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# EVALUATION OF THE EFFECTIVENESS OF AN EXISTING PROJECT MANAGEMENT FRAMEWORK FOR A MINING COMPANY

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#### ABSTRACT

A Project Management Framework (PMF) provides support and assistance by forming a basic structure for project management. Project management is used in the modern business era to apply skills, tools, knowledge and techniques to meet the project objectives and stakeholders' expectations. The elements of a PMF form the foundation of project execution and a successful project is an indication of a solid project foundation. This research evaluates the current PMF of a South African mining company. Recently, a number of project shave experienced schedule and cost overruns which had an impact on achieving the project objectives. The aim of this research was therefore to evaluate and identify PMF areas and processes which require improvement. The aim was also to provide the company with recommendations on how to improve their current PMF. All functional departments within the company were considered which included mining, plant processing, engineering, finance and procurement. The research indicated that the functional departments within the company are highly dependable on the PMF to ensure project quality and successful project execution.

Key Words: project management framework, PMF foundation.

#### 1. INTRODUCTION

A PMF is a set of principles which creates a foundation for the Project Management Process (PMP). A PMF includes the tasks, templates, processes and tools which are used to manage the project activities throughout the Project Life Cycle (PLC). Projects are about change and all organisations are experiencing continuous change. The mining company has come to understand the value of a strong and solid PMF. Organisations that do have a solid PMF foundation complete projects successfully, meet project objectives and achieve corporate goals. Both the Project Management Institute of the United States and the International Project Management

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Association share the same view of PMF and that is, PMF is universal and generic across cultural, national and linguistic barriers. The company operates an open pit chrome mine and is a privately owned small scale chrome mining company which supplies high quality chrome raw materials to the global steel market. The researcher has recently been involved in a number of projects which have experienced schedule and cost overruns which had an impact on achieving the project objectives. The researcher was a member of the project teaminvolved in the construction of a new processing plant and the project schedule overran by 6 months and resulted in overspending the project budget by 21%. Mind Tools (2016) states that the whole point of having a proper PMF is to ensure projects deliver benefits opposed to simply ensuring the project is completed within a specific time frame or within budget. A PMF starts with a vision and ends with a benefits realisation. Haughey (2009) states that a well-established PMF will provide an organisation with the following:

- Better control over projects and understanding of project dependencies,
- Ensure that project roles and responsibilities are clearly defined,
- Better project communication channels,
- Better usage of resources across projects, and
- Managing risks related to projects.

The risk of not having a well-established PMF within the company is the failure to achieve the desired project objectives. It is of utmost importance for the company to execute their projects within a well-established PMF to ensure that the strategic objectives of their projects can be met.

#### 1.1 Aim of the study

The aim of this research was to evaluate the effectiveness of the existing PMF of the company and to identify PMF areas and processes which require improvement. The elements of PMF form the foundation of project execution and a successful project is an indication of a solid project foundation. The outcome of this evaluation was a review of the current PMF within the company to identify whether the existing PMF provides a successful outcome on projects.

#### **1.2 Research questions**

- How effective is the existing PMF in the company?
- What are the gaps in the existing PMF of the company?
- What actions can be taken by the company to address the shortcomings of their existing PMF?

#### **1.3 Significance of the study**

The company has not carried out any previous research to evaluate the effectiveness of its existing PMF. This research determined how effective the existing PMF for the company is. The research will benefit the company by providing them with recommendations on how they can improve their current PMF and provide management and project teams with an insurance policy to deliver their projects successfully. The research will contribute academically by highlighting that an efficient PMF is a pre-requisite for successful project execution regardless of the size of the organisation or the economic sector in which the organisation operates.

#### 2. LITERATURE REVIEW

McConnell (2010) describes the PMF as a framework which ensures project management best practices. The information provided by the PMF adds value to the project by ensuring the project is completed on time, within budget and within set quality standards. Watt (2014) states that a PMF will give a clear indication of what needs to be done and what project management tools should be used for each stage of the PLC. Watt (2014) finds that project management information exists in different forms and can be shared through project tools and templates. McConnell (2010) states that project quality standards that will assist with the planning and management of a project. McConnell (2010) points out that the information provided by the PMF also forms the starting point of the project. McConnell (2010) states that the availability of information at the start of the project assists the Project Manager with:

- Determining the scope of the project,
- Compiling a project cost analysis,
- Determining the project quality standards,
- Calculating the time estimation of the project, and
- Identifying the project risks.

# 2.1 The Project Life Cycle (PLC)

Mendez (2015) found that the PLC consists of project initiation, project planning, project execution, project control and monitoring and project closure. Mendez (2015) argues that all the tools and processes which are used to manage and monitor the project during the PLCare referred to as the PMF elements. The PLC starts with project initiation and ends with project closure. The project is continually measured and optimised during the PLC. The PLC moves through different stages and different levels of effort are required to support each stage. The level of effort during project initiation starts low, peaks during the project execution phase and then slows down during the project delivery phase.

# 2.2 Project Management Processes (PMP)

Campbell (2011) describes a project as the process of using various techniques and tools to manage the scope, time and cost of the project. The three project inter-dependencies are equal as depicted in the equal sided triangle and one inter dependency cannot change without affecting the other two.

# 2.3 Knowledge Areas used within the Phases of the Project Life Cycle (PLC)

McMaster University (2016) state that it is very important to include project management knowledge areas when using tools and techniques to manage a project during its life cycle. Project Management Body of Knowledge (PMBOK) provides assistance to the Project Manager to ensure that the project runs effectively and efficiently during the PLC. Watt (2014) identifies ten project management knowledge areas, namely:

- Scope Management this includes ensuring a proper scope of work is compiled,
- Time Management this assists in project time keeping ensuring the project is completed within time,

- Integration Management this ensures that proper integration takes place and is managed between the various project elements,
- Cost Management this is used to ensure that the project is completed within the approved budget,
- Quality Management this is used to ensure that the quality delivered satisfies the needs and requirements as what was planned for,
- Human Resource Management this ensures that people with sufficient skills are allocated to the project to ensure the project is successful,
- Communications Management this is used to provide open communication channels which ensures that everyone involved in the project is on the same page and all project information is available to everyone,
- Risk Management this is used to identify and manage the risks associated to the project,
- Procurement Management this is used to ensure goods and or services are procured according to the scope of work set out for the tasks within the project, and
- Stakeholders Management stakeholders are identified and the relationships and communications are managed between the stakeholders.

The project management knowledge areas applicable to the PLC include project integration, project scope, project time, project costs, project quality, project human resources, project communication, project risk, project procurement and project stakeholders. These project management knowledge areas are critical to the success of any project (Watt, 2014).

# 2.4 Phases of the Project Management Process (PMP)

The Project Management Institute (2013) describes the PMP as the flow of activities between the different project phases. The activities provide inputs, process it and results in an output which is used as an input again in the following phases.

**Project Initiation (PI):** The Project Initiation (PI) phase is where permission is granted or authorization is given for a new project to start. The type and complexity of the PI is directly related to the scale and nature of the project. The Project Management Institute (2013) states that the scope, financial resources and project stakeholders are already identified at this stage.

**Project Charter Issued during the Project Initiation**: The Project Management Institute (2013) describes the Project Charter (PC) as a project initiating document issued to the Project Manager by Senior Management. The PC will provide the Project Manager with the go ahead to allocate organisational resources to the project activities.

**The Stakeholder Management Process during Project Initiation:** Clements and Gido (2012) describe a project stakeholder as an individual or group that may be effected by a project. Involving the project stakeholders during the project initiating phase will allow the exploration of all aspects relating to the project and will provide a good understanding of meeting the objectives, improve stakeholder communication and will leave a sense of satisfaction with the stakeholders. The UK Department of Business Innovation and Skills (2010) states that in order to manage stakeholder relationships one must follow the following steps:

Step 1 - Identify the stakeholders related to the project,

Step 2 - Establish the stakeholder management strategy,

Step 3 - Execute the stakeholder management plan, and

Step 4 - Monitor the process and revise if necessary.

**The Appointed Project Manager's Role during Project Initiation**: As explained by Clements and Gido (2012), a Project Manager is someone who has the skills of leadership and will lead a project team to achieve the project's objectives. When a new project is identified, interested representatives from the organisation will meet early and agree on what the project will achieve and how it will be achieved. The UK Department of Business Innovation and Skills (2010) explains that the Project Manager must gain commitment from the participating individuals and needs ensure that all the role players understand the nature of their commitments in terms of the time and effort required. The Project Management Institute (2013) states that the Project Manager needs to have the necessary knowledge, skills, tools and techniques applicable to a specific project to ensure a smooth flow between all activities supporting the different phases throughout the PLC. McMaster University (2016) identifies the following areas of responsibility for the Project Manager:

- The Project Manager needs to use the necessary tools and techniques to implement an infrastructure to ensure a successful project,
- A communication plan needs to be developed by the Project Manager to ensure efficient communication throughout the project,
- The Project Manager needs to provide leadership when assisting with problem solving,
- The Project Manager needs to monitor the progress of the project and provide feedback on the project plan versus the actual status, and
- The Project Manager needs to monitor the performance of each team member.

# 2.5 Project Planning (PP)

Clements and Gido (2012) states that Project Planning (PP) includes factors such as determining what needs to be done, how to do it, how long will it take, what will the costs be and what will the risks be. The PP phase of a project starts with creating a detailed project plan. The project plan is used by the Project Manager to control the project schedule and costs for the life of the project. The planning and timing during this phase determine whether the project process will be managed effectively and successfully. The project planning sequence starts with the scope of the project and ends with the costs and the producing sequence starts with communication and ends with risk. The Project Management Institute (2013), states that PP allows for customising the project objectives which were identified during PI and provides direction to meet those objectives. The PP process also allows for constant project re-evaluation to improve the strategy and processes to complete the project successfully.

# 2.6 The Project Planning Meeting

Boss (2016) explains that the Project Manager will hold a project planning meeting to introduce the project and examine all aspects of the project. Passenheim (2016) states that the objectives of this meeting is to provide an overview of the project, address concerns internally within the project team and to determine how the team is going to work together. Boss (2016) finds that the planning meeting is the starting point and confirmation whether a project will be a success or not because at this meeting any conflict or opposing ideas gets addressed and resolved.

# **Developing the Work Breakdown Structure (WBS) during the Project Planning Phase**: The City of Chandler (2016) states that a Work Breakdown Structure (WBS) process is used during PP to break down the project objectives into deliverables. The WBS needs to be compiled and completed as a joint venture by the project team and should be reviewed and updated as part of the PLC. The City of Chandler (2016) argues that the WBS forms the heart of PP and many responsibilities and disciplines depend on it. The ten PM knowledge areas earlier identified are also an important factor when compiling the WBS. The WBS is also used for creating the project responsibility matrix, schedules, costs, quality plan, communication plan, risk assessments and project procurement plan.

**Developing the Responsibility Matrix during Project Planning**: Clements and Gido (2012) found that the purpose of developing a project Responsibility Matrix (RM) is to assist the Project Manager to assign roles and responsibilities to the project team. The RM consists of the tasks indicated in the WBS and each project team role taking responsibility for managing that task. The RM consists of four basic responsibilities namely: owner, reviewer, approver and last word. According to Piscopo (2013), project communication is an important tool that contributes to the success of a project. The PCP is critical for establishing a communication process and network during the PLC. The PCP forms a summary of all information gathered and provide consistency among project team members. Watt (2014) concluded that project communication affects the successful completion of a project.

**Conducting a Project Risk Assessment (PRA) during Project Planning:** The UK Department of Business Innovation & Skills (2010) defines a project risk as an area of the unknown that might influence or provide an opportunity to the project. In order to manage project risks it first needs to be identified. For each risk identified a scale from 1-10 can be used to determine how likely it is that risk will happen and what the consequences will be. The City of Chandler (2016) suggests the following basic risk management strategies:

- Risk avoidance this refers to making the necessary changes to the original project plan in order to avoid the risks identified.
- Risk mitigation this refers to making preparations beforehand to prepare for a risk to happen and if when it will have the minimum impact.
- Risk transfer the outcome of the risk becomes someone else's problem, meaning the risk is not resolved but just shifted.

**Project Team Skill Requirements**: Watt (2014) refers to project team skill requirements as finding the correct people with the correct skills in order to follow the project through until successfully project completion. Piscopo (2013) finds that individuals and leaders who are managing the key project functions will ensure the success of a project irrelevant where they fit into the organisational structure. Successful project management requires a group of individuals sharing the same values and beliefs and are dedicated to achieving the set project goals.

**Project Quality Management**: Clements and Gido (2012) states that the project quality plan needs to include the specifications which has to be measured to monitor the project performance. Piscopo (2013) advices that the Project Manager has to develop a quality plan that is executed throughout the PLC and the quality plan should include all the tools and techniques to ensure the

quality criteria for all the project objectives are met. Clements and Gido (2012) found that projects require constant monitoring against project specifications to ensure the required project quality is achieved and therefore if changes needs to be made and implemented, it will be during project quality management. Clements and Gido (2012) also identify that decisions have to be taken with regards to how quality standards will be measured, documented and tested. Typical standards will include ISO quality standards, internal organisational standards and stakeholder standards.

**Project Procurement Management (PPM):**Watt (2014) refers to Project Procurement Management as procuring of services or goods from outside suppliers and the selecting of suppliers to fit in with the project life cycle. Piscopo (2013) explains that the purpose of the Project Procurement Plan (PPP) is to clearly define the project procurement requirements and project procurement management. According to Piscopo (2013), PPP must be aligned with the business case for the project and must be approved before confirming the funds that are available for the procurement process The PPP will include proposals on how tenders will be selected, how tenders will be managed, how tenders will be evaluated and negotiated and who will be responsible for the tender process. Piscopo (2013) states the PPP needs to outline the following:

- The procurement strategy,
- The market approach
- The tender method, and
- And governance framework for the tender process.

#### 2.7 Project Execution (PE)

Mason (2012) explains that the function of this phase of the project is to execute the activities compiled during the planning phase and to ensure that all processes are performed and carried out according to the project specifications.

**Project Control and Monitoring**: The Project Management Institute (2013) states that his phase of the PLC requires the project team to produce the agreed project deliverables and objectives. Watt (2014) argues that the Project Manager can make use of the following tools to manage and control the project:

- Time management used for tracking time spent against project plan,
- Cost management used for tracking cost against approved budget,
- Quality management used to monitor the quality of the deliverables,
- Change management managing the request for any changes to the project plan,
- Risk management used for assessing the project risks and taking appropriate actions,
- Issue management resolving all identified project issues,
- Acceptance management –used to communicate the completion of deliverables to the customer and gaining customer acceptance, and
- Communication management used to inform all stakeholders of the project progress.

The Project Management Institute (2013) states that continuous controlling and monitoring of the project provides an overview of the progress of the project and project checkpoints are tools used to implement control measures and do not necessary have to be in written format or in the form of meetings. It allows for making changes or improvements if required in order to fit in with the

set project plan and achieving the set project objectives. Piscopo (2013) describes project controlling and monitoring process as identifying the weak and strong areas during the PLC. This information can be used as a guideline for future projects for time management and scheduling. This phase of the project will come to an end as soon as the customer accepts the deliverables and all the project objectives have been met.

#### 2.8 Risk Management

Tomanech and Juricek (2015) state that there is a huge lack of risk management techniques within project management. This gap can be resolved by aligning the risk management techniques with the project management framework and product development framework, identified by Tomanech and Juricek (2015). The project management process includes; identifying the risks, evaluate the identified risks, plan for corrective actions, implement and communicate the corrective actions and monitor the implementation and changes, referred by Tomanech and Juricek (2015). The project risk management process starts with identifying the project risks and ends with risk controlling. The project risk management process is a continuous process during the PLC.

#### 2.9 Project Closure

Westland (2006) describes project closure as the final phase of the project and will include a closure report which should identify the closure actions required. As mentioned by Westland (2006), closure actions will typically consist of the release of resources, handover of deliverables and communicating the close out of the project. The Project Management Institute (2013) states that the activities in the closure phase must ensure that best practices are captured and shared and this will ensure that continuous improvement is practiced for future projects. The Project Manager must archive the project documentation, obtain final sign-off, assess customer satisfaction and will capture the lessons learned during the PLC. The project's overall success is determined through an evaluation which is carried out after project closure. A huge amount of information is collected, analysed and used from when the project idea is established up until the closure phase of the project. Information and data is also used for the project controlling processes and may be communicated verbally or in reporting format during the execution of the project(Watt, 2014).

#### 2.10 Success Factors for Project Management

Ofori (2013) defines that there are numerous factors contributing to the success of project management. The framework of project management consists of factors and tools contributing to the successful completion of the project. The factors identified by Ofori (2013), includes time management, costs of the tasks set out, scope of the project, social, cultural, economic and political, communication, competency of team members, stakeholder involvement and leadership. By using all the above mentioned tools, the project management framework will mirror the project goals and objectives set out for the project (Ofori, 2013). The framework of project management can also be influenced by the way the tasks of the project are executed. Environmental aspects such as socio-cultural, politics, government, technical and operations can also have an impact on successful project delivery, referred by Ofori (2013). The stronger the environmental aspects are active within executing the tasks of the project, the bigger the influence will be on delivering the outcome of the project according to the set objectives. Ofori

(2013) points out if all factors, tools, methods and activities within the framework of project management are incorporated, it will lead to successful completion of projects and meeting the goals and objectives.

# **3. RESEARCH METHODOLOGY**

The aim of an explanatory type of research is to identify links between study variables. This research follows a very structured approach and may also be referred to as an analytical study ResearchMethodology.net (2016). The researcher selected a descriptive research design which consisted of a questionnaire which was used to describe the relationship between the effectiveness of the existing PMF of the company and the successful completion of projects. The researcher selected this research design because it is conclusive in nature due to its quantitative nature and unlike exploratory research it is pre-planned and structured in design so the information collected can be statistically inferred on a population.

# 3.1 The Research Philosophy

Research philosophy refers to the different beliefs about the manner in which the data of the research topic should be collected, analysed and used(ResearchMethodology.net, 2016). Two major research philosophies exist namely quantitative or positivist and qualitative or phenomenological research. The quantitative research philosophy is based on believes that facts are used to measure the existence of a phenomenon (Collins, 2011). The qualitative research philosophy is more concerned with what things mean and is based on the idea that human experience is a valuable source of data (Collins, 2011). Quantitative research is based on the belief that a researcher can make predictions from observation of entities and their interrelationship and Khalid, Hillman and Kumar (2012) state that complex statistical modelling can be used to explain the relationship among variables and this type of research is the best suited for social sciences research. The research philosophy of this research was to describe the company's existing PMF and to predict the relationship between their PMF and successful project delivery. A quantitative research philosophy was used for this research.

# **3.2 The Research Strategy**

Saunders, Lewis and Thornhill (2009) describes the research strategy is a general plan that assists the researcher in answering the research questions in a systematic way. It consists of a step-by-step plan of actions which gives direction to the researcher's thoughts and efforts and ensures the research is conducted systematically and on schedule to produce quality results. In this research an unbiased and representative sample is taken from the population which the researcher wish to study. Questions are used to gather data and may be asked by using questionnaires, having face-to-face discussions, having telephone conversations or by a mixture. The researcher selected a quantitative research strategy which consisted of a survey where a census was conducted on all the functional areas within the company which may have an impact on successful project delivery. The survey consisted of a questionnaire which was aligned with the research objectives. As mentioned by Khalid*et al.*(2012), a quantitative research strategy would be the most suitable approach to identify the relationship between the company's current PMF and successful project delivery.

#### **3.3 Target Population**

Reference.com (2016) describes the target population of the research as the entire group of people identified by the researcher from which the researcher want to generalise his research findings. The accessible population is a subset of the target population and is that portion of the target population to which the researcher has reasonable access. The researcher defined all people employed by the company as the target population and the accessible population was defined as all those people who may have an impact. The accessible population includes all those employees who the researcher has reasonable access to and consists of 98 employees. Respondents from both the management and operational levels of all the functional areas involved in project delivery were included in the population and is the suitable population to inform the research objectives.

#### 3.4 Sampling

Probability sampling is a sampling method that utilizes some form of random selection. Processes and procedures have to be set up to ensure the different population units have an equal probability of being chosen (Trochim, 2006). Non-probability sampling does not involverandom selection and cannot depend upon the rationale of probability theory (Trochim, 2006). Researchers prefer probability sampling and consider it to be more accurate and rigorous than non-probability sampling. The researcher selected a census approach to survey the population due to the small number of people employed by the company. As mentioned by the Australian Bureau of Statistics (2013) a census approach will ensure that detailed information from all of the participants in the population becomes available. The aim of the census was to survey every employee involved in project. The majority of number of quantitative research makes use of questionnaires to collect objective and reliable data (Wilkinson and Birmingham, 2003). A questionnaire was used as the research instrument for this research. The questionnaire recorded primary data through direct data collection and assisted the researcher to: guarantee the respondent's anonymity, collect large amounts of data in a short time and it was a cost effective way administer the data collection process.

#### **3.5 Pilot Study**

Schreiber (2014) describes a pilot study as a smaller version of the full scale study which is carried out to test whether the proposed study is feasible. Van Teijlingen and Hundley (2011) state that the pilot study is a smaller version of the full scale study and is used to test the questionnaire. A pilot study was conducted with ten participants. The purpose of the pilot study was to test the questionnaire for brevity, completeness and clarity of instructions. The pilot study was drawn from participants employed at the company's head office in functional areas involved in project management and represented the actual population in all respects. The pilot study confirmed that the participants were comfortable in answering the questionnaire, as all questions were answered by all the participants. No logical problems were identified with the research method, only rewording of words and one question was removed from the questionnaire. The feedback from the participants assisted the researcher to refine the wording of some questions to comply with the features of a good questionnaire as advised by Muller (2016). The researcher also improved the numbering of the available responses to the questions to ensure that data capturing could be done accurately and effortlessly.

#### 3.6 Data Analysis

As explained by Wegner (2012), quantitative research data analysis is done through a number of descriptive statistical techniques. The researcher made use of descriptive statistics to describe the distribution and relationship among variables in the collected data. Tables, graphs and frequency tables were used to translate the statistics into an understandable form. The degree of confidence in the results was estimated through the use of inferential statistics. This enables generalisation from the population

# 3.7 Data Validity and Reliability

**Validity:** Sagor (2000) describes validity as the extent to which the questionnaire actually measures the phenomenon which are being researched. Khalid *et al.* (2012) identify two types of validity namely internal validity and external validity. Khalid *et al.* (2012) found that a researcher should ensure that a questionnaire complies with the following requirements:

- The questions should appear to participant to measure what is says it does, and
- The questions should comparable against other standard measurements.

The researcher further ensured research validity through:

- Piloting the research instrument, and
- Using a census approach to sample the population to ensure the biggest data set possible.

**Reliability**: As stated by Sagor (2000), reliability is a researcher's claim that his data is accurate and free from random error. Bryman and Bell (2015) states that researchers may use two ways to estimate research reliability namely test/retest and internal consistency. The test/retest is based on the idea that one should get the same score on test 1 as they do in test 2. Internal consistency refers to the concept of estimating reliability by grouping questions in the questionnaire which measures the same concept

#### 3.8 Limitations of the Study

PMF covers a very broad area. The researcher defined some boundaries by focusing the research on those functional areas which may have a direct impact on project delivery.

#### **3.9 Elimination of Bias**

Pannucci and Wilkins (2011) found that bias will occur when systematic errors are introduced in the sampling. This will happen when encouraging one answer to the research question over others. Bias can occur during the research design phase, the data collection phase as well as during the data analysis and publication phase. Pannucci and Wilkins (2011) identify random bias and systematic bias. Random bias occurs due to sampling variability or measurement precision and systematic bias occurs due to reproducing inaccuracies. Fouka and Mantzorou (2011) identify the following major ethical guidelines for research:

- Respect for anonymity and confidentiality the researcher must ensure that there is no link between the participant's identity and responses,
- Beneficence the research must be of benefit not do harm,
- Informed consent the researcher must ensure the participant gives his consent and partakes in the research knowingly and voluntarily, and
- Respect of privacy the researcher must discuss the aim of the research and the research as well as the research methodology with the participants before the research.

**Ensuring Participants have given Informed Consent**: The researcher informed all participants of the nature of the research to ensure they understood the objective of the research. The covering letter which accompanied each questionnaire clearly explained the nature of the research.

**Ensuring no Harm comes to Participants:** The participants had the right to decide whether or not to participate in the research. The researcher described the nature of the study as well as the respondent's right to participate or to refuse to participate in the study.

**Ensuring Confidentiality and Anonymity**: The researcher maintained the confidentiality of participants by not disclosing any names in the research report. The participants who wished to obtain a research report could contact the researcher who would supply such a report.

**Ensuring that Permission is obtained:** The company gave permission to conduct the research. The researcher undertook not to cause any disruptions to the operations.

# 4. **RESULTS**

# 4.1 Demographics

10.6% of respondents were from executive management, 23.5% were from senior management, 31.8% were from middle management and 34.1% were from operational management (n = 85). This statistic indicates that 34.1% of the respondents were from operational management constituting the majority of the group. Middle management constituted the second largest of the sample at 31.8% and senior management the third largest at 23.5%. The significance of this statistic is that almost 90% of the sample consisted of organisational levels which are intimately involved with project management and associated PMF principles. 21.2% of respondents were from the mining department, 36.5% from the plant or processing department, 14.1% from the engineering department, 17.6% from the finance department and 10.6% from the procurement department (n = 85). This statistic was sought to give an idea of the spread of research respondents over the different functional departments in the company. More than 70% of the respondents represent the mining, plant and engineering functional areas where the majority of the projects in the company are executed. 83.5% of respondents are employed in functional departments which are involved in project management and associated PMF principles in the company. The majority of the functional department in the company are involved in project management and associated PMF principles.

# 4.2 Business Case Completed

9.4% of respondents indicate that they strongly agree that a business case is completed for each project, 31.8% agree, 32.9% don't know, 21.2% disagree and 4.7% strongly disagree (n = 85). Only 41.2% of the respondents agree that a business case is completed for each project. 32.9% of the respondents indicated that they do not know whether a business case is completed for each project and this could be an indication that there is a lack of PMF tools, templates and procedures in the company. As stated by the UK Department of Business Innovation & Skills (2010) the project business case is used to decide whether to proceed with the project or not based on the expected return on the investment.

#### 4.3 Identification of Roles

12.9% of respondents indicate that they strongly agree that all project stakeholders are identified at the start of a project, 36.5% agree, 27.1% don't know, 18.8% disagree and 4.7% strongly disagree (n = 85). 17.6% of respondents indicate that they strongly agree that a dedicated project manager is appointed for each project, 48.2% agree, 15.3% don't know, 12.9% disagree and 5.9% strongly disagree (n = 85). There is a 65.9% agreement among respondents that a dedicated project manager is appointed for each project. There is also a significant difference in the functional department and the appointment of a dedicated project manager for each project (H (4) = 10.970, p = 0.027). Mining and plant were more likely to agree whereas engineering and procurement were more likely to disagree.

#### 4.4 Documentation

16.5% of respondents indicate that they strongly agree that a WBS is developed for each project. 25.9% agree and 27.1% don't know, 29.4% disagree and 1.2% strongly disagree (n = 85). Less than 50% of the respondents agree that a RM is drawn up for each project. It appears that respondents believe a responsibility matrix is a requirement for a project communication plan as well as the project risk management. 10.6% of respondents indicate that they strongly agree that a PCP is developed for each project, 32.9% agree, 22.4% don't know, 25.9% disagree and 8.2% strongly disagree. 7.1% of respondents indicate that they strongly agree that a POP is developed for each project, 25.9% agree, 31.8% don't know, 30.6% disagree and 4.7% strongly disagree. Only 33% of the respondent's indicated that a PQP is developed for each project. 16.5% of respondents indicate that they strongly agree that all projects are formally monitored during execution, 42.4% agree, 20.0% don't know, 17.6% disagree and 3.5% strongly disagree. 58.8% of the respondents agree that projects are formally monitored during project execution. 11.8% of respondents indicate that they strongly agree that project checkpoints are in place, 38.8% agree, 35.3% don't know, 11.8% disagree and 2.4% strongly disagree. More than 50% of the respondents agree that project check pints are in place. 14.1 % of respondents indicate that they strongly agree that project deviations are reported timorously, 21.2% agree, 31.8% don't know, 23.5% disagree and 9.4% strongly disagree.

#### 4.5 Project Deviations

Less than 36% of the respondents agree that project deviations are reported timorously. 14.1 % of respondents indicate that they strongly agree that project deviations are reported timeously, 25.9% agree, 29.4 % don't know, 23.5% disagree and 7.1% strongly disagree. Less than 50% of the respondents agree that a project risk management process is in place to manage project risks. 14.1 % of respondents indicate that they strongly agree that project deviations are reported timeously, 40.0% agree, 17.6% don't know, 23.5% disagree and 4.7% strongly disagree. 7.1% of respondents indicate that they strongly agree that a closure report is completed for all projects, 23.5% agree, 36.5% don't know, 29.4% disagree and 3.5% strongly disagree. Only 30.6% of the respondents agree that a closure report is completed for all project Manager's activities during project closure is the preparation of a closure report (Project Management Institute, 2013). 17.6% of respondents indicate that project documentation is archived for future use, 37.6% agree, 30.6% don't know, 12.9% disagree and 1.2% strongly disagree. Around 55% of the respondents agree that project documentation is archived for future

use. The project Management Institute (2013) found that the Project Manager should archive project documentation to ensure continuous improvement is practised for future projects. There is a significant difference in whether their department contributes to the successful completion of Projects within the company, and project documentation being archived for future reference (H(1) = 5.163, p = 0.023). If answered yes, respondents were more likely to agree, whereas those answering no, were more likely to not know.

# 5. CONCLUSIONS AND RECOMMENDATIONS

The findings from the primary research evaluated the company's existing PMF. A number of gaps, challenges and shortcomings were identified with their current PMF. The research participants consisted of executive management, senior management, middle management and operational management. This means that around 90% of the sample consisted of the company's organisational levels which are intimately involved with project management and associated PMF principles.

# 5.1 The Current PMF in the company

- There are different opinions and views from the participants regarding the company's existing PMF,
- Almost 90% of the participants are employed in functional departments which are involved in project management and associated PMF principles,
- The mining, plant and engineering functional areas are where the most projects are executed and are also the most involved with the current company's PMF,
- There is a general lack of understanding of the project management tools and templates used in the company during the PLC,
- There is a general lack in sharing project information across the different the company's functional areas,
- There is a poor understanding of what the responsibilities of the Project Manager should entail,
- There are a number of shortcomings in project communication,
- Project control and monitoring are not fully rolled out and formalised which results in project deviations not being reported timeously, and
- There is a lack of proper project closure practises and standards.

# **5.2 Gaps in the Current PMF of the company**

- There is no Standard Operating Procedure (SOP) which described the PMF requirements for the company,
- The different tools and templates to be used during the PLC is not well articulated and communicated in the company,
- The current requirement to complete a business case for each project to be used as part of the project approval, is not always met,
- A standard PC is not completed for each project,
- Project stakeholders are not always identified during the PI phase,
- Dedicated Project Managers are not always appointed for projects,

- A WBS is not always completed for projects,
- A RM is not always developed for each project,
- A PCP, PQP and PPP are not always developed for each project,
- Projects are not formally monitored during project execution,
- Project checkpoints are not always in place during project execution,
- Project deviations are not are not reported timeously,
- Project risk management processes are not in place for all projects,
- Scope changes are not managed formally,
- Closure reports are not complete for all projects, and
- Project documentation are not always archived for future use.

#### **5.3 Recommendations**

The absence of a well-established PMF within the company will result in projects failing to achieve the desired project and strategic objectives. In many cases throughout the study, the participants responded "don't know" response to the research questions. This could be an indication that there is a lack of PMF procedures, tools and templates in the company. It is recommended that the following general PMF recommendations are considered:

- Develop a SOP for their PMF. This SOP should spell out and guide all the PMF requirements during the PLC. The SOP will ensure standardisation and assurance of the various PMF tools, processes and templates across all projects in the company.
- Create a roll in the organisation to be responsible and accountable for all project on an executive level. This role will typically be called Head of Projects and will also take responsibility for the strategy and vision of projects in the company, and
- Consider the establishment of a Project Support Office (PSO). The purpose of the PSO would be to establish a project committee with representation from all the functional departments in the company. The PSO will further review and approve all projects while at the same time provide support from each functional area required to ensure successful project execution.

The above recommendations should ensure a more effective PMF for the company and will ensure projects deliver benefits opposed to simply ensuring that the projects are completed within a specific time frame or within budget. The different stages of the PMF will enable the company to create an environment where all projects can be monitored and controlled which will improve their probability of delivering a successful project at closure.

#### 5.4 PMF Recommendations for PI

The study identified a number of PMF shortcomings during PI. It is recommended that the company consider the following PMF recommendations for PI:

- Generate a standard template to be used for all PC. This will ensure the implementation and standardisation of PC in the company. The PC will further be used to convince the PSO to commit to the project, give direction to the project and secure the necessary approvals for the project.
- The PC template should include the following sub headings:
- The business needs,
- The project scope,

- The project objectives,
- The project deliverables,
- The project assumptions
- The project constraints,
- The project timescale,
- Project key staff and resources,
- Written authorisation to proceed with the project.
- All project stakeholders must be identified during PI and should be reflected in the PC. It is further recommended that all project stakeholders also sign off the PC before it is presented to the PSO which will ensure alignment of the project boundaries.
- A dedicated Project Manager should be appointed for each project. The appointed project Manager should have the necessary technical, project management as well as project leadership skills. It will also be beneficial if the Project Managers holds a formal qualification in project management and is registered a professional project management practitioner.
- It is also important that the Project Manager clearly understands that he is responsible for:
- Providing the necessary tools and techniques to manage the project.
- Ensure effective communication throughout the project.
- Provide leadership to assist with problem solving.
- Monitor and provide feedback on the progress of the project.
- Monitor the performance of the project team members.

# 5. 5 PMF Recommendations for PP

The study identified a number of PMF shortcomings during PP. It is recommended that the company consider the following PMF recommendations for PP:

- The Project Manager must arrange a planning meeting which serves as the starting point of the project.
- A WBS must be developed for each project. This WBS must be compiled by the project team and reviewed and updated during the PLC.
- The Project Manager must also develop a RM from the WBS. The RM will ensure each task in the WBS is allocated to a project team member.
- A PQP must also be developed for each project. The PQP should cover the level, detail, format, method and responsible person for project communication.
- A PRA must be drawn up for each project. Risks should be identified on a scale from 1-10 where 1 is the lowest and 10 is the highest. Each project risk must have a suitable risk management strategy.
- A PQP must be developed for each project. This will ensure that each project is monitored against the agreed project specifications.
- A PPP must also be drawn up for each project. The PPP should have the following sub headings:
- Procurement strategy.

- Market approach.
- Tender method.
- Tender governance framework.

# 5.6 PMF Recommendations for Project Execution

The company must ensure that the required project team skills are available and in place for the duration of the PLC. The company must align personal performance with project objectives to ensure the success of projects. It is recommended that the company consider the following recommendations for Project Execution:

- The Project Managers must ensure a kick-off meeting takes place for their projects. The kick-off meeting should have an agenda, review actions items and minutes of this meeting must be kept.
- The Project Manger must control, monitor and track the project during execution. The company should implement formal project review meetings and project control points. This could take the form of bi-weekly project steercom meetings and quarterly PSO feedback meetings.
- The company should also implement a process where Project Managers provide monthly project progress reports to executive management.
- The company must develop and roll out a project risk management strategy. This should include the establishment of project risk registers and a risk management procedure.

The abovementioned recommendations will allow for making project changes or improvements in order to still achieve the project objectives. These project deviations should be communicated to all the functional areas. This will ensure a large resource base with various experiences, ideas and suggestions can be accessed to improve the probability of getting projects back on track

# 5.7 Conclusion

The research indicated that the company's PMF plays an important and significant role in the completion of a project. The study confirms a positive relationship between the functional departments within the company and their ability to make decisions relating to projects. The research further indicates that the PMF of the company is used to manage project management processes regardless of the frequency at which decisions are made during the project process. The study also indicated a positive relationship between the qualities attributes of the company's PMF and project management processes. The study also revealed that the functional departments within the company are highly dependable on the PMF of the company to ensure project quality and successful project execution.

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