past events which add the change of speed and time as well as the causal relationships between these elements and structures coming into play within the project (Marinho, Sampaio, Lima, & Moura, 2014), exposing a "not-exactly-known" reality (Pfoser, Tryfona, & Jensen, 2005).

#### 3.4.2.4 AGENCY AND STRUCTURE

*"Critical realism regards structure and agency as "existentially interdependent but essentially distinct" (Bhaskar, as cited in Heeks & Wall, 2018).*

From a Critical Realist perspective, there is a distinction between agency and structure. Structures are assumed to pre-exist actions, like a project management methodology, it creates the conditions for actions to be taken, things must be done in a specific way. "New or elaborated project management methodologies may or may not emerge from those actions, but those emergent structures necessarily post-date the associated actions, once the actions were taken, the impact of those actions will influence the project management methodologies, retroductively" (Fletcher, 2017). Through the process of retroduction these causal relationships can be highlighted on a continuum.

Structure and agency have very different properties and powers. They make a difference in their own right and not merely as parts of the sum (Hu, 2018). Structures - like project management methodologies are, to some extent, lasting. They have the power, not to ascertain, but to prompt or deject, to enable or hamper action—so-called "material causality." This is not deterministic causality, but if project management methodologies had not existed, or are contextualised differently, the process of change that projects facilitate would not have happened in the same way. Agents - in contrast, the people who act (agents) have properties such as self-consciousness, reflexivity, intentionality, cognition, and emotionality. These agents can conceptualise methodologies, plans, and pursue objectives, and thus have the power to preserve or adapt the project management methodologies available to them through innovation (Volkoff & Strong, 2013). The project management knowledge is held by agents and is used to operationalise structures.

Human beings exist separately from social structures like class and gender and race. However, these social structures casually determine who gets what, how people are treated, and how people should be punished as determined by the society of which they are part. Therefore, it must be conceded that the limitations of interpreting accounts of social action

purely to illuminate a more thought-through understanding of the existence of social structures cannot be denied (Smith & Elger, 2014).

### 3.4.2.5 RETRODUCTION

Mechanisms need to move retroductively from ignorance through indeterminacy to incommensurability and back. They have to use their knowledge to measure things to classify them and, based on that classification, assign it an identity. Alternatively, they have to look at what is experienced, see the parameters for that identification to determine what is known or not known about it.

Retroduction - literally meaning leading backward, is a mode of inference in which events are explained by postulating (and identifying) mechanisms that are capable of producing them. It implies moving backwards through the domains from the empirical via the actual to the real and represents how the domains are connected within active research. Although it is potentially a one-time movement, in practice, retroduction is generally understood more as part of an iterative cycle. In this cycle, mechanisms are postulated from existing data, evidenced or otherwise through the gathering of new data, and supported or revised or rejected iteratively during the analysis of said data (Easton, as cited in Heeks & Wall, 2018).

**Retroduction** - is more iterative and creative in nature as the researcher constantly moves between empirical and deeper levels of reality to fully understand the phenomenon under study, back and forth between the data and explanation. It involves transfactual thinking because there is a need to think beyond what is observed and experience and starts to investigate the understanding that drives the underlying mechanisms. It has the potential to allow cross-disciplinary understanding (Patel & Pilgrim, 2018). It must be understood that the events observed and experienced were caused by the application of knowledge in certain conditions that activated causal relationships between mechanisms that resulted in the manifestation of

that event. Through an iterative process, researchers improve the understanding of those mechanisms (Saxena, 2019).

Retroduction starts by looking at the event that manifested, then to how that event is perceived and contextualised by those experiencing it and finally to the relationships that made it happen. As a reasoning process that moves from concrete to abstract and back again, retroduction is the 'central mode of inference' in CR (Fletcher, 2017). Retroduction can be contrasted to other research strategies such as deduction or induction, as not merely developing specific claims from general premises nor general claims from specific premises, respectively, but also the mode of inference in which events are explained by postulating (and identifying) mechanisms which are capable of producing them. This paper argues that retroduction requires the 'triangulation' of research methods. Such triangulation can, under certain assumptions, be claimed to unite research contributions in such a way as to transcend the use of specific methods in a disciplinary sense. This follows from distinguishing methods of analysis and research methodology and, in particular, the ontological justification offered for the use of different methods of analysis (Downward & Mearman, 2007).

#### 3.4.2.6 RETRODUCTION IN PROJECTS EVALUATIONS

Retroduction will require that the organisation will have to look at projects from two angles. The ex-post and the ex-ante views. The link between ex-ante (pre-project evaluations such as feasibility studies, impact assessments, forecasting, and policy analyses) and ex-post (unlike summative programme evaluations, ex-post are conducted sometime after project termination in order to evaluate the project's long-term impact and sustainability) (Dunlop & Radaelli, 2017).

##### 3.4.2.6.1 The Ex-Post View

"Evaluation" refers typically to ex-post (i.e. retrospective) evaluation, which can be interim (i.e. at the mid-term of an initiative), final (at its conclusion), or ex-post in the strict

sense (which can take place several years after the intervention has finished) (Smismans, 2015), (Zidane, Elvenes, Samset, & Hussein, 2018). The goal of the ex-post evaluation is first and most importantly to assess the lessons learned in an undertaking. The motivation for using ex-post evaluation is in principle that it contributes to double-loop learning (Samset & Christensen, 2017).

The Ex-ante evaluation will start from the measured outcomes of the previous project, as an event. The measurement (how was it observed, the impact sensed and the underlying perceptions that were created based on what was observed and how it was sensed) must be set against known, and agreed upon, standards, to avoid incommensurability. This will be followed by mapping all the stakeholders (agents and structures) and what they brought to the project. This relates to who collected what information, the format they held it in, and the availability of that information to all stakeholders. Next, the processes, with their supporting tools and techniques that were applied to the project activities, need to be mapped to determine how it supported the management (monitoring and evaluation) of those activities. This outlines the actual data collection, the flow of the data, the tools/templates used to collect the data, and the techniques applied to the data collection, processing, and dissemination. This is the with-project-view.

This observable event or outcome, resulted from the enactment of the inherent powers in stakeholders, interacting through their causal relationships. This looks at all the agents and the structures they represent (stakeholders) involved in the project and the relationships and the impact of those relationships on the implementation of the project activities. It also looks at the processes, through which these structures and agents interacted with each other, and the supporting tools and techniques they applied to facilitate the process. The source of the inherent powers held by all stakeholders becomes a critical element. This relates to the uncertainty element of indeterminacy, the challenge of predicting how each structure and its

agents will react to the enactment of their inherent power, and the counter-reaction from other agents and the structures they represent.

Finally, these structures and the agents that represent them are independent entities or individuals, containing their inherent power within. This is in a state where they are independent and interact independently with their reality, exerting their causal power over that reality. They say knowledge is power, knowledge is also an asset and by extension, project management knowledge is power. The more mature that knowledge is, the more powerful is the one that wields it.

**3.4.2.6.2 Ex-Ante View**

*"Ex-ante evaluation is an evaluation process undertaken prior to the project" (Doğan, Doğan, & Yıldız, 2018) in* (Sejati, Rahayu, Pigawati, & Winarendri, 2018).

Ex-ante evaluations provide strategic information about the main choices at an early stage when the possibility to influence the course of an undertaking is greatest. Ex-ante evaluation is a broad initial assessment aimed at identifying which alternative will yield the greatest benefit from an intended investment. This suggests that evaluation should be conducted early on because the possibility of influencing a process is highest at the outset and diminishes after that. This is where knowledge or maturity can have the greatest impact, in the dimension of the real and the actual. As mentioned, ex-ante evaluation occurs when principal decisions are made, and the possibility of making changes is greatest - but is at the same time when uncertainty is also at its peak and the information basis is at its most limited. This is when knowledge is at its most powerful. What matters at this point is the type of information needed, because the primary focus is on the problem and the needs the project is meant to address. There is a lesser need for detailed knowledge of the alternative solutions to the problem (Samset & Christensen, 2017).

At the other end the of the spectrum, the organisation will have to look at the problem or challenge that is presented to them or their client, as an event. This event becomes the starting point for the conceptualisation of a response, through a project that will facilitate the proposed outcomes for the project.

## 3.5 LEARNING LOOPS IMPORTANCE TO PROJECT MANAGEMENT

Three distinctive but interrelated levels of learning can be distinguished.

### 3.5.1 SINGLE-LOOP LEARNING

Single-loop learning is based on error detection and correction in the context of established actions, without questioning or altering the underlying values of the system (McClory, Read, & Labib, 2017). This is seen as adaptive learning where observing takes place from a single perspective; individuals adapt to the work to be performed. "This form of learning is by far the most common, and it is both encouraged and easily adopted. Single-loop learning focuses on the question: **"are we doing what we do right?"** (Johannessen, et al., 2019). The mechanisms that create the error or event are treated as independent, and a single perspective is applied to the event. The causal relationships with the values and systems underlying the error/event are not considered, even though they are inherent to these mechanisms.

When a mismatch is detected (in what the organisation is doing) it is corrected (to make sure it is done right). The central idea is to remain within the accepted routines (Fahrenbach & Kragulj, 2019). Single-loop learning attempts to solve problems with minimal variation in method, without questioning underlying assumptions about how work is supposed to be done. In the organisational context, it is a mere behavioural change that aims to resolve a problem. Its interest is in finding out what the problem is and ways in which things could be done more effectively, rather than asking why the problem occurs (Kwon & Nicolaides, 2017).

This happens at both structural and institutional levels, incorporating all uncertainties across these levels in the overall decision-making cycle (Alderson, 2020). This implies that from a critical realist perspective, both the structures and the agents are impacted.

### 3.5.2 DOUBLE-LOOP LEARNING

In contrast, double-loop learning is defined as a process of inquiring into the assumptions or mental models that govern our actions. It is a total reframing of our cognitive schema, which could lead to fundamental changes in our behaviour. In this sense, behavioural changes derived from double-loop learning are more powerful and transformative than those from single-loop learning because the former entails a deep-level change in our cognitive framework (Kwon & Nicolaides, 2017). Such changes relate to the causal relationships between the assumptions and models that govern human action. One should bear in mind that CR rejects linear notions of causality between mechanisms and the event or in this case ways of learning.

However, when attempting to proceed from the access and real paradigm to the learning and effectiveness paradigm, single-loop learning is not sufficient. To accomplish such a transformation, double-loop learning is required. Companies had to replace their old mentality, with a new mind-set that explored its possibility. It should also be noted that the word transformation, instead of transition or change, is intentionally used here to describe the nature of double-loop learning better. Double-loop learning would have started with challenging the underlying logic of the status quo (Kwon & Nicolaides, 2017). This requires new relationships to emerge, and thus, new mechanisms and events should follow.

"Double-loop learning is represented as a sub-loop in the larger sequence of planning, design, and management" (Alderson, 2020). "Double-loop learning ensues when a mismatch is detected and corrected by first changing the underlying values and other features of the status quo. This action creates new routines based on a different conception of the

universe" (Fahrenbach & Kragulj, 2019), creating a multi-perspective foundation. This is referred to as generative learning where, observing from multiple perspectives, continuous learning, and improvement of creative potential develops the ability to achieve the objectives (McClory, Read, & Labib, 2017). Similar generative processes are at work in the critical realist framework that is drawn into the actual dimension from the dimension of the real.

'It differs from single-loop learning because it is focused on new situations that are difficult to fit into existing patterns and plan. Instead, agents must overcome current limitations (reframing) and understand or accept something significantly new or different. It is concerned with the question, **are we doing the right things?'** Learning outcomes concern, for example, changes in the organisation's knowledge base, and new objectives, or new policies. New knowledge may come from cooperation partners who have a different view of the risk (Johannessen, et al., 2019).

This compares well with the process that takes place in the dimension of the actual in the critical realist framework.

### 3.5.3 TRIPLE-LOOP LEARNING

*"Triple-loop learning is a total re-creation of oneself. It is a process of experiencing the unexperienced and a journey of exploring the unexplored"* (Kwon & Nicolaides, 2017).

'It is concerned with reflecting on and discovering why structures learn the way they do; for example, what are the underlying norms, values, and paradigms. Triple-loop learning is seen as transforming and creative learning, where the following questions require an answer. **What is driving a structure and other mechanisms to be predisposed to learn in this way? And why these objectives?'** (McClory, Read, & Labib, 2017). This looks at how structures learn and why they learn in that particular way, to investigate the underlying structures and processes. This includes understanding who needs to contribute to making the right decisions and whether they have the opportunity and competence (knowledge) to participate. Learning

outcomes include changes to defining principles - for example, underlying governance protocols and structures or new learning strategies (Johannessen, et al., 2019). 'Consideration of uncertainty arising from social processes has followed from the recognition that various forms of social learning are critical for developing adaptive management of complex systems' (Alderson, 2020).

Tosey et al (2012) describe triple-loop learning as a change of the "underlying purposes, principles or paradigms" of an organisation in (Fahrenbach & Kragulj, 2019). Third, triple-loop learning is "a profound reorganisation of character" or a "profound redefinition of the self," that touches an empirical dimension. The point here is to conceptually apply organisational learning theories (e.g. single- and double-loop learning) to understand the changes in management practices, and to propose transformation toward a new paradigm using the notion of triple-loop learning (Kwon & Nicolaides, 2017).

This can be aligned with the empirical dimension in CR. A particular way of learning manifests, similar to an event, and the underlying mechanisms that create the event must be determined. Similar to CR, this suggests that the intervention to bring about the change required cannot take place at this level but at the levels where the mechanisms that created the way of learning interact with each other and their environment.

**3.6 SUMMARY**

Retroductively, both the ex-ante view and the ex-post- view– moving back and forth through a project, must have the desired outcomes of the project at the centre.

The ex-ante view will have to look at the project in terms of what would be the ideal outcomes at the end of the project.

The ex-post process should look at the same project from the perspective of how the actual outcomes of the project compare with the ex-ante view. This will determine the points

of intersection across the project management processes as the project moves through the layers of reality.

The view from both ends will have to move through the same path, back and forth through the same relationships, inherent power, causal interaction and processes, tools and techniques. All should be facilitated through a project management methodology that will standardise the sum of the process, to ensure that all knowledge and lessons are extracted to be infused with future project planning to promote maturity through consistency.

Once the organisation can harmonise this process by ensuring that all processes, tools and techniques can intersect with all the activities as planned, consistently every time, project success can be improved/achieved and guaranteed.

It is crucial that learning takes place across each process as it moves through the various dimensions of reality. In this way, the learning can be deconstructed retroductively to determine where learning has taken place in one direction and where learning should take place in the other direction.

The models of learning show similarities to the critical realist approach and support the movement of knowledge through a layered reality.

**Single-loop learning** is focused on the nature of "doing" and figuring out the most effective way to accomplish goals from a singular perspective.

**Double-loop learning** is concerned with the nature of "knowing" and challenging what the right goals are to be pursued. This happens in an environment where learning takes place, within a multi-perspective environment and where the mechanisms that hold those perspectives have to interact with each other.

**Triple-loop learning** is related to the nature of "being" and reshaping intentions, purposes, and motives (Bateson, 1972; Nicolaides & McCallum, 2013; Torbert, 2004; Tosey & Matheson, as cited in Kwon & Nicolaides, 2017), how things work and not merely how they

are. It is not only about the learning model that is experienced but the contextualisation of that model.

In the same way, as CR requires that an event must manifest through the various dimensions of reality, learning is expected to move through the various loops of learning. This creates a foundation for creating learning models that could facilitate the creation and movement of knowledge through the critical realist dimensions. In this way, it can strengthen the relationships between the mechanisms that facilitate the creation and emergence of an event and successful outcomes of the planned event.

This could be extended to apply the process of retroduction to the looped layers of learning to determine how learning is generated from single-loop learning to triple loop-learning through double-loop learning. In this way, a multi-dimensional model for learning can be harmonised with multi-dimensional reality to strengthen the relationship between knowledge and the successful outcomes of events based on that knowledge.

## 3.7 RESEARCH METHODOLOGY

### 3.7.1 INTRODUCTION

> *"Scientific research adopts qualitative and quantitative research methodologies in the modelling and analysis of numerous phenomena. Qualitative methodology tends to understand complex reality and the meaning of actions in a given context. On the other hand, quantitative methodology seeks to obtain accurate and reliable measurements that allow statistical analysis. Both methodologies offer a set of methods, potentialities, and limitations that must be known and explored by researchers"* (Queirós, Faria, & Almeida, 2017).

### 3.7.2 PILOT STUDY

'There are many different definitions of pilot studies. Pilot study, feasibility study, small sample size study, pilot randomised controlled trial, these names are often used

interchangeably. While they may share some common aspects, they have specific definitions and aims and are associated with particular approaches to analysis' (Vogel & Draper-Rodi, 2017). 'What these definitions have in common is the concept of a smaller study doing with the intent of gathering information to scale it up in the future' (Thabane, et al., 2019). The research looked at project management maturity. The question was whether there is a link between project management maturity and project success. The relationship was investigated using mixed methods. A quantitative method, consisting of an assessment tool developed by Kerzner (2001) was used. This assessment will measure project management knowledge of respondents and those responses will be used to determine the project management level of the centre.

This was followed by a qualitative tool, a structured open-ended interview investigating perceptions about project management knowledge and the maturity thereof. The questionnaire was developed to be stratified in line with the proposed theoretical approach.

"The purpose of performing pilot and feasibility studies is to clarify any uncertainty about the feasibility of conducting a future study. Pilot and feasibility studies are about giving research the best chance of success but must be performed well to have the greatest benefit" (Chan, 2019). "More importantly, perhaps is the role pilot and feasibility studies can have in modifying the design and conduct, and therefore increasing the value of the research, helping to avoid methodological design flaws, and reducing the burden of research waste" (Blatch-Jones, Pek, Kirkpatrick, & Ashton-Key, 2018). The KAS has been used in several studies and has become a sort of industry tool for measuring project management maturity. It was critical to see whether the instrument is applicable to HEIs and whether it provides the desired outcomes in terms of the type of knowledge it tests.

"Pilot work may also be used to gather preliminary feedback on a intervention and what might be refined for the main trial going forward, and also to measure adherence to protocol"

(Thabane, et al., 2019). 'In a pilot study, a future study, or part of a future study, is conducted on a smaller scale. This test whether all the components of the main study can work together. It is focused on the main process of the study. It resembles the main study in many respects, including an assessment of the primary outcome. In some cases, this will be the first phase of the substantive study and data from the pilot phase may contribute to the final analysis. This can be referred to as an internal pilot' (Eldridge, et al., 2016). "If an established and validated tool is being used, and the pilot study is determining other methodological aspects, it could be argued that such data may be of value" (Van Teijlingen & Hundley, 2001). In the case of this research the quantitative tool that was applied is a standard industry tool used for assessing maturity levels in organisations. Therefore, the data collected from the pilot group will be considered for use in the main study.

The pilot was conducted with a centre in one of the universities that were selected as part of the sample. This provided information about the structures and relationships in the same institution. It also looked at respondents' perceptions from the same institution. The focus was very much aligned with the areas covered in the Kerzner Assessment Tool (KAT). This allowed for the investigation of both the qualitative and the quantitative parts in a similar environment to that of the main study.

"The number of participants recommended for a pilot study is influenced by many factors and is less straightforward than determining the sample size needed to detect a particular effect, given the level of significance and desired power for the statistical analysis" (Johanson & Brooks, 2010). For this pilot study, the respondents for the quantitative component were ten, and the qualitative component was only four of those ten participants.

Reflecting on the nature of pilot studies as applied in the discipline of project management, Turner (2005) 'summarises the learning opportunities the researcher can extract from assessing the feasibility of any study and presents them as risk mitigation strategies'.

"These opportunities are learning how to reduce uncertainty in research projects or processes of a project; learning what will work or not in the design of a new project; and learning by testing the efficacy of a research instrument. Pilot studies increase the likelihood of success in the main study" (Nunes, Martins, Zhou, Alajamy, & Al-Mamari, 2010). Both research instruments were tested in this study. The quantitative instrument that tested the project management knowledge was found to be suitable to be used as is for the main study. However, the qualitative questionnaire that was used to look at the perceptions of respondents was found not to produce the required feedback.

Therefore, the qualitative instrument was redesigned to include different questions more aligned to the three dimensions of the theoretical framework. This was in an attempt to see how respondents, in their own view, could potentially provide insight as to how knowledge can move through these dimensions, and if not, why not.

### 3.7.3 MIXED METHODS (MM)

The study used a mixed-method approach. Creswell, Plano Clark, Guttmann, and Hanson, (as cited in Tsushima, 2015), define mixed methods (MM) research "as the collection or analysis of both quantitative and qualitative data in a single study in which the data are collected concurrently or sequentially, are given a priority, and involve the integration of the data at one or more stages in scientific research." It allows for the extraction of a more holistic picture of the research problem (Sarantakos, 2013). MM can provide a better outcome in conditions where a single methodology cannot answer the desired research questions and or achieve research objectives" (Tsushima, 2015). The study provided the data that were used to produce a baseline of the project management knowledge levels across the model that was applied. This was used to determine the maturity levels of project management knowledge across the centres involved.

Exploratory Mixed Methods were used since the survey was concluded with interviews to probe inconsistencies, and the underlying assumptions, in the findings across the various centres of excellence. It was not possible to conduct the interviews concurrently as the survey response was problematic. Respondents who responded to the online survey did not necessarily want to respond to the interview request as well. In the end, respondents from different centres of excellence were interviewed. The advantage is that at least two centres of excellence responded to both the survey and the interview request. It allows the researcher to traverse a continuum, including both qualitative, quantitative, and mixed approaches, rather than using the dichotomy of qualitative or quantitative. MM allowed the researcher to triangulate, consolidate, or compare quantitative and qualitative data. Through this process, the data will enrich each other and, therefore, the findings (Tashakkori & Creswell, 2007). The survey provided a baseline of the project management knowledge levels. In contrast, the interviews provided the information required to determine the underlying mechanisms and causal relationships driving these levels of knowledge.

'A strong mixed methods study starts with a sound mixed methods research question or objective. Research questions fashion and configure the methods and the design of the investigation. Therefore, mixed methods research questions and objectives demand the use and integration of both qualitative and quantitative approaches or methods' (Tashakkori & Creswell, 2007). The research question looked at the relationship between maturity and perceptions of which elements of project management contribute to project success.

Given the transitive (i.e., variable and uncertain) relation between the empirical and the actual, CR requires pluralism of methods to improve the validity of insights into events (and, hence, into underlying mechanisms) (Downward & Mearman, 2007). This is typically understood in terms of two types of triangulation. Data triangulation is most often operationalised by gathering data from different stakeholders, thus allowing for multiple

perspectives and intersubjective insights into the events of the actual. Method triangulation means CR is associated with mixed-methods research: combining qualitative and quantitative methods (Zachariadis, Scott, & Barrett, as cited in Heeks & Wall, 2018). These two methods of investigating the same phenomenon allowed the gathering of multiple perspectives and at the same time allowed for learning from it based on two approaches.

'Critical realism pays attention to studying the historical context within which interventions are implemented. Therefore, the approach applied involved base-line critical realist studies that examine the context at a particular point in time. The baseline is to enable before and after comparisons to be made to establish and track ongoing change being introduced and taking place within the intervention' (Eastwood, et al., 2019). The study provides an opportunity for future research in this area.

> *"Mixed methods refer to a tradition that combines qualitative and quantitative data to address the same (or closely related) research questions. Combining the complementary strengths and perspectives of each research tradition allows for a better understanding of a research topic than either approach in isolation. It provides an opportunity to derive emergent insights by merging multiple perspectives"* (Dopp, Mundey, Beasley, Silovsky, & Eisenberg, 2019).

The insights provided by this study show how the relationship between project management knowledge and project success could be resolved and managed.

Qualitative and quantitative methods may be used together for:

- corroboration (hoping for similar outcomes from both methods);
- elaboration (using qualitative data to explain or interpret quantitative data;
- demonstration of how the quantitative findings apply in particular cases);
- complementarity (where the qualitative and quantitative results differ but generate complementary insights) and

- contradiction (where qualitative and quantitative data lead to different conclusions).

Each has its advantages and challenges and is outlined in (Hammarberg, Kirkman, & de Lacey, 2016). Mixed methods supported the extraction of complementary data to create more depth in the perceptions and findings.

Mixed method research has strengths that offset the weaknesses of both qualitative and quantitative research methods when used individually. Mixed research methods are advantageous because they provide useful findings regardless of the unexpected nature of the results since qualitative data is, to some degree, generalised (Wu, Zhao, & Ma, 2019). Determining the knowledge levels of the respondents alone will not provide the depth required to determine the constitution of this historical point in time.

To explain the world and the phenomenon in it, science establishes laws and principles that systematically allows us to predict and or influence these phenomena. “In this endeavour, qualitative and quantitative research methods can provide us with useful tools” (Leppink, 2017).

#### 3.7.3.1 QUANTITATIVE METHODS

‘Qualitative and quantitative research methods are often presented as representing two different world views. On the one side, in quantitative circles, qualitative research is commonly viewed with suspicion and considered insubstantial because of its small samples. Small samples might not be considered as representative of the wider population; it is not seen as objective and the results are assessed as biased by the researchers’ own views. On the other side in qualitative circles, quantitative research can be rejected as an oversimplification of an individual’s experience in the processes of generalisation, failing to acknowledge researcher biases and expectations in research design, and requiring guesswork to understand the human meaning of aggregate data’ (Hammarberg, Kirkman, & de Lacey, 2016).

The research made use of a cross-sectional structured questionnaire survey to collect quantitative data to assess the project management maturity of the various CoEs. Question one of the research questions was answered with this data. The data were analysed using Statistical Package for Social Sciences (SPSS).

Quantitative methods can relate biographical indicators to a particular phenomenon. It was tracked across different interventions investigating different phenomena (Hammarberg, Kirkman, & de Lacey, 2016).

In quantitative research, data can be quantified, because the samples are generally large enough to be representative of the population. The results are taken as if they constituted a general and sufficiently comprehensive cross section of the entire population. It focuses on objectivity and is especially appropriate when there is the possibility of collecting quantifiable measures of variables and inferences from samples of a population. It adopts structured procedures and formal instruments for data collection. The data are collected objectively and systematically (Queirós, Faria, & Almeida, 2017). The survey from Kerzner consisted of more than 180 questions, thereby providing a detailed picture of project management knowledge levels.

Project management is seen as offering little more than 'mere description' based on vague causal linkages between organisational environments and human behaviour. Such bland empiricism should be replaced by adopting the positivist approach to science. Observed patterns should not be portrayed as singular occurrences but rather as exemplars, possibly unique depending on contingent circumstances (Johnston, et al., 2019). The knowledge levels determined across the project management knowledge areas should be investigated at deeper levels that determine the mechanisms and the relationships that carry this knowledge through the project management processes to the final project outcomes that determine its success.

### 3.7.3.2 QUALITATIVE METHODS

Qualitative methodology is not concerned with numerical representativity but with the deepening of understanding of a given "event." In qualitative research, the researcher is both the object and subject of the research. The objective of the qualitative methodology is to produce in-depth and illustrative information to understand the various dimensions of the problem under analysis. It is concerned with aspects of reality that cannot be quantified (Queirós, Faria, & Almeida, 2017). It was used to extract perceptions and the contextualisation of those perceptions.

Hammarberg, Kirkman, & de Lacey, (2016) argues that qualitative methods are used to answer questions about experience, meaning, and perspective, most often from the standpoint of the participant. These data are usually not amenable to counting or measuring. They further outline the Qualitative research techniques, including:

- 'small-group discussions' for investigating beliefs, attitudes and concepts of normative behaviour;
- 'semi-structured interviews,' to seek views on a focused topic or, with key informants, for background information or an institutional perspective; and
- 'in-depth interviews' to understand a condition, experience, or event from a personal perspective; and 'analysis of texts and documents', such as government reports, media articles, websites or diaries, to learn about distributed or private knowledge

The interviews were used to discuss underlying issues that might elucidate the reasons why project management knowledge cannot be seen to have an impact on project success.

Concurrently the interviews included open-ended questions to collect qualitative data probing perceptions about the importance of project management maturity and its importance in project management success. The interviews also explored elements of the quantitative data that need clarification or additional information for clarification. The qualitative research

captured the participants' understandings and meanings of the intervention and contextualised it (Eastwood, Kemp, Garg, Tyler, & De Souza, 2019).

The common thread through all qualitative methods is an emphasis on achieving a depth of understanding (often with a small sample of participants or groups) that captures the perspectives, experiences, or environments of specific individuals or groups (Dopp, Mundey, Beasley, Silovsky, & Eisenberg, 2019). Project management methodologies seem to have a low uptake in HEIs, and the answer to this is explained by how people working in HEIs perceive project management knowledge and the value of that knowledge in relation to project success.

**"**Qualitative interviews, with individuals or with groups – continue to predominate in the social science sub-disciplines. Here, in a broadly hermeneutic tradition, interviews are used in understanding interpretations, experiences and spatialities of social life" (Dowling, Lloyed, & Suchet-Pearson, 2016). This approach was used to answer questions two and three of the research questions. NVIVO was used to analyse the data.

Project management knowledge and its interaction with the structures and agents in the HEIs in the end determine project success.

### 3.7.4 SAMPLING

*"Sampling is the process of selecting units (e.g., people, organisations) from a popul of interest so that by studying the sample, we may fairly generalize our results back to the population from which they were chosen"* (Trochim, 2020).

Sampling units are derived from the study population. Information is collected from these respondents to enlighten research questions. The concept of sampling, therefore, is a compromise between certain benefits and disadvantages. While on the one hand, it saves time and resources, on the other hand, it may compromise the level of truthfulness in the findings.

Sampling only provides an estimate of the actual situation prevalent in the total population from which the sample is drawn (Kumar, 2019).

A stratified random (probabilistic) sampling was used, where "the sampling frame is divided into sub-sections comprising groups that are relatively homogeneous concerning one or more characteristic and a random sample from each stratum" (Onwuegbuzie & Collins, 2007). The criteria for selection initially looked at Centres of Excellence which firstly belong to a publicly funded University, secondly use English as an official language and thirdly have been funded by DAAD in the past. These selection criteria had to change because of the poor response rate from the Centres of Excellence that fell into this category. These criteria were changed to include Centres of Excellence from Universities in Southern Africa.

This sampling approach originally excludes Centres of Excellence in private universities. The Centres of Excellence selected for the research were originally from Namibia, Tanzania, Ghana and South Africa, representing about 75% of the target population. The number of participants from each Centres of Excellence was to include at least three strata of staff: directors, managers, and support staff. At least 10 staff members per Centre were to be interviewed, resulting in at least 40 participants. The final sample included Centres of Excellence from HEIs from Namibia, South Africa, Democratic Republic of Congo, Ghana and Zambia.

Stratified sampling was applied. According to Etikan & Bala, (2017) "this is when the population from which the sample is to be drawn as a group does not have a homogeneous group of stratified sampling techniques applied to the group. Generally, it is used to obtain a representation of a good sample". "Stratified type of sampling, stratifies the world into several subgroups of the population that are individually more homogeneous than the total population (the sub-population's differences are called strata). Selected criteria will be identified from each sub-group to generate a sample; in this case each of the strata will be more homogeneous

with the population. This allows for the generation of more precise estimates from each stratum'. The population was stratified based on levels of positions in the Centres selected as the final sample. This was based on a three-tier sample including strategic, management, and operational level staff.

Stratified sampling supports more precise estimates when relatively homogenous and distinctive strata (classes) are outlined compared to simple random or systematic sampling. Stratification endeavours to reduce discrepancies within each stratum when a significant difference between the strata values exists and increases the efficiency of inventory sampling designs (Bickford, 1952; Saborowski & Cancino, 2007, as cited in Wallner, et al., 2017).

'As discussed, the accuracy of a sample largely depends on the extent of inconsistency or heterogeneity in the study population, concerning the characteristics that have a strong correlation with what you are trying to ascertain. It follows, therefore, that if the heterogeneity in the population can be reduced by some means for a given sample size, greater accuracy in the estimate can be achieved'. This is the logic behind stratified random sampling (Kumar, 2019).

### 3.7.5 INSTRUMENTS

It is critical for the study that the instruments that will be used to collect the data will support a mixed-method approach. It would require an instrument that would allow for the extrapolation of the quantitative data and an instrument that would allow for the extraction of the qualitative data. For this study, a survey was chosen for the quantitative data, and this was followed by a structured interview to explore areas deemed necessary.

An online survey was developed using SurveyMonkey. The instrument was based on the KPM$^3$, using the assessment tool from the same model.

The survey was sent out to staff, identified across the various strata, by the head of the centre, from all the centres identified to be part of the sample.

### 3.7.6 SURVEY

As organisations grow, the processes and environments of organisations become more complex. To retain control over these processes organisations standardise processes in order to ensure maturity across these processes to improve performance across the organisation (De Zousa & Gomes, 2015). The standardised methodologies provide consistent implementation of processes that drives efficiency and effectiveness. "Increasing the level of sharing and expanding the commonality of project management methodologies across all projects is the embodiment of organisational maturity" (Kerzner & Kerzner, 2017).

Organisations find themselves in a situation where the level of project management maturity needs to be measured to determine areas for improvement. Several assessment tools have been developed for this purpose, some of which are very simple and generic, while others are complex and specific. However, all these tools have one thing in common; they want to determine the weaknesses and strengths of organisations with regard to project management maturity and to identify areas for improvement. One of the most popular assessment tools is the $KPM^3$ questionnaire (Yen, Peng, & Gee, 2016).

$KPM^3$ remains popular because it is generic and can easily be adapted to the requirements of any organisation that will allow the investigation of different processes in different organisations. The model, which relates to the project management standards as outlined by PMI, can achieve this for the following reasons:

- It involves the evaluation of organisation processes and culture;
- It recognises the human and social capital as key factors;
- It has a low application cost and complexity,
- The evaluation tool is practical and flexible, allowing for adaptation to the organisation;
- The results obtained are analysed using the ranges and levels established by the model;

- It allows for the proposal of improvements in the organisations in a clear way to advance in the levels of maturity; and
- Levels can overlap, allowing them to progress without having to complete one level to continue to the next (Hernández, Lagado, & Rodriguez, 2018).

Additionally, the model differentiates itself from other models by presenting a methodology to assess each level of maturity. The objective being the verification of the degree of the organisation's adherence to maturity at every level of the scale (De Zousa & Gomes, 2015).

Since the model is inclusive, it acts more like a general theoretical guideline towards improving PM processes. This simplicity and the generic format makes it an excellent, straightforward tool for senior managers who want to implement a maturity model to explain the concepts behind maturity models, what these models seek to accomplish, and what each maturity level implies in term of project management competencies (Vergopia, 2008). A more complex methodology might bring more confusion than clarity. It can serve better as an introductory methodology, and organisations can move on to more complex methodologies once they gain sufficient experience with specific methodologies.

Above all, the instrument has been published and validated by Kerzner in 2001 and is already recognised in the academic arena. The KPM$^3$ is accompanied by KAT in the form of a questionnaires with sections for each maturity level and a data analysis tools are available in the public domain. These questionnaires can be used by organisations as a diagnostic instrument to reveal the gaps between where their PM processes are at now and where they need to be to achieve a higher maturity level. It provides a clear vision and current positioning of the current state of the organisation. The model also evaluates the entire organisation and not only parts of it (Berssaneti, de Carvalho, & Muscat, 2012); (Vergopia, 2008). Since no two companies or organisations implement project management the same way, maturity will vary

across institutions. The questions in the Kerzner assessment instrument can be modified to the individual needs of companies, customised to include company specific areas of maturity (Kerzner, 2019). It makes the tool generic but adaptable to the particular requirements of any organisation.

This generic nature of the assessment tool allows for the assessment of project management maturity across various industries and companies (Hernández, Lagado, & Rodriguez, 2018). The KPM$^3$ has also been very successfully applied to the education and healthcare arenas (Seelhofer & Graf, 2018) ; (De Zousa & Gomes, 2015). This made the tool very applicable for the investigation of HEIs.

In countries like China and Brazil the use of the KPM$^3$ is very popular. Studies show that up to 50% of articles produced on the topic of maturity in these countries refer to the Kerzner model (De Zousa & Gomes, 2015). It shows the applicability of the tool for developing countries as well as emerging economies.

The questionnaire follows the five levels of the model. The questionnaire consists of 183 multiple-choice questions. Since the questionnaire tests the PMBoK at the first level, in order to test the level of knowledge, the questions may appear very similar. Five possible answers are presented, but only one answer can be selected. The questionnaire tests knowledge across nine project management knowledge areas, but combines scope and integration management into one category (Kerzner, 2001). Since the tool tests knowledge across different knowledge areas, it provides an excellent overview of the knowledge levels in individuals as well as in organisations. It can also support the development of common knowledge that can facilitate the development of common language around project management.

At level two, the model looks at the recognition of the different life cycle phases, to determine how mature the organisation is perceived to be. The questionnaire uses a seven-point Likert scale ranging from strongly agree to strongly disagree (Kerzner, 2001). Using a

7-point scale allows optimum ordinal value for numerical ranges (Serrador & Turner, 2015). Reliability increases as the scale grows from five to seven response options and then levels off for higher numbers of response options. Therefore, having too few or too many response options can affect the reliability and consistency of a scale. Simulation and empirical studies have found that 4 to 7-point scales return the strongest reliability and validity (Nadler, Weston, & Voyles, 2015). This section facilitates the development of common processes around project implementation through the project cycle.

Level three looks at the development of a singular methodology. It supports the development of integrated methods for project implementation, for synergy and control (Kerzner, 2001).

Level four of the questionnaire looks at the benchmarking of the organisation against other organisations. Four to five potential answers are provided and only one answer can be chosen (Kerzner, 2001).

At level five the questions start to explore how the benchmarking that was investigated in the previous sections can be analysed to improve project management processes in the organisation. This level looks at continuous improvement. The section once again uses a seven point Likert scale ranging from strongly agree to strongly disagree (Kerzner, 2001).

It is best to use a PMMM that allows for both customisation and updating of assessment instruments, even if initially, the organisation does not believe that customisation is necessary (Kerzner, 2019).

The model was designed to meet the needs of a broad array of industries and cultures, especially the different natures of organisations. Furthermore, making changes to the model is perfectly acceptable, and KPM3 introduces a process management maturity assessment that was developed to assess the implementation of Business Process Management and achievements. Most importantly, KPM3 assessment is designed for organisations to objectively

identify strengths and weaknesses concerning their project management practices. The result of the five levels of assessment helps to determine where improvements will add the most value so that organisations can establish a specific implementation goal. This model is chosen because of its simplicity and availability, and it is a result of real-life application, and it has been industry validated within several world-class organisations (Yen, Peng, & Gee, 2016).

Kerzner's model assesses the way the organisations are performing and the state of respective processes at five different levels, factoring in variables such as visibility, consistency and control. The computed scores will show how far along the maturity curve respective organisations have progressed, and this helps to strategise and prioritise the organisation's next steps to increase competitive position in the broader marketplace. In effect, KPM3 is a good model for the measurement of project management maturity, which creates a strategic plan for moving project management forward in organisations' as well agreeing on how an organisation can achieve superior levels of project management maturity (Yen, Peng, & Gee, 2016).

The scope of the different models is also variable. Some are much more focused on the project management process, whereas others are much broader, taking in the entire organisation. It is organisational factors that are more likely to drive project failure, thus suggesting that the broader organisational models are more appropriate. This argument is supported by Thiry and Deguire, (2007), who suggest that in project-based organisations, project management practice influences organisational practice and vice versa. This influence requires "the development of a collaborative relationship between the fields of project and general management and a common language that fosters dialogue" (Brookes & Clark, 2009).

This research was based on the $KPM^3$ and the associated assessment questionnaire.

### 3.7.7 STRUCTURED OPEN-ENDED QUESTION INTERVIEWS

*"Interviews are a widely used methodology in research. They are flexible, allowing in-depth analysis from relatively small sample sizes and place the focus of research on the views of participants"* (Young, et al., 2018).

Fontana and Frey, (as cited in Young, et al., 2018) define an interview as an "interchange in which one person attempts to elicit information or expressions of opinion or belief from another person or persons." Interviewing relies on an interactive method in which mutual learning occurs between those involved in the interview process. In this respect, interviewing is an active research process by which an interview or a "contextually bound and mutually created story" is produced by interviewer and interviewee(s) (Young, et al., 2018).

However, according to Smith & Elger, (2014) 'critical realists also emphasise that social action takes place in the context of pre-existing social relations and structures, which have both constraining and facilitating implications for such action. It means that critical realists seek to utilise interviews and other social research methods both to appreciate the interpretations of their informants and to analyse the social contexts, constraints, and resources within which those informants act. It entails a non-relativist conception of these social relations and structures, and thus an evaluation of the adequacy of competing accounts of this social reality, albeit one that often emphasises its layered and complex character'.

"For constructionists, realists, and critical realists, such interviews involve interviewer and respondent engaging in a fluid, interactive process to generate a set of responses that formulate perspectives, observations, experiences, and evaluations pertinent to an overall research agenda. Furthermore, everyone recognises that the research agenda critically influences this interaction" (Smith & Elger, 2014).

The questionnaire was divided into three sections that explored questions around knowledge creation, the exchange of knowledge and the measurement of knowledge. The

foundation is in the critical realist methodology - an attempt to trace the movement of knowledge through the three layers of the CR reality.

The interviews were conducted face to face where possible, including online via Zoom. This allowed for detailed discussions and the exploration of questions and responses. All the interviews were recorded and transcribed. All interviews were conducted in English. A total of 16 interviews were conducted over a three-month period.

### 3.8 DATA COLLECTION

The research uses a mixed-method research methodology. It includes a quantitative and qualitative approach.

#### 3.8.1 QUANTITATIVE

The data were collected within a six-month period. A structured survey questionnaire based on Kerzner's Project Management Maturity Model was developed to assess the five levels, Namely: Level One - Common Language, Level Two - Common Processes, Level Three - Singular Methodology. Level Four - Benchmarking, Level Five - Continuous Improvement (Kerzner, 2001). The questionnaire was developed as an online survey using Survey Monkey. **For an example of the questionnaire, please see Appendix 1**.

The survey was sent out to all respondents identified from the sample population. A total of 50 surveys was sent out and 36 responses were received of which only 28 were complete. It includes the responses from the pilot study. Thus, 28 useful interviews were available for analysis. The researcher scrutinised the eight partially completed questionnaires and after careful consideration, decided to exclude these responses from the further statistical analysis.

Initial communication with the head of the centre was conducted to ensure availability and willingness of the centre and its staff to participate in the research. It was followed with

formal letters to the same effect and to also explain the purpose of the study. Once the surveys were sent out, telephonic follow-ups were done on a regular basis, at least once a week.

It became clear that most of the respondents were from an academic background and they felt very threatened by the detailed nature of the questionnaire and the fact that it was testing their knowledge in a field that they did not feel comfortable with. A few e-mails made it clear that project management was not their field, and therefore, they did not feel comfortable responding to the survey. This creates an impression of insecurity and unless this insecurity is addressed it present both a barrier to learning and an opportunity for leaning.

### 3.8.2 QUALITATIVE

"The critical realist methodology identified the importance of contextualisation of interventions, case studies and the subsequent development of data collection tools and approaches in those concrete situations" (Eastwood, et al., 2019). A structured interview was used based on a structured questionnaire. The questionnaire contained 34 questions over three sections**. For an example of the Instrument please see Appendix 2.**

Therefore, the main study used the layered approach to collect the data. Data were collected at the individual level and the centre level. Data were also be collected through a qualitative tool as well as a quantitative tool (Eastwood, et al., 2019). The quantitative tool was used to collect data on the knowledge levels of the respondents and to develop an average for the Centre. The qualitative tool was used to collect data on the perceptions that respondents hold about the mechanisms and their causal relationships that interact with the knowledge levels.

"From a qualitative perspective, trustworthiness is considered a more appropriate criterion for evaluating qualitative studies, in order to ensure the process is trustworthy" (Maher, Hadfield, Hutchings, & de Eyto, 2018). The qualitative interview sought to describe the meanings of central themes in the life of the participants. The main task in interviewing is

to understand the meaning of what participants say (Moser & Korstjens, 2018). Online interviews, such as those conducted over Zoom, are often presented as a second choice or alternative when face-to-face interviewing is not possible (Deakin & Wakefield, 2014). They allow face-to-face communication with the opportunity to appreciate body language and other non-verbal communication, which telephone interviews cannot. However, they also rely on the participants having good internet access and some participants might not be comfortable "on-camera", and do not present as they would in a person-to-person situation (Heath, Williamson, Williams, & Harcourt, 2018). The Covid-19 outbreak had some impact on travelling to the countries selected and, therefore, all the interviews outside the country was conducted via ZOOM and or Skype.

The data were used to provide descriptive knowledge and understandings of the phenomenon under study (Assarroudi, Nabavi, Armat, Ebadi, & Vaismoradi, 2018).

## 3.9 PROCEDURES

### 3.9.1 DATA ANALYSIS

*"Deep and insightful interactions with the data are a prerequisite for qualitative data interpretation. The researcher must also employ imaginative insight as they attempt to make sense of the data and generate understanding and theory"* (Maher, Hadfield, Hutchings, & de Eyto, 2018).

#### 3.9.1.1 QUALITATIVE

The data fed into **NVIVO** produced several clusters.

These clusters included:

- Project Knowledge
- Project Success
- Stakeholder Management
- Standard Project Management Methodology

- Project Success Measurement
- Benchmarking
- Ratings

Qualitative research seeks to embrace and understand the contextual influences on the research issues (Hennink, Hutter, & Bailey, 2020). Therefore, NVIVO was used for data analysis. It allowed for the investigation of themes and clusters as they emerged from the data. The software also allowed for the exploration of relationships between different questions and the cross-referencing of such questions.

The respondents' files were imported and classified as cases, and memos and annotations were developed around those cases. The individual questions were classified as codes, and memos and annotations were developed around each of those codes.

The relationships between various questions were crossed referenced using query wizard and matrix coding query functions in NVIVO.

#### 3.9.1.2 QUANTITATIVE

The data was coded and extracted from SurveyMonkey into Excel spreadsheets. These spreadsheets were imported into SPSS. The data was used to extract tables that used biographical data and data about knowledge levels to make inferences about the respondents and the centres they represent.

## 3.10 VALIDITY

Validity explains how well the collected data covers the actual area of investigation (Ghauri and Gronhaug, as cited in Taherdoost, 2016). Validity refers to the ability of the instrument to measure the attribute for the measurement of the test it has been designed for (Mousaei & Gandomani, 2018). In this research, a standard validated questionnaire was used. After receiving and considering feedback from the pilot study, contextual adjustments were made. The interview is a subjective representation of the relevance of the instrument as well as

the degree to which items in the assessment tool reflect the content of the reality to which the tool will be generalised (Taherdoost, 2016).

### 3.11 RELIABILITY

Reliability refers to the accuracy of reliance and stability of test results. Cronbach's alpha was used to measure reliability in the present study. After the data collection process, reliability factor (Cronbach's alpha) of 7,5 was calculated using SPSS software. A scale and item reliability were determined by means of a Cronbach's Alpha co-efficient analysis, a tool which indicates the degree to which items are interrelated. The reliability co-efficient should be greater or equal to 0.70 (Johnson & Christensen, 2012). The result indicates the stability and internal consistency of the questionnaire. Cronbach's alpha method is one of the most common methods to measure the reliability and validity of the questionnaire. This factor (co-efficient) is used to get the respondents' impression of the items (questions). Cronbach's alpha values between 5.0 to 7.0 are average and acceptable, lower than 5.0 lacks reliability, more than 7.0 is good reliability, and higher than 9.0 is considered too high (Mousaei & Gandomani, 2018).

### 3.12 GRADING AND CLASSIFICATION OF DATA

The grading was quantitative - to grade each centre in terms of project management maturity. This grading and classification were done using a five-level grading approach, based on the KPM$^3$. A profile of each CoE is presented on the knowledge areas from the PMBoK. A comparative analysis of the similarities and variances between the centres was conducted. The relationship that exists between project management maturity and project success was investigated.

### 3.13 ETHICAL CONDUCT

The participation of all sampling units was on a voluntary basis. Participants were fully informed of the purpose of the research to ensure informed participation. This ensures the sampling units that they will not be exposed to any harm to themselves. All information is

deemed confidential. To support this further, all findings will be published at an aggregated level to ensure the anonymity of the participants. The results will be shared with participants, allowing them an opportunity to scrutinise the findings.

## 3.14 SUMMARY

The critical realist approach was applied to the research. The approach sees reality as a three-dimensional construct with the real, the actual, and the empirical dimensions as sub-levels. The looped learning framework is integrated with this approach, and together they provide a framework that could facilitate the observation of the movement of knowledge through the looped learning framework and the critical realist layered reality.

Looking at project management knowledge and a lack of empirical evidence to link it to project success, this provides an opportunity to investigate why this link cannot be observed clearly. The link might be difficult to prove as a linear link but looking at causal links might elucidate the link.

The phenomenon was investigated based on research that incorporated both qualitative and quantitative methods of investigation. The qualitative investigation was based on a structured interview conducted through face to face interviews, some of which were conducted via Skype and ZOOM. The questionnaire contained three sections, dealing with the stratified causal links as per the critical realist approach. This highlighted the perceptions that staff working in the Centres of Excellence have about project management knowledge and project success.

The quantitative investigation was based on a structured survey that was based on the KPM$^3$ and it used the KAT. This tool assessed the project management maturity of an organisation across five levels of maturity.

The quantitative part of the study provides a baseline and serves as a foundation from which the underlying causal relationships with project success can be investigated.

These two sections form the foundations for the mixed methods-based investigation into the link between project management knowledge and project management success. Mixed-methods allow for the determination of the levels of the organisations maturity, while the relationships between maturity and success can be explored at the same time. This should provide depth and context to the findings.

## 3.15 PILOT STUDY RESULTS

A pilot study was conducted using a Centre in a university that also host one of the Centres that was identified for the main study. First, the quantitative online survey was administered to 10 staff members of the Centre. A total of ten staff members completed the survey. The survey was based on the KPM$^3$. The model is based on a five-level model that ranks institutions on their project management knowledge.

The questionnaire was developed to test the knowledge of individuals and based on that an institutional score can be calculated.

### 3.15.1 LEVEL ONE (COMMON LANGUAGE)

A score below 60, according to the KAT indicates low levels of project management in a particular area. A score below 60 in all knowledge areas indicate low knowledge levels across all the project management knowledge areas.

### 3.15.1.1 QUANTITATIVE

**Table 3.1: Knowledge Areas Pilot Centre**

| Knowledge Areas | Centre 1 | | |
|---|---|---|---|
| | Total Score | No of Respondents | Average |
| Scope Management | 570 | 10 | 57 |
| Time Management | 250 | 10 | 25 |
| Cost Management | 320 | 10 | 32 |
| Human Resource Management | 335 | 10 | 33,5 |
| Procurement Management | 350 | 10 | 35 |
| Quality Management | 300 | 10 | 30 |
| Risk Management | 470 | 10 | 47 |
| Communication Management | 400 | 10 | 40 |
| **Average** | **2 995** | | **37** |

It is clear that as a Centre the scores are all below 60 on average. With the lowest individual score of 20 and the highest at 45 and an average of 37, the implication is that all staff members who participated including managers and senior managers are challenged when it comes to project management knowledge. The areas with the lowest score are quality management, time management and cost management. These knowledge areas are the foundations of project management. Understanding these elements and having a foundational knowledge in these areas is of critical concern.

The interventions required will have to involve training on the basics of project management. One of the first things to look at is an evaluation of current processes, tools and

techniques that are in use and the identification of best practices to form the foundation of a standardised project management methodology.

This should go beyond training. It should be about capacity building. With the understanding of the areas of weakness and what is required to achieve maturity in project management knowledge, the Centre will have to develop a curriculum that would support the development of all the knowledge and skills needed to support the emergence of a project management methodology suitable for the Centre.

In addition, the Centre will have to start looking at the interaction with other departments and management to begin a process of aligning processes, tools and techniques to support the development of project management knowledge and the maturity of that knowledge throughout the institution.

The critical thing is to start with creating a common language through standardised training for all staff. It will support the development of a common language around project management. Once this starts to happen, one would hope to see the emergence and identification of best practices that can be used as a foundation for developing a common project management methodology.

One of the most critical elements of this process is the identification of best practices around the processes, tools and techniques that are currently in use.

There should be a realisation that there needs to be a process in place to identify those processes, tools and techniques that work for the organisation around project implementation. The organisation should consciously seek out the success elements and duplicate and refine them to improve project success.

At the same time, all the elements that can be considered to contribute to project failure must also be identified. It will allow the team to mitigate or to avoid these risks associated

with these elements. The organisation needs to develop a process that determines what contributes to and what distracts from project success.

### 3.15.1.2 QUALITATIVE

Three out of four respondents indicated that they do apply project management principles. However, two out of the four indicate that they did not think it is being done correctly.

Three out of four respondents indicated that they do not think the Centre has the competencies to support these project management principles.

All four of the respondents indicate that they did not get full support from management for project management capacity building.

All respondents agree that project management methodologies have an impact on project success.

When asked about resource management and the processes for managing project resources, all respondents indicated that they follow university or gazetted procedures. It is a clear indication that the functional processes of the university dictate how project processes run.

With regards to communication, it is clear from the responses that little or no documentation of project management processes take place. All the responses relate to meetings and e-mail correspondence, with no mention of documentation processes that are in place. Even when asked about communication with external stakeholders outside the university, it is the same in that there is no mention about processes being documented and reported on.

A lot of the responses indicate telephonic, e-mail and other social media as mediums of correspondence with staff and other stakeholders. These forms of communication are

problematic to record, and record keeping of such communication are critical in a project environment.

### 3.15.2 LEVEL TWO (COMMON PROCESSES)

*"This is the phase where an organisation is making a concerted effort to use project management and to and to develop processes and methodologies to support its effective implementation"* (Kerzner, 2001).

The development of common processes around project management has to emerge in this stage. If we look at the pilot centre clearly the scores achieved in this area are far below the proposed levels.

#### 3.15.2.1 QUANTITATIVE

A score of +6 is considered a high score and should indicate that that particular phase has been achieved. An average score of +1.6 is relatively low. All the averages across all the phases are below +6, an indication that the Centre has not reached this phase.

**Table 3.2: Common Processes Score**

| Level Two: | Total | Number of Respondents | Average |
|---|---|---|---|
| **Embryonic** | 43 | 10 | 4,3 |
| **Executive** | 20 | 10 | 2 |
| **Line Management** | 32 | 10 | 3,2 |
| **Growth** | 29 | 10 | 2,9 |
| **Maturity** | 36 | 10 | 3,6 |
| **TOTAL** | 160 | 10 | 16 |
| **Centre Average** | | | **1,6** |

From the scores, it is clear that there is a huge difference in the individual scores among the ten respondents. The implication is that people do not understand each other when they are

talking about project management. It confirms the scores in the first section indicating that the centre is still at level one.

The score indicates that there is no concerted effort to build project management knowledge. There is no coordinated effort to create a project-based organisation, and there is no effort to achieve maturity in project management.

None of the phases has a score of +6, indicating that none of these phases has been achieved.

This is a clear indication that the Centre has not moved into Level two of the model. The Centre is still at level one. The Centre is implementing projects using mostly functional processes. There seems to be no coordinated effort to create a project-based centre or to use project management as the primary management method for the activities in the Centre.

The emergence of common processes is not possible since there is a lack of common understanding as well as a lack of development of common project management knowledge in the Centre. In turn, without common processes, it is improbable that common methodologies will develop.

### 3.15.2.2 QUALITATIVE

When the respondents were asked about support from management for project management, the responses are split in the middle. Half of the respondents indicate yes and the other half no. This should be an indication that there is no consistent support from management for project management approaches.

Respondents indicate that if they have to improve on the current project management system, they will have to start with training, they will have to change the structure of the Centre and the processes that are currently in place will have to change. At the same time, they are split in their opinions around whether management will support such suggestions for change.

Half of them feel that they will get support and the other half think that there will be no support and that reasons like lack of funding will be used.

Again the respondents are split about whether they will have the capacity to implement such changes as per their suggestions. Half indicate that yes, they will be able to do it while the other half indicate that they will not be able to do it, a serious lack of consistency.

### 3.16 LEVEL THREE (SINGULAR METHODOLOGY)

Looking at the third level of the assessment tool, the marks underscores the results of the previous two sections, indicating that support for project management in the organisation is minimal. The organisation realises that PMM is important but that the facilitating role of the executives has not been realized. The organisation is essentially a functional organisation.

#### 3.16.1 QUANTITATIVE

With a potential score of up to 210, the score of 124 is very low.

**Table 3.3: Singular Methodology**

| PROCESS | TOTALS | NUMBER OF RESPONDENTS | AVERAGE |
|---|---|---|---|
| Integrated Processes | 219 | 10 | 21,9 |
| Culture | 222 | 10 | 22,2 |
| Management Support | 209 | 10 | 20,9 |
| Training and Education | 157 | 10 | 15,7 |
| Informal Project Management | 207 | 10 | 20,7 |
| Behavioural Excellence | 224 | 10 | 22,4 |
| **Total** | **1238** | **10** | **123,8** |

This is an indication that there is little or no coordination of the process that drives the development of a singular methodology.

### 3.16.2 QUALITATIVE

This lack of coordination is reflected in the responses from the interviews with staff from the Centre. The answers focus on the fact that all projects are different and that therefore every project should be approached differently. The realisation that consistency is required to build knowledge around project management has not taken place yet.

The responses also indicate that there is no clear project management methodology that is used or that are dominant in the project management of the organisation. At the same time, the respondents indicated that they do not think that there will be management support for a move to a specific project management methodology.

In response to the question of the performance of the organisation about their project success the responses are mixed. Some feel they are below average others think they are at around 80 per cent and others feel they are at 50 per cent. This is clearly a situation where the organisation does not use a structured measurement of project success, and there is no methodology behind the measurement process. A reference to the fact that not all projects are profitable and that they could have done better economically could be an indication that performance is mostly based on financial indicators. This creates a very linear relationship between project success and financial success. This focus could be detrimental to the success of the organisation.

Respondent indicated that the organisational culture plays a significant role in the performance of the Centre. References to some structural challenges suggest that there is not a lot of support from the top structures of the organisation for project management methodologies in the organisation.

## 3.17 LEVEL FOUR (BENCHMARKING)

This sections measure benchmarking, to types of benchmarking, quantitative and qualitative benchmarking. Quantitative benchmarking relates to improvements in processes and methodology.

### 3.17.1 QUANTITATIVE

A score greater than 25 is an indication that an organisation is committed to quantitative benchmarking. Scores less than 10 indicate a lack of commitment or that organisations do not know how to benchmark or against what to benchmark (Kerzner, 2001).

Qualitative benchmarking looks more at applications benchmarking and how the culture executes methodology. Scores greater than 12 are excellent. Scores less than five indicate that not enough emphasis is placed on the 'soft side' of benchmarking (Kerzner, 2019).

Combined scores of 37 or more imply that your organisation is performing benchmarking well. The right information is considered, and the right organisations are targeted. The balance between quantitative and qualitative benchmarking is good.

**Table 3.4: Benchmarking**

| Type of Benchmarking | Total | No of Respondents | Average |
|---|---|---|---|
| Quantitative Benchmarking | 44 | 10 | 4,4 |
| Qualitative Benchmarking | -9 | 10 | -0,9 |
| **Total** | **35** | | **3,5** |

With an overall average score of 3.5, there seems to be a lack of commitment towards benchmarking.

Both qualitative and quantitative benchmarking scores are deficient. It indicates that both the processes and the companies that are benchmarked against are inappropriate.

### 3.17.2 QUALITATIVE

The quantitative scores for this Centre indicate that there are challenges with benchmarking. If this is cross-referenced with the responses from the interviews, it is confirmed. There is no specific benchmarking method in place. At the same time, none of the answers refers to the benchmarking of processes, tools or techniques in project management. When the responses do refer to benchmarking, it refers to benchmarking related to curriculum development. Benchmarking clearly is not considered necessary in the process of improving project management in the Centre.

The importance of benchmarking is that the lessons learned from the benchmarking exercise should provide a road map as to what needs to be improved in the project management methodology or approach of an organisation in relation to how other organisation achieve success in the particular area.

## 3.18 LEVEL FIVE (CONTINUOUS IMPROVEMENT)

Level five of the KPM$^3$ investigates the elements that supports the development of continuous improvement. Continuous improvement implies that all systems are in place to support project management maturity and the system now needs to look at how to sustain maturity and how to grow it. It becomes the pursuit of excellence.

### 3.18.1 QUANTITATIVE

Scores above 20 are indicative of organisations committed to benchmarking. Scores between 10 and 19 are an indication that some benchmarking or continuous improvement is taking place. Scores below 9 is an indication of strong resistance to change.

**Table 3.5: Continuous Improvement**

| Continuous Improvement | Total | No of Respondents | Average |
|---|---|---|---|
| | | | |
| **Score** | **16** | **10** | **1,6** |

With a score of 1.6, this centre is clearly at a stage where there is strong resistance to change and that improvement will come only with a lot of effort.

In the previous level, the benchmarking was looking at how an organisation is doing compared to other organisations in the same sector or field. At level five, it is about taking the lessons learned and bringing about those changes in the project management methodology of the organisation. It becomes a continuous process of identifying the leaders in a sector relevant to that of the organisation and benchmarking against them. Learning from this and continuously improving the organisation based on these lessons learned. One should bear in mind that lessons are learned from both successes and failures.

Only through continuous improvement can an organisation improve its processes to ensure a competitive advantage. This process is driven by factors such as stakeholder relationships.

In the HEI framework, internal benchmarking becomes the hall-mark of continuous improvement. This process identifies inner strengths and weaknesses, providing an opportunity to learn from inner success and failures, building a more competitive organisation through a process of introspection. At the same time, it offers an opportunity to discuss what can work across the organisation and creating an opportunity to build common frameworks for specific methodologies.

### 3.18.2 QUALITATIVE

When respondents were asked about learning from their own experiences, benchmarking against their past experiences, there are responses that indicate that there is no process in place while some claim that there are processes in place.

Respondents also indicated that project management is part of the strategic management processes of the organisation. This is contradicted by several statements to the contrary in previous sections of the interviews. There is a clear realisation of the importance of measuring

project success. This is in line with the responses to the question on how project management methodologies can contribute to project success. All answers are very optimistic about the potential contributions of project management methodologies. This is in stark contrast to project management methodologies being seen as not taking into consideration that each project is different and that each project requires a different methodology. The value of standardised processes now emerges.

The structural interaction, once again, is identified as a problem. The respondents indicate that better cooperation will improve project success. Support from structures within the organisation is identified as a critical element for project success.

Interaction with external structures and clients is also essential. These relationships can be critical to the success of the centre. There are different relationships with each structure and there is also a realisation that this creates some uncertainty. At the same time, these structures can also complement each other to contribute to project success.

When asked to rate the centre on a scale of 1 to 5 where five is good, and one is poor, the average rating was below average. This created the idea that the Centre was rated low because the staff felt that not all staff held the right knowledge. This was a subjective rating of the centre knowledge levels.

**Table 3.6: Centre Rating**

| RESPONDENTS RATING | Total | No of Respondents | Average |
|---|---|---|---|
| | | | |
| **Rating** | **11** | **4** | **2,75** |

This was changed in the main study to include a subjective rating of the knowledge of the self. This should provide for a better comparison in the main study.

## 3.19 SUMMARY

The survey instrument was well accepted and it did produce the desired results. The respondents understood the questions well and understood the process very well. The questionnaire was explained to the respondents in advance, and it was made clear to respondents that they could call for clarifications and any other support if required.

The qualitative part of the study included structured interviews. These interviews were conducted face to face. The questions were clearly understood, but the questions did not yield the desired responses in terms of speaking to the maturity issues. For this reason, the questions were adjusted and aligned with the three-tier theoretical framework

The data were beneficial, and provided the information in a format that could support the decisions to continue with the survey as is and to adjust the questionnaire for the interviews accordingly. Therefore, both instruments could be used with confidence in the main study.

Ten staff from the Centre responded to the online survey that was based on the KAT. The Assessment tool consisted of 184 questions. The tool was converted to a SurveyMonkey questionnaire and was sent to respondents as an online survey.

This was followed by a face to face interview based on a structured questionnaire consisting of 6 sections. These sections included questions on the five areas of the KPM$^3$ and a final section, including concluding questions such as a ranking of the Centre's project management knowledge by the respondents.

It is clear from the quantitative study that the Centre is challenged in terms of the levels of project management individual and centre level. Based on the scores the Centre will have to embark on a serious training programme if they want to build the appropriate knowledge in the staff around project management.

From the interviews, it is clear that the staff realised that they are facing challenges around this topic. At the same time, they also seem to have learned that it is a process that

requires support from management and other structures within the institution, that is unfortunately not forthcoming. The frustration is almost tangible in some of the responses.

The qualitative questionnaire for the pilot study did not provide all the answers that could relate to the model and relate to the research methodology. Therefore, the questionnaire was redesigned and aligned with the research methodology. The questionnaire was designed around the three-tier reality model proposed by the Critical Realist Methodology. The sections dealt with knowledge, indeterminacy and incommensurability. These areas were aligned to the three levels of the real, the actual and the empirical from the Critical Realist Methodology.

# CHAPTER FOUR (DATA ANALYSIS)

*"Research is about making choices, about what elements of a reality to emphasise and the postulations underscoring said reality. Research is both about exploring and confirming knowledge"* (Zachariadis, Scott, & Barret, 2013).

## 4.1 INTRODUCTION

*"Maturity models are considered to be tools that simulate specific aspects of capability and define the qualitative attributes that characterise competence at a particular level of performance" (Demir and Kocabaş, as cited in Langston & Ghanbaripour, 2016).*

This chapter will be exploring the data in the context of the reality it represents, in relation to the research questions underscoring this research and to determine if the data supports the postulations that uphold the research questions. Initially five centres from various institutions across Sub-Saharan Africa were selected for the quantitative investigation. However, it became clear that respondents were uncomfortable to answer questions about project management as indicated through e-mails and telephonic discussions. The level of detail of the questionnaire seemed to be the reason for the discomfort. Although the model and the questionnaire were discussed with all potential respondents in a letter, e-mails and follow up telephonic engagement.

Towards the end of the of the research, it was evident that this discomfort stemmed from the realisation of the shortcomings in the respondents' own project management knowledge. This is concluded from the frank responses by some respondents', which included statements like "this is not my field of study or work, and I am not comfortable to answer questions about it". It took some convincing to get respondents to understand that working with these Centres of Excellence; these centres are projects in their own right and particularly viewed as such by those donors funding the centres. At the same time, these centres are implementing projects with other partner institutions and or clients. Therefore, the opportunity

offered by the research should be considered, to determine what they know about project management and how project management could potentially assist them in rethinking their work environments. Grasping this opportunity seemingly convinced some respondents to complete the survey.

Some respondents', however, only completed the first few questions. Once they realised their shortcomings, they could not see themselves going through the whole exercise. With a few of the respondents, the process led to interesting discussions afterwards and hopefully a better understanding of the topics around project management.

When the same respondents were requested to complete the qualitative structured interview, only one centre could be convinced to complete the second part of the study. All staff from the other centres, unfortunately, could not be convinced to participate in the interviews. There was a sense of 'I now realise my shortcomings, based on the survey, and I am not comfortable to discuss it any further'. Realising the insecurities harboured by academics about their knowledge was surprising. The discomfort was clear from discussions attempting to convince some of the academics to participate in the second part of the study.

In the end, alternative centres had to be identified for the purposes of the research, in new institutions, that still fitted the criteria for the sample. These centres were housed in different institutions and also across different countries. However, the first matter that came up from the discussions with these alternative centres was the same concern about their knowledge and the fact that project management was not their field of study. Secondly, as the structures of these centres started to emerge, the way these centres are institutionalised, elucidated the lack of strategic value assigned to these structures and thus project management.

Most of these centres only employ one or two full-time staff members while the rest were academics or functional department staff that were involved in a very "loose" matrix system. In some centres the full-time staff did not want to understand that the level of project

management knowledge of all these staff members are woven into the centres project management capabilities through the matrix system. Full time staff struggled to perceive the centre as consisting of both the full time staff and the "matrix" staff. There was a serious misunderstanding of the structure of the centre and it could be based on the fact that they look at the centre structure from a functional perspective. The centre is one department and staff from other departments cannot be part of it. This was an early sign that project concepts like matrix systems were not grasped and or appreciated.

Interestingly, one of the centres is managed by one person, making all the decisions. This person saw the importance of what the "matrix" staff contributes to the centre and how important it could be for the centre to investigate the "matrix" staff's knowledge and contribution to the project management capabilities of the centre. This variance of perceptions about the investigation process was challenging, until it was realised that all the centres seems to have the same challenges.

Based on this experience, it was decided that the one centre where staff participated and completed both the quantitative and qualitative components of the study would constitute a reference centre. The findings of the reference centre will be discussed first, while the rest of the centres and respondents will be used to cross-reference the findings to develop inferences in support of the research questions.

### 4.1.1 LEVEL ONE (COMMON LANGUAGE)

*"The growth of project management body of knowledge and the advancement of project managers' capabilities in dealing with resources are crucial to the successful delivery of projects"* (Tabassi, Bryde, Kamal, & Dowson, 2018).

Unleashing the project management knowledge, as an asset, competently has contributed to vigorous discussion of the topic for the past decades, organisations still struggle

with how to strategically shift project management (Tabassi, Bryde, Kamal, & Dowson, 2018), getting project management to be part of the strategic fabric of discussion.

The first of the KPM$^3$ level tests the project management knowledge of the respondent across eight knowledge areas based on the Project Management Body of Knowledge (PMBoK) and is known as the common language level. Common language is based on common knowledge.

The eight PMBoK areas are each tested through 10 questions on each specific area with each correct answer being scored as 10. Thus the highest possible score per knowledge area is 100. Any score below 60 in any area indicates deficiencies in the knowledge for that particular knowledge area. An overall average score below 60 has similar implications for the centre as a whole. This score also implies that a centre has not yet mastered the requirements of this level and therefore still needs to complete this level before moving to the next level (Kerzner, 2001).

Applying this framework to the reference centre yielded insight into not only the knowledge levels of the centre, but also the value attached to such knowledge, particularly when the quantitative and qualitative knowledge are layered to contextualise project management knowledge as a baseline to a common language and ultimately to project management maturity.

**Table 4.1: Reference Centre - Knowledge Levels**

| Knowledge Area | Score Per Knowledge Area | Number of Respondents | Average Per Knowledge Area |
|---|---|---|---|
| Scope Management | 500 | 9 | 56 |
| Time Management | 220 | 9 | 24 |
| Cost Management | 250 | 9 | 28 |
| Human Resource Management | 310 | 9 | 34 |
| Procurement Management | 290 | 9 | 32 |
| Quality Management | 240 | 9 | 27 |
| Risk Management | 380 | 9 | 42 |
| Communication Management | 360 | 9 | 40 |
| | | | |
| **Total across all 8 knowledge areas** | **2550** | **9** | **283** |
| **Average across all 8 knowledge areas** | | | **35** |

The centre has an overall average of 35. This constitutes a very low score; it is far below the average of 60 that is considered a critical cut off point.

For scores lower than 30 serious interventions are required. The centre scored just above 30 and far below 60. The implication would be that some serious training interventions will be necessary (Kerzner, 2019). This score represents the sum of the project management knowledge of the centre.

### 4.1.2 COMPARISON TO OTHER CENTRES

The other four centres had 19 respondents. The score of these centres as an overall average is 37. This score is close to the score of the reference centre. The scores across the knowledge areas are in order of ranking the same. Scope management is once again the highest while time management is the lowest.

**Table 4.2: Knowledge Levels Compared across other Centres**

| Knowledge Area | Score Per Knowledge Area | Number of Respondents | Average Per Knowledge Area |
|---|---|---|---|
| Scope Management | 950 | 19 | 50 |
| Time Management | 490 | 19 | 26 |
| Cost Management | 570 | 19 | 30 |
| Human Resource Management | 585 | 19 | 31 |
| Procurement Management | 720 | 19 | 38 |
| Quality Management | 700 | 19 | 37 |
| Risk Management | 830 | 19 | 44 |
| Communication Management | 770 | 19 | 41 |
| | | | |
| **Average** | **5615** | | **296** |
| **Grand Average** | | | **37** |

The overall score across these two tables are very similar. This could be an indication that this is the general picture across centres of excellence in universities in Africa. The implication is that all these centres will fall in level one of the KPM[3]. If the scores in the subsequent levels are similar, the implication is that these could represent structural issues.

The highest score was recorded for Scope Management. This could be, because this is the one knowledge area that is critical to both the centre and its stakeholders. All stakeholders and partners must agree at least on what needs to be done and what not.

If this is cross referenced with the responses from question 6 in the interviews there is a serious discrepancy between the individual scores and the perception about personal project management knowledge. When looking at whether respondents think they hold the right knowledge to manage a project successfully a picture emerged that indicates that qualifications, certifications and experience are used as justification for having the right knowledge to implement a project successfully. This is combined with knowledge about different processes, tools and techniques from different management methodologies.

When the data is analysed to look at the impact of qualifications, there seems to be very little impact on the levels of project management knowledge. Comparing the average level

score for a respondent who holds a Master's degree with the score for those with a Doctorate shows that they both have a level of knowledge that is similar to the overall average.

**Table 4.3: Knowledge Levels - Masters**

| Knowledge Areas | Average Knowledge Levels |
|---|---|
| Scope Management | 54 |
| Time Management | 27 |
| Cost Management | 33 |
| Human Resource Management | 34 |
| Procurement Management | 41 |
| Quality Management | 29 |
| Risk Management | 37 |
| Communication Management | 38 |
| | |
| **TOTAL** | **293** |
| **AVERAGE** | **37** |

**Table 4.4: Knowledge Levels - Doctorate**

| Knowledge Areas | Average Knowledge Levels |
|---|---|
| Scope Management | 52 |
| Cost Management | 30 |
| Time Management | 23 |
| Quality Management | 32 |
| Humana Resource Management | 31 |
| Procurement Management | 37 |
| Risk Management | 47 |
| Communication Management | 44 |
| | |
| **TOTAL** | **297** |
| **AVERAGE** | **37** |

This could be because these qualifications relate to the technical knowledge areas of the respondents and not to project management knowledge.

The respondents indicated that they feel they have the right knowledge to manage a project. There is, however, an acknowledgement from some respondents that their current capabilities will be limited to smaller, less complex projects.

A repetitive response about most of the project management knowledge being gained through experience emerges here for the first time. This accompanies the response that since respondents implemented projects for international institutions, they have gained the knowledge and experience to implement projects. This makes strong assumptions about knowledge transfer taking place. If this is compared to the answers to question seven on the qualitative interviews, this view is not supported.

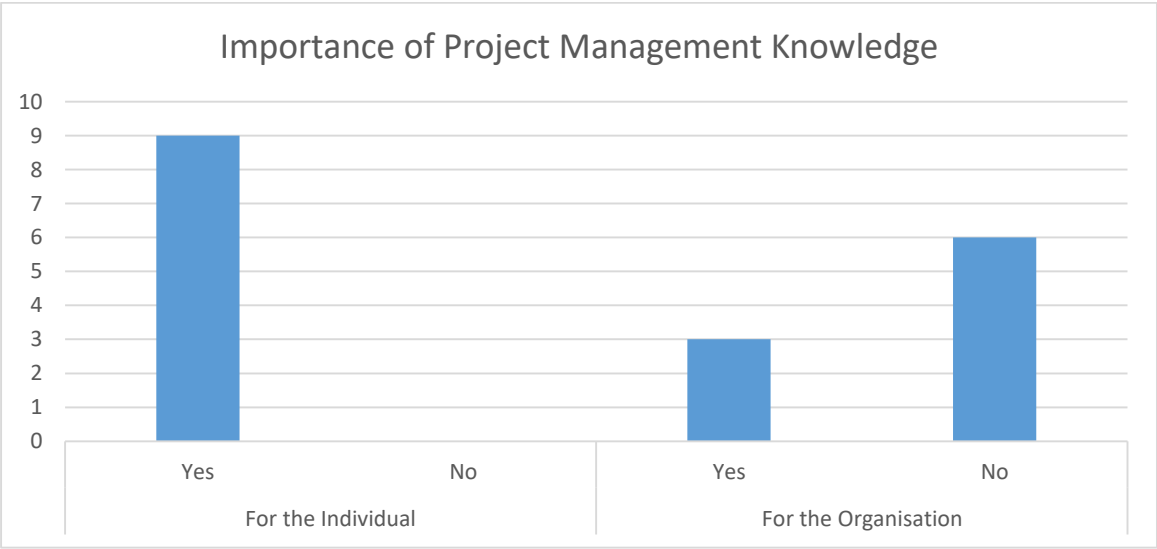
Common knowledge is the foundation for a common understanding and for the development of a common language. Knowledge transfer requires a common understanding and a common language. Therefore, it is fundamental to start by developing common knowledge across the knowledge areas as outlined by the PMBoK.

The score across the centres provides insight into the project management knowledge available to the centre as an independent asset. A fundamental building block for project management maturity.

### 4.1.3 QUALITATIVE

This section dealt with knowledge and is aligned with the first level of the Critical Realist approach, the real, and aligns with the first level of KPM[3]. It looks at the perceptions the respondents hold about project management knowledge as an independent asset.

Looking at the responses of respondents from the Reference Centre, there is consensus that project management knowledge is essential for project success. Comparatively question two looks at the importance of project management for the institution. As per the table below only three respondents indicated that their organisation considers project management important. In comparison, six respondents indicated that they disagree and that their institution does not consider project management as important.

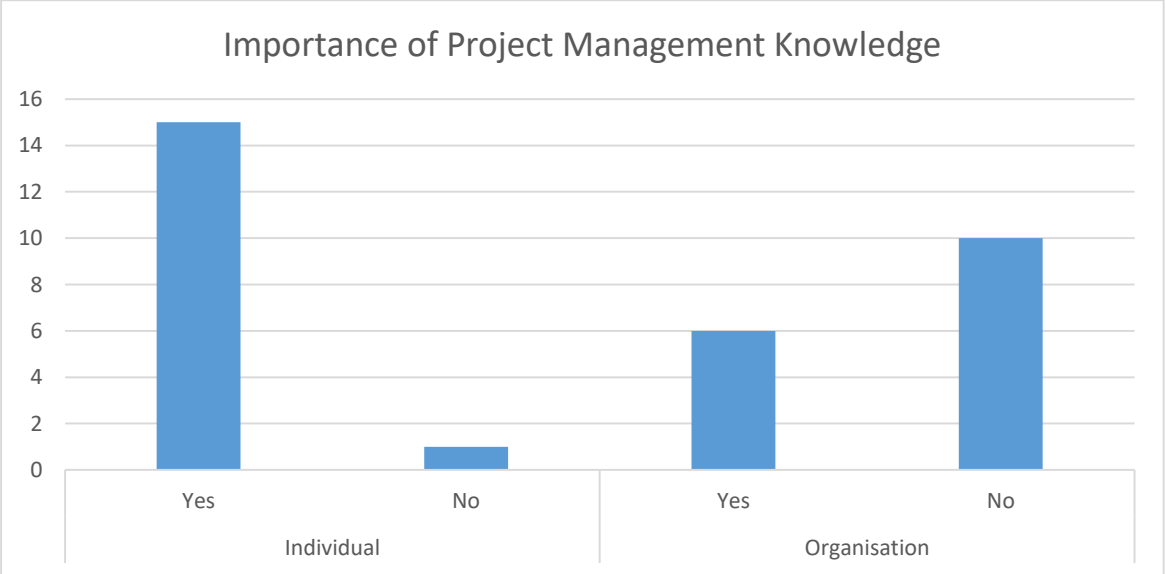



**Graph 4.1: Importance of Project Management Knowledge – Personal**

This comparison between the personal perception and the perception about how the centre values project management knowledge is important in the sense that it provides a glimpse into the perceived structural issues that staff in the centres perceive as being part of the reasons behind poor project success. The relationship between the individual and the organisation will be defined by the conceptualisation and contextualisation of project management knowledge and the importance of that project management knowledge.

As per the graph below, looking comparatively out of total number of 16 respondents, 15 respondents agree that project management knowledge is important while only one respondent indicated that it is not important for project success.

Out of the same 16 respondents, six of them indicated that their organisation shares the same sentiment and that the organisation considers project management knowledge as important. However, ten respondents disagree and feel that their organisations do not value project management knowledge.




**Graph 4.2: Important of Project Management Knowledge – Organisation**

From the individual perspective, the sentiment is that project management knowledge is required to improve project success. People working in project environments need to know-how project management works, how to organise and plan for it, to make the best contribution to the project. Therefore, the more project management knowledge a person has, the better

such a person should be able to manage projects. If a person's project management capabilities are known and communicated, it will help the organisation to attract more projects and to make projects more efficient and effective. The interaction of tacit and explicit knowledge seems to be an essential element in this regard. The communication based on such tacit and explicit knowledge requires a common language. According to Bach, Zoroja, and Čeljo (2017), 'there are two significant issues regarding communication. First, open communication enables project managers to be effective. Second, open communication among all project actors prevents conflicts. In other words, lack of information exchange among project actors lead towards many problems, e. g. strategic goals are at risk, resources are not used optimally and clients' expectations are unfulfilled'.

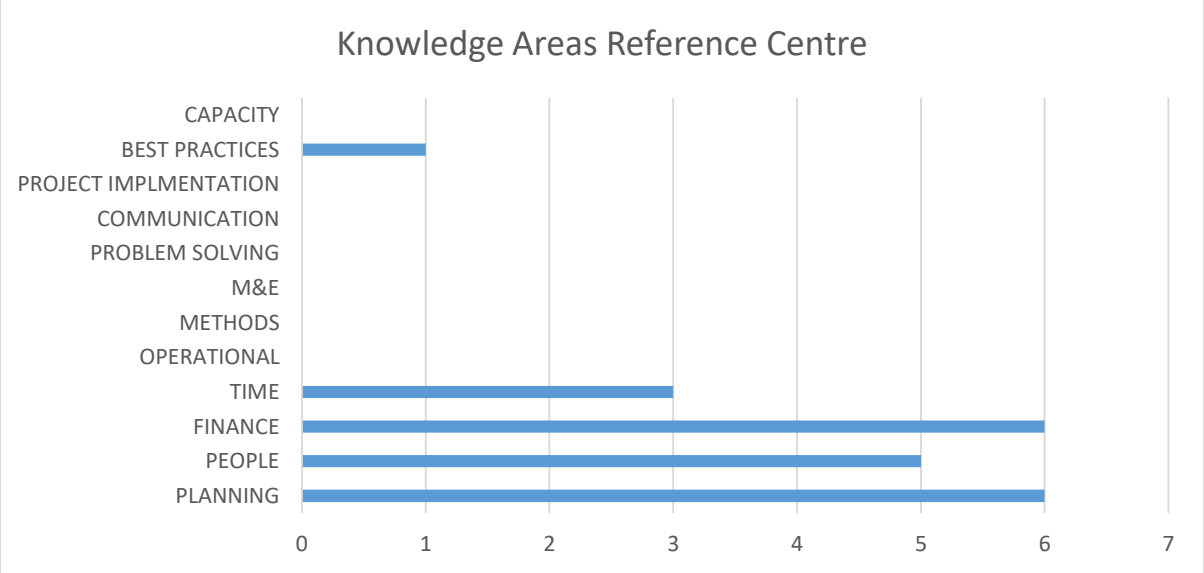
Project management methodology provides a process to guide organisations through the project management cycle, ensuring that project goals are achieved as set out. If a project management methodology is applied consistently to every project, it becomes a learning experience. When challenges arise, the methodology through the measurement of indicators will realise this and thus enable the organisation to improve on the processes, tools and techniques to a point where it can be applied consistently with success. This is the foundation for maturity, getting an organisation to a point where it can achieve its goals and objectives based on its project management knowledge capabilities (Cuadros López, Morales Viveros, & Rojas Meléndez, 2017). If this kind of maturity does not exist in the project management knowledge of the project team, the chances of success are already diminished. Maturity of this nature can only develop if it is driven by a common understanding of the conceptual framework and a common language can be applied to contextualise that conceptual framework.

This will allow organisations that apply a project management methodology to be more mature in their project management capabilities and therefore, achieve higher levels of project successful. This motivates organisations to develop capabilities to enhance their operations to

a point where they know what information is required and the level of detail for that required information. They can estimate the amount of time that is needed and, based on this, develop systematic processes for their project implementation. Therefore, it is critical for organisations to know what their knowledge gaps are and what are their strengths and weaknesses in terms of their project management knowledge.

The perceptions about how the organisations view project management knowledge is considerably more negative. Respondents felt that the organisations might consider project management knowledge important but does not know necessarily know how to implement it. This is supported by statements indicating that project management is not discussed in the centres at any level. This becomes a recurring point across all levels and will be dealt with in that context.

Moving on to the specific knowledge areas that individuals consider as important for project success, the picture that emerges is consistent with the individual perceptions about the importance of project management.

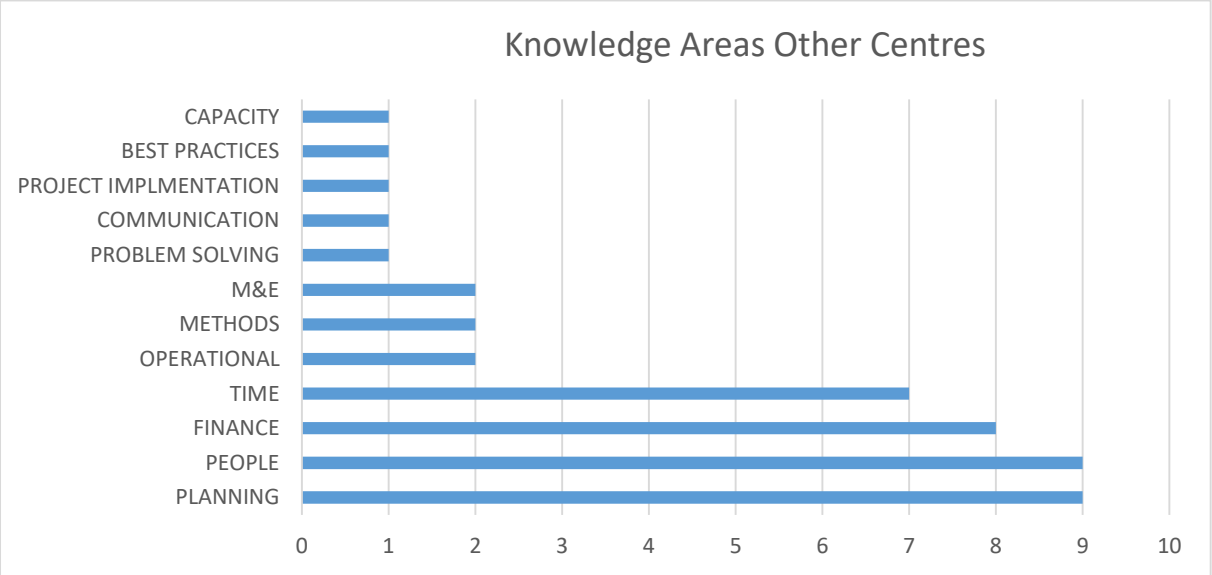



**Graph 4.3: Knowledge Areas - Centre One**

In the reference centre, the most important knowledge areas identified by respondents are time, finance, people and planning. Interestingly best practices are mentioned at least once from this centre. It is interesting that time is mentioned as an essential knowledge element,

while in table 4.1, time management has the lowest score as a knowledge area across the respondents from this centre. Scope management with the highest score in table 4.1 is not mentioned once. These discrepancies could indicate the lack of structure in the knowledge, based on the low levels of project management knowledge. This could influence the development of a common language around project management.

If this is correlation is extended to the picture across all centres a very similar situation emerges.




**Graph 4.4: Knowledge Areas – Other Centres**

The graph provides a picture of the number of times the knowledge elements are mentioned. This provides a clear picture of the knowledge areas that the respondents consider as the most important. Planning is mentioned nine times, while people issues is also mentioned nine times, finance eight times, and time seven times. An interesting point is that methods is only mentioned twice. This provides a good picture of how respondents rank the knowledge areas for project management. The areas such as finance and time are some of the basic elements of project management. They are mentioned around 7 times each, but the knowledge levels for time and cost are very low. This could be a realisation that such knowledge is important and that it needs to be developed. Interestingly, planning is mentioned the most. What is disappointing is the fact that it is not mentioned in relation to strategic planning.

Communication is only mentioned once, but yet it emerges as a theme across a number of subsequent questions.

Respondents' created a sense that the right structures are in place, for both academic and administrative structures. However, at least eight of the total respondents indicated that the structures do not hold the required knowledge. That represented 50% of the total respondents. The sentiment is that structures are created, but not capacitated as project structures, creating a disconnect and distance between management structures and the project mechanisms. Management structures seems to refer to Centre management structures. The agents of the management structures are only interested in projects of their own interest, and they set criteria for managing projects. The project criteria are set to advance their interest and not that of the centre or broader institution. If their interest is the publishing of a paper based on project activities, only those elements that will advance the production of the paper will be promoted. It seems that although the project structures are created, they are not operationalised as project structures. This creates an environment where project structures have to engage functional departments based on functional processes and based on knowledge about those functional processes. This attaches value to knowledge about functional processes. Project staff gets conditioned to interact with the functional processes and the related knowledge and how to interact with others based on that functional processes and knowledge.

In contrast functional structures are not expected to engage project centres on the basis of project management knowledge or engage with project management knowledge. Respondents expressed the opinion that functional departments will not accommodate project management approaches in the operations of the centres. As an example, Centres are expected to follow the university systems to satisfy the university requirements for financial management. These represent structural problems. Structural in the sense that some departments have the authority to dictate how project centres are expected to function within

the structure of the broader institution. These structural problems severely impact on the operations of the centres, the knowledge requirements of the centres and ultimately projects success. Project management knowledge is devalued against functional knowledge. In such an environment project management knowledge is not required for the centre to function. This constitutes the Achilles heel of project management maturity and its link to project success. If project management knowledge is not required by a Centre to within the broader institution, why would staff or the centre for that matter invest in acquiring such knowledge. If the project management knowledge is not applied, how can a mature project management environment be expected to emerge. If the centres does not invest in project management knowledge how can a return on that investment be expected in project success. This determines how project management knowledge will be applied and valued across all structures of the broader institution.

Based on the previous point, an interesting observation is made by one of the respondents obliquely linking staffing to knowledge levels. Older staff members in the institutions are perceived to hold management positions. However, they might have less project management knowledge because they had less exposure to project management during their studies. The younger generation consider themselves to have been more exposed to project management knowledge during their studies. This knowledge gap is perceived to influence project decision making. The sentiment expressed is that management across all levels does not necessarily hold the appropriate levels of project management knowledge. This perception is extended to include top management. This adds an additional challenge. Apart from a lack communication on the basis of project management knowledge with functional or other departments, internal communication across ranks also seems to present a problem.

Perceptions of this nature, generates an environment where universities are not experienced as very entrepreneurial since the latest project management knowledge are not

integrated into structures. A lot of frustration is created since project activities are not given the priory it requires. That might be one of the reasons why although project management is seen as taking place in HEIs, it is not generating the success that is sought through the methodology. This could be linked to earlier references to communication.

These responses are also linked several other questions. Responses to question 11 indicate that when staff are recruited into the organisational structure they are not asked about their project management knowledge or experience. This relates to question two that explores the question about the perceived importance of project knowledge to the organisation.

At this juncture the responses to question 5 links two issues; project management knowledge and structure. The question looks at who should be the custodian of project management knowledge in the institution. A custodian should serve as a guardian and curator of project management knowledge (Merriam-Webster, 2020). This represent a pivotal point in the organisation where project management knowledge is generated, consolidated and disseminated. This will determine how project management knowledge is communicated through the structures of the institution.

There are several opinions that emerge from the responses to this question. One is that there should be a specific unit in the institution that needs to be responsible for project management in the institution as a custodian. This unit must take responsibility for the promotion, development and coordination of project management in the institution. The second opinion is that everyone should take responsibility for project management in the institution. The third opinion is that it should be linked to a senior position in the institution. This would link project management to the senior management and hopefully to strategic management of the organisation. Improved communication across the ranks based on project management knowledge would enhance the strategic value of project management knowledge.

One of the critical functions of this office or unit should be to make sure that project management knowledge is developed across the institution. This should also include the coordination of all project activities and staff in the institution. This includes support staff, since they also have an impact on the project activities and therefore project success. All staff should develop at least basic project management knowledge, and this should be used to develop support for the project management approach. This unit must ensure that all projects are registered with them. In this way, the unit must ensure that the project management knowledge that exists in that unit is transferred to all staff working on the projects. All the building blocks for a common language must be produced here.

Expanding the knowledge theme through question seven, to stakeholders, both internal and external, 11 of 16 respondents indicate that stakeholders, in general, do not hold the right knowledge to support project implementation. A subtle subjective judgement is made. Stakeholders are perceived to have lower project management knowledge levels compared to the centres.

A second interesting differentiation is drawn by two respondents. They suggest that international partners, holds higher levels of project management knowledge. These two responses underlie very powerful perceptions. The first perception looking at local stakeholders who are perceived as not holding the right knowledge required to support project success is critical. Thus, in the local context this might create a situation where the centres become the proverbial one-eyed kings. Since the stakeholders will not be able to hold the centres accountable owing to their own lack of knowledge. This will set the bar very low in terms of expectations from the stakeholders. On the other hand, the centres might find themselves in a situation where they only develop their own skills in response to those low expectations. This will create a situation detrimental to both the stakeholders and the centre as a service provider. This has severe implications for Horizontal Accountability.

The stakeholders need to understand their roles in a project. Critically it involves understanding their expected contribution to the project, particularly in terms of elements such as information and knowledge contributions. The relationship between the centre and its project stakeholders should be seen as being the source or pool of knowledge and skills, determining the capabilities available to the project. This pool of capabilities should represent the project management maturity. If knowledge does not exist in the stakeholders or the centre, as a service provider, the implication is that such knowledge or related skills will have to be procured from outside.

The second perception relates to international stakeholders or partners holding higher levels of project management knowledge than local stakeholders or partners. This is an important perception since it supports the idea that international supported projects are implemented to a higher standard than locally supported projects. If this should be the case some knowledge transfer should take place across collaborative projects. However, if one looks at the scores across the centres, there is not much support for this view. Some of the centres have been in these international collaborative projects for the past 10 years and have been in existence for even longer, and yet the scores on the project management levels are still very low.

At the same time there is a feeling that when the centre project staff interacts with the stakeholders, there is not much effort to transfer project management knowledge to stakeholders. This creates uncertainty and dependency. Stakeholder representatives might not be comfortable to ask about things they have little knowledge of, and this keeps them dependent on the project staff for guidance on their involvement in the project. This dependency can be dangerous as it might leave stakeholders confused about what they can expect from the project team and what the project team can expect from them. Stakeholders might have technical knowledge that is relevant to the project, but they might not have the

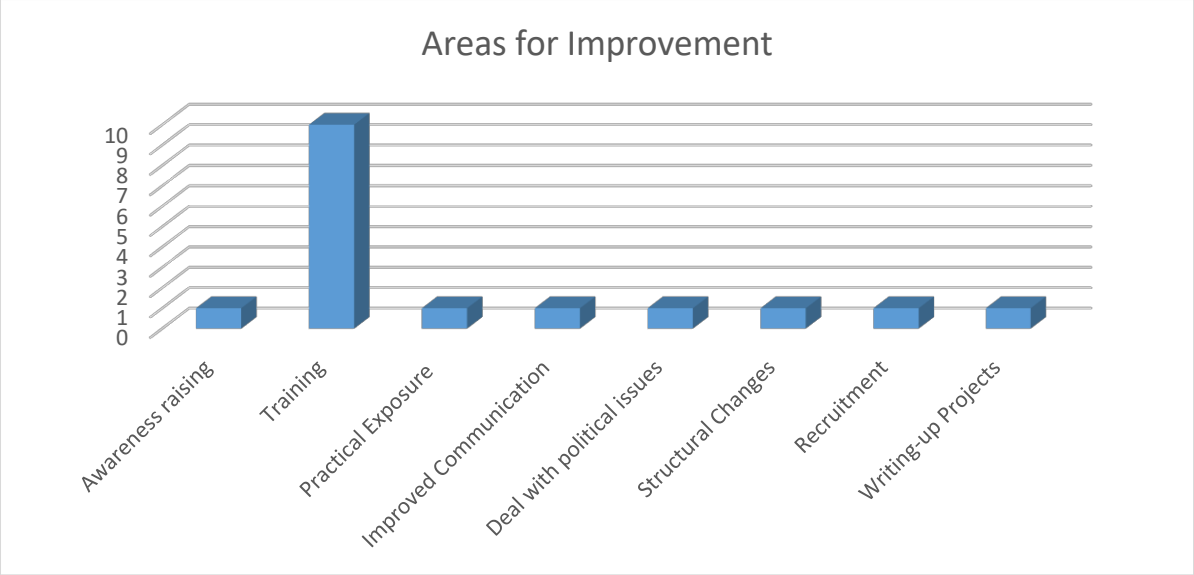
project management knowledge that is required to manage the project through its phases. They might simply lack the project experience since they might come from industries where project management are not generally applicable. A common language around project management could defuse this uncertainty.

All of this links back to maturity. If the project management knowledge and the project methodologies are not consistently applied and used to engage stakeholders it is difficult to say the least, to extract best practices and to create a mature project management framework for the organisation.

Project environments are both complex and challenging, challenging in the sense when the expected project management knowledge capabilities (demand) outstrips the available project management capabilities (supply) in the project team the whole project gets exposed to risks. Some members of the team only have theoretical knowledge about projects and others have only practical experience in projects. This in itself can cause big differences and conflict about what to do and how to do it. This conflict is based on the lack of a common medium of communication.

When asked about what they would do to improve the current situation around project management, nine out of the 16 respondents indicated that they would introduce training, different types of training. Some refer to continuous training, practical training and others refer to training towards certification.

The graph below provides a visual representation of areas for improvement.




**Graph 4.5: Areas for Improvement**

A critical suggestions dealing with the important aspect of how to fund such training, links training, knowledge transfer and cooperation. The suggestion is that the project centre should include funding in every project for training of staff working on that specific project. If this were to be combined with a project management knowledge assessment, like the Kerzner Assessment Tool (KAT), the training could be targeted, ensuring the skills deficits are addressed in the team and not just general training on project management.

One of the most critical questions in the interviews were, does a person's project management knowledge play a role in being appointed to projects? Eight of the respondents, 50 per cent, indicated that this is the case in their institutions. An additional three respondents indicated that they do not know whether it is used or not. Implying that it was not applicable in their appointment. This question deals with the foundational problem of recruiting the right people for the job. At the same time, it deals with the issue of recruiting staff with project management knowledge in the support services of the institution that deals with, for example, recruitment and finance. This is one of the reasons why project management knowledge should be developed across the institution to ensure an understanding of project management in all the structures in the institution.

Expectantly, for HEIs, there is a focus on academic qualifications and the field of those qualifications. However, when it comes the recruitment of project staff recruitment will look at whether people have project management knowledge based on their academic transcripts, but not on whether they have actual project management experience behind the assumed project management knowledge. The depth of that knowledge is never assessed, and therefore the potential contribution of the recruit to the team is difficult to ascertain ex-ante.

Recruiting people into a project environment on this basis can be quite disruptive. It requires a mentoring system to ensure that these staff members develop the right knowledge and that they are acclimatised to the specific project management approach applicable in the centre or unit. If this is considered and staff members without the required knowledge are recruited, at least this will allow the centre or unit to identify those knowledge gaps and develop them in the recruit. The current focus of recruitment is mostly on the technical knowledge related to a specific field of study relevant to the focus of the centre or unit. The implication is that people know what to do, but not how to do it. This creates a challenge in reporting to donors or partners and can be construed as incompetence.

All of this creates challenges for team building, an essential aspect of project management. This is particularly important in project-based organisations or units like the Centres of Excellence. In these environments, people with various levels of project management knowledge are put together in teams, and sometimes they are part of more than one project team at a time. An added complication is the fact that project team members join the teams on contract or from outside, and therefore it becomes critical to know an individual's knowledge and abilities in relation to project management. It is this matrix nature of project management that makes it difficult to manage. It is the same matrix nature that requires a common language to function optimally.

If cross-referenced with the responses to question one and two, the importance of project management knowledge to the individual and the organisation is evident as well as the challenges that are inherent to the structures and operations of the centres. There seems to be an appreciation for project management knowledge at the personal level, but that appreciation is not perceived to extend into the organisation. The communication between the tacit and explicit knowledge is structurally hampered.

All of these challenges are captured in a few responses referring to the impact of political issues, undermining project activities. In at least two interviews respondents had to be coaxed back to continue the interviews after this question. One respondent made it clear that discussing these issues spoiled her day. Another got so emotional that needing a few minutes to recompose. Yet another one indicated that participation in the research is only because of the hope that these issues are also raised with colleagues who are viewed could not to care less about how their behaviour in the project environments impact on others and the project. Some refused to participate in the research for fear of being recognised. The issue of politics had a direct impact on the research. Respondents were not willing to share biographical data for fear of being identified. This links up with the issues of trust in project teams. There cannot be trust in the midst of so much fear. The suppressed fear and anger might influence communication. This, in turn, relates to structural issues in the institutions around project-based centres or units. It seems alternative forums or structures will need to be created to discuss project management in a more neutral environment. This creates a layered uncertainty, based on fear of being exposed about project management knowledge levels and being exposed to management about perceptions held about them and the centre.

Some of the more interesting topics that are raised include the writing up of projects. This came up from a respondent indicating that he was skipped for a promotion based a lack of publications. Working in the centre did not provide him with the opportunity to publish.

This can provide interesting case studies and can contribute to lessons learned. This is important since case studies can be a useful tool in teaching project management. This also provides an opportunity for project management research. Project staff might not realise it, but this could facilitate meeting research output requirements for many of them. This is a crucial element in promotions in HEIs. The value project management can add as a field of study is lost in this regard. The opportunity to create new project management knowledge from such academic engagement with project management is also lost.

In order to successfully achieve the goal of the project, one must carefully manage every resources involved in it (Wijaksono, Pratami, & Bay, 2020). This becomes critical for project success. This links project management success and project success. In order to achieve project management success all the project elements such as time, cost and scope needs to be applied to the project resources. Showing that the resources can be managed successfully and efficiently. Secondly managing all the resources, including knowledge, through all the relevant project management methods, process, tools and techniques towards meeting the project goals, constitutes project success. Project management success is about managing project operations while project success is about managing the strategic contribution of project management.

### 4.2.4 SUMMARY

The data about this level represent the fundamental understanding of the project management conceptual framework by the centres (Szpitter, 2013). The project management knowledge across all the project management knowledge areas did not yield good scores across all the centres and respondents. All indications are that the project management knowledge levels are low and this is an indication that all the centres are scored into level one of KPM[3].

This is in stark contrast with the personal perceptions the respondents hold about their project management knowledge. The feeling that emanates from the responses is that every respondent thinks that he or she has all the knowledge required to manage a project and that

other team members do not have it. This will be explored in the final section of this chapter based on ratings.

Structure must follow strategy. If project management is the management strategy applicable to a centre, staffing structures and business processes should be aligned to that strategy. The responses show that there are concerns relating to project structures in HEIs. This has a severe impact on the performance of the centres. Particularly, the "political issues" and recruitment issues that need to be resolved and the impact thereof on project based units in Higher Education establishments. This starts to raise the issue of the inherent power that some structures hold in relation to other structures in Higher Education environments.

It is apparent from this level that common knowledge are the building blocks for a common language. A common understanding of project management needs to evolve for it to stimulate project management knowledge growth in an organisation both as a capability and as an asset. The alignment of tacit and explicit project management knowledge needs a lot of attention if common knowledge is to develop.

## 4.2 LEVEL TWO (COMMON PROCESSES)

If one looks at the emergence of common processes, it must build on a definition of good processes. This is achieved by looking at it from a phased life cycle approach. Five phases are identified in the life cycle. Embryonic, Executive Management Acceptance, Line Management Acceptance, Growth and Maturity phases. Twenty questions over these five areas investigate these phases (Kerzner, 2001) showing how the life cycle approach links to a definition of good processes.

### 4.2.1 QUANTITATIVE

The score for this section is calculated based on a 7-point Likert scale, ranging from -3 to +3. A score of below +6 per phase is considered low and implies that a specific phase has

not been achieved. An overall average score of below +6 for the centre suggests the centre has not reached this level in the model (Kerzner, 2001).

The average score for the reference centre is 4. This score is in line with the score in level one, an indication that the centre is still at level one and that the centre has not moved into level two.

**Table 4.5: Common Processes Score – Centre**

| Phase | Score | Number of Respondents | Average |
|---|---|---|---|
| Embryonic | 41 | 9 | 5 |
| Executive | 35 | 9 | 4 |
| Line Management | 32 | 9 | 4 |
| Growth | 30 | 9 | 3 |
| Maturity | 30 | 9 | 3 |
| | | | |
| **Overall Score** | **168** | | **19** |
| **Overall Average** | | | **4** |

If all the other centres are compared to the reference centre the scores are even lower. A score of an overall average of 3 was achieved.

**Table 4.6: Common Processes Score – Other Centres**

| Phase | Score | Number of Respondents | Average |
|---|---|---|---|
| Embryonic | 80 | 19 | 4 |
| Executive | 61 | 19 | 3 |
| Line Management | 63 | 19 | 3 |
| Growth | 65 | 19 | 3 |
| Maturity | 63 | 19 | 3 |
| | | | |
| **Overall Score** | **332** | | **17** |
| **Overall Average** | | | **3** |

None of the scores is above the +6 score for this level. That score was not even achieved in one single phase or in the accumulative score. This implies that none of the centres of the

total centres has reached this level. This is in line with the findings of the first level, indicating that all the centres are still at level one of the KPM[3].

This implies that in none of these centres has common processes developed. The use of ad-hoc processes across different projects will be common in such an environment. Such an environment will have specific challenges around the development of standardised processes. One of the critical concerns is that a change towards standardised or common processes will have an impact on the current power relations in the structures in the organisation. It is said that "structure follows strategy" and in the same way structure determines the nodes where power will accumulate in the organisational structure. The strategy determines what will be done and who will do it. The implication is that when a person is given the position in the structure, they also get the responsibility, linking it to the strategy.

The organisational strategy should outline what needs to be done and who should do it and this includes the processes. The processes will guide the "how to do it" part for structures in the organisation. The positions or jobs are defined by the skills required to implement the processes that are outlined as part of the strategy.

Project management processes ensures that projects are planned and controlled according to the organisational policies, and that organisational practices are maintained (Muñoz, Negrón, Mejia, & López, 2016). In this way the practices that best support the organisational policies should be compressed into the common processes that will ultimately support the emergence of a singular methodology.

The phased view of this process, the extraction of common practices that will produce the most efficient way of getting projects done in the institution requires that processes that support project implementation must be compared with each other.

### 4.2.2 QUALITATIVE

Based on an interview schedule, the responses gathered from the various interviews could be summarised as follows:

In the literature review some of the critical factors contributing to project success were identified as communication, trust and cooperation. Amongst these elements, communication must be the most important. One of the most important common processes that needs to emerge is a common way of communication. A common language must develop to allow for effective communication and the emergence of common processes. Some of the responses around communication were very critical.

A common language and common communication processes facilitates the conceptualisation and contextualisation of project management in the institution. The importance of communication is self-evident, in the higher education environment, no centre or unit can survive without support from other departments and, in particular, functional departments like finance. These departments may sometimes have a different approach and they will not allow project staff to bypass any rule as an example when they have to procure goods. Functional departments are not sensitive to project processes. A Centre will be expected to go through the whole procurement process which can take very long. This leads to misunderstandings between project and functional processes. Such misunderstandings are reflected in responses like, some people will be allowed to break the rules and others not. Such inconsistencies highlight the lack of trust in processes and inhibits the development of common processes. In project environments this has a severe impact on planning particularly on time.

Projects will start and half-way through the project people will be reprimanded for something that was done incorrectly. Throughout the project there may have been no discussion or communication about how a process needs to be implemented. Sometimes a process will be poorly communicated and not clarified and once the misunderstandings start to

impact implementation suddenly everyone is in trouble. People are frustrated when there is no guidance. There is no common process to guide interaction with all stakeholders. People need to be informed about what is happening in the project and how things are to be done.

The same goes for stakeholder relationships. The foundation must be a common language and common processes. A lack of common processes will cause a collapse in cooperation and trust. A lack of clarity can create uncertainty. Objectives, particularly, must be clear and known by all relevant stakeholders. Therefore, the most important point is to improve on how the project staff communicate with stakeholders. Stakeholders must be granted the opportunity to "speak into" the project in a systematic way and this is something that is often neglected. Processes needs to be clarified, stakeholders' need to know their role in those processes, thereby recognising and acknowledging the importance of each stakeholder.

A common process can stimulate discussion with other colleagues. If everyone's roles and activities are transparent it is easier to talk about what is expected and how each team member sees his or her roles and responsibilities in relation to others. This can trigger debate about project management and related matters.

A few statements reflect on the internal communication within the centre or units. Respondents on several occasions indicated that they did not know how things worked, that they were not involved in activities that they should have been involved in. "I haven't been involved in the other spheres of the centre I am working for". Another statement to this effect is "I'm sure there is, but I haven't had an opportunity to be part of that process". Statements evidently indicating that there is a lack of communication and lack of common and transparent processes. People are excluded from very important processes and discussions. Assumptions are made about people's knowledge based on their positions. There are no discussions about project management taking place and no trainings offered in the area of project management knowledge. It is obvious that project management skills are not valued in this environment.

These issues have an impact on the development of a common processes just as much as the lack of a common language has an impact on it.

"The way people communicate with each other, the way people are managed, the value associated with achieving certain outcomes, the whole system is skewed". This statement reflects frustration and maybe even anger at how the system is biased towards the interest of certain individuals. This talks to a lack of common processes hampering the development of a common understanding. Just briefing stakeholders is not enough; detailed communications should be shared with stakeholders. Changes to processes must be communicated with stakeholders. A good support structure will facilitate process flow. Roles and responsibilities will be clarified in relation to processes and cooperation will become easier. The whole notion that people are expected to work in a centre or unit, but they are not kept informed about what is happening in and how things are being done is counterproductive. "Unless my seniors know about it, nothing has been divulged to us".

Respondents expressed frustration with the exclusion from processes. Stakeholder engagement being a critical process. Staff has to find out from external stakeholders about the engagements with their centres. "No, your centre is in business with that organisation", so team members can be busy working with an organisation and not know that a different department or unit from the same institution is doing a different project with the same organisation. Several synergies could have been exploited to drive cost down and to deliver more efficiently on the outcomes of all projects. The extraction of best practices is neglected.

The link between a common understanding of processes and project failure is critical. The reason is that because of poor communication, there is no conversion of tacit knowledge into explicit knowledge, and therefore, no common understanding develops. For this reason, no common language and or common processes can develop, hampering the development of a singular methodology.

A singular methodology requires that standardised processes, tools and techniques are developed to support the implementation of a project plan. For a communication plan to work it requires standardisation of measurements, allowing for comparison and benchmarking. This demands common processes. The foundation for continuous improvement is founded on the consistent benchmarking of processes, tools and techniques, first against internal processes and once it is consolidated into a singular method, external benchmarking can start. It is about knowledge creation. Common knowledge must be created from all information that is collected. Both tacit knowledge and explicit knowledge develop from this process.

### 4.2.3 SUMMARY

It is evident from the scores on the quantitative tool that none of the centres have developed into the second level. This implies that common processes have not yet started to emerge from the current project management methodologies that are applied across the institutions.

Looking at the individual centres and as well as a summary of the centres the picture is very consistent. Higher Education Institutions across Africa struggle with developing a common understanding and a common language to support the development of project management knowledge and the supporting processes. This creates a lack of maturity. The fact that ad-hoc processes are applied across the centres implies that no process gets used consistently to appoint where it can be identified as a best practices and be developed into a common process based on efficiency.

The consolidation of existing best practices into common processes is not happening. This has severe consequences for the development of project management methodologies and project maturity in higher education.

## 4.3 LEVEL THREE (SINGULAR METHODOLOGY)

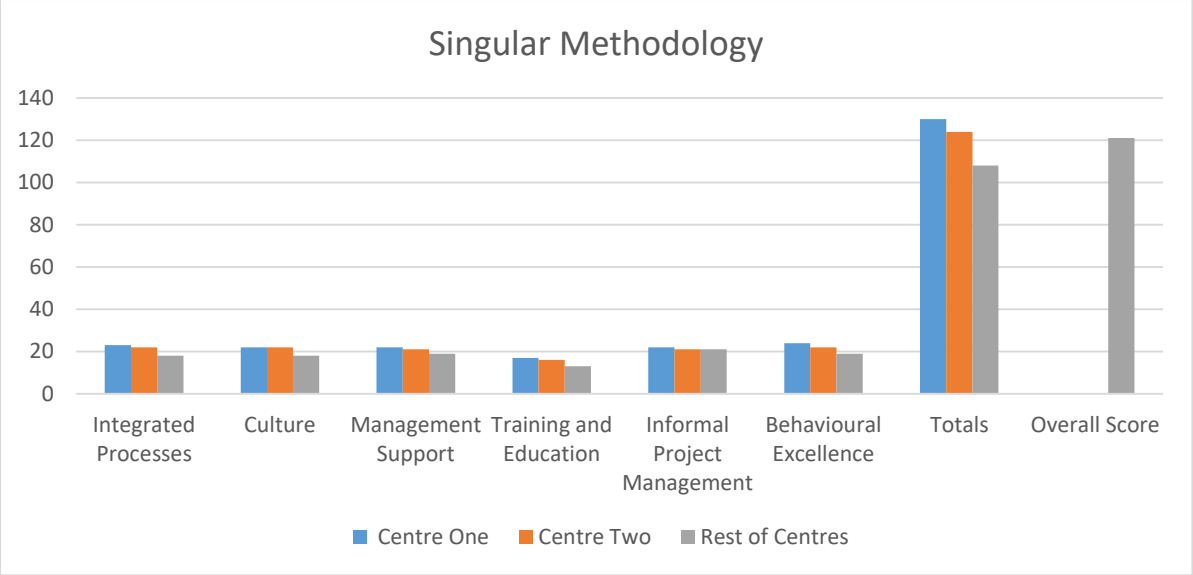
*"The contemporary need for project management, and the contribution that is possible from deploying a structured methodology, regardless of industry sector or discipline, is well documented. Project management has become both a key activity of organisational management and has enabled success in organisations"* (Langston & Ghanbaripour, 2016).

The emergence of a singular methodology is determined through looking at process control and synergies, because this indicates the presence of a harmonised processes coalescing into a singular methodology. This is achieved by looking at the following elements that support the development of a singular methodology, namely integrated processes, cultural support, management support at all levels, informal project management, return on investment for project management training dollars, and behavioural excellence. These elements links project management methodologies to organisational structure.

### 4.3.1 QUANTITATIVE

Forty-two questions structured across these six element make up this section of the questionnaire. An overall score of below 147 indicates that the centre is not yet on this level (Kerzner, 2019).

All Centres scored well below the 147 mark while the cumulative score for the rest of the centres were even lower. The overall score for all centres is as low as 121. This clearly indicates that the centres are not at this level yet. They still operate as functional entities. The true benefits of project management have not been realised and the management has not figured out what value project management can contribute to the competitive advantage of the organisation and project based centres contained within (Kerzner, 2001). This remains the central point.




**Graph 4.1: Singular Methodology**

These scores are in line with level one and level two scores indicating that these centres have not moved out of level one and even in level one they are scoring in the lower ranges. The implication is that these centres are essentially functional units with islands of project management knowledge and processes and lacks consistency and focus in terms of project management. The process of moving from common processes to a singular methodology should be almost a natural progression. It should be an internal process, a process of introspection. Best practices should be identified across the project based centres and units within the institution to be consolidated into common processes, to form the building blocks for a singular methodology.

This process has at its heart the institutionalisation and positioning of project management within the organisation. This looks at the internal relationships, with the internal stakeholders of project management. It is this interaction between all the internal stakeholders that will ultimately produce the desired singular methodology, and empirical event. The singular methodology must be based on providing guidelines and checklists, and not restrictive policies and procedures (Kerzner, 2001). Choosing a unified, singular project management methodology (PMM) is an effective approach by which to consolidate prior project management efforts in an organisation.

### 4.3.2 QUALITATIVE

There is consensus that, project management processes needs be standardised to provide guidance. Standardisation reflects on an element of benchmarking. The existing best practices must provide the foundation for standardisation. The experience with best practices must be transferred into singular methodology and rooted in common experiences. Project management competence has become an international discipline and standardisation needs to reflect that. Standardisation can lay a foundation and can provide a roadmap. Standardisation can contribute to success, but since not all projects are run the same way, they are exposed to different constraints. Therefore, different projects require different methodologies. The assumption that the emergence of a singular methodology will be a restrictive process persists.

There is a fear that with standardisation some experiences or processes will be lost. Standardisation is a process of compromise. Through compromise, standardisation may not always achieve its intended purpose. A standardised methodology must be understood in the context of adaptation. It must take into consideration the complexity of the existing best practices to adapt the methodology accordingly. Set standards help to measure success and failure despite the fact that projects are different, while a standardised methodology ensure that set standards are met. A singular methodology will facilitate a systematic approach and in complex institutions like universities this can only be an advantage.

The experience with project management methodologies inside the universities juxtaposed against the experiences outside the universities is proof that project management methodologies has a contribution to make to project management in universities. The challenge is that PM requires structural support to enforce it. To be enforced PM requires the measurement of standards and indicators. The results of such measurement must be contextualised through project management knowledge, to add value to project management knowledge. Alternatively, people will hold project management knowledge but will not

necessarily use it. The structure provided by standardisation can facilitate adaptation of project based methodologies.

Standardisation provides a framework that guides how institutions implement projects. By implication project activities should be monitored and evaluated against the standards that underscore the processes, but it should retain some flexibility. This flexibility will be determined by the variance in the margins set in the measurement framework. A rigid bureaucratic system will not work. This is not the intention with standardisation, but this rather reflects the experience of project staff with functional processes enforced on project activities. A singular methodology that is based on best practices and well thought through can support implementation across different types of projects. In this way a singular methodology will support efficiency and consistency in terms of monitoring implementation of projects. The framework guides how the implementation should be executed, and if mistakes are made, corrective measures can be instituted. Consistent application of a methodology drives stability and uniformity of skills, knowledge and capabilities.

There is no need to create a new method every time a new project is implemented. The fact that some centres tried standardisation and did not succeed should not become an excuse not to try it. The methodology that is followed must add value to the centre. It's about a consistent process that will identify best practices that will lead to improved engagement by learning from every engagement. Stakeholders must also be taught what to expect from project agencies. As centres within universities, this is part of the mandate, teaching industry about standards and how things should be done. This is a very powerful realisation. Each stakeholder needs to be engaged in a different way, yet standardised methodologies can provide a solid foundation for such engagement.

Standardisation must be a process that is approved and embraced by the institution for stakeholders to take ownership. They will see the project as their project because there's a

systematic process of involving them at every stage. If staff knows what is expected of them, they will maximize their contribution and similarly if everyone knows what is expected of each other, vertical accountability will emerge. Communication across a more vertical framework is a lot easier. Channels of communication will be clarified, stakeholders' interests will be known, thereby recognising and acknowledging each stakeholders' importance. Project success will be influenced in a positive way because everybody will be working towards that common goal.

If there's a standardised methodology in place supported by a structure, relationships between the institution and its stakeholders can be improved. It gives stakeholders peace of mind, there is a methodology that's going to be applied and they know what to expect from it.

Again, assuming that everyone interacts with project management knowledge and interacts with each other based on project management knowledge, standardisation can benefit their interaction and make it more productive. Standardisation will allow for the alignment of the collaboration strategy of the institution. This is bigger than project management. In large institutions, a lot of different interests are at play. Standardisation will provide guidelines on how those interactions should be managed. A standardised approach will point to where more needs to be done. If it is not built into the framework of the project, it is difficult to think about why it should be considered necessary.

Standardisation will have to be supported by the other structures in the organisation. Due to the matrix nature of project structures in universities supporting departments must ensure that their staff are aware of the standardised methodologies and that these methodologies will be enforced from the project centre management as well as from the functional department management.

The central role of standardised methodologies is to facilitate smoother interaction. The interaction between structures will improve. Management structures always seek

accountability. A standardised methodology will provide just that. Management will understand why things are being done and why certain process are required to produce specific outcomes. Standardisation will create a common framework, a singular methodology.

A singular methodology should encompass all project processes. In this way all project processes are considered during all the project cycle phases. This is where a shift in the thinking about project management must occur. There are no guarantees that it will always work, but it will provide a foundation to start from and from where new approaches can be launched if the current ones are not working.

### 4.3.3 SUMMARY

There is consensus amongst the respondent's that a singular project management methodology will bring about positive changes to project management implementation and success. It will provide the required guidelines for the implementation of projects. Higher education institutions need to realise that only if they can agree on a singular methodology, they can compete with other institutions. The sum of the competitive advantage of the whole institution is dependent on the competitive advantage of all its parts. This competitive advantage is captured in project management maturity.

External stakeholders might be important and engaging those stakeholders is critical to the success of the institution. However, the internal stakeholders are the ones determining the opportunities that each centre or structure in the broader institution can access. It is through the internal stakeholders that project based centres will have to ensure that project-based management becomes part of the strategic management approaches of the institution. By convincing the internal stakeholders that project based management can add value to the broader institutions and by showing that all project-based units can work together through a singular methodology, other structures will have to support such an initiative. The maturity of

the processes will provide a foundation for the recognition of project management as a reliable methodology to manage activities.

This is the only way to convince management that the centres are driven by efficiency. Efficiency requires a continuous evaluation of processes and the benchmarking of such processes to ensure that the most efficient process that can guarantee the competitive advantage of the broader institution prevails.

Again standardisation can be a key factor in success. When you have a standardised system in place, it alerts you to any deviation, time challenges or financial challenges. A standardised system provides a road map. Since most projects are implemented in very uncertain environments, a standardised system can mitigate such uncertainty. It will ensure that if things start to go wrong, everyone knows what was planned and if it is not working everyone will need to deal with the deviations. If there is no standardisation then stakeholders and donors may start to develop unrealistic expectations because they expect the implementation agency to hold specific knowledge and to follow certain project management principles as standard practice.

Universities will have to start thinking differently about the value of project management to the institutions. They have to think about how project management maturity is developed and how that maturity contributes to project success.

### 4.4. LEVEL FOUR (BENCHMARKING)

*"Benchmarking allows an organization to identify strengths and weaknesses, as well as to learn how to adapt and enhance organizational processes with the aim of countering the growing competition"* (Ganushchak-Yefimenko, Shcherbak, & Nafitova, 2017).

This level evaluates benchmarking across the centres. This is done based on twenty-five questions covering quantitative and qualitative benchmarking. A score of below 25 for

quantitative benchmarking are indicating deficiencies in this area. Scores below 12 in the qualitative benchmarking shows low levels of achievement in this area (Kerzner, 2019).

### 4.4.1. QUANTITATIVE BENCHMARKING

Looks at improvements on the methodology and the processes. Scores greater than 25 are excellent and imply that the organisation is committed to quantitative benchmarking. Scores less than 10 indicate a lack of commitment or the organisation does not understand what to benchmark or against whom to benchmark. Scores between 11 and 24 suggest that some benchmarking might be taking place, but there is no coordinating structure in place for the process (Kerzner, 2001).

### 4.4.2 QUALITATIVE BENCHMARKING

This section looks at applications of benchmarking and how the organisational culture executes the methodology. This is important, since the culture within which the methodology and processes is executed is critical for the transfer of the knowledge. The culture that motivates the adoption and growth of a methodology and processes must be investigated and understood to facilitate the adaptation and adoption of such a methodology and processes (Rastogi, 2020). Scores greater than 12 are excellent. Scores lower than 5 indicate that not enough emphasis is put on the soft side of benchmarking. Scores between 6 and 11 are marginally acceptable. A combined score of 38 and more indicates that the organisation is performing some benchmarking. In this context the right information and companies must be targeted (Kerzner, 2019).

**Table 4.7: Qualitative Vs Quantitative Benchmarking – Reference Centre**

| TYPE OF BENCHMARKING | SCORE | RESPONDENTS | AVERAGE | TOTAL AVERAGE |
|---|---|---|---|---|
| **Quantitative** | **84** | **9** | **9** | |
| **Qualitative** | **80** | **9** | **9** | |
| | | | | |
| **Combined Score** | | | **18** | **9** |

With an average quantitative score of 9, the centre shows a lack of commitment to benchmarking. With a qualitative average score of 9, the centre has a marginally acceptable score. This indicates some qualitative benchmarking practices might be present in the centre. With an overall average of 18 some benchmarking might be present in the centre. It is indicated that the qualitative benchmarking is detected in the score for that measurement.

**Table 4.8: Quantitative Benchmarking – Other Centres**

| TYPE OF BENCHMARKING | SCORE | RESPONDENTS | AVERAGE | TOTAL AVERAGE |
|---|---|---|---|---|
| **Quantitative** | **142** | **19** | **7** | |
| **Qualitative** | **42** | **19** | **2** | |
| | | | | |
| **Combined Score** | | | **9** | **4,5** |

The table indicates that for quantitative benchmarking the average score for the other centres is 7. This shows serious challenges with benchmarking.

For qualitative benchmarking the score is 2. This indicates that not enough emphasis is put on the soft side of benchmarking. A total combined score of 9 indicates that very little benchmarking is taking place across the various centres. This is in line with the scores in the previous levels where all centres tested below the lower parameter of the scale.

### 4.4.1.3 INTERNAL VS EXTERNAL BENCHMARKING

As was discussed in level three, the processes that involve the development of a singular methodology in a project-based environment is mostly an internal process. Benchmarking against internal processes takes place within the broader organisation. Once the internal process and methodology is consolidated, extracting the best practices, into a singular methodology the process moves to an external process.

At the same time if benchmarking is not taking place, the scores in the next level should also be low since excellence is based on continuous improvements and these require benchmarking. There must be some comparison within the same sector or industry to

determine what information should be benchmarked. The information and knowledge areas most critical to the competitive advantage of the organisation would be the most important to benchmark. At the same time the leading organisations in that sector would be the most important to benchmark against (Kerzner, 2019).

From this perspective, PMM not only plays an important role in securing the presence of a common language and common processes, which are fundamentals of project management, but also helps to provide benchmarking studies that may produce continuous feedback for the organisation (Ozmen, 2013).

### 4.4.2. QUALITATIVE

Another significant issue regarding project management maturity is its role in strategic planning and approach to measurement and benchmarking (Bach, Zoroja, & Čeljo, 2017).

The first question is a subjective question about how the project management knowledge of their centre compares to other centres that are peers or competitors. The rationale behind this is for the respondent to think about what it is about their centre's project management knowledge that would make them better or worse than other centres. It must be borne in mind that benchmarking is about measuring performance of specific indicators across two organisations. It is about comparisons based on measurements.

Respondents indicated that their centres compare well against other institutions, locally. They indicate that they learn from each other. Benchmarking is a continuous process in this centre and it is seen as a process that will differ depending on the organisation against which the benchmarking is done. Benchmarking should be a consistent process that measures the same indicators against all organisations that are part of the process.

The internal knowledge is ranked highly by respondents. The respondent considers their centre above average in terms of the project management knowledge. Admittedly, this perception is based on the knowledge held by individuals in the centre. However, if this score

is compared to the scores in level one, it does not correlate well. If this is compared to the scores in all levels up to this point the picture gets worse. If there is benchmarking taking place and this is the foundation for this perception that their knowledge in this centre is above average, it basically reinforces the findings and the scores in level one and subsequent levels. This indicates that project management knowledge in these centres are at best at the same level of this centres and could be worse.

The international centres that are operating in the local environment are once again considered to be more advanced. This is already a benchmark in the mind of the respondents, a subjective benchmark, but one none the less. When the respondents indicate that their centre knowledge is close to the knowledge of their partners and competitors, they seem to exclude these international centres. This is reinforced with perceptions that having international staff on-board for some of the projects is an advantage. This exposure is regarded as shedding some light on how things are done in other centres or companies that might be hired to support specific projects. Access to these skills is regarded as pushing the centre above other centres and is reflected as if the skills of these external people are part of the knowledge pool of the centre. The reality is that minimal or no knowledge transfer seems to take place between these external staff and the local staff. As mentioned before this perception that foreign staff and centres have better knowledge than the local centres or staff cannot be substantiated.

Centres that implement projects satisfactorily for international donors is considered to show project management competence. However, such knowledge or competencies simply are not reflected in the scores of this research.

An interesting comparison is when respondents compared their centre's to other centres from other countries that are in the same funding programme from a specific donor. A ranking of 8$^{th}$ out of 11, once again provides some insight into how these subjective benchmarks shine

the light on where the levels of project management knowledge levels might exist across several other centres of excellence that are not necessarily part of this study.

All centres of excellence should be project based. These centres are created as projects in the first place. Secondly, these centres are created to implement research projects and other projects to advance a specific field of study and to build knowledge and skills to the advancement of that field of study. If that environment does not require project management as at least one of the core skills in the minds of the people working in such centres, the scores from previous and the current level certainly start to make sense.

From several responses, it is apparent that respondents are unsure about where they stand compared to other centres or organisations. Responses like 'we are doing well' and 'we are average' does not say much but it does indicate uncertainty. This is some indication that benchmarking is not done. At the same time some few responses indicate that people do see the challenges they have around project management knowledge, but they do not seem to know what to do about it or they feel they are not in a position to do something about it. Centres are perceived as short-sighted with no long term vision. The focus is on project management success and not project success.

At least 10 respondents indicated that they do not benchmark their project management knowledge. Taking this with the statements from the previous section sheds some light on why there is little or no project management knowledge developing in the centres. The confusing part is that some respondents will indicate that they have a process in place for benchmarking while others from the same centre will respond in the negative or indicate that they are not aware of something like this in their centre. Others still refer to processes that seem to be linked to a specific project or programme they are involved in. This might explain why others who presumably are not engaged in the same programme are not aware of it. The picture in the specific centre is that there is no such process in place. The challenge is once again that

the knowledge transfer from this individual experience does not reach the rest of the centre. This links into the attempt from several of the respondents to link their responses to their own personal experiences and knowledge. However, when prompted to respond to the experience of the centre, a brusque 'no' becomes the response. This issue of knowledge transfer seems to be one of the critical issues that needs to be addressed.

There is the realisation that 'yes' centres need to look at what others in the same field are doing and that this could potentially contribute to the growth of the centres. However, from all responses that mention this, it seems that it is always discussed but never acted upon. It is always referring to what others are doing, but never to what others know. The processes from other peers or partners are discussed but not the knowledge that underlines those actions or processes. It seems that there is no comparison with the centre for the purposes of improving on those matters discussed.

Out of the 16 respondents, 14 indicated that they do not benchmark their processes as a continuous and consistent process. Once again the picture that is emerging from those who responded with 'yes', refers to specific programmes that they are part of and not for the whole centre. The rest of the responses are in the negative and basically indicate that benchmarking is not conducted for processes in the centres. If compared to the responses from the previous question where respondents were asked to make a subjective judgement about how their centre compared to others, the respondents were a lot more willing to make such judgements and to make more positive judgements about their own centres. Once they are expected to talk about something a little more specific like the processes, that readiness to do so disappeared.

Some respondents revert to looking at benchmarking against centres that are working in the same technical field as themselves, reflecting again on the importance of technical versus project management knowledge for these centres. This also shows how deeply rooted the idea is about project management methodologies and the rigidity of methodologies. Centres

struggle to see themselves being benchmarked purely based on their project management knowledge or capabilities.

The worrying part is that several respondents indicate that they have never participated in a process like this. The implications are far reaching, and once again, this reinforces the low scores achieved at the various levels. Evidently, project management is not a priority either in terms of knowledge or processes and growth in the field of project management is also not a priority since none of the elements required to drive growth can be detected in the responses or the scores.

Asked whether they benchmark their project success management measurement tools and processes, 14 respondents indicated 'no'. Consistently, some of the respondents refers to programmes or projects that only they seem to be part of. Additionally, in all these references, the projects and programmes referred to are with international partners and seems to be driven by them. The process of knowledge transfers to the broader centre or institution is never referred to or highlighted.

The most concerning statements from these responses are that they indicate that most tools they apply for measuring for monitoring and evaluation are from donors or external partners. There are no internally developed tools, techniques and processes, and the fact that no institutionally sanctioned processes exist implies that not even internal benchmarking takes place to see what those colleagues around them are doing. This links up with some of the consistent responses about the processes around benchmarking from international partners for specific programmes or processes. The problem is that none of this seems to filter into the centre or broader institution. No knowledge transfer is taking place.

The most worrying response indicates that these processes are donor driven, and whatever the donor requires is done. Once again if there are no internal processes in place for measuring project success and all of it is just done to satisfy donor requirements, the knowledge

transfer to develop deeper understanding will not develop. This, plus all the other responses related to external process and external-driven process, indicate that there is no desire in the centres to develop their own process to measure their project success and to benchmark those processes for continuous improvement. Therefore, there is no desire and drive to develop a singular methodology. The methodology has always been prescribed from outside. If linked to all the other issues that indicate a lack of interest in project-based management, it seems that all project management processes, tools and techniques are imposed from outside, and there is no interest in project management from within the centres or the institutions. The challenge is that the culture behind these methodologies and models are not transferred with it.

The big question is answered. It becomes next to impossible to measure project success if all projects are measured against different processes, tools and techniques from different methodologies, prescribed by donors or clients. There is no interest in developing their own methodologies or processes, since they know it will be provided and prescribed by the donor. A common organisational culture develop will be impossible to develop around project management if different methodologies and processes are transplanted from different organisational cultures. Culture determines how people engage with a specific phenomenon.

The rest of the responses that indicate that benchmarking does take place refers to processes that are ad hoc and are subjective perceptions about what others are doing and how they are doing it. There is no process in place, no consistency. What is hopeful is that there is at least one reference to conferences as a source of information for benchmarking. People need to realise that what is presented at conferences can provide a lot of insight into why and how people do things and, if investigated, can become a baseline for discussion and cooperation towards benchmarking.

The saddest is the comment “I’m just an academic that is teaching there, I’m not involved in those processes, I wish I was, but I’m not”. This is a response from someone

teaching and doing research in one of the centres. The exclusion of those who are actively working on the implementation of activities that will directly influence the success of the project or centre for that matter is a huge cause for concern.

### 4.4.3 SUMMARY

This research in itself is a benchmarking exercise. The centres participating in this research is benchmarked against each other based on their project management knowledge. Benchmarking allows an organisation to position itself within an industry, based on sound comparisons of processes, methodologies and the cultures that underscore such methodologies. This should include the organisational culture to support project management.

The challenge that emerges from this picture is that since all processes and methodologies are prescribed by donors or clients, the centres are not required to acquire the knowledge. These centres are always prescribed, what to do and how to do it, and therefore they never concern themselves with why it is done like this. This could be one of the reasons why knowledge transfer does not take place, the applicable learning methodologies are not transferred to, and developed in the centres. The conceptualisation and contextualisation of knowledge is missing. The culture to support the knowledge transfer must be developed.

When it comes to project management knowledge these centres are only concerned with operational matters as prescribed. They never venture into the strategic elements of project management. Project management knowledge should be seen as an asset or a resource and as a source of competitive advantage for the organisation (Mathur, Jugdev, & Fung, 2014). The realisation that technical knowledge alone cannot get the centre to a level where it can compete with others and that is why part of the equation is missing. Because this does not happen in the centre, it does not happen in the broader institution. Project management knowledge becomes the source of power for the donor or client and, therefore, they determine what will happen and how it will happen. There is no evidence of project management knowledge in

the project success because the project management knowledge in such centres never develops and can, therefore, not be visualised in the outcomes.

If one supposes every project is implemented based on the requirements from external entities, then every project is implemented based on a methodology from outside. How can projects be compared with each other to see what works and what does not work? There is a lot of information available, but all of it is in different formats and, therefore, it cannot be read together to form a full picture.

These centres have to realise that if they have their own methodology they will be able to negotiate better terms of cooperation. They will be able to sell their services on the foundation of what they know best and not based on what they are told to do. To reach this state centres must realise that they have to develop mature project management methodologies.

## 4.5 LEVEL FIVE (CONTINUOUS IMPROVEMENT)

*"A sustainable competitive advantage not only placates your customers, it also puts pressure on your competitors to spend money to compete with you"* (Kerzner, 2001).

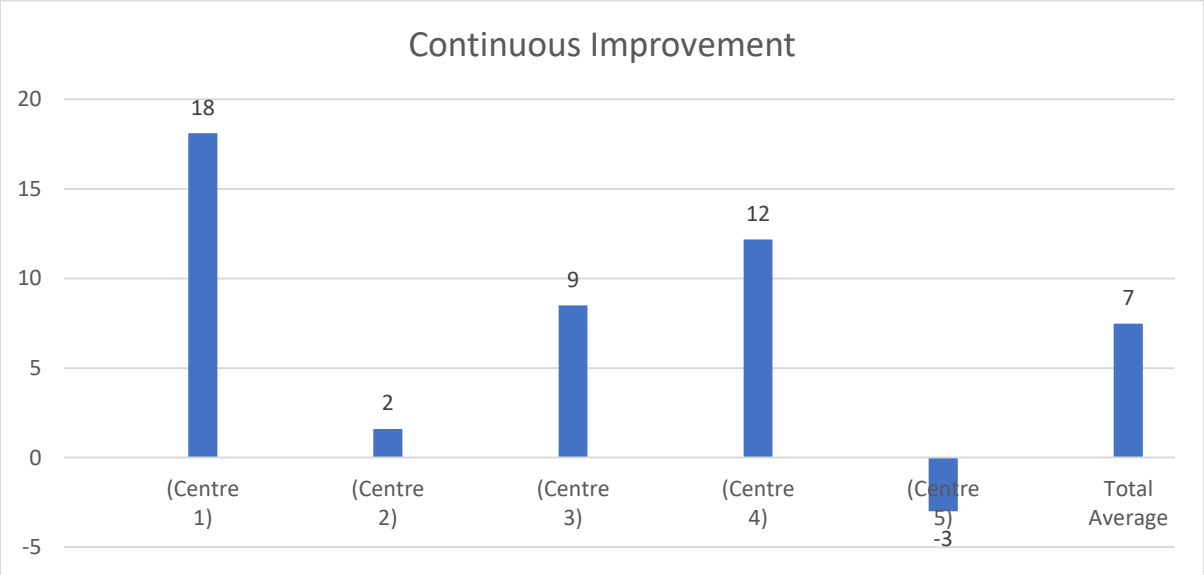
This level focus on continuous improvement. The organisation is now benchmarking against other organisations in the same sector or industry. The lessons learned from these benchmarking exercises become the foundation for improvement in the organisational processes. A score of 20 and more shows that an organisation is committed to benchmarking and continuous improvement. None of the centres tested in this range (Kerzner, 2001).

The organisation must evaluate the information gathered through the benchmarking process to ascertain whether such information enhances the singular methodology adopted by the organisation (Szpitter, 2013).

### 4.5.1. QUANTITATIVE

A score between 10 and 19 is indicative of some continuous improvement taking place, but the changes are slow. Only one centre tested in this range.

A score below 9 shows resistance to change and is an indication that the organisation is not project-driven. Four out of the five Centres tested in this range (Kerzner, 2001).




**Graph 4.1: Continuous Improvement**

Looking at continuous improvement through benchmarking requires a system that would facilitate the measurement of key indicators that would allow for comparisons of these indicators across processes and in turn on the application of those processes across various projects. The same system will apply to the measurement of the performance of specific tools and techniques across the processes and projects. Therefore, looking at continuous improvement is about looking at how the organisation can improve its efficiency and its competitive advantage.

In the end, it is all about the measurement of performance. A critical element of measuring performance is that it must be done on the basis of a standardised process, a singular method. It must be done consistently, and it must be done continuously to support the emergence of maturity.

### 4.5.2. QUALITATIVE

Fourteen of the 16 respondents indicate that it is important that there must be a system in place to measure project success. The whole process of benchmarking starts with the

establishment of a baseline. The centre or organisation must establish where they are at a given point in time. Any future progress will be measured against that baseline.

To facilitate this process outputs must be agreed upon right at the beginning of every project. Everything must be measured against its performance towards those outputs and those outputs must be measured against the baseline. A project must be aligned to the strategic goals of the organisation. The performance on a specific project will determine future funding from the same or similar donors. By measuring performance, it becomes possible to determine which processes, tools and techniques contribute to the efficiency of these processes and to the overall performance of the centre on a specific project. This allows for the centre to improve on its performance and to draw on the lessons learned from past projects. This becomes the foundation for contingencies or new processes.

Past performance becomes the foundation for future planning. Lessons from successes and failures alike must be contextualised in relation to the operations of the centre and broader organisation. Reflecting on past experiences allows for retroduction. Looking back through those experiences and drawing the lessons from those experiences into the future and at the same time being able to look back through planned projects to see the lessons from past experiences reflected in those plans is vital. The continuous pursuit of excellence through improvement is the essence of being in existence as a business.

In the Higher Education environment, a lot of income is generated from third party funding or through donors. Most of this is done through projects and particularly cooperation projects. All that funding can only be accessed through projects. How these projects are managed will determine future access to project funds. Donors have rating systems in place that will determine whether recipients of funds will qualify or not. Projects are undertaken to create impact. This is what projects are measured against. Could they bring about the planned impact. In the same way project management knowledge must be improved and the impact of

that knowledge must be measured. Through consistent measurement recurring weaknesses and strengths can be identified. This identifies opportunities for growth and improvement. It forces the centre to reflect on its past experience.

Every project that is implemented provides an opportunity to contribute to the development of standardised processes, a blueprint for how things should be done. Every opportunity to refine that blueprint should be utilised to contribute to the efficiency of the centre. This blueprint can be used for future projects and the lessons learned can be transferred to those future projects. This is the essence of project management. Measuring progress through monitoring and evaluation processes to identify opportunities for continuous improvement and to enhance chances for project success one project at a time.

All respondents agree that a standardised methodology for measuring project success is important. It forms the foundation of measurement for the purposes of comparison towards improvement. The problem is that the perception that such methodologies are rigid and time-consuming persists. It seems people cannot look beyond this misperception. A systematic approach to projects will help to create a roadmap. Indicators along the way will allow for management at various levels to monitor progress and to intervene as and when required. It becomes a lot easier to determine where deviation is required and how it is dealt with. In the end a more comprehensive approach will be in place.

A singular methodology will focus all the effort on results. The implication is that outcomes will be well defined for measurement purposes and this will lead to better implementation. It will improve planning and the transfer of knowledge from one project to the next. Efficiency will improve with consistency.

A singular methodology for measuring project success will provide a key selling point to project donors and other funding agencies. If they can see in advance how processes will be managed and what type of measurements will be in place across their projects or programmes

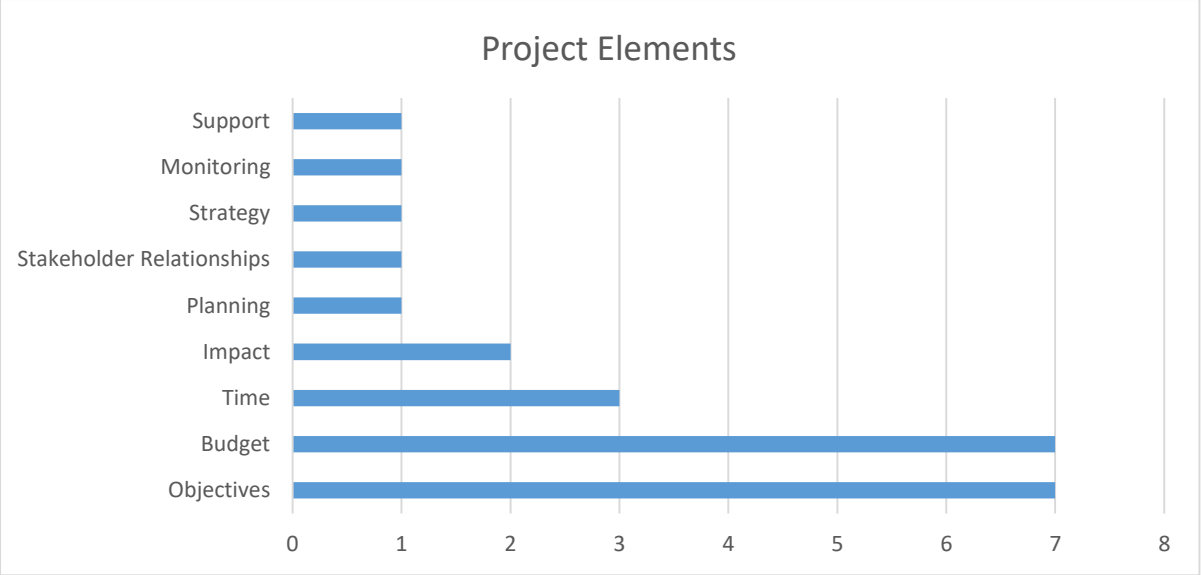
it should be a lot more convincing. Once again it will be a lot easier to define outcomes and the measurements of those outcome. The methodology will also provide a baseline, a point of reference from where the project started and how it progressed through the various phases.

The greatest benefit would be the development of consistent processes; this in turn makes it easier to identify strengths and weaknesses. Those strengths can be built upon to improve success ratings and the weakness can be improved upon for the same reason. A continuous and consistent process will build maturity.

When asked about whether their institution had a standardised project management methodology only two respondents answered 'yes'. However, not one of them was sure whether it was being used. One indicated that there is something in place for students for their research management but was not sure about the rest of the centre. At least one respondent answered that there is a unit in the institution that is supposed to be responsible for coordinating all projects but that many projects are implemented outside the framework of this unit. This defeats the purpose and implies that several methodologies could still be in play throughout the institution. The rest of the respondents were either not sure about something like a methodology being in place or were not involved, although they work in the centre. In such an environment it is difficult to see how staff can support a methodology or processes from which they are deliberately excluded.

The aspect of methodologies being driven by donors or funders reappeared. Donors determine the project requirements and the centre is expected only to implement projects based on those guidelines. The centre needs to be in control of its processes and methodology if it wants to be in charge of its future growth and change.

As per the chart below, several elements were identified as necessary for measuring project success. Two crucial issues that were raised are firstly, that objectives should be clear and measurable. Secondly that outputs should be verifiable and quantifiable through indicators.




**Graph 4.2: Project Elements**

The planning phase is very important and the measurements should be built into the planning. This will make monitoring and evaluation easier and will support the measurements in relation to the budget and the achievements of the objectives.

The measurement methodology must support the strategy of the organisation. It must be comprehensive and it must be supported by management. The outcome must be in line with the organisation's short and long-term vision. Every project must show impact. This requires measurement of changes that are brought about by a project.

All respondents agree that measuring project success contributes to future project success. In their responses to this question, there is a realisation that comes through. In previous sections there was a constant remark about how a singular methodology could be restrictive and how it will not be suitable for all projects. Now the responses look at how it is possible to build the success of past projects into future ones. It provides continuity even if it involves different elements or different focus areas. Continuity is very important for improvement while the measurement itself is key. It helps to build a track record, which reflects the success of the centre. This should translate into more funding opportunities. In

this way, results from previous projects influence the proposals for the next projects based on what aligns across these projects.

Measurement helps to pinpoint areas for improvement or areas of strength. These elements provide an opportunity to capitalise on the strengths and lessons learned from the weaknesses.

Critically there is the realisation that every project that is implemented adds to the baseline from where the next project will be started. It provides a picture of where the centre is at a specific point in time with regards to its project management knowledge and capabilities. It builds the experience that can be passed forward and it slowly but surely helps to craft the efficiency of the centre.

Measuring project success allows the centre to reflect on different parts of the project. Those parts that were more successful than others can be identified. It exposes the risks that could be eliminated or mitigated in future projects. In this way, even the areas that did not perform well becomes a selling point in the next project. Donors could be sold on how those issues were identified, dealt with, the lessons that was learned from those mistakes and how those lessons are incorporated into the next funding proposal as well as into the methodology.

Measurement allows the project team to visualise their impact. Measurement is the foundation for continuous improvement. The impact of the project on the intended stakeholder can be quantified and the impact on the implementing centre can also be measured. Donors or clients are more willing to reward what can be visualised than what cannot. This could support the extension of contracts and relationships for future cooperation. This reflection that comes with measurement allows the common processes to emerge and forms the foundation for the development of a singular methodology. Best practices are identified and move forward with future projects. In time more and more best practices flow into common practices.

It is important to look at how lessons learned from benchmarking, and measurement systematically moves from one project to the next; it brings out what is learned through the monitoring and evaluation of previous projects. Some respondents reflect on a process where all projects are captured through reports and those reports are used as discussion documents about what worked and what did not work. This includes discussions on what should not be repeated and what could be taken forward to the next projects. In other centres it seems to be a very transactional process. The measurement is done, it is reported on and the report is registered with a depository. There is no automatic transfer of lessons learned from one project to the next. If it does happen it is through individuals who become part of the future project.

As with all other examples there are those centres where staff members do not know about a process like this, or they are not part of the process. At the same time if the process does take place it is informal, and nothing is available in writing. Improvement efforts must be inclusive to support the development of a project management culture.

The transfer of knowledge is not formalised in most of the centres. Relying on individuals to transfer knowledge from one project to the next feeds into a system where individuals build knowledge and use it to build power nodes in organisations. This becomes a problem that can be very difficult to deal with. The problem is that the organisation will not have access to such knowledge unless it is to the benefit of said individuals. Organisational interest gets captured by individuals. Building project management knowledge should be a conscious process for an organisation. It provides purpose to efforts like measuring project success, extracting lessons learned and creating a singular methodology. It creates an incentive, once staff realise the value of what they have learned and the fact their knowledge is built on experience, boosting their confidence.

People who are part of a well-managed project will learn how things should be done. It is taken for granted that the knowledge and the experience gained will automatically be

transferred to the next project. Each contribution has a lot more value if it is filtered through a systematic process. A process where these elements are extracted, processed and packaged for use as part of a methodology. In this way, knowledge gaps can be identified and eliminated or compensated for. This support improves project team compilation. Team members are capacitated through every experience, the knowledge they bring to every project is known, and they know how things are expected to be done. This makes the human resource element of projects a lot easier to manage. With every project comes new lessons. What worked in the past might not have worked again and what lessons were learned from past mistakes could serve as a valuable lesson this time around. The issue is that learning takes place through every project and in a formalised process and system even more so. It must be allowed to permeate the structures of the institution.

This becomes the foundation for capacity building. It supports horizontal accountability. Every project team member knows what went wrong and where it went wrong. Everyone becomes accountable for their contribution to the project. This should bring the team close together because this illuminate's horizontal and vertical reliance on each other. In reflection, every team member's contribution will be evaluated and sometimes their failures are caused by others failing them. People that are consistently exposed to this type of learning and problem-solving develop the capabilities to build on experience and to engage with knowledge towards problem solving.

Ignoring lessons from past projects will invariably lead to situations where mistakes will be repeated. Projects might be taken on that should not have been taken on. Some projects are dependent on very specialised skills, and if those skills are absent in a team, the team and the project is doomed. This includes both technical knowledge and project management knowledge.

Continuous improvement requires building institutional memory, memory of success and failures. At the same time the institutional memory becomes the foundation for future success through efficiency. It creates common processes that can be fine-tuned with consistent application. In time a singular methodology should emerge from this process. This continuity becomes part of the process of consolidating project management knowledge and experience. Standardisation brings stability through consistency. With this comes more realistic expectations. Stakeholders and team members know what to expect from the process in front of them. Common process, tools and techniques create confidence in team members; they know what to do and how to do it. It creates comfort for stakeholders; they know what will be done and how it will be done. It boils down to the fact that all stakeholders involved know what to expect. This knowledge empowers the project team; they are in control of the process and growth.

When respondents were asked about the impact of general standardisation in organisations, very positive responses came forth. Standardisation feeds into structure. Roles and responsibilities are illuminated and consolidated. As these roles and responsibilities are consolidated they are institutionalised in the centre and in the broader organisation. This draws project management into the sphere of strategic management in the broader organisation. Processes, people and resources are consistently drawn into the processes and structures of the organisation. The value that is generated through this process becomes part of the value the broader organisation is generating. Project management as an organisational resource contributes to competitive parity by being valuable (Maher, Hadfield, Hutchings, & de Eyto, 2018). Project management becomes one of the strategic management methodologies for senior management. Standardisation does not translate linearly into project success. It supports and directs the flow of processes, through structures and agents, that will ultimately produce events that will manifest as project success.

It is critical for the roles and responsibilities to be clarified and structured. The way roles and responsibilities flow through the structures of an organisation determine how knowledge will flow through that organisation. It will determine where knowledge will accumulate in the structures and systems. If knowledge is considered power, this same process will determine where power will accumulate in the structures and systems. The structures and systems become the memory of the organisation in terms of project management knowledge.

Standardisation should trigger debate. Everything will have to be considered more critically. Everything will have to be debated in terms of its fit into the system and the supporting processes. This should drive innovation; if things do not fit, new solutions will have to develop, whether it is procedural or structural. The central goal should be efficiency.

In higher education, standardisation is a well-known concept. Higher education systems are cyclical. Administrative processes are standardised to the smallest detail. Therefore, it is surprising that there is so much resistance to standardisation in project management methodologies. Just as people plan their year around academic processes, project staff will plan their projects around their project activities. Processes will align those activities with the project plan. There are so many similarities, and yet the choice is to concentrate on the differences.

Standardisation encourages cooperation. If one person knows what the next person is doing and how it is being done, it is easier to see how cooperation with such a person can work. If both people know what the other is doing and how it is being done, it is easier to see and determine synergies. It highlights the casual relationship between processes and structures because it demands compliance.

It is interesting to see the inconsistencies in the way people appear to see project management and assumingly how they think about project management. As in the previous section there seems to be a realisation about the potential benefits that standardisation can bring

to operations. In diverse institutions like higher education it can bring standards and it can contribute to stability. In this way, the impact of processes can be seen and experienced.

Respondents felt that a standard management tool will definitely have an impact on the current system. The detail that can be expected from standardisation can obviously be shared across processes, and everybody can benefit from the learning extracted from it. Mistakes can be avoided with a system like this in place, and efficiency can be improved.

Because standardisation provides both procedural and structural stability it makes it a lot easier to assimilate new staff into the organisation. New staff is provided with a baseline against which they can evaluate their own knowledge and against which they can be measured in terms of performance and compliance. This includes self-evaluation, which is only possible in a standardised system. All these responses support the idea of putting all the elements in place required for continuous improvement based on benchmarking and standardisation.

However, when asked about the potential impact of standardisation on their own institution or structure some recipients reverted to their previous negative perceptions. Suddenly it depends, on what is valued more, on how it's structured, on who it is targeted at, because if it is just about knowledge and it is not really enforced it is not going to serve its purpose.

Standardisation is prescriptive about how things need to be done. This makes it restrictive about encouraging out-of-the-box thinking. In order to think outside the box one should know the parameters of the box. Once the parameters of the box are established there is nothing wrong in shifting the parameters of the box in all directions, bearing in mind that it is done systematically and procedurally. This must be a creative process. It must create new ways of doing things. It must create new things to do. It should create new structures, if required, to achieve all these new things. Most importantly, it will create new knowledge that can be applied to test the boundaries of the box even more.

Alongside the issue of being restrictive, the issue of applicability across different kinds of projects is raised again. The concern is that there will be projects requiring new things to be put in place. The realisation that even functional process and systems and structures are exposed to change. Ironically, such change is mostly facilitated through projects.

Standardisation is seen as being dependent on individuals dealing with specific methodologies and controlling such methodologies. The contrary is true, that methodologies are put in place to ensure transparency. Everyone should know what needs to be done and how it needs to be done. However, these responses could be based on current experiences.

In the absence of a singular project management methodology the respondents should see their current situation as an example of the impact of the lack of such a methodology. This should be a reflection on what they are currently experiencing and what they would like to improve on.

The first respondent reflects on the impact on the quality of the projects. Others see the impact as only relevant to some projects. This seems to relate to the fact that some projects are seen to have a methodology that is applied to them, but this methodology is not relevant to all projects.

The lack of guidance and structure around project management is a real challenge for some. The impact on project success is huge. There is no control, no capacity to track what is happening. There is no singular methodology to track the impact of project management on the efficiency and thus the success of project management.

This creates a very chaotic system, where people do not always know what influences project success and what is detrimental to it. The lack of coordination creates silos and or islands of project management in the broader organisation. People work on their own toward their own goals, and none of it translates back into the value project management brings to the broader institution. There is no coordination on time, leading to undesirable outcomes. The

lines become blurry, and uncertainty develops around expected outcomes and the achievability of such outcomes. The measurement elements are missing, and therefore processes are not adhered to since there is no requirement for compliance.

This requires a project management culture. "A set of stable beliefs attitudes and values recognised from the perspective of an organisation, to combine the values of staff with strategic objectives to promote the realisation of those objectives" (Wang, Bai, Huang, Du, & Zhang, 2019) consistently and continuously.

### 4.5.3 SUMMARY

The issues around the processes that need to support continuous improvement are numerous. Looking at the scores for level five of the KPM$^3$, it is obvious that little is done to promote continuous improvement of project management in the centres under discussion for the purposes of this research.

There are structural and procedural issues at play. There is a lot of uncertainty about who should be responsible for project management in the organisation. This is accompanied by confusion as to which processes should be applicable to project management.

The development of a singular methodology that as a requirement for continuous improvement is misunderstood. There is a misunderstanding around how a singular methodology could support the development of project management across the higher education environment. It is perceived as creating a restrictive and prescriptive framework instead of seeing the guidance and transparency that it can bring to the process. The link between knowledge development and continuous improvement is not appreciated.

The status quo is based on individual ownership of knowledge and control over processes to serve the individual interest. This can be very detrimental to the sustainability and competitive advantage of the centres and the broader institutions. The value that project management can add to the centres and the institutions is diminished through these perceptions.

The fact that there is no process in place that allows tacit knowledge to be converted into explicit knowledge implies that the process cannot facilitate the mix of both the technical project management knowledge and the softer knowledge areas required to facilitate project success. There is a lot of discussion about learning from experience, which is the reverse of this process. There is no process in place to link the experience held by project members to the technical project management knowledge required to facilitate project success. It becomes impossible to move retroductively through this process of creating explicit knowledge out of the tacit knowledge held about project management knowledge and project management experiences. This needs to be codified by the project team to allow the growth and maturity of project management knowledge. This should include a culture of project based management.

This codification is required to build an explicit reality around which project management knowledge can be operationalised. It will identify and expose the knowledge gaps in terms of the tacit knowledge building blocks required to construct an explicit, common reality. This reality becomes the realm that determines the knowledge requirements for project success. At the same time the culture behind codified knowledge determines the contextualisation of such knowledge.

If this is brought into the three-dimensional reality that is posited by the critical realist theoretical framework, this will fall in the dimension of the real. This is the dimension where the structure or project team, exist and holds inherent power, power that can be exerted over its reality. In universities, this power is based on knowledge. The knowledge that the structure or in this case the Centre holds, lies in the creation of new knowledge and the dissemination of that knowledge. When the Centre starts to interact with other structures within the university, that interaction will be based on the knowledge held by the centre versus the knowledge held by other structures.

In this environment it becomes essential that knowledge should be seen as an asset, that is the foundation on which the power base of the centre or specific structure is constructed. Therefore, it is in the interest of project-based structures in any organisation and particularly in universities to ensure the growth and maturity of the knowledge that underscores its existence, creating specialist knowledge to support competitive advantage.

Knowledge development in the said field must be focused, targeted and strategic. It must link the structure to the strategic goals of the broader institution and it must link the structure to the culture of the institution, through linkages into other structures that are built on the same foundational knowledge. Thus, within a project structure/centre the project management knowledge held by individuals becomes the building blocks of the explicit reality, within which the structure must exercise its power. Project management must be developed to a point where it is seen as a strategic management strategy of the institution for those structures that implement activities, in the interest of the institution, that require such a strategy. If one looks at the scores achieved in the KAT and that are further explored in the interviews, the project management knowledge levels are at the basic levels. The implication is that the discussions about project management, if it takes place, will also take place at the basic level. From the interviews it is reasonable to conclude that discussions about project management do not take place in the centres. If there is no discussion in the centres, chances of having discussions about project management at the strategic level are limited. There is no discussion about project management at the strategic levels and therefore project management can simply not emerge as a strategic management methodology.

This makes it critical that there is a match between the tacit knowledge that is developed in the project structure and the explicit knowledge required to weave the structure into the strategic fabric of the organisation. Some of the staff will hold technical knowledge about a specific field of knowledge that might be important for the implementation of specific projects

or all projects if it is a specialised centre or a CoE. Some of the staff will know the structures that are required to build a project-based organisation although they might not have all the experience to manage projects, because they know how a project-based organisation must be structured to facilitate the implementation of the project management processes, tools and techniques. Others will hold knowledge about project management. These two streams of knowledge need to be harmonised in such a way that it creates all the sub structures that are required to build a project-based structure. This in turn can be harmonised with the structures that operate on the same knowledge foundation and be aligned with the broader institutional knowledge.

The challenge is that in most universities you find that there is a focus on technical knowledge of specific subject areas and project staff is appointed based on that technical knowledge. This knowledge might not be supported by the technical knowledge about project management, required to anchor that knowledge to the project-based nature of the structure/centre. A project-based centre must be built on project-based processes, tools and techniques that form the foundation of a project management methodology. This in turn will require the development of specific structures that support this management strategy.

Universities need to realise that structure must follow strategy. If project management is a management strategy of the institution, the structures that are created to support that strategy must be created and structured to support that strategy. Universities are in a sense unique organisations. They are complex institutions that have various structures in place that have to interact with each other in order for the institution to succeed. This interaction is based on the inherent causal relationships that link these structures into the sum that is the university, this relationship is emulsified by a culture.

When these structures start to interact with each other, two things start to happen. The power held within each structure starts to interact based on the causal relationships between

these structures. This is further complicated by the fact that the structures in Universities are grouped into structures that support specific strategies of the institution. You have Schools or Faculties, there are Centres, and there are administrative departments. Then you have structures that are made up of representatives of all these structures like the Senate. The implication is that these structures can interact with each other as individual structures or as group structures. This interaction creates the events that moves the process, retroductively, through the three-dimensional reality proposed by CR.

It is clear from this that it becomes important for project-based structures within the university to find commonalities that can transcend the individual structure into the group structures and finally into the organisation as a structure.

The events that are created by this interaction becomes the experiences that the structures, group structures and the sum of the organisation experience as project management. If project management comes out of this interaction and it is perceived as a non-strategic management strategy, it will be at a disadvantage within the organisation. It will face challenges in terms of access to power and resources, against other structures that are strategically more aligned to the dominant management structure. It is for this reason that the dominant management strategy in universities determines the dominant structures in the organisation. Therefore, these structures produce the events that becomes the experience that is project based management and project success.

Universities have a mandate that is rooted in academia. This places the focus of all activities on the advancement of that mandate. In response there are attempts to bridge this issue by linking project activities to academic strategic goals. Projects related to research, that supports academic objectives are the most dominant projects in most of the institutions. Very little actual research about project-based management is conducted by universities. Research management remains a dominant strategy to achieve the strategic goals related to the

organisational mandate. This generates a lot of discussion and activity around research management. The skills and knowledge around research management are regarded as pivotal for the organisation compared to project management that is regarded as a peripheral management strategy.

On the other hand, funding availed to universities through donors are linked to project-based outcomes and therefore project-based management. This can lead to a situation where project management elements are applied to research management and the research project is born. This creates a constant mismatch between the academic research projects and donor expectations. This translates into tension between donor-funded projects that involve cooperation across international partners. So, when structures in universities interact with each other the causal relationships and the power will produce events that are conducive to research management and not project management.

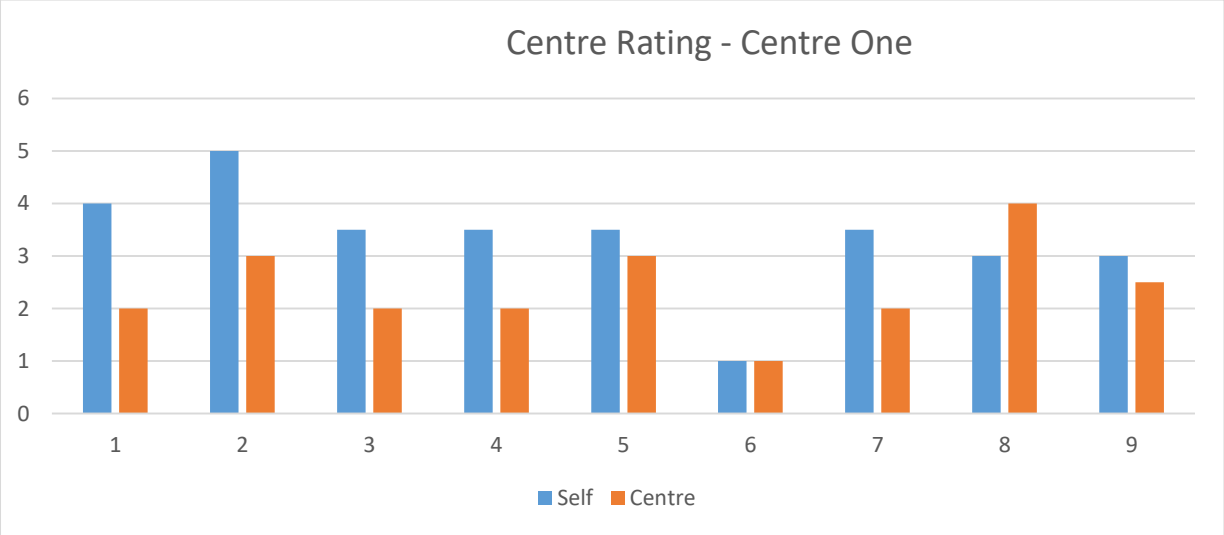
This pushes the discussion into the next level of reality, the empirical. The events that are created through this process is what project staff experience in universities. The project team will have to apply their knowledge and all the information available to them to respond to these events. Bear in mind that these events do not have to be observed or experienced to be real. Yet they become the reality experienced throughout the university. Now, if there is no common knowledge, a common language and common processes to use as a foundation to move through these levels of reality each structure will contextualise the event in to their own reality, and alternative realities develop and experiences are built on these realities. Therefore, the construction of a common reality is the challenge and this process falls apart right at the point where common knowledge needs to be created to facilitate the creation of a common language that can develop into common processes that will lead to the development of a common methodology.

Project success becomes a challenge for universities because the structures do not support project management, the short term project management goals and the long term goals of project success are not aligned through a common methodology. Because of this, it is not part of the dominant strategy for the institution, to either manage academic activities or administrative activities. This creates a situation where it is not discussed at the appropriate levels to influence the power and causal relationships in its favour, thus creating a reality where the events that are produced from these interactions are not in favour of project success. Because there is little or no discussion taking place about project management, a lot of uncertainty is created around project- based management. There is no certainty about what knowledge is relevant for the successful management of projects. There is vagueness as to where the knowledge should be sourced from that is required for project success and finally there is no certainty as to how stakeholders, particularly internal stakeholders, will respond to project based processes, tools and techniques, and project management methodologies. In each question asked there was a response such as, 'I am not sure', 'I don't know', 'maybe but I am not part of it'. Clearly this lack of discussion around the topic has detrimental effects on the development of project management in universities. This in turn has a detrimental effect on the development of project-based structures or centres in universities. In the end it has a detrimental effect on the success rate of project centres in universities and the success rate of the projects they implement.

Across all the areas investigated there is a constant refrain of 'it must be taken seriously', when referring to project management methodologies. This implies that structures or processes are put in place but not applied. It indicates a lack of trust in the system. Staff do not expect the institution to be consistent, creating a culture of distrust around project management methodologies and processes.

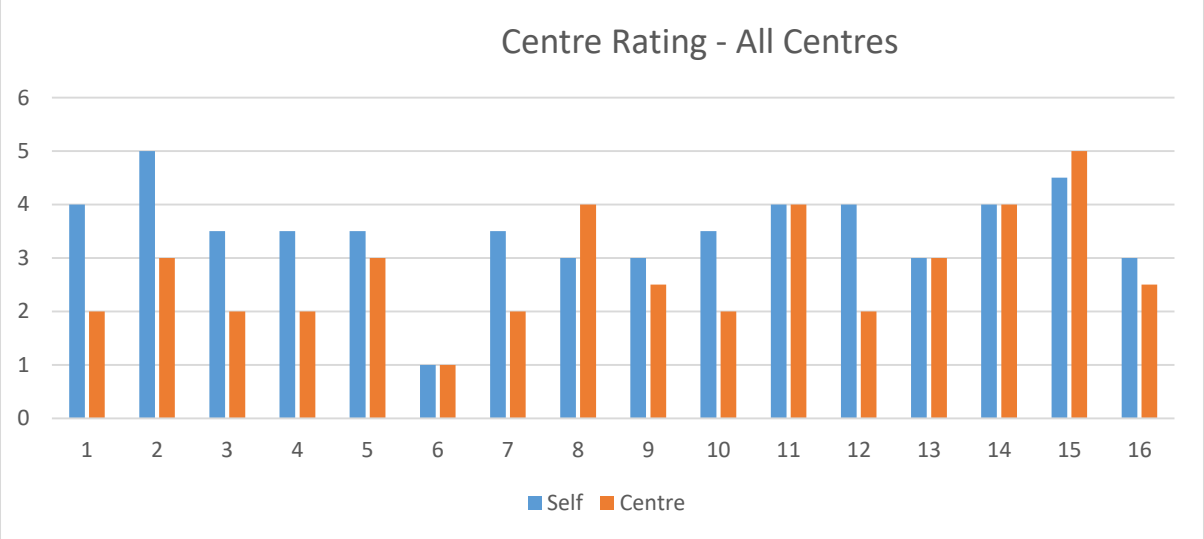
## 4.6 RATING

In reflection at the end of the interview, as part of the qualitative interviews, respondents' were asked to subjectively rate their own project management levels against that of their centre, on a scale from 1 to 5 where one was poor and five was excellent.




**Graph 4.1: Centre Rating - Reference Centre**

In the reference centre it was already detected that there is only one respondent who rates the personal rating lower than that of the centre and one who rates the personal rating to be equal to that of the centre.




**Graph 4.2: Centre Rating – All Centres**

If all the respondents are compared the same pattern prevails. Most of the respondents rate their own knowledge level above the knowledge level of the centre. Logic should tell us that the implication is that these respondents see themselves as having higher project management levels when compared to their colleagues. In their view it is their colleagues who would bring down the average knowledge level of the centre.

It is posited that because there is little or no discussion about project management taking place in the centres people never have had the opportunity to be exposed to the project management knowledge of colleagues. As project management knowledge is not practised in the centre; people are not exposed to the project management knowledge of their colleagues in action. The lack of discussion hampers the existing knowledge being shared and complemented by other sources of knowledge. Thus, no new knowledge can be created around project management. Therefore, project management knowledge cannot be observed in the achievement of project success.

If this is cross referenced with the responses in question one and two of the qualitative questionnaire it is interesting to see that there is a development from question one where there is a clear appreciation for project management knowledge, at the personal level, to question two where there is a clear perception that the institutions do not appreciate project management knowledge to the final question where in the responses suddenly everyone feels that their knowledge is better than that of their colleagues.

When cross-referenced with the scores across all the five levels it is apparent that there is limited project management knowledge in these centres. The perception is that individuals in these centres feel they know more than the rest of the colleagues in their centre. This results in limited opportunities for this knowledge to be benchmarked against each other in a horizontally accountable manner, to stimulate academic discussion around project management.

The same problem seems to persist when these centres cooperate with international partners. Project management is not discussed, assumptions are made about project management knowledge levels on both sides, and only when things go wrong are the problems discussed. Compatibility is not considered.

Projects are about planning. Planning requires that all matters related to the implementation of the activity must be discussed and clarified. Project management developed the project cycle to support the project planning process. This is in place to make sure that all stakeholders are informed about how the project is progressing through all its phases. Project planning is based on the idea that everything must be broken down into the smallest work unit. A break-down structure of work must be developed from this which ensures that all stakeholders are identified for each work activity and that all possible information about that work unit is determined to the minutest detail. All this is done to ensure that the information flow between all stakeholders can be managed properly. Therefore, if in a project environment there is no communication taking place, it is understandable that people will not see the value of project management. It is because they do not use the methodology and so they do not see the information that can be generated through such a methodology and thus they do not realise what they ought to be discussing.

### 4.6.1 SUMMARY

The importance of this rating is the perception that respondents hold about their own knowledge levels against that of the centre they work in. The idea that most respondents perceive themselves as having better knowledge than their colleagues can create several challenges. People who think they know more than others have little or nothing to learn from other people. Therefore, trying to convince such people to undergo training with their colleagues might prove to be a challenge.

Secondly the idea might also create a barrier to knowledge transfer since these project staff might not think other staff has anything to offer in terms of knowledge. It seems that in such an environment every person is trying to hold on to their knowledge since they know best. This seems to determine the culture around project management in the centres.

# CHAPTER FIVE (IMPLICATIONS, RECOMMENDATIONS AND CONCLUSIONS)

## 5.1 INTRODUCTION

*"Project success is regarded as a multidimensional construct with interrelated technical, economic, behavioural, business and strategic dimensions" (McLeod, Doolin, & MacDonell, 2012).*

This chapter focuses on the conclusions reached from considering the results of the empirical investigations as well as, the recommendations to enhance the quality of project management maturity in HEIs.

The importance of projects has resulted in increased international standards, academic research, and education and training on project management concepts. However, studies show that the number of successful projects has not changed significantly (Anantatmula & Rad, 2018). The assumption is that because the relationship between project management maturity and project success is not clear, project management knowledge does not impact on project success. Therefore, project management knowledge is not considered to add value to the achievement of project success.

This contributes to the prevailing situation in centres of excellence in African HEIs. Project management knowledge simply does not add value to the achievement of project success. Thus, project management knowledge is not considered an asset for competitive advantage and therefore cannot develop into maturity. Williams, Ferdinand and Croft, as cited in Bach, Zoroja, & Čeljo, 2017) concludes that maturity is a process which enables codification, measurement and control of project management activities which at the same time estimate integration of project and organizational processes in companies.

The causal relationships investigated in this research exposes the challenges around integrating project management maturity into the strategic fabric of the organisations. An overview of the conclusions follows.

## 5.2 OVERVIEW OF THE CONCLUSIONS

Based on the empirical evidence three conclusions were reached:

- Conclusion One – Lack of Project Management Knowledge;
- Conclusion Two – Lack of Project Management Methodology;
- Conclusion Three – Lack of Project Management Structures.

These need to be understood within the framework of the underlying issues, which are a lack of project management knowledge, the relevance of the theoretical framework and the contextualisation of learning as a solution. Since these elements are lacking in these structures and or organisations maturity cannot be expected to develop in these organisations.

### 5.2.1 CONCLUSION 1 - LACK OF PROJECT MANAGEMENT KNOWLEDGE

From the quantitative and qualitative research contributions, it is evident that there is a lack of project management knowledge as detected in level one of the KPM$^3$ across all these Centres of Excellence in the HEIs. At the end of the model, level five it is clear that there is no project management maturity based on the scores across all the centres across all the levels.

**A lack of Project Management Knowledge** - is detected across all the knowledge areas as outlined in the PMBoK. The lack of knowledge is confirmed across all five levels of the KAT of the KPM$^3$. This implies a lack of project management maturity.

The respondents to the qualitative interviews also indicated that they do not think the structures in their organisations hold the right project management knowledge and expressed similar views about the project management knowledge of the project stakeholders.

The perceptions about the respondents' own project management knowledge is also a clear indication that they do not understand their own lack of knowledge as per the assessment tool.

They need to understand their own lack of knowledge to realise the need to develop their project management knowledge. If they do not see the lack of knowledge, they will not see the impact of the lack of that knowledge.

Project management knowledge and the value it adds to the competitive advantage of the structures and organisation must be conceptualised and contextualised in the context of the organisational culture. The way things are done procedurally, structurally and culturally.

**Theoretical relevance** – as applied to the research makes knowledge a critical element. Knowledge is an inherent asset that is required to sustain the competitive advantage of any organisation. The inherent nature of knowledge as an asset, converts knowledge into power, because it becomes the assets that advance the growth of the organisation. Thus for the Centres of Excellence, it is important to hold relevant project management knowledge. In the critical realist, approach knowledge becomes that inherent power that forms the foundation for the dimension of the r*eal*. It becomes the asset that determines the power the structures or mechanisms require to influence the project environment. In order to advance knowledge, the focus of that process is important.

**Learning** - in particular, the focus of learning in this dimension is inwardly focused. It looks at the organisation as an independent organisation, and on the question **"Are we doing what we do right?"** This focus is mainly on what goes wrong and fixing those things that goes wrong, without any regard to other external elements. There is no relationship to other structures or organisations that are considered.

The implication is that project management knowledge needs to be developed at this level of the real in order for such knowledge to become an inherent asset for the structures. Project management knowledge must become part of the solution in order to be appreciated as an asset that can add value to the independent existence of the organisation in relation to its competitive advantage.

### 5.2.2 CONCLUSION 2 - LACK OF A PROJECT MANAGEMENT METHODOLOGY

With knowledge as an input, project management requires a methodology, "a way of doing things", according to the Merriam-Webster Dictionary (2020), to operationalise its inherent knowledge. This means taking project management knowledge and making it part of the way things are done and by which it will be measured. A methodology defines how things are done and this determines what things and how things will be measured. Through measurement, the value such a methodology contributes to the competitive advantage of the organisation can be extracted.

**Project management methodology** – or rather the lack thereof, has critical implications for the development of project management maturity. A methodology is operationalised by processes. Processes define the interaction of structures. How structures interact with each other is based on the processes that facilitate their interaction. Therefore, if project management knowledge is to become part of the way things are being done, it has to become part of the methodology and underlying processes that define how things are being done.

This, in turn, will outline how project management knowledge will become part of the interaction with other structures based on matured methodologies.

**Theoretical relevance** – of the methodology and the underlying processes, as part of the interaction of structures, lies in the fact that once structures are causally linked through a project the causal relations will determine the interaction of the structures. The critical realist sees this as part of the *actual* dimension. This is where structures interact with each other based on their inherent power to produce outcomes or events. This power is derived from knowledge.

In order to structure this interaction, a methodology must be in place. A project management methodology with underlying processes, in particular, should be in place to determine how project outcomes will be achieved, how each structure will contribute to reaching the goals and objectives of the project. Project management knowledge must become

an inherent part of this interaction. Problems and solutions encountered must be discussed based on project management knowledge.

**Learning** – in this dimension, is concerned with new situations that are difficult to fit into existing patterns and schemes. Instead, organisations must now overcome their existing limitations (reframing) and understand or accept something that is significantly new or different. It is concerned with the question **"are we doing the right things?"** This new knowledge might be derived from the interaction with collaborating partners who hold different perceptions. Organisational learning now converts into an external process, demanding interaction with other structures. Learning outcomes are now concerned, for example, with changes in the organisation's knowledge base, new objectives, or new policies based on this new exposure. Thus interaction becomes linked to benchmarking and benchmarking requires that processes and its underlying knowledge be revisited.

The result invariably should be either change in the methodology and its underlying processes to improve efficiency, or changes in the structures to support more efficient implementation of the methodology and its underlying processes. This should be aligned with efficiency, based on which option will add most value to the competitive advantage of the organisation or structure and to project management maturity.

### 5.2.3 CONCLUSION 3 - LACK OF PROJECT MANAGEMENT STRUCTURES

In order for project management knowledge to be operationalised it must also be institutionalised. This requires that structures must be in place to house project management knowledge, to take ownership of project management knowledge: these structures must start to operate based on project management methodologies and not functional management methodologies. They must apply project management processes.

**Project management structures** – implies that the project management methodology must become a guide towards how structures implement their project activities. Project

management structures must be developed by being capacitated with project management knowledge. The project management structures must know their project management levels, weakness and strengths. These structures need to be capacitated to extract value out of project management knowledge and methodologies to support the advancement of the competitive advantage of the structures internally and of the broader institution externally. Project management knowledge should, therefore, be developed, then evaluated and continuously improved upon in these structures. In this way, project management maturity should become evident or manifest in project outcomes or success.

**Theoretical relevance** – this process is the movement of project management knowledge from being just project management knowledge, independent from other knowledge and divested from structures and context. Once project management knowledge emerges in the empirical dimension, of the critical realist reality, it becomes part of the elements that are applied to project events in order to contextualise such outcomes or project success. Project management must move through the real and the actual into the empirical. This process requires structures to internalise project management to be part of their inherent assets to advance their competitive advantage internally and externally.

**Learning -** learning in this context becomes transformative and creative learning. The focus of learning is on **"what is driving the organisation and others to be predisposed to learn in this way? And "why these objectives?"** This looks at how people learn and why they learn in that particular way, the culture of learning, in order to investigate the underlying structures and processes.

Structures must look at how the agents that represent them develop and apply project management knowledge. They need to understand how structures engage with other structures on the basis of project management knowledge.

Structures must understand how project management knowledge is used to contextualise the project reality. This should support the development of structures that will support the most efficient methodology towards the most efficient route through the dimensions of CR.

The project structures must be geared for knowledge transfer. When engaging stakeholders, the learning that takes place must be consolidated and placed in the custody of s specific structure and culturally contextualised. If learning does not have a structure and processes to be retained and accumulate in, it will be lost.

## 5.3 SUMMARY

The conclusions support the development of a strategy to develop project management knowledge in structures or organisations. Once the knowledge is developed it must be institutionalised. Only then can the project management knowledge be consolidated into a mature project management methodology.

This becomes the foundation for the contextualisation of the project management environments that structures are engaging with. Structures must be able to engage other structures in project management environments based on mature project management methodologies, and they must be able to pull the matured project management knowledge through the layers of reality to be visible in the contextualisation of project success.

## 5.4 RECOMMENDATIONS

Based on these three conclusions recommendations were developed to address the causal elements. Recommendations will be based on the individual conclusions in an attempt to support a structural approach to mediate project management maturity.

1. Recommendations to improve project management knowledge in tertiary education institutions.

a. The most obvious intervention that is outlined in the responses from the interviews is training. As per the literature review and the theoretical framework, training or learning must be focused appropriately.
b. The overall focus of the training should be on the development of a learning framework that will:
    i. Firstly, develop the required project management knowledge;
    ii. Secondly, it should facilitate learning on how to apply the knowledge as an asset towards enhancing the engagement with other mechanisms or structures; and
    iii. Finally, it should facilitate the learning to be drawn through the layers of reality to support the contextualisation of project success in the empirical dimension.
c. The different loops of learning should be aligned and applied to the various dimensions of reality, as per the discussion in the theoretical framework. This implies a curriculum that would allow for learning to be facilitated across levels of complexity. This should be bear in mind the internal versus external elements of project management maturity.
d. Learning must be assessed and evaluated at each level of the learning framework in order to ensure that appropriate levels of knowledge are developed and at the same time, the application of such knowledge must be assessed. This must be supported by a methodology that will develop, assess, evaluate, and continuously improve learning and knowledge development.
e. Learning and capacity building must take place in a culture that supports continuous improvement.

2. Recommendations to support the development of a project management methodology and its underlying processes.
    a. The explication of best practices that are already in place in the organisation and structures in support of project management maturity should be the starting point. This must be the foundation of developing a project management methodology and its causal processes.
    b. Based on these best practices, the project management methodology that is the most aligned to these existing processes must be identified. This should become the foundation for developing a singular project management methodology for the organisation.
    c. This process must be institutionalised, allowing for the development, monitoring, and enforcement of the methodology and its supporting processes.
        i. This process must be developed around the understanding that this is a development process. First, the process should be internal to consolidate the internal methodology for engaging internal stakeholders and to develop a singular methodology for the organisation. Secondly, the methodology and processes must be aligned to the external engagement with stakeholders based on this matured methodology.
        ii. This process must be a continuous process that will consistently benchmark internally to identify processes that can improve internal efficiencies and contribute to the value-addition of project management knowledge. Secondly, it should support external benchmarking to enhance the competitive advantage of the broader organisation through maturity.
3. Recommendations to support the structural elements of project management maturity

a. Project management structures must be structured around a project management methodology. The project management methodology must be linked to the organisational strategy.

b. The project structures should operate based on project management methodologies and not functional management methodologies.

c. Project management staff should be recruited based on their project management knowledge and project management experience and not purely on their technical knowledge in a specific field.

d. Supporting structures to project management structures must be included in the training and processes of project management knowledge development. The support units are critical to the success of project structures and they must understand their role towards that success.

## 5.5 IMPLICATIONS OF THE STUDY

The research looked at the relationships between project management knowledge levels and project success. The argument was that if project management maturity levels are high, project management success should also be high.

In order to determine if there is such a relationship it was important first to determine the project management knowledge levels of the staff working in the various centres that participated in the study and from that calculate the centre scores. The KAT was used for this purpose to determine the knowledge levels across five levels. These levels are based on the project management knowledge area, as outlined in the PMBoK.

This was then cross referenced with the data from the interviews that were conducted with respondents working in these centres. These interviews provided subjective information and perceptions about project management knowledge and project success.

The research investigated the claims that there is little or a very weak relationship between project management knowledge and project success. A linear relationship is assumed between project management maturity and project success.

Since a linear relationship is not evident, logic dictates that there should be an alternative relationship between project management maturity and project success. Therefore, this research sought alternative ways of interrogating the relationship between project management maturity and project success. For that reason, the research looked at the relationship between project management maturity and project success from a Critical Realist Perspective. This implies that project success should be viewed as an empirical event with underlying causal relationships and mechanisms that produces the events.

Thus project management knowledge must be viewed in relation to the mechanisms that hold project management knowledge as an inherent source of power, the real level; how structures interact with project management knowledge and how structures interact with each other based on project management knowledge. The actual level; how that interaction creates the events that are experienced in the empirical level. There is a need for effective governance in external relationships, in terms of both the formal and informal mechanisms through which individuals work together (Mol, Birkinshaw, & Foss, 2019).

This stratified reality supports the idea that the relationship between project management maturity and project success is not a linear relationship, but a causal relationship. The relationship is determined by the movement of project management knowledge through the levels of maturity and the layers of reality. The route of the knowledge through these realities becomes critical. The most efficient route must be found in order to extract the most value to invest in the competitive advantage of the project structures for internal purposes and the broader organisation for external purposes. In this way project management maturity will be created.

Project management maturity needs to be constructed differently. The learning that forms the foundation of project management maturity will have to be layered based on the critical realist methodology. Knowledge will have to be constructed for each dimension based on the needs and context of each dimension.

## 5.6 HYPOTHESIS TESTING

This questions were tested by means of the following hypotheses:

$H_0$: Levels of PMM have no influence on centre success

$H_a$: Levels of PMM have an influence on centre success

Dependent and independent variable. This makes project management maturity the independent variable and project success the dependent variable. This is argued on the basis that knowledge is the foundation of project management maturity and knowledge exist independently from the organisations or mechanisms that hold the knowledge or that applies the knowledge. However, the maturity of the project management knowledge does have an influence on project success.

Project management maturity does have an influence on project success. The positive hypothesis is supported through the research. The influence is, however, not based on the assumed linear relationship between Project Management Maturity and project success. The evidence collected through the research indicates that project management maturity has a causal relationship with project success. That causal relationship must be extracted through the Critical Realist Methodology. This implies that the path of project management knowledge which is the foundation of project management maturity must be mapped through the three-dimensional reality as proposed by the Critical Realist Methodology. Based on that causal relationship project management maturity contextualises project success.

The lack of project management knowledge and the lack of project management maturity across the various centres involved in this research clearly indicate that project

management knowledge cannot be expected to manifest in empirical events or project outcomes if it is not present in the dimension of the real.

## 5.7 RECOMMENDATIONS FOR FUTURE RESEARCH

A larger study with more centres and particularly project centres across the same institutions of higher education should be conducted. This will gather a lot more data, and this will allow for a lot more inferences to be made on the relationship between project management maturity and project success.

A longitudinal study should be undertaken to see what the impact will be of proper training interventions in the various centres. This will allow for the development of project management knowledge through the whole maturity process. This should be done based on the critical realist approach to determine how project management knowledge can be mapped to elucidate the relationship between project management maturity and project success.

A study should be undertaken to determine if different project management maturity models will have a similar impact or whether different maturity models will produce different impacts.

At the same time, different project management methodologies must be compared to see the outcomes they produce over different types of projects. This can determine if a singular methodology or a mixed methodology will deliver similar outcomes. This will shed light on the fear of many of the respondents that a singular methodology will produce a very strict methodology that will not be suitable across different types of projects.

The research should also look at a comparative study that will compare project management maturity in organisations with high project management maturity levels and to investigate the presence of project management knowledge in project success. This could be done by comparing project centres from, for example, European universities with project centres in African universities.

Research should also be conducted into the impact of communication on the maturity of project management in organisations. It is important that the barriers to communication be explored since it is clearly an inhibitor to the development of project management maturity in HEIs.

The development of a model that can support the building of project management maturity through the layered development of project management knowledge across the three dimensions of the critical realist methodology.

## 5.8 CONCLUSION AND RECOMMENDATIONS

Centres of Excellence in HEIs in Africa are brought into being as projects mostly through international funding. These centres are created to develop and disseminate new knowledge in specific knowledge fields. These centres of excellence usually become structures that contain the best minds in particular fields. One of the key objectives of these centres is to implement projects that will facilitate the advancement of their specific field of study, mostly research projects.

Based on this mandate, one would assume that these centres will also be centres of excellence when it comes to project management. The technical knowledge will provide them with the tools for 'what' to do while project management knowledge should provide them with the 'how' to do it.

It is significant that the most common elements of organisational reputation are the judgements, evaluations, and estimations of stakeholders that are developed by the stakeholders as a result of interaction with organisations (Irfan, et al., 2020). Project management is assumed to exist in these centres at high levels, since this is the foundation for most of their interaction with donors as well as other project stakeholders. In most of these relationships, these centres are considered as the most knowledgeable stakeholder, based on the fact that they are housed in higher education institutions and the fact that they represent excellence.

However, from the research it is apparent that this is not the case. Project management knowledge levels are low across all the knowledge areas and across all the maturity levels. The question about the impact on project success or the lack thereof becomes a concern. Project management maturity greatly influences the success rate of project implementation (Košťálová & Tetřevová, 2018) if the causal relationships that links these elements are explored effectively.

These project centres are staffed by staff members who do not hold the appropriate project management knowledge. The recruitment of these staff members does not focus on their project management knowledge or experience. The centres operate mostly on functional management methodologies. The project structures are not institutionalised in a way that they can influence the development of project management culture and maturity.

There is very little discussion about project management and thus very little transfer of project management knowledge in the centres. There is a common perception that when these centres work with international staff or centres in cooperation projects that project management knowledge will be transferred. This does not seem to be the case. Even centres that have been in partnership with international partners over more than ten years have the same level of project management maturity and the same project management knowledge levels as the rest of the centres. The challenge is that there must be processes in place for knowledge transfer to take place, and there must be qualified staff with the absorption capacity for the new knowledge. If value is created in external relationships, it emerges through the skills and experience of these individuals. In this way individuals are often the key to inter-organisational innovation (Monteiro, Mol, & Birkinshaw, 2017).

Knowledge transfer must be institutional, cultural and structural. Knowledge transfer requires that that there must be a process in place, and there must be a structure in place to absorb the knowledge, supported by a culture of learning. There must be effective project

management processes that capitalise on innovation, measure progress, value, and risk and confirm that the right projects can be delivered in alignment with the organisational strategy (Katunina, 2018). Project maturity must have a purpose in the new institution or structure to which the knowledge is transferred. Because project management is not a requirement in these Centres of Excellence project management knowledge simply does not find fertile ground to grow. These centres simply survive on using functional management processes. This is the prevailing culture in organisations.

As one respondent claimed, 'I focus on the higher levels issues, like the conceptualisation of projects'. In the same centre knowledge levels and maturity levels indicate that there is no structure, culture or methodology in place to support project maturity or success. The measurement of project success becomes based on only the functional supported elements of project management. Measurements of time and cost become the foundation for determining project success. However, time and cost have the lowest knowledge levels according to the assessment across all centres. This means that these elements are based on functional knowledge and a functional conceptualisation of time and cost and not project management knowledge and its conceptualisation of time and cost.

It is critical to understand that because there is no evident proof of a linear relationship between project management maturity and projects success, the perception created is that project management knowledge does not contribute to project success. The impact of that perception on the value of project management knowledge is devastating. If there is no evident relationship, the implication is that project management knowledge adds no value in the achievement of project success. Therefore, project management knowledge adds no value. This is the most essential element that needs to be addressed. It will link organisational competitive advantage with project management maturity (Ngonda & Jowah, 2020) and project management maturity to project success.

## 6. REFERENCES


Abyad, A. (2018). Project management, motivation theories and process management. *Middle East Journal of Business, 13*(4), 18-22. doi:https://doi.org/10.5742/MEJB.2018.93502

Abyad, A. (2019). Project management: Science or a craft? *Middle East Journal of Business, 14*(1), 4-16. doi:https://doi.org/10.5742/MEJB.2019.93608

Addis, M. (2016). Tacit and explicit knowledge in construction management. *Construction Management and Economics, 34*(7-8), 439-445.

Adelle, C., Elema, N., Chakauya, E., & Benson, D. (2018). Evaluating 'homegrown' research networks in Africa. *South African Journal of Science, 114*(3/4). doi:https://doi.org/10.17159/sajs.2018/20170070

Albliwi, S. A., Anthony, J., & Arshed, N. (2014, December). Critical literature review on maturity models for business process excellence. *International Conference on Industrial Engineering and Engineering Management*, 79 - 83.

Albrecht, J. C., & Spang, K. (2014). Linking the benefits of project management maturity to project complexity: Insights from a multiple case study. *International Journal of Managing Projects in Business, 7*(2), 285-301.

Alderson, P. (2020). Powerful knowledge and the curriculum: Contradictions and dichotomies. *British Educational Research Journal, 46*(1), 26-43. doi:DOI: 10.1002/berj.3570

Al-Had, M. A., & Al-Shaibany, N. A. (2017). Critical success factors (CSFs) of ERP in higher education institutions. *International Journal of Advanced Research in Computer Science and Software Engineering, 7*(7), 92-95.

Allen, P. L. (2017). Is there verification in theology? *Open Theology, 3*(1), 417-433. doi:https://doi.org/10.1515/opth-2017-0033

Anantatmula, V. S., & Rad, P. F. (2018). Role of organizational project management maturity factors on project success. *Engineering Management Journal, 30*(3), 165-178. doi:https://doi.org/10.1080/10429247.2018.1458208

Andersen, E. S., & Jensen, S. A. (2003). Project maturity in organisations. *International journal of project management, 21*(6), 457-461.

Armenia, S., Dangelico, R. M., Nonino, F., & Pompei, A. (2019). Sustainability project management: A conceptuaisation-oriented review and a framework proposal for future studies. *Sutainability, 11*(2664). doi:10.3390/su11092664

Assarroudi, A., Nabavi, F. H., Armat, M. R., Ebadi, A., & Vaismoradi, M. (2018). Directed qualitative content analysis: the description and elaboration of its underpinning methods and data analysis process. *Journal of Research in Nursing, 23*(1), 42-55. doi:https://doi.org/10.1177/1744987117741667

Austin, C. B., Haas, B., Kenyatta, E., & Zulueta, S. (2013). Application of project management in higher education. *Journal of Economic Development, Management IT, Finance and Marketing, 5*(2), 57- 99.

Bach, M. P., Zoroja, J., & Čeljo, A. (2017). An extension of the technology acceptance model for business intelligence systems: project management maturity perspective. *International Journal of Information Systems and Project Management, 5*(2), 5-21. doi:10.12821/ijispm050201

Bartholomew, P. (2017). Beyond research productivity: Matching productivity measures to institutional mission. *Journal for the Study of Postsecondary and Tertiary Education, 2*, 1-11. Retrieved from http://www.informingscience.org/Publications/3559

Belatreche, M., & Benharrat, H. (2017). The Romanian organizations and the project management maturity model. *Managerial Challenges of the Contemporary Society, 10*(2), 35–41. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=1281

Bento, I., Gomes, J., & Romão, M. (2019, January). The relationship between OPM3 and project management: A multiple cases study. *Journal of Modern Project Management, 6*(18), 46 - 58. doi:https://doi.org/10.19255/JMPM01803

Berssaneti, F. T., de Carvalho, M. M., & Muscat, A. R. (2012). Impact of reference model for project management and project management maturity models on performance: an exploratory study in information technology projects. *Produção, 22*(3), 421 - 435.

Bhaskar, R. (2008). *A realist theory of science.* New York: Routledge.

Bilginoğlua, E. (2019). Knowledge hoarding: A literature review. *Management Science Letters, 9*, 61–72. doi:10.5267/j.msl.2018.10.015

Bird, A. (2008). Incommensurability naturalized. (L. Soler, H. Sankey, & P. Hoyningen-Huene, Eds.) *Boston Studies in the Philosophy of Science, 255*, pp. 21-39. doi:https://doi.org/10.1007/978-1-4020-6279-7_2

Blake, J. (2004). Project managing the SDLC: Using milestones to align project management and system development lifecycles and report project success. *Paper presented at PMI® Global Congress 2004.* Newtown Square.

Blatch-Jones, A. J., Pek, W., Kirkpatrick, E., & Ashton-Key, M. (2018). Role of feasibility and pilot studies in randomised controlled trials: A cross-sectional study. *BMJ Open, 8*. doi:10.1136/bmjopen-2018-022233

Bond-Barnard, T. J., & Steyn, H. (2015). Project management in developing countries: Implications for project trust, collaboration and success. *3rd IPMA Research Conference*, (pp. 1 - 23).

Bond-Barnard, T. J., Fletcher, L., & Steyn, H. (2018). Linking trust and collaboration in project teams to project management success. *International Journal of Managing Projects in Business, 11*, 432-457. doi:10.1108/IJMPB-06-2017-0068

Borlaug, S. B., & Gulbrandsen, M. (2018). Researcher identities and practices inside centresof excellence. *Triple Helix, 15*(14). doi:https://doi.org/10.1186/s40604-018-0059-3

Borlaug, S. B., & Langfeldt, L. (2019). One model fits all? How centres of excellence affect research organisation and practices in the humanities. *Studies in Higher Education*. doi:10.1080/03075079.2019.1615044

Brookes, N., & Clark, R. (2009, May 04). Using maturity models to improve project management practice. *In POMS 20th Annual Conference, 1*, pp. 285-296.

Carlucci, D. (2016). Intellectual capital and business excellence for the 21st century organisations. *Measuring Business Excellence, 14*(4), 1-87.

Chan, C. L. (2019). Chan, C. L. (). A website for pilot and feasibility studies: giving your research the best chance of success. , 5, 122. *Pilot and feasibility studies, 5*, 122.

Chib, A., Ale, K., & Lim, M. A. (2012). Multi-stakeholder perspectives influencing policy-research perspectives,. In A. Chib, & R. Harris (Eds.), *Linking research to practice: Strenthening ICT for development research capacity in Asia* (p. 95). Singapor: ISEAS Publishing.

Ciric, D., Lalic, B., Gracanin, D., Tasic, N., Delic, M., & Medic, N. (2019). Agile vs. traditional approach in project management: Strategies, challenges and reasons to introduce agile. *Procedia Manufacturing, 39*, 1407-1414. doi:10.1016/j.promfg.2020.01.314

Clarke, J. A., Stoodley, I. D., & Nelson, K. J. (2013). Using a maturity model to move student engagement practices beyond the generational approach. *16th International First Year in Higher Education Conference.* Retrieved May 30, 2019, from https://eprints.qut.edu.au/60019/2/60019.pdf

Cole, C. (2019). Project management evolution to improve success in infrstrucutre projects. *Management Dynamics in the Knowledge Economy, 5*(4), 619-640. doi:10.25019/MDKE/5.4.09

Cooke-Davies, T. J., & Arzymanowc, A. (2003). The maturity of project management in different industries: An investigation into variations between project management models. *International Journal of Project Management, 21*, 471 - 478.

Cristescu, P. M., & Stancu, A. M. (2018). Using the integrated capability and maturity model in the development process of software systems. *Revista Economică, 70*(4).

Crowford, J. K. (2015). *Project management maturity model* (3rd ed.). Boca Raton: CRC Press.

Cuadros López, A. J., Morales Viveros, J. A., & Rojas Meléndez, A. B. (2017). Methodology proposal to determine project management maturity level in engineering companies. *Revista EIA, 27*, 85-95.

DAAD. (2012). *Centres of African excellence evaluation report.* DAAD. Bonn: DAAD.

Darrell, V., Baccarini, D., & Love, E. (2010). Demystifying the folklore of the accidental project manager in the public sector. *Project Management Journal, 41* (9), 56-63.

De Bruin, T., Freeze, R., Kaulkarni, U., & Rosemann, M. (2005). Understanding the main phases of developing a maturity assessment model. *16th Australasian Conference on Information Systems.* Sydney: Association for Information Systems .

de Oliveira, J. M., de Almeid Jurach, G., Pinto , R. S., & Kerchirne, L. M. (2017). Project offices and the federal universities: A study on project management in the context of higher education institutions. *Revista de Gestão e Projetos-GeP, 8*(3), 18-28.

de Souza Scotelano, L., da Conceição, R. D., da Costa Leonídio, U., & de Jesus, C. S. (2017). Project management maturity model: the case in an automotive industry in Brazil. *Brazilian Journal of Operations & Production Management, 14*(4), 500-507. doi:10.14488/BJOPM.2017.v14.n4.a6

De Zousa, T. L., & Gomes, C. F. (2015). Assessment of maturity in project management: A bibliometric study of main models. *Procedia Computer Science, 55*, 92 - 101.

Demchig, B. (2015). Knowledge management capability level assessment of the higher education institutions: Case study from Mongolia. *Procedia - Social and Behavioral Sciences, 174*, 3633 – 3640.

Demir, C., & Kocabas, I. (2010). Project management maturity models (PMMM) in educational organisations. (I. Kocabas, Ed.) *Procedia Social and Behavioural Sciences, 9*, 1641-1645.

Derenskaya, Y. (2017). Organisational project management maturity. *Baltic Journal of Economic Studies, 3*(2), 25-32.

Desouza, K. C., & Evaristo, J. R. (2004). Managing knowledge in distributed projects. *Communications of the ACM, 47*(4), 87-91. doi:10.1145/975817.975823

Dopp, A. R., Mundey, P., Beasley, L. O., Silovsky, J. F., & Eisenberg, D. (2019). Mixed-method approaches to strengthen economic evaluations in implementation research. *Implementation Science, 14*(1), 2. doi:https://doi.org/10.1186/s13012-018-0850-6

Dowling, R., Lloyed, K., & Suchet-Pearson, S. (2016). Qualitative methods 1: Enriching the interview. *Progress in Human Geography, 40*(5), 679-686. doi:DOI: 10.1177/0309132515596880

Downward, P., & Mearman, A. (2007). Retroduction as mixed-methods triangulation in economic research: reorienting economics into social science. *Cambridge Journal of Economics, 31*(1), 77-99.

Dunlop, C. A., & Radaelli, C. M. (2017). If Evaluation is the Solution, What is the Problem? In L. Buonanno , & N. Zahariadis, *The Routledge Handbook of European Public Policy.* London: Routledge.

Eastwood, J. G., Kemp, L. A., Garg, P., Tyler, I., & De Souza, D. E. (2019). A critical realist translational social epidemiology protocol for concretising and contextualising a "theory of neighbourhood context, stress, depression, and the developmental origins of health and disease (DOHaD). *International Journal of Integrated Care, 19*(3), 1-13. doi:https://doi.org/10.5334/ijic.3962

Eastwood, J. G., Woolfenden, S., Miller, E., Shaw, M., Garg, P., Lui, H., . . . Ettema, R. G. (2019). Implementation, mechanisms of effect and context of an integrated care intervention for vulnerable families in Central Sydney Australia: A research and evaluation protocol. *International Journal of Integrated Care, 19*(3), 1–13. doi:DOI: https://doi.org/10.5334/ijic.4217

Eastwood, J., Ettema, R., De Souza, D., Lui, H., Busetto, L., Ben, H. R., . . . Schrijvers, G. (2018). Realist research design and evaluation for integrated care RIC SIG-Part 1:

Establishing a special interest group. *International Journal of Integrated Care*, *18 (S2):A255*, pp. 1-8. doi:DOI: dx.doi.org/10.5334/ijic.s2255

Eldridge, S. M., Lancaster, G. A., Campbell, M. J., Thabane, L., Hopewell, S., Coleman, C. L., & Bond, C. M. (2016). Defining feasibility and pilot studies in preparation for randomised controlled trials: development of a conceptual framework. *PloS one, 11*(3), e0150205. doi:doi:10.1371/journal.pone.0150205

Elton, C. (2017). Botswana: One of Africa's fastest-growing economies looks to boost its project management maturity. *PM Network, 31*(7), 62 - 67. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=123803722&site=ehost-live

Eshtehardian, E., & Saeedi, F. (2016). Developing improvement planning phase in project management maturity models. *Modern Applied Science, 10*(9), 1-13. doi:doi:10.5539/mas.v10n9p1

Fahrenbach, F., & Kragulj, F. (2019). "The ever-changing personality: revisiting the concept of triple-loop learning". *The Learning Organizatio*. doi:https://doi.org/10.1108/TLO-01-2019-0016

Farrokh, J., & Mansur, A. K. (2013). Project management maturity models and organizational project management maturity model (OPM3®): A critical morphological evaluation. *Project management, 2*(7), 23-33.

Fernandes, G., Ward, S., & Araújo, M. (2014). Developing a framework for embedding useful project management improvement initiatives in organizations. *Project Management Journal, 45*(4), 81-108. doi:10.1002/pmj.21441

Fletcher, A. J. (2017). Applying critical realism in qualitative research: methodology meets method. *International Journal of Social Research Methodology, 20*(2), 181–194. Retrieved from https://doi.org/10.1080/13645579.2016.1144401

Frefer, A. A., Mahmoud, M., Haleema, H., & Almamlook, R. (2018). Overview success criteria and critical success factors in project management. *Industarial Engineering and Management, 7*(244). doi:10.4172/2169-0316.1000244

Fritz, L., & Binder, C. R. (2020). Whose knowledge, whose values? An empirical analysis of power in transdisciplinary sustainability research. *European Journal of Futures Research, 8*(3). doi:https://doi.org/10.1186/s40309-020-0161-4

Ganushchak-Yefimenko, L., Shcherbak, V., & Nafitova, O. (2017). Managing a project of competitive-integrative benchmarking of higher educational institutions. *Eastern-European Journal of Enterprise Technologies, 3*(3), 38-46. doi:10.15587/1729-4061.2017.103194

García-Jiménez, E. (2016). A definition of excellence in higher education. *EducaciónMédica, 17*(3), 83-87. doi:http://dx.doi.org/10.1016/j.edumed.2016.06.003

Gasik, S. (2011). A model of project knowledge management. *Project Management Journal, 42*(3), 23-44. doi:10.1002/pmj.20239

Ghinea, V. M., Dima, A. M., & Hadad, S. (2017). Excellence model for sustainable convergence in the EU higher education. *Amfiteatru Economic, 19*(11), 1107-1122.

Gosling, D., & Turner, R. (2015). Responding to contestation in teaching and learning projects in the centres for excellence in teaching and learning in the United Kingdom. *Studies in Higher Education, 9*, 1573-1587.

Grant, K. P., & Pennypacker, J. S. (2006). Project management maturity: An assessment of project management capabilities among and between selected industries. *IEEE Transactions on engineering management, 53*(1), 59-68. Retrieved May 30, 2019, from 3076897_Project_management_maturity_An_assessment_of_project_management_capabilities_among_and_between_selected_industries

Grobler, P. J., & Steyn, H. (2006). Project management maturity models: Does one size fit all. *In Proceedings of the 2006 PSMA International Conference*, (pp. 149-157).

Guarina, M., & Dirkie, K. (2014). Projects on the map. *PM Network, 28*(3), 60–67. Retrieved 04 30, 2019

Guo, N. (2018). Study on project portfolio management organization maturity for major construction enterprise. *Advances in Engineering Research, 120*, 507-511.

Gupta, A. (2015). The incommensurability thesis: Has it lost its bite? *Journal of Indian Council of Philosophical Research, 32*(1), 59-77.

Hammarberg, K., Kirkman, M., & de Lacey, S. (2016). Qualitative research methods: when to use them and how to judge them. *Human Reproduction, 31*(3), 498-501. doi: doi:10.1093/humrep/dev334

Heath, J., Williamson, H., Williams, L., & Harcourt, D. (2018). "It's just more personal": Using multiple methods of qualitative data collection to facilitate participation in research focusing on sensitive subjects. *Applied Nursing Research, 43*, 30-35.

Heeks, R., & Wall, P. J. (2018). Critical realism and ICT4D research. *The Electronic Journal of Information Systems in Developing Countries, 84*(6), e12051. doi:https://doi.org/10.1002/isd2.12051

Hellstrom, T. (2018). Centres of excellence and capacity building: From strategy to impact. *Science and Public Policy, 45*(4), 543–552. doi:doi: 10.1093/scipol/scx082

*helpjuice.com*. (2020, August 15). Retrieved from Knowledge management tools: http://www.knowledge-management-tools.net/knowledge-information-data.html

Hennink, M., Hutter, I., & Bailey, A. (2020). *Qualitative research methods* (2nd ed.). London: SAGE Publications Limited.

Henriques, V., & Tanner, M. (2020). Assessing the Association between Agile Maturity Model Levels and Perceived Project Success. *M. Jones (Ed.), Proceedings of InSITE 2020: Informing Science and Information Technology Education Conference* (pp. 117-156). Informing Science Institute. doi:https://doi.org/10.28945/4519

Hepworth, A., Misopoulos, F., Manthou, V., Fyer, R., & Michaelides, R. (2017). Exploring ad-hoc portfolio management: Does it work, and is it the flexibility that supports project portfolio management? *Procedia computer science, 121*, 345-355. doi:doi:10.1016/j.procs.2017.11.047

Hernández, F. Y., Lagado, R. I., & Rodriguez, J. P. (2018). Maturity analysis in project management in Colombian universities. *Journal of Physics: Conference Series, 1126*, 1 - 7.

Hsieh, N. (2016). *Incommensurable Values.* (E. N. Zalta, Ed.) Metaphysics Research Lab, Stanford University. Retrieved from https://plato.stanford.edu/archives/spr2016/entries/value-incommensurable/

Hu, X. (2018). Methodological implications of critical realism for entrepreneurship research. *Journal of Critical Realism, 17*(2), 118-139. doi:doi:10.1080/14767430.2018.1454705.

Huckle, J. (2019). Powerful geographical knowledge is critical knowledge underpinned by critical realism. *International Research in Geographical and Environmental Education, 28*(1), 70-84. doi:DOI: 10.1080/10382046.2017.1366203

Hudson, J. N., Farmer, E. A., Weston, K. M., & Bushnell, J. A. (2015). Using a framework to implement large-scale innovation in medical education with the intent of achieving sustainability. *BMC Medical Education, 15*(2), 1-9. doi:https://doi.org/10.1186/s12909-014-0282-1

Ika, L. A. (2012). Project management for development in Africa: Why projects are failing and what can be done aboutit. *Project Management Journal, 43*(4), 27 - 41. doi:10.1002/pmj.21281

Irfan, M., Hassan, M., Hassan, N., Habib, M., Khan, S., & Nasruddin, A. M. (2020). Project Management Maturity and Organizational Reputation: A Case Study of Public Sector Organizations. *IEEE Access, 8*, 73828-73842. doi:doi: 10.1109/ACCESS.2020.2988511

Islam, M. S., & Trigunarsyah, B. (2017). Consruction delaaysin developing countries: A review. *Journal of Construction Engineering and Project Management, 7*(1), 1-12. doi:http://dx.doi.org/10.6106/JCEPM.2017.3.30.001

Jacob, J., Xiong, W., & Ye, H. (2015). Professional development programmes at world-class universities. *Palgrave Commun, 1*(2). doi:https://doi.org/10.1057/palcomms.2015.2

Jansen, S., & Yang, Z. (2020). A focus area maturity model for software ecosystem governance. *Information and Software Technology, 118*, 106219. doi:https://doi.org/10.1016/j.infsof.2019.106219

Johannessen, Å., Gerger Swartling, Å., Wamsler, C., Andersson, K., Arran, J. T., Hernández Vivas, D. I., & Stenström, T. A. (2019). Transforming urban water governance through social (triple-loop) learning. *Environmental Policy and Governance, 29*(2), 144-154. doi:doi.org/10.1002/eet.1843

Johanson, G. A., & Brooks, G. P. (2010). Initial Scale Development: Sample Size for Pilot Studies. *Educational and Psychological Measurement, 70*(3), pp. 394 - 400. doi:10.1177/0013164409355692

Johnson, B., & Christensen, L. (2012). *Educational research quantitative, qualitative and mixed approaches* (4th ed.). Thousand Oaks: SAGE Publications Inc.

Johnston, R., Harris, R., Jones, K., Manley, D., Wang, W. W., & Wolf, L. (2019). Quantitative methods I: The world we have lost–or where we started from. *Progress in Human Geography, 43*(6), 1133-1142. doi:https://doi.org/10.1177/0309132518774967

Joslin, R., & Müller, R. (2015). Relationships between a project management methodology and project success in different project governance contexts. *International Journal of Project Management, 33*, 1377–1392.

Jovanović, P., & Berić, I. (2018). Analysis of the available project management methodologies. *Management: Journal of Sustainable Business & Management Solutions in Emerging Economies, 23*(3), 3–13. doi:https://doi.org/10.7595/management.fon.2018.0027

Katane, J., & Dube, S. (2017). The influence of organizational culture and project management maturity in virtual project teams. *Cell, 72*(398), 4764.

Katunina, I. V. (2018). Organisational project management in OMSK region companies: Current state and development constrinats. *Ekonomika Regiona (Economy of Region), 14*(1), 69-78. doi:Doi: 10.17059/2018-1-6

Kerzner, H. (2001). *Strategic planning for project management using a project management maturity model.* New York: John Wiley and Sons. Inc,.

Kerzner, H. (2001). *Strategic planning for project management using a project management maturity model.* New York: John Wiley and Sons. Inc,.

Kerzner, H. (2013). *Project management: A systems approach to planning, scheduling and controling.* New York: John Wiley.

Kerzner, H. (2019). *Using the project managent maturity model startegic planning for project management* (3rd ed.). Hoboken, New Jersey: John Wiley and Sons.

Kerzner, H., & Kerzner, H. R. (2017). *Project management: A systems appreoach to planning, scheduling and controlling.* John Wiley and Sons.

Keshk , A. M., Maarouf , I., & Annany, Y. (2018). Special studies in management of construction project risks, risk concept, plan building, risk quantitative and qualitative analysis, risk response strategies. *Alexandria Engineering Journal, 57*, 3179 - 3187. doi:doi.org/10.1016/j.aej.2017.12.0031110-0168Ó2018

Kettunen, J. (2011). Evaluation of the centres of excellence in higher education. *Tertiary Education and Management, 17*(2), 151-161.

Khoshgoftar, M., & Osman, O. (2009). Comparison of maturity models. *In 2009 2nd IEEE International Conference on Computer Science and Information Technology* (pp. 297-301). IEEE.

Khraiwesh, M. (2020). Measures of organizational training in the capability maturity model integration (CMMI). *International Journal of Advanced Computer Science and Applications, 11*(2), 584-592.

Kissi, E., & Ansah, S. K. (2014). Professional project management practices and its constraints in developing African countries: A literature review. *Covenant Journal of Research in the Built Environment, 1*(2), 28 - 40.

Klaus-Rosińska, A., & Betta, J. (2017). Project maturity of organizations implementing research projects - preparing for questionnaire research. *CBU International Conference Proceedings*, *5*, pp. 656-659. doi:DOI: http://dx.doi.org/10.12955/cbup.v5.1002

Košťálová, J., & Tetřevová, L. (2018). Proposal and verification of project management methods and tools oriented maturity model. *Revista de Gestão e Projetos, 9*(1). doi:DOI: 10.5585/gep.v9i1.595

Kostalova, J., & Tetrevova, L. (2018). Proposal for project management methods and tools oriented maturity model. *Gestão e Projetos: GeP, 9(1), ., 9*(1), 1-23.

Krolevetskaya, E. N., Eroshenkova, E. I., Isaev, I. F., Shekhovskaya, N. L., Irkhina, I. V., & Karabutova, E. A. (2019). Benchmarking of the professional education system in postsecondary institutions of the Russian Federation. *Universal Journal of Educational Research, 7*(10B), 38-42. doi:DOI: 10.13189/ujer.2019.071808

Kumar, R. (2019). *Research methodology: A step-by-step guide for beginners* (3rd ed.). London: Sage Publications Limited.

Kwak, Y. H., & Ibbs, C. W. (2002). Project management process maturity (PM) 2 model. *Journal of Management in Engineering, 18*(3), 150-155.

Kwon, C. K., & Nicolaides, A. (2017). Managing diversity through triple-loop learning: A call for paradigm shift. *Human Resource Development Review, 16*(1), 85-99. doi:https://doi.org/10.1177/1534484317690053

Langston, C., & Ghanbaripour, A. N. (2016). Management maturity model (MMM) for project-based organisational performance assessment. *Construction Economics and Building, 16*(4), 68-85. doi:DOI: http://dx.doi.org/10.5130/AJCEB.v16i4.5028

Larsen, K. (2019). Managing the complexity of centres of excellence: Accommodating diversity in institutional logics. *Tertiary Education and Management*, 1-16.

Lekorwe, M. H. (2010). Centres of Excellence in Africa: The contribution of CESPAM in public administration in the SADC region. *Innovation Journal, 15*(1), 2-17.

Leppink, J. (2017). Revisiting the quantitativeequalitative-mixed methods labels: Research questions, developments, and the need for replication. *Journal of Taibah University Medical Sciences, 12*(2), 97-101. doi:http://dx.doi.org/10.1016/j.jtumed.2016.11.008

Lindley, D., & Lotz-Sisitka, H. (2019). Expansive social learning, morphogenesis and reflexive action in an organisation responding to wetland degradation. *Sustainability, 11*, 4320. doi:doi: 10.3390/su11154230

MacGregor, K. (2016, June 18). 24 centres of excellence for East and Southern Africa. Retrieved May 19, 2019, from https://www.universityworldnews.com/post.php?story=20160618095557616

Maciel-Monteon, M., Limon-Romero, J., Gastelum-Acosta, C., Baez-Lopez, Y., Tlapa, D., & Rodríguez Borbón, M. I. (2020). Improvement project in higher education institutions: A BPEP-based model. *Plos One, 15*(1). doi:https://doi.org/10.1371/journal.pone.0227353

Maher, C., Hadfield, M., Hutchings, M., & de Eyto, A. (2018). Ensuring rigor in qualitative data analysis: A design research approach to coding combining NVivo with traditional material methods. *International Journal of Qualitative Methods, 17*(1), 1609406. doi:https://doi.org/10.1177/1609406918786362

Managed Healthcare Executive. (2018, September). Have you considered a center of excellence for data? . *Managed Healthcare Executive, 28*(9), p. 39. Retrieved 05 19, 2019, from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=132151575&site=ehost-live

Marinho, M. L., Sampaio, S. C., Lima, T. L., & Moura, H. P. (2014). A guide to deal with uncertainties in software project management. *International Journal of Computer Science & Information Technology, 6*(5). doi:10.5121/ijcsit.2014.6501

Mason, J. (2006). Mixing methods in a qualitatively driven way. *Qualitative Research, 6*(1), 9-25.

Mathur, G., Jugdev, K., & Fung, T. S. (2014). The relationship between project management process characteristics and performance outcomes. *Management Research Review, 37*(11), 990.

Mba, M. F., & Agumba, J. N. (2018). Critical success factors influencing performance outcome of joint venture construction projects in South Africa. *Construction, Economics and Building, 8*(3), 74-94. doi:doi.org/10.5130/AJCEB.v18i3.5885

McClory, S., Read, M., & Labib, A. (2017). Conceptualising the lessons-learned process in project management: Towards a triple-loop learning framework. *International Journal of Project Management, 35*(7), 1322-1335.

McLeod, L., Doolin, B., & MacDonell, S. G. (2012). A perspective-based understanding of project success. *Project Management Journal, 43*(5), 68-86.

Merriam-Webster. (2020). Capability. *Merriam-Webster.com Dictionary*. Retrieved August 23, 2020, from https://www.merriam-webster.com/dictionary/capability

Mingers, J., Mutch, A., & Willcocks, L. (2013). Critical Realism in Information Systems Research. *MIS Quarterly, 37*(3), 795–802. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=89477777&site=ehost-live

Mol, M., Birkinshaw, J., & Foss, N. J. (2019). The system of management ideas. In *In The Oxford Handbook of Management Ideas* (pp. 24-41). Oxford: Oxford University Press.

Monteiro, F., Mol, M., & Birkinshaw, J. (2017). Ready to be open? Explaining the firm level barriers to benefiting from openness to external knowledge. *Long Range Planning, 50*(2), 282-295. doi:doi: 10.1016/j.rpl.2015.12.008

Morris, P. W. (2002). Science, objective knowledge, and the theory of project management. *Civil Engineering,, 150*(2), 82-90.

Moser, A., & Korstjens, I. (2018). Series: Practical guidance to qualitative research. Part 3: Sampling, data collection and analysis. *European Journal of General Practice, 24*(1), 9-18. doi:DOI: 10.1080/13814788.2017.1375091

Mousaei, M., & Gandomani, T. J. (2018). A new project risk management model based on scrum framework and prince2 methodology. *International Journal of Advanced Computer Science and Applications, 9*(4), 442-449.

Mthembu, M., & du Plessis, T. (2018). Maturity mapping for continuous improvement: A case study of a revenue services institution. *South African Journal of Economic and Management Sciences, 21*(1). doi:org/10.4102/sajems.

Muller, R., & Turner, J. R. (2007). Matching the project manager's leadership style to project management. *International Journal of Project Management, 25*, 21-32.

Muñoz, M., Negrón, P. P., Mejia, J., & López, L. G. (2016). Actual state of the coverage of Mexican software industry requested knowledge regarding the project management best practices. *Computer Science and Information Systems, 13*(3), 849-873. doi:10.2298/CSIS160808040M

Nadler, J. T., Weston, R., & Voyles, E. C. (2015). Stuck in the middle: The use and interpretation of mid-points in items on questionnaires. *The Journal of General Psychology, 142*(2), 71 - 89.

Neverauskas, B., & Railaite, R. (2013). Formation approach for project management maturity measurement. *Economics & Management, 18*(2), 360-365. doi:10.5755/j01.em.18.2.4604

Ngonda, V. S., & Jowah, L. E. (2020). A study of the impact of project managers' power and Influence on their organisation's project management maturity. *MATEC Web of Conferences, 312*, 03001. doi:https://doi.org/10.1051/matecconf/202031203001

Nijhuis, S., Vrijhoef, R., & Kessels, J. (2018). Tackling project management competence research. *Project Management Journal, 49*(3), 62 - 81. doi:10.1177/8756972818770591

Niklas, B. (2019, May 06). *South African-German Centre for Development Research 10-year anniversary of the centres of African excellence.* Retrieved from Institute of Development Research and Development Policy: http://www.development-research.org/index.php/institute/iee-newsletter/607-neu-south-african-german-centre-for-development-research-10-year-anniversary-of-the-centres-of-african-excellence.html

Nissinboim, N., & Naveh, E. (2018). Process standardization and error reduction: A revisit from a choice approach. *Safety Science, 103*, 43-50. doi:https://doi.org/10.1016/j.ssci.2017.11.015

Nunes, M. B., Martins, J. T., Zhou, L., Alajamy, M., & Al-Mamari, S. (2010). Contextual Sensitivity in Grounded Theory: The Role of Pilot Studies. *Electronic Journal of Business Research Methods, 8*(2), 73–84. Retrieved from http://search.ebscohost.com/log

Ochungo, E. A., & Odinga, R. O. (2019). Project Management Readiness: A Glimpse into the Troubled Rhetoric and the Expected Delivery of 2020 Priority Action Projects in Africa. *Journal of Business and Management Sciences, 7*(2), 64-71.

Odiaka, E., Lounsbury, D. W., Jalloh, M., Adusei, B., Diallo, T. A., Kane, P., & Makinde, I. (2018). Effective project management of a Pan-African Cancer Research Network: Men of African descent and Carcinoma of the Prostate (MADCaP). *Journal of Global Oncology, 4*, 1-12. doi:https://doi.org/10.1200/JGO.18.00062

Ofori, D., & Deffor, E. W. (2013). Assessing project management maturity in Africa: A Ghanaian perspective. *International Journal of Business Administration, 4*(6).

Onwuegbuzie, A. J., & Collins, K. M. (2007). A typology of mixed methods sampling designs in social science research. *The Qualitative Report, 12*(2), 281-316.

Ozguler, I. S. (2016). Increase the projects' success rate through developing multi-cultural project management process. *Procedia - Social and Behavioral Sciences, 226*, 236 – 242. doi:10.1016/j.sbspro.2016.06.184

Ozmen, E. (2013). Project management methodology (PMM): how can PMM serve organisations today? *PMI® Global Congress 2013—EMEA*. Istanbul, Turkey. Newtown Square: Project Management Institute.

Pace, M. (2019). A corrolational study of project management methodology and project success. *Journal of Engineering, Project and Production Management, 9*(2), 56-65. doi:10.2478/jeppm-2019-0007

Patel, N., & Pilgrim, D. (2018). Psychologists and Torture: Critical Realism as a Resource for Analysis and Training. *Journal of Critical Realism, 17*(2), 176-191. doi:doi:10.1080/14767430.2018.1430975

Paver, M., & Duffield, S. (2019, January). Project management lessons learned: "The elephant in the room". *Journal of Modern Project Management, 6*(18), 104 - 125. doi:doi.org/10.19255/JMPM01807

Pažur Aničić, K., & Divjak, B. (2020). Maturity model for supporting graduates' early careers within higher education institutions. *SAGE Open, 10*(1), 2158244019898733.

Perrin, R. J. (2017). *PMP exam prep boot camp.* (5th, Ed.) Edwel Programs.

Pfoser, D., Tryfona, N., & Jensen, C. S. (2005). Indeterminacy and spatiotemporal data: Basic definitions and case study. *GeoInformatica, 9*(3), 211-236.

Pinto, J. K., & Slevin, D. P. (1988). Project success: Definitions and measurement techniques. *Project Management Journal, 19*(1), 67–72.

Poirier, E., Forgues, D., & Staub-French, S. (2016). Collaboration through innovation: implications for expertise in the AEC sector. *Construction Management & Economics, 34*(11), 769–789. Retrieved from https://doi.org/10.1080/01446193.2016.1206660

Project Management Institute. (2013). *A guide to the project management body of knowledge (PMBoK Guide)* (Fifth edition ed.). 14 Campus Boulevard: Project Management Institute, Inc.

Project Management Institute. (2017). *A guide to the project managemenent body of knowledge* (6th ed.). Newtown Square, Pennsylvania: Project Management Institute.

Project Management Institute. (2017). *A guide to the project mangement body of knowledge* (6th ed.). Newtown Square, Pennsylvania: Project Management Institute.

Putri, S. M., Pratami, D., Tripiawan, W., & Rahmanto, G. (2019). Assessing of project management process knowledge area: Procurement based on project management maturity model (PMMM) (case study of PQR company). *IOP Conference Series: Material Science and Engineering, 505*, 012004. doi:10.1088/1757-899X/505/1/012004

Queirós, A., Faria, D., & Almeida, F. (2017). Strengths and limitations of qualitative and quantitative research methods. *European Jouranl of Education Studies, 3*(9). doi:doi: 10.5281/zenodo.887089

Radujković , M., & Sjekavica, M. (2017). Project management uccess factors. *Procedia Engineering, 196*, 607 – 615. doi:10.1016/j.proeng.2017.08.048

Raharjo, H., Guglielmetti Mugion, R., Ericksson, H., Gremyr, I., Pietro, L., & Renzi, M. F. (2015). Excellence models in the public sector. Relationships between enablers and results. *International Journal of Quality and Service Sciences, 7*(1), 120-135.

Ranf, D. (2018). Substiation and implementing the knowledge based management system at Beast Deal ltd. Romania - Actual implementation of the system. *ICMEA Alba Lulia Conference.*

Ranf, D. E., & Herman, R. (2018). Knowledge managments contribution to project management. *Land Forces Academy Review, 23*(4(92)), 288-293. doi:10.2478/raft-2018-0036

Ranganathan, S. (2011, September 5). Are you speaking with your knowledge or capability? *Modern Ghana*. Retrieved August 23, 2020, from https://www.modernghana.com/news/349006/are-you-speaking-with-your-knowledge-or-capability.html

Rasid, S. Z., Ismail, W. K., Mohammad, N. H., & Long, C. S. (2014). Assessing adoption of project management knowledge areas and maturity level: Case study of a public agency in Malaysia. *Journal of Management in Engineering, 30*(2), 264- 271.

Rastogi, S. (2020). Ayurveda education in India: Addressing the human resource barriers to optimize the delivery. *Journal of Ayurveda and Integrative Medicine*. doi:https://doi.org/10.1016/j.jaim.2020.04.003

Röglinger, M., Pöppelbuß, J., & Becker, J. (2012). Maturity models in business process management. *Business Process Management Journal, 18*(2), 328-346.

Rostan, M., & Vaira, M. (2011). *Questioning excellence in higher education: An introduction.* Rotterdam: Sense Publishers.

Rourke, F. E., & Brooks, G. E. (1966). *The managerial revolution in higher education.* Baltimore: Johns Hopkins Press.

Sadkowska, J., Ciocoiu, C. N., Totan, L., & Priotesa, A.-L. (2020). Project management in small and medium enterprises: A Comparison between Romania and Poland. *Economic Computation & Economic Cybernetics Studies & Research*, 197–214. doi:https://doi.org/10.24818/18423264/54.1.20.13

Samset, K. (1998). Project management in a high-uncertainty situation.

Samset, K., & Christensen, T. (2017). Ex ante project evaluation and the complexity of early decision-making. *Public Organization Review, 17*(1), 1-17. doi:DOI 10.1007/s11115-015-0326-y

Sarantakos, S. (2013). *Social research.* New York: Palgrave Macmillan.

Saxena, D. (2019). The Search for Mechanisms in Business Research: Reflections on Retroductive Analysis in a Multilevel Critical Realist Case Study. *Electronic Journal of Business Research Methods, 17*(1), 17–27. Retrieved from http://search.ebscohost.com/

Seelhofer, D., & Graf, C. O. (2018). National project management matrity: A conceptual framework. *Central European Business Review, 7*(2), 1 - 20.

Seidel-Sterzik, H., Mclaren, S., & Garnevska, E. (2018). A capability maturity model for life cycle management at the industry sector level. *Sustainability, 10*(7), 2496. doi:10.3390/su10072496

Sejati, A. W., Rahayu, S., Pigawati, B., & Winarendri, J. (2018). The Ex-Ante Evaluation of Hotel Buildings Height in Airport Area: A Case of Hotel in Kaliwungu, Peri-Urban Area of Semarang. *Journal of Architectural Design and Urbanism, 1*(1), 31-39. doi:doi: 10.14710/jadu.v1i1.3038

Serrador, P., & Turner, R. (2015). The relationship between project success and project efficiency. *Project Management Journal, 46*(1), 30 - 39. doi:10.1002/pmj.21468

Simangunsong, E., & Da Silva, E. N. (2013). Analyzing project management maturity levels in Indonesia. *South East Asian Journal of Management, 7*(1), 72-84.

Smismans, S. (2015). Policy evaluation in the EU: The challenges of linking ex ante and ex post appraisal. *European Journal of Risk Regulation, 6*(1), 6-26.

Smith, C., & Elger, T. (2014). Critical realism and interviewing subjects. Studying organizations using critical realism: A practical guide,. 109-131.

Sorrell, S. (2018). Explaining sociotechnical transitions: A critical realist perspective. *Research Policy, 47*(7), 1267-1282. doi:https://doi.org/10.1016/j.respol.2018.04.008

Spender, J. C. (2014). *Business strategy: Managing uncertainty, opportunity, and enterprise.* Oxford: Oxford University Press.

Špundak, M., & Štriga, K. (2010). Project management maturity of Croatian companies: Is there any? . *PMI Research & Education Conference 2010 Defining the Future of Project Management.*

Stigendal , M., & Novy, A. (2018). Founding transdisciplinary knowledge production in critical realism: implications and benefits. *Journal of Critical Realism , 17*(3), 203-220. doi:DOI: 10.1080/14767430.2018.1514561

Świętoniowska, J. (2013). Toward project management maturity. Knowledge transfer as key behaviour of mature organizations. *Studia Ekonomiczne, 137*, 163-182.

Szpitter, A. A. (2013). Achieving Levels of Project Management Maturity in Organization. *Management, 17*(1), 78-89.

Tabassi, A. A., Bryde, D. J., Kamal, E. M., & Dowson, J. (2018). Challenges for project management in the 21st century. *The European Proceedings of Multidisciplinary Sciences* , *12(63).* doi:https://doi.org/10.15405/epms.2019.12.63

Tabassi, A. A., Bryde, D. J., Kamal, E. M., & Dowson, J. (2018). Challenges for project management in the 21st century. *The European Proceedings of Multidisciplinary Sciences*, *12(63)*, pp. 631-641. doi:https://doi.org/10.15405/epms.2019.12.63

Taherdoost, H. (2016). Validity and reliability of the research instrument; how to test the validation of a questionnaire/survey in a research. *International Journal of Academic Research in Management, 5*(3).

Tashakkori, A., & Creswell, J. W. (2007). The new era of mixed methods. *Journal of Mixed Methods Research, 1*(3), 207-211. doi:10.1177/1558689807302814

Tatnall, A., & Webb, M. (2017). Tomorrow's Learning: Involving Everyone. Learning with and about Technologies and Computing. *11th IFIP TC 3 World Conference on Computers in Education, WCCE 2017*, (p. 15). Dublin, Ireland.

Thabane, L., Cambon, L., Potvin, L., Pommier, J., Kivits, J., Minary, L., . . . Alla, F. (2019). Population health intervention research: what is the place for pilot studies? *Trials, 20*(1), 1-6. doi:https://doi.org/10.1186/s13063-019-3422-4

The World Bank. (2020, August 29). *The World Bank.* Retrieved from The World Bank: https://www.worldbank.org/en/news/press-release/2019/04/03/world-bank-scales-up-its-support-for-regional-higher-education-centers-for-excellence-in-africa

Titov, S., Bubnov, G., Guseva, M., Lyalin, A., & Brikoshina, I. (2016). Capability maturity models in engineering companies: case study analysis. *ITM Web of Conference*, *6*, p. 03002. doi:http://dx.doi.org/10.1051/itmconf/20160603002

Tourish, D. (2012). 'Evidence based management', or 'evidence oriented organizing'? A critical realist perspective. *Organization, 20*(2), 173 - 192. doi:10.1177/1350508411435281

Trochim, W. M. (2020, July 29). *Conjointly.com.* Retrieved from Conjoint.ly: https://conjointly.com/kb/sampling-in-research/

Trojanowska, J., & Dostatni, E. (2017). Application of the theory of constraints for project management. *Management and Production Engineering Review, 8*(3), 87-95. doi:10.1515/mper-2017-0031

Tsang, E. W. (2014). Case studies and generalization in information systems research: A critical realist perspective. *Journal of Strategic Information Systems, 23*(2), 174-186.

Tsushima, R. (2015). Methodological diversity in language assessment research: The role of mixed methods in classroom-based languages assement studies. *International Journal of Quantitative Methods, 14*(2).

Van Teijlingen, E. R., & Hundley, V. (2001). The importance of pilot studies. *Social Research Update*(35).

Vaskimo, J. (2015). Organisational project management methodologies - Structures contents and use. Helsinki, Finland: Aalto University Publication. Retrieved from http://urn.fi/URN:ISBN:978-952-60-6586-1

Vergopia, C. (2008). Project review maturity and project perfromance: An Empirical case study. Florida: University of Central Florida. Retrieved from http://etd.fcla.edu/CF/CFE0002401/Vergopia_Catherine_A_200812_PhD.pdf

Viana, J. C., & Mota, C. M. (2016). Enhancing Organizational Project Management Maturity: a framework based on the value focused thinking model. *Production, 26*(2), 313-329. doi:doi: http://dx.doi.org/10.1590/0103-6513.169913

Vogel, S., & Draper-Rodi, J. (2017). The importance of pilot studies, how to write them and what they mean. *International Journal of Osteopathic Medicine, 23*, 2-3. doi:https://doi.org/10.1016/j.ijosm.2017.02.001

Volkoff, O., & Strong, D. M. (2013). Critical Realism and Affordances: Theorizing It-Associated Organizational Change Processes. *MIS Quarterly, 37*(3), 819–834. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=89477779&site=ehost

Wang, C., Alashwal, A. M., Asef, A., Abdul-Rahman, H., & Wood, L. C. (2018). Moderating role of organisational learning and firm size on risk management maturity in construction firms. *South African Journal of Business Management, 49*(1), a320. doi:https://doi.org/10.4102/sajbm.v49i1.320

Wang, H., Bai, L., Huang, N., Du, Q., & Zhang, T. (2019). Social project culture: A new project management culture to promote the sustainable development of organizations. *Sustainability, 11*(1), 202. doi:10.3390/su11010202

Wijaksono, F. A., Pratami, D., & Bay, A. F. (2020). Measurement of Risk Project Maturity Using Organizational Project Management Maturity Model (Opm3): Study Case Of Construction Project In Bandung. *852*(1), 012098. doi:10.1088/1757-899X/852/1/012098

Wikgren, M. (2005). Critical realism as a philosophy and social theory in information science? *Journal of Documentation, 6*(1), 11 - 22. doi:10.1108/00220410510577989

Williams, C. K., & Karahanna, E. (2013). Causal explanation in the coordinating process: A critical realist case study of federated IT governance structures. *Mis Quarterly*, 933-964.

World Bank. (2019, April 30). Restructuring paper on a proposed project restructuring of the additional financing for the Africa higher education centres of excellence. *1*. (B. Himdat Iqbal, Compiler) Retrieved May 19, 2019, from http://documents.worldbank.org/curated/en/389701556647714790/pdf/Disclosable-Restructuring-Paper-Africa-Higher-Education-Centers-of-Excellence-Project-P126974.pdf

Wu, X., Zhao, W., & Ma, T. (2019). Improving the impact of green construction management on the quality of highway engineering projects. *Sustainability, 11*, 1895. doi:doi: 10.3390/su11071895

Yazici, H. J. (2009). Does project maturity matter for organizational success? *Proceedings of the Industrial Engineering Research Conference.*

Yen, W. W., Peng, Y. K., & Gee, Y. S. (2016). A case study assessment of project management maturity level in the Malaysia's IT industry. *Proceedings of the 2016 International Conference on Industrial Engineering and Operations Management* (pp. 361 - 371). Kuala Lumpur: IEOM Society International.

Yen, W. W., Peng, Y. K., & Gee, Y. S. (2016). A Case Study Assessment of Project Management Maturity Level in the Malaysia's IT Industry. *Proceedings of the 2016 International Conference on Industrial Engineering and Operations Management* (pp. 361 - 371). Kuala Lumpur: IEOM Society International.

Young, J. C., Rose, D. C., Mumby, H. S., Benitez-Capistros, F., Derrick, C. J., Finch, T., . . . Mukherje, N. (2018). A methodological guide to using and reporting on interviews in conservation science research. *Methods in Ecology and Evolution, 9*, 10-19. doi:DOI: 10.1111/2041-210X.12828

Zachariadis, M., Scott, S., & Barret, M. (2013). Methodological implications of critical realism for mixed-methods research. *MIS Quarterly, 37*(3), 855 - 879.

Zachariadis, M., Scott, S., & Barrett, M. (2013). Methodological implications of critical realism for mixed-methods research. *MIS Quarterly, 37*(3), 855 - 879.

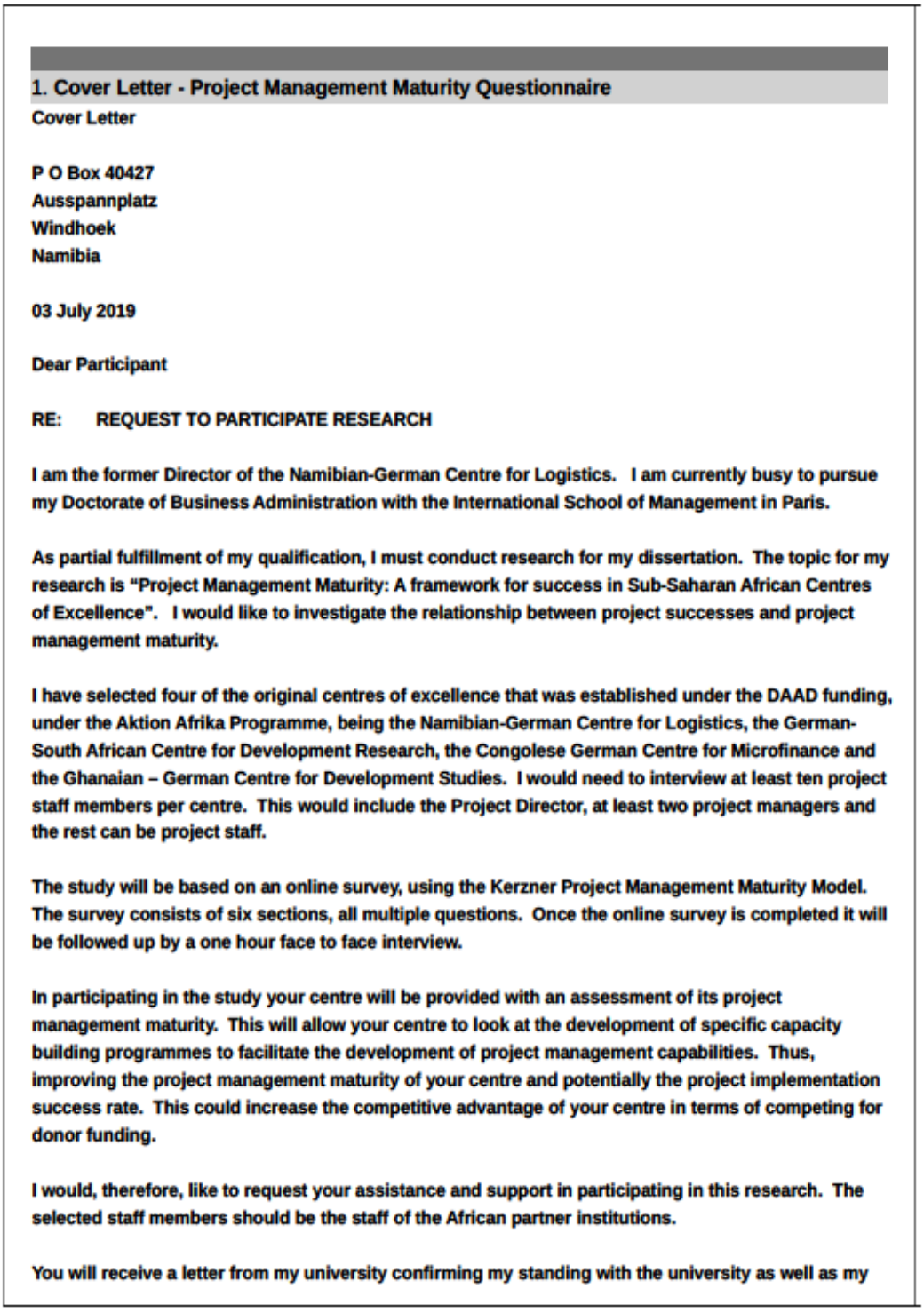
Zachariadis, M., Scott, S., & Barrett, M. (2013). METHODOLOGICAL IMPLICATIONS OF CRITICAL REALISM FOR MIXED-METHODS RESEARCH1. *MIS Quarterly, 37*(3), 855-879. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=89477782&site=ehost-live

Zidane, Y. J., Elvenes, B. O., Samset, K. F., & Hussein, B. A. (2018). System thinking, evaluations and learning–experience from road construction megaproject in Algeria. *Mediterranean Journal of Social Sciences, 9*(3), 121-121. doi:doi: 10.2478/mjss-2018-0054

## LIST OF APPENDIXES

## APPENDIX ONE

**KERZNERS ASSESSMENT TOOL** (Double click to open pdf document)



1. Cover Letter - Project Management Maturity Questionnaire

Cover Letter

P O Box 40427
Ausspannplatz
Windhoek
Namibia

03 July 2019

Dear Participant

RE: REQUEST TO PARTICIPATE RESEARCH

I am the former Director of the Namibian-German Centre for Logistics. I am currently busy to pursue my Doctorate of Business Administration with the International School of Management in Paris.

As partial fulfillment of my qualification, I must conduct research for my dissertation. The topic for my research is "Project Management Maturity: A framework for success in Sub-Saharan African Centres of Excellence". I would like to investigate the relationship between project successes and project management maturity.

I have selected four of the original centres of excellence that was established under the DAAD funding, under the Aktion Afrika Programme, being the Namibian-German Centre for Logistics, the German-South African Centre for Development Research, the Congolese German Centre for Microfinance and the Ghanaian – German Centre for Development Studies. I would need to interview at least ten project staff members per centre. This would include the Project Director, at least two project managers and the rest can be project staff.

The study will be based on an online survey, using the Kerzner Project Management Maturity Model. The survey consists of six sections, all multiple questions. Once the online survey is completed it will be followed up by a one hour face to face interview.

In participating in the study your centre will be provided with an assessment of its project management maturity. This will allow your centre to look at the development of specific capacity building programmes to facilitate the development of project management capabilities. Thus, improving the project management maturity of your centre and potentially the project implementation success rate. This could increase the competitive advantage of your centre in terms of competing for donor funding.

I would, therefore, like to request your assistance and support in participating in this research. The selected staff members should be the staff of the African partner institutions.

You will receive a letter from my university confirming my standing with the university as well as my

**APPENDIX TWO**

**PROJECT MANAGEMENT MATURITY ASSESSMENT**

**INTERVIEW SCHEDULE**

**SECTION A: INTRODUCTION**

**Welcome the interviewee to the interview and let him/her feel relaxed.**

**Introduce yourself.**

**Provide background information** (You are picked from amongst the respondents of the online survey; Broad questions will be asked in which you can respond in any way you feel appropriate; The same questions will be asked to all respondents participating in the research)

**The purpose of the interview:** Questions were developed to investigate the stratification of reality as outlined in the Critical Realist approach. Explain what this means in simple terms. Critical Realism posits that reality consist of three dimensions, the actual the real and the empirical.

1 Empirical (Evidence of events and their impact)

2. Actual (Relationships and how the power influence the relationships)

3. Real (structures and inherent power)

The interview approach that researcher will follow: (Please specify). The questions were developed to probe; the relationship of project management maturity with project success.

**Value of their contribution:** By participating in this research you will provide me with data that will allow me to investigate the causal relationships between project management maturity and project success. We also hope to identify which dimension of reality has the strongest link with project success.

Timeline for the interview: The interview is designed to take around 45 minutes. I really hope that you will learn as much from this experience as I will.

**Institution: ……...….**

## SECTION B: THE BODY OF THE INTERVIEW

### The Real

1. Do you think project management knowledge is important for project success?
2. Do you think your institution consider project management knowledge important for project success?
3. What knowledge do you consider important for project management success?
4. In your view, do you think structures in your institution holds the right knowledge to manage projects successfully?
5. Who do you think should be the custodian of project management knowledge in your institution?
6. Do you think you hold the right knowledge to manage a project successfully?
7. Do you think all the stakeholders involved in your projects hold the knowledge required to implement the projects successfully?
8. What would you suggest to improve project management knowledge in your institution?
9. How do you think your project management knowledge as a centre compare to that of your competitors / peers?
10. Do you benchmark your project management knowledge?
11. 11. Does a person's project management knowledge play a role in being appointed on projects?

### The Actual

12. Do you think a standardised project management methodology can contribute to project success? If yes, how?

13. Do you think a standardised framework can provide stability to the project implementation process? If yes, Why?
14. What do you think a standardised project management framework can contribute toward stakeholder management?
15. How do you think will a standardised project management framework influence interaction between stakeholders, both individually and institutionally?
16. How does your institution manage stakeholder relationships at the moment?
17. Do you think a standardised project management approach can help to improve on this? How?
18. Do you think stakeholders know what they can expect from you as an institution in terms of how you implement projects?
19. How do you think the current relationships between the different structures involved in your projects influence project success? Why?
20. Do you think a standardised project management approach will improve interaction with other structures in your institution?
21. Do you benchmark your project management processes against industry competitors?

**The Empirical**

22. Do you think measuring project success is important? Why?
23. Is a standardised project management methodology important for measuring project success?
24. Does your institution have a standardised project management methodology?
25. What elements of project management is the most important to measure in your view?
26. How does measuring project successes contribute to future project success?
27. Do you have a system in place to move project measurements results from one project to the next?

28. How does measuring project success contribute to building project management knowledge?
29. In your experience, how does standardised measuring processes influence operations in any institution?
30. Do you think a standardised project management approach will have the same impact on your organisation?
31. Looking at your current system of project management, what would you improve? Why?
32. Do you benchmark your project management measurement tools and processes?
33. Which structure in your organisation should be responsible for measuring project success? Why?
34. What do you think is the impact of the lack of a standardised project management approach on project success?

**Rating: (1 is low and 5 is high)**

35. How do your rate yourself on a scale of 1 -5 in terms of your project management knowledge?
36. How would you rate your institution on a scale of 1 – 5 in term of their project management knowledge? Why?