

# **Public sector project implementation in Botswana**

By

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## **Declaration**

I hereby declare that this dissertation titled "*Public Sector Project Implementation in Botswana*" submitted for the degree of Masters in Public Administration at the Department of Public Administration and Management, University of South Africa is my own original unaided work and has not previously been submitted to any other institution. I further declare that all sources cited or quoted are indicated or acknowledged by means of a comprehensive list of references.

**Modise Lucas Sefhemo**

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## **ACKNOWLEDGEMENT**

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## **ABSTRACT**

Similarly to other developing nations, Botswana is working towards the achievement of the millennium development goals (MDG's) and its longstanding national vision called Vision 2016. One of the pillars of Vision 2016 is development. In an endeavour to achieve the aforementioned principle, the government of Botswana is constantly initiating new projects that are aimed at the development and improvement of citizens lives. Although the government initiates significant projects for the development of the country, most projects fail to achieve successful completion.

The study took a case study approach about a governmental department which deals with implementation of public projects. This study focuses on public sector project implementation in Botswana paying particular attention to the Project Implementation Division in the Ministry of Infrastructure, Science and Technology. The study investigated the control and monitoring approaches in project management used by the Project Implementation Division during implementation of government project under their office and compared them to industry best practices. The research tool used to obtain data was a questionnaire which was hand delivered to target research participants. The questions were open and close ended subdivided into sections which covered biographical details, prerequisites for project implementation and control and monitoring methods. The study found training in Project Management to be very much lacking in current Project Managers as well as lack of well-resourced Project Management Office (PMO) entrusted with the management of public projects. The study concluded with recommendations on how public projects can be effectively and efficiently managed and implemented including recommendations for future research.

## LIST OF ABBREVIATIONS

<b>BCP:</b>	Botswana Congress Party
<b>CBS:</b>	Cost Breakdown Structure
<b>CCB:</b>	Configuration Control Board
<b>CP:</b>	Critical Path
<b>CPA:</b>	Critical Path Analysis
<b>CPM:</b>	Critical Path Method
<b>CPM:</b>	Critical Path Method
<b>CR:</b>	Critical Ratio
<b>DABS:</b>	Department of Architecture and Building Services
<b>DBES:</b>	Department of Buildings and Engineering Services
<b>DEMS:</b>	Department of Electrical and Mechanical Services
<b>EVT:</b>	Earned Value Technique
<b>MOC:</b>	Milestone Objective Chart
<b>NASA:</b>	National Aeronautics and Space Administration
<b>NDP:</b>	National Development Plan
<b>PERT :</b>	Program Evaluation and Review Technique
<b>PID:</b>	Project Implementation Division
<b>PM:</b>	Project Management
<b>PMBOK:</b>	Project Management Body of Knowledge
<b>PMI:</b>	Project Management Institute
<b>PMIS:</b>	Project Management Information System
<b>PMO:</b>	Project Management Office
<b>TAB:</b>	Technical Review Board
<b>WBS:</b>	Work Breakdown Structure

## LIST OF TABLES

	<b>Page</b>
<b>Table 2-1:</b> Four periods of Project Management.....	19
<b>Table 3-1</b> Milestone objective chart.....	35
<b>Table 3-2:</b> CPM calculation.....	37

## LIST OF FIGURES

	<b>Page</b>
<b>Figure 2-1:</b> The project life-cycle.....	16
<b>Figure 3-1:</b> The control cycle.....	30
<b>Figure 3-2:</b> Change control process.....	31
<b>Figure 3-3:</b> Gantt Chart.....	34
<b>Figure 3-4:</b> Critical path diagram.....	37
<b>Figure 3-5:</b> PERT three time probabilistic analysis.....	38
<b>Figure 4-1:</b> The project planning process.....	49
<b>Figure 4-2:</b> Project management plan.....	50
<b>Figure 4-3:</b> Resource management plan.....	52
<b>Figure 4-4:</b> Financial management plan.....	53
<b>Figure 4-5:</b> Quality management plan.....	54
<b>Figure 4-6:</b> Risk management plan.....	55
<b>Figure 4-7:</b> Communication management plan.....	56
<b>Figure 4-8:</b> Procurement management plan.....	58
<b>Figure 4-9:</b> PERT chart.....	59
<b>Figure 4-10:</b> Gantt chart.....	60
<b>Figure 4-11:</b> WBS.....	61
<b>Figure 5-1:</b> Classification of the different research types.....	66
<b>Figure 5-2:</b> Hierarchy of research.....	73
<b>Figure 6-1:</b> Respondents' gender.....	78
<b>Figure 6-2:</b> Respondents' age group.....	79
<b>Figure 6-3:</b> Project Management experience.....	79
<b>Figure 6-4:</b> Project Management qualification.....	79
<b>Figure 6-5:</b> Project Manager professional qualification level.....	80
<b>Figure 6-6:</b> Other professional qualification.....	81
<b>Figure 6-7:</b> Project baseline prior to implementation.....	81
<b>Figure 6-8:</b> Project baseline plan presentation at stakeholder meeting.....	82
<b>Figure 6-9:</b> Project plan signing at review meeting.....	82
<b>Figure 6-10:</b> Importance of project plan.....	83
<b>Figure 6-11:</b> Importance of other plans.....	83

<b>Figure 6-12:</b>	Other plan frequencies.....	84
<b>Figure 6-13:</b>	Performance of phase review.....	84
<b>Figure 6-14:</b>	Control and monitoring tools.....	85
<b>Figure 6-15:</b>	Kick-off meeting with stakeholder.....	86
<b>Figure 6-16:</b>	Kick-off frequency.....	86
<b>Figure 6-17:</b>	Application of PM control and monitoring techniques.....	87
<b>Figure 6-18:</b>	Control and monitoring stages.....	88
<b>Figure 6-19:</b>	Progress and performance reports.....	88
<b>Figure 6-20:</b>	Importance of progress and performance reports.....	89
<b>Figure 6-21:</b>	Problem solving recommendations.....	89
<b>Figure 6-22:</b>	Baseline amendment methods.....	90
<b>Figure 6-23:</b>	Availability of change requests board.....	90
<b>Figure 6-24:</b>	Available of board names.....	91
<b>Figure 6-25:</b>	Availability of time.....	92
<b>Figure 6-26:</b>	Availability of transport and budget.....	92
<b>Figure 6-27:</b>	Availability of human resources.....	93
<b>Figure 6-28</b>	Availability and application of PM processes.....	93

## LIST OF APPENDICES

	<b>Page</b>
<b>Appendix A:</b> Consent Letter.....	<b>110</b>
<b>Appendix B:</b> Research questionnaire.....	<b>111</b>
<b>Appendix C:</b> Statistician Confidentiality Agreement.....	<b>116</b>
<b>Appendix D:</b> Editor Confidentiality Agreement.....	<b>117</b>

# TABLE OF CONTENTS

	Page
<b>CHAPTER 1- GENERAL INTRODUCTION</b>	
1.1.Introduction.....	1
1.2.Background and rationale.....	1
1.3.Motivation.....	5
1.4. Problem statement.....	6
1.5. Research questions.....	7
1.6.Research aims.....	7
1.7.Hypothesis.....	7
1.8.Research scope.....	8
1.9.Significance of study.....	8
1.10. Terminology.....	8
1.11. Data gathering and research methods.....	9
1.12. Research ethics.....	10
1.13. Overview of chapters.....	11
1.14. Conclusion.....	13
<b>CHAPTER 2- LITERATURE REVIEW</b>	
2.1. Introduction.....	14
2.2. Project.....	14
2.3. Project Management.....	17
2.4.Historical overview of project management.....	18
2.5. Project Management Knowledge Areas.....	23
2.6. Conclusion.....	24
<b>CHAPTER 3- THEORETICAL AND CONCEPTUALISATION OF CONTROL AND MONITORING DURING PROJECT IMPLEMENTATION</b>	
3.1.Introduction.....	25
3.2. Control and monitoring.....	25
3.3. Project monitoring.....	26
3.4. Project control.....	29
3.5. The integrated change control.....	31
3.6. Tools and techniques for monitoring and control.....	33
3.7. Conclusion.....	40
<b>CHAPTER 4-THEORETICAL AND CONCEPTUALISATION OF PREREQUISITES FOR PROJECT IMPLEMENTATION</b>	
4.1.Introduction.....	41
4.2.Project implementation.....	41
4.3.Project planning.....	47
4.4.Project plan.....	49
4.5.Work Breakdown Structure.....	60
4.6.Project baseline plan.....	62
4.7. Conclusion.....	63

<b>CHAPTER 5- RESEARCH DESIGN AND METHODOLOGY</b>	
5.1. Introduction.....	64
5.2. Research design.....	64
5.3. Population.....	68
5.4. Sampling.....	69
5.5. Data collection.....	69
5.6. Data analysis.....	75
5.7. Ethical considerations.....	76
5.8. Conclusion.....	77
<b>CHAPTER 6-DATA ANALYSIS AND DISCUSSION OF FINDING</b>	
6.1. Introduction.....	78
6.2. Demographic profile of respondents.....	78
6.3. Prerequisites for project implementation.....	81
6.4. Control and monitoring methods.....	85
6.5. Conclusion.....	94
<b>CHAPTER 7- CONCLUSIONS AND RECOMMENDATIONS</b>	
7.1. Introduction.....	95
7.2. Summary of core findings.....	95
7.3. Limitations of the study.....	98
7.4. Core findings with regard to the hypothesis.....	99
7.5. Recommendations.....	100
7.6. Recommendations for further studies.....	102
7.7. Conclusion.....	102
References.....	103
List of Appendices.....	110
Appendix A: Consent Letter.....	111
Appendix B: Research Questionnaire.....	112
Appendix C: Statistician Confidentiality Agreement.....	116
Appendix D: Editor Confidentiality Agreement.....	117

# **CHAPTER 1**

## **GENERAL INTRODUCTION**

### **1.1. INTRODUCTION**

This study took a case study approach about a government department which deals with implementation of public projects. The study focuses on public sector project implementation in Botswana paying particular attention to the Project Implementation Division in the Ministry of Infrastructure, Science and Technology. The study investigates the control and monitoring methods in Project Management used by the Project Implementation Division which is primarily tasked with overseeing implementation of government projects. It is anticipated that the findings of this study will contribute positively to public sector project implementation by way of recommendations on suitable methods and strategies that should be used to successfully implement projects. This introductory chapter provides the background to the research problem. The researcher situated and articulated the research problem as well as highlighting the research aims and questions. The chapter also defines the scope and significance of study, together with some of the key terms used. In conclusion, this chapter presents a summary of the other chapters that make up the dissertation report.

### **1.2. BACKGROUND AND RATIONALE**

Project implementation constitutes one of the phases of a project. It is also referred to as one of the five processes of Project Management which are: project initiation processes, project planning processes, project implementation/executing processes, project controlling processes and project termination/closing processes (Baker, 2003:17). As projects are continually initiated in the public and private sector, there is always need that these projects are successfully implemented so that the project objectives are achieved (Baker, 2003:6). Project Management is the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project (PMBOK, 1996:6). According to Richman (2002:4), Noah was a project manager because it took him careful planning and implementation to construct the ark and gather two of every animal on earth including the necessary food and water. In the 1950s, the United States Navy employed modern project management methodologies in their Polaris project. During the 1960s and 1970s, the U.S Department of Defence, NASA and large engineering and construction companies utilised Project Management principles and tools to manage large-

budget, schedule-driven projects (Hoon, 2005:1). By the 1990s, Project Management theories, tools and techniques were widely received by different industries and organisations including government (Hoon, 2005:1). The internet started to change virtually every business in the mid-1990s, it provided a fast and customised new medium that allowed people to browse, purchase and track products online instantly (Leiner et al., 2011:2). Between 1995 and 2000, the Project Management community adopted internet technology to become more efficient in controlling and managing various aspects of projects. While the information technology revolutionised the traditional business practices, various industries started to adopt and apply Project Management practices (Leiner et al., 2011:3). Kharbanda and Stallworth (1983:17) claim that in the U.S, the art and science of control of projects is well developed and well understood and that it has been learnt the hard way by experience over several decades.

Japan is also renowned for its large-budget projects that today lead the world of technology. Some of the outstanding examples are in the field of microelectronics and robotics. Japan is said to be far ahead of any other nation in its application of robots. The number of robots in the U.S in 1983 was assessed at some fifteen thousand whereas in Japan it is said to be nearly four times as many, some sixty thousand. (Kharbanda and Stallworth, 1986:66.) Kharbanda and Stallworth (1986:61) further states that the vast experience in Project Management by Japan led to its speedy recovery after World War II destroyed Hiroshima and Nagasaki, and since then Japanese have set best practises in Project Management. .

Although there are success stories in project implementation in developing countries like South Africa's Sasol 2 and Sasol 3, which was established in 1975 to produce liquid fuels from coal, the problem is generally more severe in developing countries (Kharbanda and Stallworth, 1986:72). Kharbanda and Stallworth (1986:72) further state that the problem of implementation in developing countries is exacerbated by insufficient experience by developing countries in Project Management. Kharbana and Stallworth (1983:37) further claim that in developing countries, if projects are not abandoned on the way, they are completed at an extra cost. Kharbana and Stallworth (1983:37) claim that in developing countries projects are always marred by both time and cost overruns and if one picks up any newspaper any day, they are likely to find at least one project in the news for overrunning costs.

Botswana, like other developing countries at independence in 1966, was among the 25 poorest and least developed countries in the world. As years passed, Botswana discovered mineral deposits that generated the country some income that was used and continues to be used to develop the country (Presidential Task Group, 1997:13). Botswana evolved a system of national development plans, based upon an overall objectives and strategies and an estimated total budget leading to a series of project spending votes authorised by parliament. This has been further developed into systems for economic planning and budget control, ensuring that development projects are selected on a basis of their economic and social returns (Presidential Task Group, 1997:15).

In January 1997, a Presidential Task Force was set up to work on a framework of the long term vision for Botswana. The task force extensively consulted all stakeholders and later produced a document which presents a long term vision for the country titled 'Vision 2016, Towards prosperity for all' (Presidential Task Group, 1997:65). Vision 2016 is a national manifesto for people of Botswana. It reflects the views of many different parts of the society. It is a statement of long term goals that identifies the challenges implied by those goals, and proposes a set of strategies. (Presidential Task Group, 1997:66.) Among others, the principles and goals of the vision are the formation of the starting point for all future National Development Plans (NDP) and mid-term reviews, and will guide the formulation of future national policies (Presidential Task Group, 1997:61).

Botswana is one of the African countries where there is dominance of government in economic development (Maruapula, 2008:7). As a developing country, Botswana faces a lot of Project Management challenges. Many of these challenges are genuine and quite relevant as they are part and parcel of the development processes which Botswana is still grappling with (Maruapula, 2008:1). Maruapula (2008:3) claims that despite prudent economic advances by Botswana, the past few years have been characterised by poor delivery of services compared with approved and available funding and other relevant resources aimed at facilitating socio-economic improvement in the country. The former Permanent Secretary to the Ministry of Minerals, Energy and Water Affairs, Dr Akolang Tombale (2005) once voiced his dissatisfaction on project implementation in his ministry. Tombale (2005) said in the National Development Plan 8, Botswana had planned to spend about \$280 million to improve water supply coverage and security in rural areas nationally but at the end of the plan period, only 80% of the projects were implemented at a total cost of \$361 million. Tombale (2005) claims 60% of these projects were completed at least 6 months and up to 48 months

beyond their scheduled time with cost escalation of up to 100% above original estimated cost. Tombale (2005) further states that the delays in completing these projects were mainly due to ineffective Project Management.

Maruapula (2008:2) claims that the most important challenge faced by Botswana within a Project Management understanding is that there is no established comprehensive system in place as there has not been a wide (national) approach to Project Management. Maruapula (2008:2) further claims that attempts have been made by independent private consultants to work with government in a single component of Project Management known as project implementation.

In an effort to improve on implementation of projects, the government of Botswana established the Department of Building and Engineering Services (DBES) under the Ministry of Infrastructure, Science and Technology. DBES was formed by merging the former Departments of Architecture & Building Services (DABS) and Department of Electrical and Mechanical Services (DEMS). (Department of Building & Engineering Services, 2011) The merger was necessitated by the fact that DABS and DEMS clients were becoming increasingly dissatisfied with the way in which their development projects were being implemented. DBES was further structured and divided into functional sections. One section of the functional departments is the Project Implementation Division (PID). (Department of Building & Engineering Services, 2011) The Project Implementation Division (PID) has also been structured into functional units defined on a ministerial basis. The overlying rationale for distributing the projects on a ministerial basis is to enable the DBES to better focus on customer service delivery. Each unit is headed by a Chief Project Coordinator, assisted by a team of professional disciplines in engineering, (civil/structural, electrical and mechanical), architecture, and quantity surveying. In addition, project managers are attached to units with a large portfolio of projects. These are provided on a project-by-project basis. (Department of Building & Engineering Services, 2011)

Botswana continues to face the problem of implementation which requires sound Project Management control and monitoring techniques that need to be applied in order to achieve successful project implementation. Maruapula (2008:10) concurs by stating that as a developing country, there still remains more development to be seen in Botswana and this requires better ways and means of delivery taking into account all factors that might impede speedier, cost effective, quality, integrated, empowering and sustainable economic

development that should equally meet expectations of relevant project stakeholders including that of the financier being the government. Although the government took commendable initiatives aimed at tackling the problem of implementation by establishing departments solely responsible for project implementation, the researcher wishes to investigate the Project Management control and monitoring strategies used by government departments in implementing public sector projects.

### **1.3. MOTIVATION**

The researcher got introduced to world of projects when studying for a 5 year BTech in Design and Technology with the University of Botswana. The researcher's studies comprised of designing and projects management. Upon the attainment of the degree, the researcher worked for various institutions including the government as a Design and Technology Instructor for time spanning over 10 years.

The researcher then enrolled for MTech in Public Management (coursework) with the University of South Africa. In studying the coursework of the Degree which is more focused on public administration and management, there was need that the researcher studies the developing trends and contemporary issues in the Botswana public sector and globally in order to be competent in the subject area. One area of public interest which the researcher became interested in was project implementation which was constantly a point of contention in the local media, Parliament and public rallies by both ruling and opposition parties. In the editorial of one of the local newspapers, Mmegi, the editor stated that 'the government of Botswana's now legendary poor implementation of public projects is well documented that we would not be surprised if at least more than 50% of all government projects are never complemented on time at an added cost' (Mmegi, 2008). Botswana Congress Party (BCP) Secretary General, Mr Taolo Lucas (2008), dated the problem of project implementation many years back. Lucas (2008) claims that 17 years ago when the then President and the second President of Botswana, Sir Ketumile Masire addressed parliament, the President complained and also revealed that there was a growing gap between the establishment of policy and its implementation. Lucas (2008) states that president Masire acknowledged that the rapid growth in the formulation of policies was not matched by the pace of implementation. Lucas (2008) further states that the problem of project implementation continued even with President Masire's successor Mr Mogae. According to Lucas (2008), in the 1992 budget speech, Mr Mogae who was then the Minister of Finance and Development

Planning echoed the same sentiments that there is need to expedite project implementation in Botswana.

Maruapula (2008:8) states that there is a myriad of challenges and problems in effective project design, project management and implementation and effective supervision of almost all government funded and supervised development activities. Maruapula (2008:8) further states that the issue of poor project implementation by government is not a debatable issue anymore as cabinet and parliament in Botswana would agree and even implementing organs of government would know and admit that.

In 2008 when Lieutenant Ian Khama took over office as the President of Botswana, in his inaugural speech he unveiled the famous five D's (Development, Delivery, Dignity, Discipline and Democracy) as the cornerstones of his leadership. In an effort to confront the problem of project implementation which he was fully aware it exists, he solely dedicated the D's of Development and Delivery specifically to the development and delivery of public services and projects. The President also formulated and added a specific function to the Vice President portfolio that the Vice President is among others responsible for facilitating local and central government programmes and projects. This was done in an effort to tackle the problem of project implementation (Office of the President, 2011).

#### **1.4. PROBLEM STATEMENT**

As outlined in the background of the study, public sector project implementation is an integral part of the government as most countries in the developing world like Botswana are faced with a problem of project implementation. According to Maruapula (2008:9), the government of Botswana provides funding to almost all capital projects in the country hence should ensure that taxpayers financial resources are widely deployed for socio-economic upliftment of the country population. As a result, Botswana taxpayers are losing millions of money due to overall poor delivery of development services to the community (Maruapula, 2008:4). In a nutshell, there is need for projects to be successfully implemented so that they achieve their objectives, so the main problem to be addressed by this study is in regards to the poor implementation of public sector projects by the government. Thus, the researcher will seek amongst possible options the most effective ways government departments can improve the efficiency and effectiveness of public sector projects in Botswana.

## **1.5. RESEARCH QUESTIONS**

There is need for effective and efficient way of implementing government projects so that they are completed within the specified period to avoid overrunning costs that are viewed as unnecessary waste of public funds. ‘Overruns in time and cost are customarily seen as failure in project management and when extreme can well be a disaster’ (Kharbanda and Stallworthy, 1983:3). The following research questions that lead to the possible solution to the problem statement were pursued:

- What are the prerequisite for project implementation in the public sector?
- What methods, techniques and processes that are applied to ensure efficient and effective public sector project implementation?
- What are the control and monitoring methods that are used in the public sector during project implementation?

The researcher aims that the results of this study on public sector project implementation will provide valuable information on ways to ensure proper project implementation by government.

## **1.6. RESEARCH AIMS**

The aims of this study are:

- To examine public project implementation in order to arrive at a definition and description of the concept.
- To establish a framework of prerequisites for public project implementation in the Botswana public sector.
- To determine supervision on public projects by examining control and monitoring techniques applied in implementation of government projects.
- To recommend project monitoring and control strategies for public sector organisations.

## **1.7. HYPOTHESIS**

The researcher is of the opinion that – though projects are always initiated by the government in order to improve the lives of citizens. It is always taken for granted that these projects will be implemented and carried without any obstacles – the following hypothesis was formulated:

**Applicable methods, knowledge and skills, strategies, monitoring and supervision used in public projects are important tools in the process of project implementation, and when fully utilised and applied can guide projects through to successful implementation in Botswana.**

## **1.8. RESEARCH SCOPE**

The research focuses on public sector project implementation in Botswana particularly in the Project Implementation Division under the Ministry of Infrastructure, Science and Technology. The study covers a period of 2 years from 2008 to 2010 where a number of projects were implemented under the National Development Plan 10. This covers projects undertaken during the aforementioned period and were used as part of the study. The latter date was used as cut-off point in order to contain the research within a reasonable scope for the researcher to complete the dissertation.

## **1.9. SIGNIFICANCE OF STUDY**

This study will contribute to the theoretical enhancement of the current level of knowledge in the existing literature on public project implementation in Botswana. It establishes the challenges that are experienced during implementation of public projects and recommendations will be made on how to manage them successfully.

The findings of this study will also contribute positively to the practice of public project management in Botswana and it will influence policy formulation that will recommend control and monitoring strategies in project management as a key strategy to successful project implementation. The recommendations will improve operations and processes in the Project Implementation Division which will ultimately result in successful project implementation in Botswana.

## **1.10. TERMINOLOGY**

Comprehensive conceptual classification of terms pertinent to the research occurs particularly in Chapters 2 and Chapter 3. Terms which are utilised throughout the study are concisely defined below.

**1.10.1. Public sector** means part of the economy concerned with providing basic government services (Maitei et al., 2012:15 ).

**1.10.2. Project** means an endeavour with a definite beginning and definite end undertaken by the government to create a unique product or provide a service (Philbin and Kennedy, 2013:156).

**1.10.3. Project implementation** means carrying out, execution, or practice of a planned project (Rusare and Jay, 2012:248).

**1.10.4. Project Management** is the process of guiding a project from its beginning through its performance to its closure (Janice et al., 2012:79).

**1.10.5. Government** means an institution entrusted with running a country, it includes the people or parties in power and their laws, customs, and institutions (Baetjer Jr, 2010:644).

**1.10.6. Development** means a gradual growth of a country so that it becomes a larger and more advanced state in its economic, sociological state and its infrastructure (Sekeris, 2008:556).

**1.10.7. Strategy** means a plan of action or method used intended for the accomplishment of a specific goal (Hinz et al., 2011:56).

**1.10.8. Overrun** means to continue longer than intended (Bruggen and Luft, 2007:800).

**1.10.9. Control and Monitoring** means process, tools and methods that are used in Project Management to take control of a project during implementation in order to guide it to its successful completion (Isaac and Navon, 2011:501).

## **1.11. DATA GATHERING AND RESEARCH METHODS**

To complete this study, a variety of sources were consulted. Various persons in-charge of project implementation in the Project Implementation Division were also consulted with some interviews conducted.

### **1.11.1. INFORMATION GATHERING**

Relevant literature was reviewed. This includes:

- Published dissertations and thesis
- Published books
- Articles in journals and newspapers
- Political speeches
- Research reports

- Implementation manuals
- Project reports
- Government policies on project management

However, the review of literature indicated that the studies of project implementation have been approached mainly from an international perspective by international institutions like the Project Management Institute (PMI) (Maruapula, 2008:2). Therefore the review of literature was insufficient for fulfilling all the objectives of the study which are specific to Botswana scenario. The available literature was not sufficient for the purpose of applying the study to the Botswana situation. To overcome this deficiency, sources of information which discuss project implementation in Botswana were used. In this regard, the following were used as sources of information:

- Implementation documents from the Project Implementation Division.
- Implementation manuals from leading government departments.
- Research reports from University of Botswana.
- Newspaper articles.

The use of abovementioned documents on project implementation in Botswana laid a foundation and framework for project implementation in Botswana.

### **1.11.2. RESEARCH METHODOLOGY**

A qualitative research method where a case study design approach is used was adopted to conduct this study. A questionnaire survey based on structured interviews was utilised as a source of information. The target group of this survey were officials in the Project Implementation Division – Ministry of Infrastructure, Science and Technology, officials responsible for Project Management in other government ministries and project sponsors. The questionnaire was completed by officials who partake in public sector Project Management.

### **1.12. RESEARCH ETHICS**

This research study was conducted solely to inform theory and improve the practice of Project Management. It was undertaken in order to fulfil the requirements of the Master of Public Administration Degree which the researcher is currently undertaking for with University of South Africa.

To enable the researcher to conduct this study, the research participants (Project Implementation Division, Ministry of Infrastructure, Science and Technology) were communicated to. A letter was authored to the Director stating the intentions of this study and how its findings could improve operations in their department. An assurance was made that as per the requirements of the research ethics, all the information obtained from their department will remain confidential and be used entirely for study purposes. The aforementioned department agreed to offer their assistance during this study.

### **1.13. OVERVIEW OF CHAPTERS**

The rest of the dissertation report is presented and arranged under the following chapters.

- Chapter 1: General introduction
- Chapter 2: Literature review
- Chapter 3: Theoretical and conceptualisation of control and monitoring during project implementation
- Chapter 4: Theoretical and conceptualisation of prerequisites for project implementation
- Chapter 5: Research design and methodology
- Chapter 6: Data analysis and discussion of findings
- Chapter 7: Conclusions and recommendations

A summary of each of the chapters is highlighted next:

- **Chapter 1:** General introduction

This chapter presents general introduction to the study. It includes the background and rationale of the study, an explanation of the research problem and aims, the hypothesis, the scope and significance of the research. The gathering of information and the research methods are explained, and key concepts used in the test are briefly defined.

- **Chapter 2:** Literature review

This chapter presents the literature review of the study. The meaning of the concept project implementation is established. A particular attention is paid to the term ‘project’ that is discussed in order to gather a clear interpretation of the concept project implementation. The

history behind implementation of projects is also discussed in order to find out how project implementation evolved over the years.

- **Chapter 3:** Theoretical and conceptualisation of control and monitoring during project implementation

This chapter presents the control and monitoring strategies and tools used in project implementation. It provides a framework for control and monitoring tools and techniques used by Project Implementation Division.

- **Chapter 4:** Theoretical and conceptualisation of prerequisites for project implementation

This chapter presents prerequisites for project implementation. This is also done in order to establish a framework of prerequisites for project implementation in Botswana.

- **Chapter 5:** Research Design and methodology

This chapter presents the research methodology of the study. It describes and justifies the methods and processes that were employed to collect data that was used in answering the research questions. The chapter starts by defining what the methodology is, it then reviews different research types with the view of classifying the research study hence choice of appropriate research method. The different research methods are then reviewed and the appropriate one is chosen and the justification for the choice is made. The design of the questionnaire is discussed in this chapter and how it was administered.

- **Chapter 6:** Data analysis and discussion of findings

This chapter presents the findings of the study. It discusses the response profile highlighting the response rate of the survey, and the nature and number of the respondents that completed and returned the questionnaire. It then highlights and discuss the findings of the survey presented in the questionnaire.

- **Chapter 7:** Conclusions and recommendations

This chapter presents the conclusions of the research study. It also presents the recommendations on how to mitigate the challenges faced by the Government during the implementation of projects. The chapter concludes by making recommendations for future studies. It evaluates the research findings and conclusion of the study.

## **1.14. CONCLUSION**

This introductory chapter presented the general introduction of the study which included the background and rationale of the study. It defined the research problem and associated research questions and aims were determined with possible procedures on how to address them. The scope of the research and its significance were also determined and presented with key concepts used in the study briefly defined. Finally, a summary of chapters that make up the research study was presented primarily to simulcast how the study will be demarcated and carried and the sources consulted are listed as well as appendices to the survey questionnaire.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

This chapter provides the literature review which the study is based upon. The material provides the theoretical framework which the study draws its relevance and adds to the existing body of knowledge on the subject. This chapter will briefly discuss project as a concept as well as Project Management as a practice. This chapter will go back to discuss the history behind Project Management and how the practice of Project Management evolved over the years. This chapter also provides an insight into the Project Management Process as well as the Project Management Knowledge Areas so as to gather a clear understanding of projects and their management.

#### **2.2 PROJECT**

Before Project Management tools and techniques can be applied, firstly there should be a project to run and manage. On a personal level, a number of projects are embarked on, for instance when purchasing a car and building a house these are commonly referred to as personal projects. Projects differ in size and capacity. When preparing a monthly report at work which takes one day to complete is a project. The construction of a bridge with expenditure running into millions and takes years to complete is also a project.

A project develops out of an existing problem or opportunity. In some instances, a project develops when the government reacts to contemporary and arising situations in the society and a project exists when someone or a department is tasked with carrying it out. Projects may be large or small and they begin when a person or organisation authorises its beginning. The initiating party should have authority, the budget and the resources to bring the project to its successful end (Lockyer and Gordon, 1996:10).

As Young (1996:16) rightly states, projects are different from standard operational activities because projects are unique as they do not involve repetitive processes. Duncan (1994:4) defines project as “a temporary endeavour undertaken to create a unique product or service”. Young (1996:16) further defines a project as a collection of linked activities carried out in an organised manner with clearly defined start and finish point to achieve some specific results that satisfy the needs of an organisation as derived from their plan. Young (1996:16) rightly

states that every project initiated is engaged for a precise period and when the project goals are completed a project ends.

Along the way towards completion or realisation of the project, the project may have interim due dates in which deliverables must be completed. As defined by Baker (2000:16), deliverables are the clearly defined results, goods or services produced during the project or at its outcome. Haynes (1996:14), states that deliverables are products generated by the project team as scheduled to be offered to an authorising party or a reviewing committee often taking the form of a plan, report, product or service. Each deliverable and each interim goal achieved helps to ensure that the overall project will be finished on time and on budget.

Projects involve a series of related events and one event leads to another. Sometimes multiple events are contingent upon other multiple events overlapping in intricate patterns (Baker, 2000:18). At the end of each and every project is the realisation of some specific goal or objective. The objective of a project team for the roads department for example might be to construct a 100 kilometre road that link the village to a nearby town. The realisation of their objective would be the constructed 100 kilometre road ready for usage.

Time and money are very fundamental to every project initiated. Andersen, Grude and Haug (1984:13) argue that if the timeline is not specific, the project can be completed any time then that time factor will not qualify it to be a project. Andersen et al (1984:13) further state that a project should be assigned a specific timeframe that stipulates its duration clearly indicating its start date and finish date.

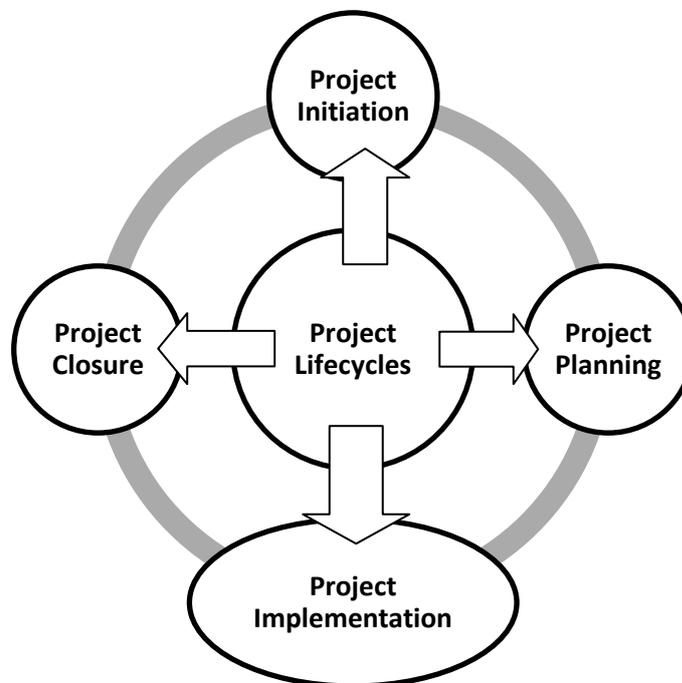
In a nutshell, a project has a specific purpose which can be readily defined. They are unique because it is most unlikely for them to be repeated in exactly the same way by the same group of people to give the same results. A project is not routine work but may include routine type tasks. It is made up of a collection of activities that are linked together because they all contribute to the desired results. A project has clearly defined and agreed time constraints stating a date when the results are required and it is frequently complex because the work involves people in different departments and even different sites. A project involves the unknowns both within the work itself, the skills of the people doing the work as well as the external influences on the project. A project has cost constraints which must be clearly defined and understood to ensure the project remains viable at all times as it involves risks at every step of the process that need to be managed to sustain the focus on the desired results (Andersen et al., 1984:14-15).

## 2.2.1 THE PROJECT PHASES

According to Baker (2000:21), each project evolves through a predictable life cycle of four phases which are project initiation, project planning, project implementation and project termination

### 2.2.1.1 Project initiation

Project initiation forms the first phase of the project. When an authority (government) identifies a problem or an opportunity, a feasibility study is conducted to investigate the likelihood of solutions to address the problem. Once the recommended solution is approved, a project is conceived to deliver the approved solution (Baker, 2000:22).



**Figure 2-1:** The project life-cycle (Westland, 2010:2)

### 2.2.1.2 Project planning

Baker (2000:22), states that this is the planning phase of the project where the project plan, resource plan, financial plan, quality plan, risk plan, acceptance plan, communication plan and procurement plan are created to get the project ready for commencement. It is at this stage where the project has been planned in detail and ready to be executed.

### **2.2.1.3 Project implementation**

At the implementation stage, every task listed in the project plan is carried out or executed. While the activities and tasks are being executed, a series of management processes are undertaken to monitor and control the deliverables being the output by the project. As rightly stated by Baker (2000:22), the implementation phase includes the identification of changes, risks and issues, review of deliverable quality and the measurement of each deliverable being produced against the acceptance criteria. Once all of the deliverables have been produced and the customer has accepted the final solution, the project is ready for closure.

### **2.2.1.4 Project termination**

This is the final phase of the project. At this phase, the final deliverables or the project itself is handed over to the customer. This includes handing over project documentation, terminating supplier contracts, realising project resources and communicating the closure of the project to all stakeholders (Baker, 2000:22).

## **2.3 PROJECT MANAGEMENT**

As aforementioned that projects are unique and sometimes too large involving big budgets and some running into years to complete, the likelihood of successful completion is minimal when these projects are not carefully planned, controlled and monitored. In order to strive towards the achievement of project objectives, Project Management tools and techniques should be applied to ensure that a project achieves its goal.

As defined by Portny (2001:12), Project Management is the process of guiding a project from its beginning through its performance to its closure. Heldman (2005:6) notes that Project Management brings together a set of tools and techniques performed by people to describe, organise and monitor the work of project activities. According to Maylor (1999:6), Project Management again includes planning, organising and controlling all project activities in addition to motivating what is usually the most expensive resource of the project – the people.

Lewis (1995:10) claims that although managing projects has been going on for years now, the practice of Project Management has only been recognised as a discipline in its own right and some organisations have made a prerequisite that contractors should provide only project managers who have been certified as professionals by Project Management Institute (PMI).

To sum up the discussion on Project Management, Heldman (2005:10) claims in today's fast paced, sophisticated world, organisations that practice sound Project Management methods and techniques have an edge over those that do not practice Project Management methods. Managing projects better is one way to achieve better timely results. Project Management also helps cross-functional teams to work smarter as it enables teams to better draw upon the individual strengths of members by providing an efficient infrastructure to successfully run the projects regardless of the structure of the firm's organisation (Heldman, 2005:10).

## **2.4 HISTORICAL OVERVIEW OF PROJECT MANAGEMENT**

As alluded in the previous chapter, projects can be traced many years back since the beginning of mankind. Keeling (2000:1) claims that most projects of ancient civilisations were related to the construction of great monuments like the Egyptian Pyramids and the Great Wall of China.

Most research points the origins of modern Project Management to the 1950s. As researched by Morris and Hough (1987:25), Project Management began in the 1950s, when industrialisation took off and the engineering sector started to boom. Morris and Hough (1987:25) claim during that era, projects became big and sophisticated therefore that called for Project Management tools and techniques to be devised in order to successfully complete projects. Some literature points the origin of Project Management to Henri Fayol's 1916 five functions of a manager: (1) to plan, (2) to organise, (3) to coordinate, (4) to control, and (5) to direct or command (Hoon, 2005:2). Morris and Hough (1987:27) argue that the study of Project Management appears to have begun just prior to World War II in the chemical industry where there were heavy engineering projects in the defence sector particularly in the United States of America.

In an endeavour to trace back the origins of Project Management, Hoon (2005:2) refers to the four periods that have been identified to capture the history of modern Project Management; (1) prior to 1958, (2) 1958-1979, (3) 1980-1994, and (4) 1995 to present. The following summarises the aforesaid four periods.

<b>Periods</b>	<b>Theme</b>	<b>Sub content</b>
Prior to 1958	Craft system to Human Relations Administration	<ul style="list-style-type: none"> <li>▪ Project management</li> <li>▪ Actual projects</li> </ul>
1958-1979	Application of Management Science	
1980 – 1994	Production centre: Human Resources	
1995 – Present	Creating a new environment	

**Table 2 – 1:** Four periods of project management (Hoon, 2005:2).

#### **2.4.1 PRIOR TO 1958: CRAFT SYSTEM TO HUMAN RELATIONS ADMINISTRATION**

As already mentioned, Hoon (2005:2) also claims that the origin of the modern Project Management concept started between 1900s and 1950s. According to Hoon (2005:1), during that era technology advancement shortened the project schedule as automobiles allowed mobility and effective resource allocation and, the telecommunication system increased the speed of communication. Hoon (2005:1) further states that during that era, the job specification was also widely used and Henry Gantt invented the Gantt chart. The job specification later became the basis of developing the Work Breakdown Structure (WBS).

Among the major project that revolutionised Project Management is the construction of the Hoover Dam between 1931 and 1936. In 1928, congress passed the Boulder Canyon Act, assigning \$175 million to the construction of the Hoover Dam. The so called “Big Six”, Utah Construction, Pacific Bridge, H.J. Kaiser, W.A. MacDonald and Kahn, Morrison-Knudsen and J.H. Shea, formed a consortium to work as a general contractor. It was crucial for the companies to have a detailed project planning, controlling and coordinating strategy because the project involved six independent companies. The project was completed under budget and ahead of schedule and now the Hoover Dam is one of the highest gravity dams in the United States of America and generates more than four billion kilowatt-hours of electricity a year (Dunar and McBride, 1993: 91).

Another project known to have revolutionised Project Management cited by Hoon (2005:3) is the Manhattan Project. Between 1942 and 1945 was the Manhattan Project which was the pioneer research and development project that designed and built the atomic bomb. In 1941, the Office of the Scientific Research and Development (ORSD) was established to coordinate government sponsored projects and the Manhattan Project was initiated in 1942. In July

1945, the project was successfully tested a month before the bomb was dropped on Hiroshima, Japan. The project involved 125 000 labourers and cost nearly \$2 billion (Hoon, 2005:3).

#### **2.4.2 1958 - 1979: APPLICATION OF MANAGEMENT SCIENCE**

During this era, there was significant technology advancement between 1958 and 1979. In 1959, Xerox introduced the first automatic plain paper copier and in 1969, Bell Laboratories developed the programming language UNIX and the computer industry started to develop rapidly (Hoon, 2005:3). Hoon (2005:3) further states that during this era in 1971, Intel introduced 4004, a 4-bit microprocessor which was the foundation of the evolution of Intel's 80386, 80486 and Pentium processors in the 1990s. In 1972, Ray Tomlinson introduced the first e-mail software and in 1975, Bill Gates and Paul Allen founded Microsoft. Several Project Management software companies were founded during the 1970s including Artemis in 1977, Scitor Corporation in 1979 and Oracle in 1977. Between 1950 and 1979, several core Project Management tools including Critical Path Method (CPM), Program Evaluation and Review Technique (PERT) and Material Requirement Planning (MRP) were introduced (Hoon, 2005:3).

According to Hoon (2005:3), one significant project that revolutionised Project Management during that era is the Polaris Project between 1956 and 1961. The \$11 billion project was undertaken by the United States of America government to deliver nuclear missiles, fleet ballistic missiles by submarines. The project was initiated by the US Navy in 1956 and successfully launched its Polaris missile in 1961 (Hoon, 2005:3.)

In 1958, the National Aeronautics and Space Administration (NASA) was created in pursuit of the mission of exploring the moon. In 1960, NASA set up the Apollo Program office to maintain and schedule Apollo missions using PERT. NASA used PERT to procure and contract with suppliers, develop a management system to measure the performance and establish a focal point of the Apollo Program (Kharbanda and Satallworthy, 1986:8).

Leiner et al. (2011: 3) claim in 1962, the internet project began its journey on internet project. According to Leiner et al. (2011:3), the internet project started with series of memos discussing the concept of a "Galactic Network" by J.C.R. Licklider of MIT. The U.S. Department of Defence initially funded the project and the Advanced Research Agency (ARPA) coordinated it. The ARPA's objective was to schedule and coordinate the activities

of the heterogeneous set of contractors. The ARPA started to develop its ARPANET, the origin of Internet. In 1970s, a federal networking council was formed to support international organisations and coordinate federal agencies such as NASA, the Department of Energy and others. Many researchers and organisations drove the development of the initial ARPANET and currently the Internet is coordinated by several organisations including the Internet Engineering Task Force (IETF), the Internet Engineering Steering Group (IESG), the Internet Architecture Board (IAB) and Internet Society (ISOC) (Leiner et al., 2011:4).

### **2.4.3 1980 - 1994: PRODUCTION CENTRE, HUMAN RESOURCES**

According to Leiner et al. (2011:4), during the 1980s and early 1990s, the revolution of Information Technology (IT) sector shifted people from using mainframe computer to multitasking personal computer that had high efficiency in managing and controlling complex project schedules. In the mid 1980s, the internet served researchers and developers and local area networks and Ethernet technology started to dominate network technology.

Hoon (2005:5-6) argues that during the 1950s through 1970s, most computer engineers were responsible for operating the Project Management systems because mainframe systems were not easy to use. Hoon (2005:5-6) further states that during the late 1970s and early 1980s, Project Management software for the personal computer became widely available by a number of companies which made Project Management techniques more easily accessible.

Among the projects that revolutionised Project Management in that era is the English-France Channel Project between 1989 and 1991. This project was an international project involving two government agencies which are the British and French government and several financial institutions, engineering construction companies and other organisations. The project goal, cost, schedule, language, use of standard metrics and other communication difference needed to be coordinated as the project involved governments of two different countries (Hoon, 2005:5-6).

### **2.4.4 1995 – THE PRESENT: CREATING A NEW ENVIRONMENT**

Hoon (2005:5-6) claims by the 1990s, the internet started to change virtually every business practices. It provided a fast, interactive and customised new medium that allowed people to browse, purchase and track products and services online instantly. Between 1995 and 2000, the Project Management community adopted Internet technology to become more efficient in controlling and managing various aspects of projects (Hoon 2005:6).

Among prominent projects that revolutionised Project Management in that era is the Year 2000 (Y2K) project known as the millennium bug. There was an anticipated belief that computers would not function correctly on January 1, 2000 at 12 am. This on its own made the Y2K to become a big project as it evolved organisations globally. Each organisation focused on correcting this problem within their particular organisation. The Y2K project became the most documented project in Project Management history because millions of organisations in the world conducted virtually similar projects (Hoon, 2005:7). The Y2K problem prompted many organisations to adopt Project Management practices, tools and techniques and also many organisations set up the project office to control and comply with their stakeholders regarding the Y2K issue (Hoon, 2005:7).

Another renowned project undertaken in that era is the Iridium project. Finkelstein and Sanford (2011) claim that Motorola's \$5 billion Iridium project was established to provide global communication service virtually anywhere at any time. In November 1998 the Iridium network was established and started to provide global network services. In March 2000, Iridium filed for bankruptcy terminating its services. Once viewed as a technological breakthrough, the project ended quickly and mysteriously. The project office was established with full-time project control managers. The project utilised sophisticated Project Management software, Primavera Project Planner to handle complex and interrelated project scheduling management (Finkelstein and Sanford, 2011:5).

In a nutshell, Project Management has been there since the beginning of mankind and only that it was not recognised as a discipline or profession until the Americans developed it from the beginning up to what it is now. As discussed earlier in this chapter, during the 1950s the Americans embarked on very big projects that involved big budgets and a lot of personnel. In order to avoid failure to successful completion of projects, systems had to be devised to avoid anticipated disasters that may arise when these big budget projects fail to successfully meet their objectives. The projects that were cited as examples above are among others that contributed significantly to the evolution of Project Management. There are two prominent people who are known to have contributed significantly to the development of Project Management. Frederick Taylor's (1856 – 1915) contribution is known for his famous studies on work as he is popularly known as the father of scientific management (Harvard Business School, 1996:3). Henry Gantt (1861 - 1919) also contributed by studying in detail the order of operation in work. His studies of management focused on the Navy ship construction

during the World War I. He is renowned for his Gantt Chart and diagrams that proved to be powerful analytical tools for Project Managers (Kerzner, 2005:12).

## **2.5 PROJECT MANAGEMENT KNOWLEDGE AREAS**

Since a project is bounded by its results, time and resources, the Project Management processes which are a series of steps applied for the success of the project also constitutes the Project Management knowledge areas. Below follows a brief explanation of Project Management Knowledge Areas as outlined by the Project Management Body of Knowledge (PMBOK, 1996:14).

### **2.5.1 PROJECT INTEGRATION MANAGEMENT**

This area involves all processes that verify that the project is well coordinated. It comprises of project plan development, project plan execution and integrated change control.

### **2.5.2 PROJECT SCOPE MANAGEMENT**

This area involves processes that ensure that the project encompasses all the work required for its successful completion. It includes initiation, scope planning, scope definition, scope verification and scope change control.

### **2.5.3 PROJECT TIME MANAGEMENT**

This area includes all the processes that ensure that the project is completed in time. The accompanying processes involved under this are includes activity definition, activity sequencing, activity duration estimating, schedule development and schedule control.

### **2.5.4 PROJECT COST MANAGEMENT**

This area involves all activities to ensure that the project is completed within the allocated budget. It includes resource planning, cost estimating, cost budgeting and cost control.

### **2.5.5 PROJECT QUALITY MANAGEMENT**

This knowledge area includes all the processes required to ensure that the project will fulfil the need it sets out to achieve. It includes quality planning, quality assurance and quality control.

### **2.5.6 PROJECT HUMAN RESOURCE MANAGEMENT**

This area deals with the people in the project and how to effectively use them. It includes organisational planning, staff acquisition and project team development.

### **2.5.7 PROJECT COMMUNICATION MANAGEMENT**

This area describes timely generation, collection, dissemination, storage and disposition of project information. It is made up of communication planning, information distribution, performance reporting and administrative closure.

### **2.5.8 PROJECT RISK MANAGEMENT**

This area deals with identifying, analysing and responding to project risks. It comprises of risk management planning, risk identification, qualitative risk analysis, quantitative risk analysis, risk response planning and risk monitoring and control.

### **2.5.9 PROJECT PROCUREMENT MANAGEMENT**

This area includes processes needed to acquire goods and services from other organisations. It consists of procurement planning, solicitation planning, solicitation, source selection, contract administration and contract close-out.

## **2.6 CONCLUSION**

This chapter laid a foundation by discussing a project under the practice of Project Management. It went on to discuss Project Management as a practice and the history behind management of projects. The chapter also discussed Project Management processes and Project Management Knowledge Areas. The above mentioned areas were discussed in this chapter in order to lay a foundation for the following chapter which will discuss control and monitoring techniques applied during the project implementation phase.

## **CHAPTER 3**

# **THEORETICAL AND CONCEPTUALISATION OF CONTROL AND MONITORING DURING PROJECT IMPLEMENTATION**

### **3.1 INTRODUCTION**

This chapter discusses control and monitoring during the implementation of projects. It lays a foundation as well as addresses one of the research questions which read “*what are the control and monitoring methods that are used in the public sector during project implementation*”. Therefore this chapter primarily examines universal control and monitoring tools and techniques in Project Management used during project implementation. It focuses and examines control and monitoring techniques used in Project Management basically to establish a clear understanding of the control and monitoring concept in Project Management.

### **3.2 CONTROL AND MONITORING**

Control and monitoring processes are utilised in Project Management primarily to identify and detect problems before and as soon as they arise in order to apply corrective measures to control project work and assure successful completion of a project. Project monitoring and control provide an understanding of the project’s progress so that appropriate corrective actions can be taken when the project’s performance deviates significantly from the plan (Young, 1999:45). Heldman et al. (2007:385) state that monitoring and controlling project work is concerned with monitoring all the processes in the initiation, planning, executing and closing processes and that include collecting data, measuring results and reporting on performance information. On the other hand, Fregenti and Comninos (2002:215) argue that control and monitoring are not the same but control includes monitoring therefore monitoring is an essential part of control. In agreement with the interpretation by Heldman et al. (2007:381), Fregenti and Comninos (2002:2016), monitoring can be viewed as process that entails collecting, recording and reporting information concerning project performance that the Project Manager and other stakeholders wish to know while controlling is all about using the data gathered during monitoring in order to bring actual performance to planned performance. According to Heldman et al. (2007:386), the monitoring and control process involves the following:

- Reporting and comparing actual projects results against the Project Management plan

- Analysing performance data and determining whether corrective or preventative action should be recommended
- Monitoring the project for risks to make certain they are identified and reported, their status is documented, and the appropriate risk response plans have been put into action
- Documenting all appropriate product information throughout the life of the project
- Gathering, recording and documenting project information that provide project status, measurements of progress, and forecasting to update cost and schedule information that is reported to stakeholders, project team members, management and others
- Monitoring approved change requests

In concert with Heldman et al (2007:386), a conclusion could be reached that control and monitoring is a process that oversees all the tasks and milestones necessary to ensure that the approved and authorised project is successfully implemented within scope, on time and on budget. The control and monitoring process should also be performed throughout the life of the project as it involves comparing actual performance with planned performance and taking corrective action to attain the project objectives.

In order to establish a clear understanding of the concept control and monitoring, the latter will be examined as independent concepts in order to gather a clear understanding of both.

### **3.3 PROJECT MONITORING**

Monitoring is the collection, recording and reporting of all information concerning all aspects of project performance that the project manager and others wish to know. Monitoring is carried out simply because things do not always go according to plan no matter how a thorough preparation has been done and also it is carried out to detect and react appropriately to deviations and changes to plans (Young, 1999:45). According to Fregenti and Comminos (2002:215), monitoring is a function of the Project Management Information System (PMIS). PMIS is a standardised set of automated tools available within the organisation and integrated into a system (PMBOK, 2008:86). PMBOK (2008:86) further states that the PMIS is used by the project management team to facilitate feedback as the document is refined, control changes to the project charter and release the approved document.

In an endeavour to further analyse the PMIS, Fregenti and Comminos (2002:214) state that an effective PMIS should include:

- **Schedule and network planning:** software used to perform critical path analysis and produce reports such as Gantt charts, activity lists and network diagrams
- **Cost budgeting:** systems that allow cost budgets to be determined and recorded against a cost breakdown structure (CBS)
- **Cost control:** systems that capture actual costs and other cost information and produce reports comparing it against the CBS budgets and calculate trends, variances and cash flow information
- **Performance analysis:** systems that compute and report on project performance indices, earned value and other aspects of project performance
- **Resource management:** software functions that perform resource allocation, scheduling and levelling
- **Reporting and graphics:** report writers and graphics tools to generate ad hoc user reports, performance and other graphs such as cash flow graphs and resource histograms
- **Word processing:** to create and print documents such as progress reports
- **Spreadsheets:** to capture, processes and report numerical and other data
- **Various:** software and systems used to perform functions of a more specific nature such as materials management, records management, equipment management, change control, human resource management and subcontractor management

### 3.3.1 WHAT IS MONITORED IN THE PROJECT?

Monitoring occurs in various components of the project. The PMBOK (2004:86) states that for a project to be successfully implemented, monitoring should be applied on the major components of the project like human resources (project team members), tools and equipment, materials, budget, time, tasks and quality/technical performance.

Buck (2012:23) hold a different view in terms of what should be monitored in a project. He further states that the Project Manager should monitor every element of an initiative from the following perspectives:

- a) **Risk** - proactively assess risk by reviewing and updating an activity register minimally on a bi-weekly basis
- b) **Issues** – anything that has emerged threatening overall progress to the project, or requiring corrective action

- c) **Schedule progress** – does the work match or vary from the schedule. Are there issues on activities that form a critical path and threaten a date
- d) **External/third-party/vendor deliverables** – it is advisable to maintain engagement with your vendors so that they feel a part of the team and understand the importance of their deliverable. Consultants, vendors and third parties are increasingly important. Viewing them as “hired help” will decrease their compliance and willingness to meet exceptional requests and demands
- e) **Financial progress and financial demands** – funding should be spent in prudent manner particularly if the result may breach the funding variances and further the money is required to meet a date either a quality or date-driven deliverable
- f) **Morale** – although it seems obvious, it is the most neglected aspect of an initiative

Although the elements of a project that should be monitored provided by Buck (2012:23) and PMBOK (2004:86) seem different, it needs to be noted that all the project work and activities should be monitored as monitoring is all about collection of project data or recording of project work and reporting on project progress.

### 3.3.2 WHEN IS MONITORING CARRIED OUT?

As discussed earlier, monitoring remains an integral part of any project. According to the Global Facility for Disaster Reduction and Recovery (2012:8), the frequency of monitoring on a project is dependent on several factors which are; the scope of the project, the number of people working on the project, the skill level of the individuals working on the project, the schedule/time frame of the project, the familiarity of the project, communication needs, the complexity of the project, the level of risk associated with the project and the resources associated with the project.

To further discuss the project monitoring frequency, Burke (1993:61) states that before project implementation could be embarked on, a monitoring cycle should be established in order to know monitoring time intervals therefore depending on the size of the project. According to Burke (1993:61), monitoring can be carried out at the end of the project, continuously, regularly, logically, at task completion and at pre-planned decision points or milestones.

In agreement with Burke (1993:61), it can be deduced that monitoring in a project is the regular observation and recording of activities taking place in a project. Monitoring can also

be viewed as a process of routinely gathering information on all aspects of the project and it also involves giving feedback about the progress of the project to the stakeholders.

### 3.4 PROJECT CONTROL

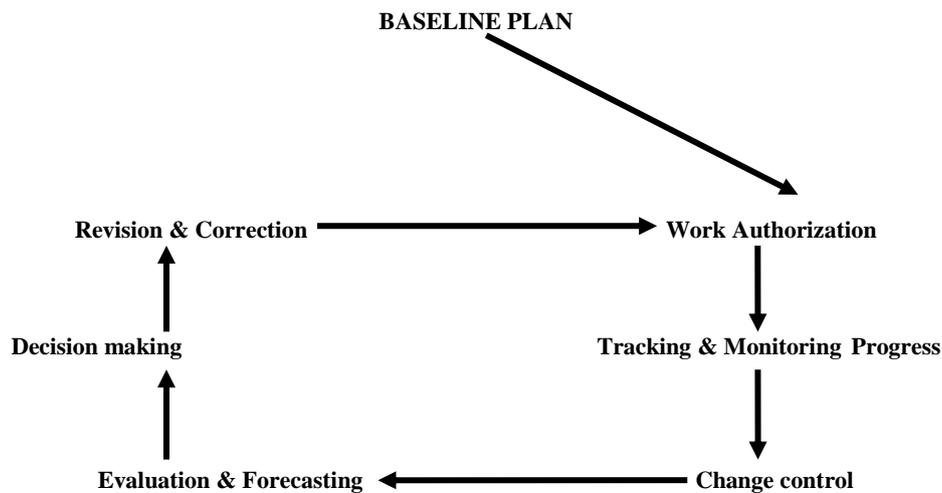
Project control is about ensuring that the project delivers what it is set up to deliver. Cleland (1994:280) claims that the process of project control deals with ensuring that other project processes are operating properly and that these other processes ensure that the project is delivered which will in turn create the change desired by the project sponsor. Wall (1988:20) defines project control as the ability to initiate action which allows the plan or the environment to be adjusted in pursuit of the project objectives. Cleland (1994:285) further states that project control is all about monitoring, evaluating, and comparing planned results with actual results to determine the status of the project cost, schedule, and technical performance objectives.

The definition of project control by Cleland (1994:285) above provides a simplified interpretation of project control as the latter is all about ensuring that a project is delivered in accordance with the plan using tools and disciplines like EVT, PMIS, schedule charts and others.

#### 3.4.1 PROJECT CONTROL CYCLE

Authorities in the practice of Project Management depict project control as a continuous cycle. Burke (1993:251) claims project control can be effectively achieved through a control cycle and that the control cycle outlines a series of steps from issuing instructions, tracking progress through to applying control on deviations. The control cycle is outlined in the **Figure 3-1** below and the elements of the control cycle as explained by Burke (1993:252) are as follows:

- (a) **The baseline plan:** - The baseline plan may be considered as the portfolio of documents which indicate how the project's objectives will be achieved. These documents should be produced before the implementation phase of the project starts.
- (b) **Work authorisation:** - This function communicates and disseminates information and instructions to the responsible parties.
- (c) **Tracking and monitoring progress:** - This data capture function records the current status of the project.



**Figure: 3-1:** The control cycle (Burke, 1993:252).

- (d) **Change control:** - The change control function ensures that all changes to the scope of work are approved by the designated people before being incorporated in the baseline plan.
- (e) **Evaluating and forecasting:** - The evaluation and forecasting function is to quantify the project's present position within the Critical Path Method (CPM) and extrapolate current trends. It may also develop what-if analysis to simulate areas of uncertainty.
- (f) **Decision making:** - The decision making function collates all the information and decides on an appropriate course of action.
- (g) **Revision and correction:** - Based on the project manager's decision the baseline plan is revised and corrective action outlined.
- (h) **Applying control:** - This function will implement the revisions and corrections. In a nutshell, control is based on the monitoring of performance in terms of what is being done, what is yet to be done as well as the quality of the work in terms of the degree of adherence to the specifications and accepted standards of testing, documentation and other important attributes of monitoring.

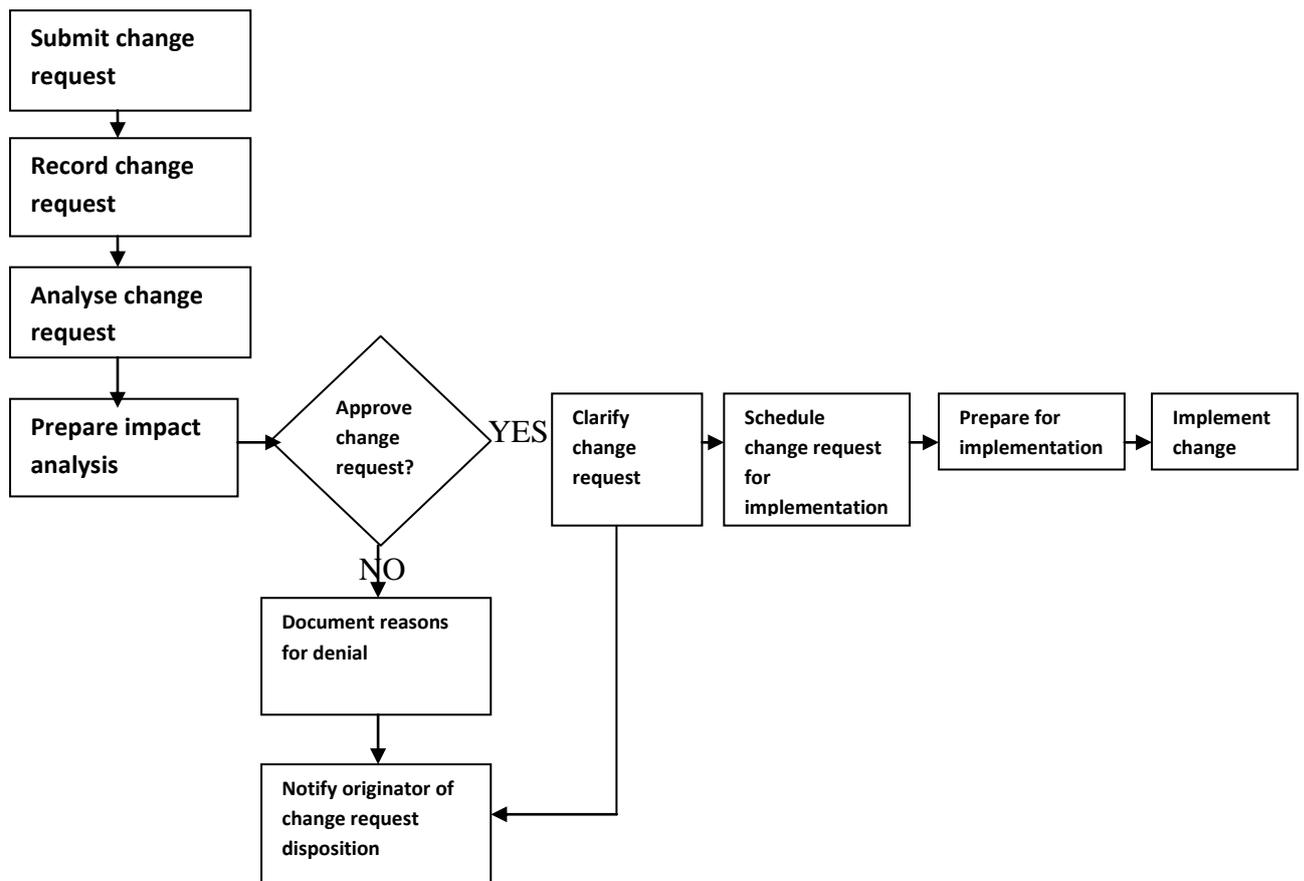
Although there are divergent views and interpretations of project control cycle, Burke (1993:252) presents a more simplistic interpretation of project control cycle which consists of the different levels of planning and authority. The project cycle consists of different levels so, all the project work is based on these levels of the cycle. Basically, the project control

cycle is divided into different parts and each part is based on the control of the project level as illustrated by Burke (1993:252) above.

### 3.5 THE INTEGRATED CHANGE CONTROL

The Integrated Change Control lays a foundation for all the change control processes. As the project progresses, the stakeholders or customers might request change directly. Team members might also recommend changes as the project progresses. Changes might come about as a result of mistakes that were made earlier in the project in the planning or implementing processes. Going further, Kliem, Ludin and Roberson (1997:217) explains change control as a process, and that it is a procedure that describes the steps from the moment the need for a change arises to its implementation. Kliem et al. (1997:217) further states that the change control process should also address who, what, where, when, why and how part of the implementation process.

**Figure 3-2** below illustrates the change control process adapted from Kliem et al. (1997:217).



**Figure 3-2:** Change Control Process (Kliem et al.,1997:217).

According to Heldman et al. (2007:420), Integrated Change Control is primarily concerned with influencing the factors that cause change and reaching agreement on change request, determining that change is needed or has happened, managing approved changes, updating and maintaining the integrity of the requirements that impact scope, quality, schedule, and budgets based on approved changes and documenting requested changes and their impacts

Heldman et al. (2007:421) further states that factors that might cause change includes projects constraints, stakeholder requests, team member recommendation, vendor issues and others. In some organisations, a Configuration Control Board (CCB), Technical Review Board (TAB) or any other change control board are established to review all change requests. The board is given the authority to approve or deny change request as defined by the organisation (Kliem et al., 1997:217).

From the discussions above, it shows that change control requires careful attention by the project management team and diligence on the part of internal and external project team members. It is of paramount importance that all project team members must adhere to the process for requesting changes to the project scope so that the project is implemented according to the agreed scope by project stakeholders.

### **3.5.1 INTEGRATED CHANGE CONTROL TOOLS AND TECHNIQUES**

The tools and techniques of the Integrated Change Control process by Kliem et al. (1997:217-220) are discussed below:

#### **3.5.1.1 Project Management Methodology**

Project Management methodology tools and techniques refers to a methodology for managing projects much like the PMBOK guide and all the processes contained within each.

#### **3.5.1.2 Project Management Information Systems**

As aforementioned, a PMIS is a set of automated tools (generally a software program) that allows you to schedule project activities and resources and collect and distribute project information.

#### **3.5.1.3 Expert Judgment**

The concept behind expert judgment is to rely on individuals, or groups of people who have training, specialised knowledge or skills in the areas you are assessing. These people might

be stakeholders, consultants, other experts in the organisation or technical or professional organisations.

### **3.6 TOOLS AND TECHNIQUES FOR MONITORING AND CONTROL**

As already discussed, monitoring tools and techniques are very important in keeping the project on track. Heldman et al. (2007:499) rightly state that without control and monitoring tools and techniques, even the best-planned projects can become mired or spin out of control. Below are significant control and monitoring tools and techniques used during project implementation.

#### **3.6.1 MEETINGS**

Regular project meetings should be conducted in order to discuss pertinent issues. These are meetings with clients, contractors, suppliers and other stakeholders. According to Kuehn (2006:131), some of the key issues discussed during the meeting include:

- Problems encountered and what is being done to correct them
- Anticipated obstacles or problems
- Resources and supplies that will be needed in future
- Required information or updates
- Possible risks or anticipated obstacles
- Anticipated completion dates of milestone and any that will be completed late
- Tasks/milestones that will be completed under or over or on budget

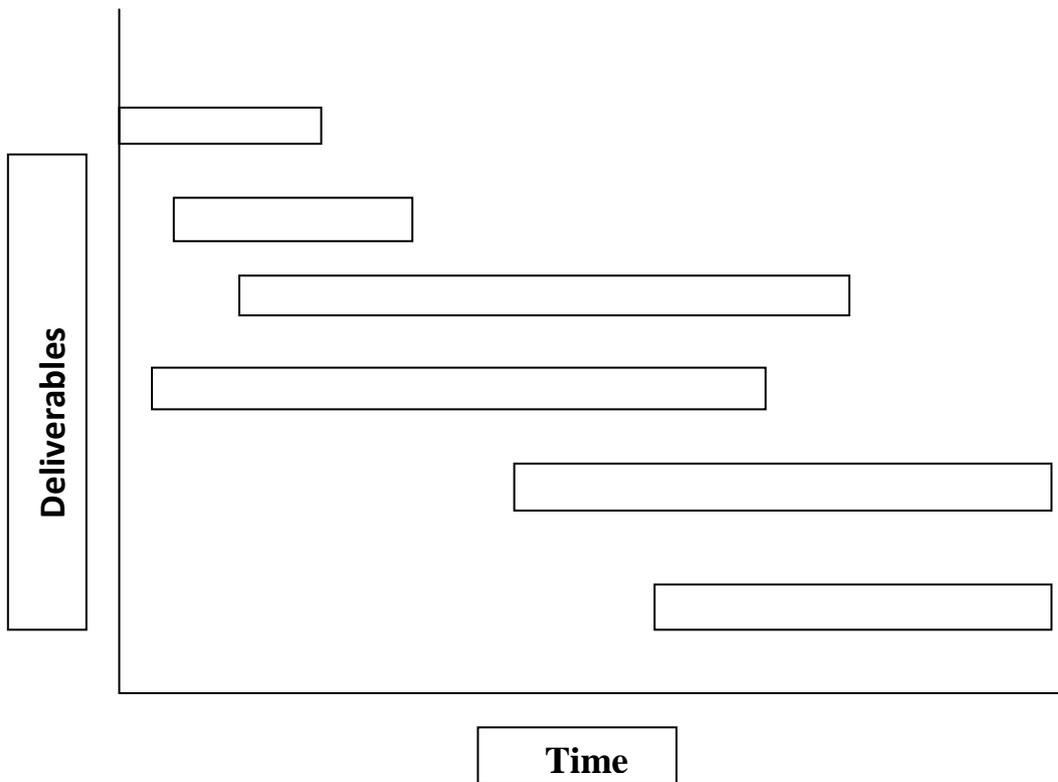
#### **3.6.2 SCHEDULE CHARTS**

Different charts are used to monitor the performance of the project so that relevant control procedures can be taken to keep the project on track.

##### **3.6.2.1 Bar (Gantt) Chart**

This type of display chart was named after Henry Gantt, who first utilised this procedure in the early 1900s and is commonly used for exhibiting project progress or defining specific work required to accomplish an objective (Kerzner 2009:557). According to Kerzner (2009:557) the Gantt chart is used for displaying simple activities or events plotted against time or money and often include such items as listings of activities, activity duration, schedule dates and progress to date. Kerzner (2009:559) rightly states that during project

implementation, the Gantt chart has to be updated regularly so that that accurate reporting on project progression can be achieved. **Figure 3-3** below shows a simple version of the Gantt Chart.



**Figure 3-3:** Gantt Chart (Kuehn, 2006:174)

### 3.6.2.2 Milestone Objective Chart (MOC)

Milestones are typically major accomplishments of the project and mark the completion of major deliverables or some other key event in the project (Heldman et al., 2007:251). Frigenti and Comminos (2002:157) describe MOC as the graphical representation of the milestones and their logical dependencies, descriptions and timing. Frigenti and Comminos (2002:158) state that:

- The MOC must be robust and changes to individual activities in terms of work content, timing, omissions or additions should not alter the milestones plan. The dates may change but the milestones should not. For credibility and control, it is important to have a plan that does not change in content or appearance at every reporting period.
- The MOC illustrates the project tactics or approach and not the operational plan.

- The MOC should maintain relatively few milestones (maximum of 15-25). If more than 25 milestones are required, breaking down the project into sub-projects should be considered.

Project: Conference project table		Milestone objective chart				
Sub-project: conference project		Compiled by: J.K. Davids		Page 1 of 2		
Date initiated: 12 Jan 2011		Approved by: Council Chairperson		Chart date/Rev.No: 12 Feb 2011		
Goals routes M C C M E	Milestone Identification	Plan Date	Description	Completion Date	Report Date	Report
	10	26/02	When the date has been set and the venue located and confirmed			
	20	01/05	When the speakers have been selected and confirmed			
	30	06/03	When exhibitors have been obtained and confirmed			
	40	06/03	When the mailing list has been prepared and approved			
	50	20/03	When the event programme has been compiled and approved			
	60	05/06	When the event programme has been compiled and printed			
	70	10/06	When the brochure has been mailed			
	80	12/06	When the speaker notes and presentation visuals have been obtained from speakers			
	90	01/07	When 100 delegates and 30 exhibitors have been registered (go/no go decision)			

Goals routes: M = Marketing C = Conference CM = Council/Management E = Exhibition O = Milestones □ = critical decision point

**Table 3-1:** Milestone Objective Chart (Fregenti and Comminos, 2002:158).

- The milestones in the MOC should be spaced at useful intervals. The intervals between milestones depend on a number of factors, such as project complexity, project duration,

level of control required, information needs of project participation, decision points and extremely imposed controls and restrictions.

The **Table 3-1** above illustrates a Milestone Objective Chart (MOC) of a conference project adapted from Frigenti and Comminos (2002:161).

According to Kerzner (2009:560) the MOC is prepared and agreed to by the project participants in a mutual discussion, it represents the common view of how the project will unfold from start to end. Kerzner (2009:551) further states that apart from being a plan of action, the drafting of the chart further commits the project participants to the project. Through the process of setting and defining the milestones, the projects participants become a bonded group united through common goals and objectives and this increases their commitment and buy-in (Kerzner, 2009:551).

### **3.6.3 Critical Path Analysis (CPA)**

According to Greene (2012), Critical Path Analysis sometimes referred to as Network Analysis was developed by operational researchers shortly after the Second World War. Greene (2012) further states that CPA was employed in diverse projects such as the Apollo moon-shot, the development of the Concorde, the Polaris missile project and the privatisation of the electricity and water boards. On the other hand, as stated by Burke (1993:5), the Critical Path Method was developed in 1957 by Remington Rand Univac as a management tool to improve the planning and control of a construction project to build a processing plant for the Du Pont Corporation. Before discussing the CPA, the phrase critical path needs to be defined since the CPA is based upon the analysis of the latter. Burke (1993:7) views the critical path (CP) as the longest full path on the project and it includes all the activities or work packages that have to be completed in order to the complete the project. Frigenti and Comminos (2002:312) defines the CPA as a technique that determines the shortest time it will take to complete a project, while considering the logical flow and dependencies between the various project tasks. In a nutshell, CPA is a schedule network analysis technique that determines the amount of time of float, or schedule flexibility for each of the network paths by calculating the earliest start date, earliest finish date, latest start date and latest finish date for each activity (Heldman et al., 2007:282).

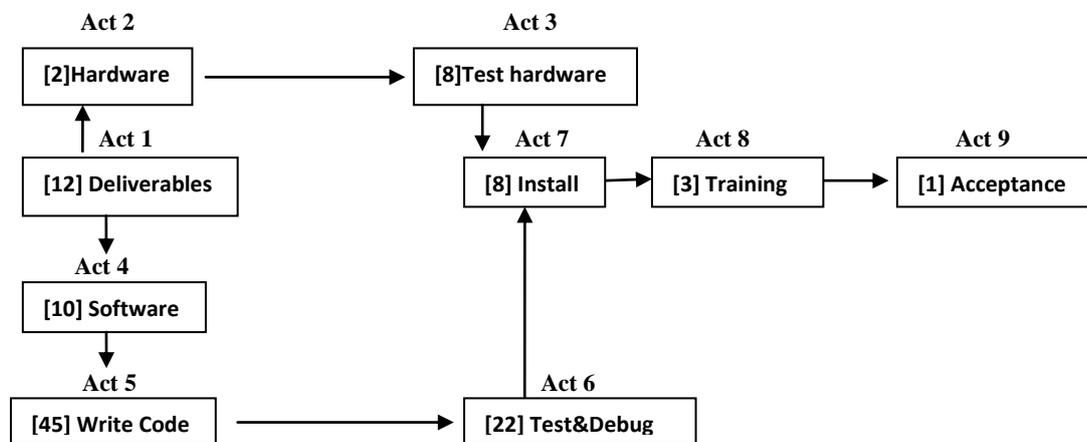
**Figure 3-4** and the **Table 3-2** below shows CPM calculation and critical path diagram for a computer company project adapted from Heldman et al. (2007:285).

According to Fregenti and Cumminos (2002:312), the CPA can be applied to every project but where CPA is applied is dependent on several factors which are as follows:

- Is the time component of the project absolutely critical to success – that is, is time fixed.

Activity Number	Activity Description	Dependency	Duration	Early Start	Early Finish	Late Start	Late Finish	Float/Slack
1	Project Deliverables	-	12	4/1	4/12	4/1	4/12	0
2	Procure Hardware	1	2	4/13	4/14	6/19	6/20	67
3	Test Hardware	2	8	4/15	4/22	6/21	6/28	67
4	Procure Software Tools	1	10	4/13	4/22	4/13	4/22	0
5	Write Programs	4	45	4/23	6/6	4/23	6/6	0
6	Test and Debug	5	22	6/7	6/28	6/7	6/28	0
7	Install	3,6	8	6/29	7/6	6/29	7/6	0
8	Training	7	3	7/7	7/9	7/7	7/9	0
9	Acceptance	8	1	7/10	7/10	7/10	7/10	0

**Table 3-2:** CPM calculation (Heldman et al., 2007:284)



**Figure 3-4:** Critical Path Diagram (Heldman et al., 2007:285).

- Is the project complex, involving many organisations and disciplines requiring close monitoring and control? This complexity is not necessarily related to the project size
- Is the project large (not necessarily complex), requiring large amounts of resources over a relatively short time period
- Is a CPA required as a contractual obligation? In cases where an outside contractor is executing the project, the client may require a CPA to be done at proposal and /or at

project initiation. Further requirement may be that the client wishes to monitor and control the contractor's progress using CPA

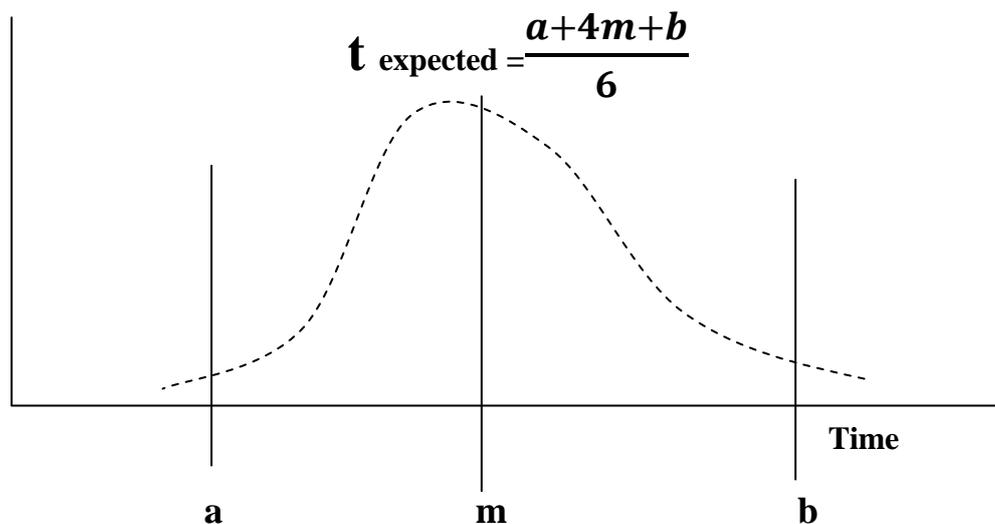
- If the CPA is not used, will it be possible to control the project efficiently
- If the impact of a delay on portion of the project or the complete project cannot be evaluated, what will the consequences be? Can this be evaluated without CPA

### 3.6.4 Program evaluation and Review Technique (PERT)

The Program Evaluation and Review Technique was devised in 1958 by the United States (US) Department of Defense's Navy Special Projects Office as part of the Polaris mobile submarine launch project, which was a direct response to the Sputnik crises (Kuehn 2006:149). Kuehn (2006:149) describes PERT as statistical summation method of analyzing the work packages along the critical path to determine the probability of success of completing the project given the current network schedule. According to Kerzner (2009:495), using of PERT has the below listed advantages:

- It determine where the greatest effort should be made to keep the project on schedule
- It determines the probability of meeting deadlines by development of alternative plans
- It is able to evaluate the effect of changes in the program like evaluating the effect of deviation in the actual time required for an activity from what had been predicted
- It allows large amount of sophisticated data to be presented in a well-organised diagram which contractors and clients can make joint decisions.

**Figure 3-5** below illustrate PERT three-time probabilistic analysis adapted from Burke (1993:4).



**Figure 3-5:** PERT Three Time Probabilistic Analysis (Burke 1993:4).

In a nutshell, PERT charts can be managed from either the events or the activities and needs to be updated regularly in order to track project progress and give accurate project reporting (Burke, 1993:4). According to Burke (1993:5) PERT uses three time estimates (optimistic, most likely, and pessimistic) to derive an expected time. Burke (1993:4) further explains that the PERT three time probabilistic model which was developed using pessimistic, optimistic and most likely time durations in order to apply a statistical treatment to the possible range of activity time durations.

### **3.6.5 Earned Value Technique (EVT)**

Earned Value (EV) is based on the original estimate of the schedule and the progress to date and is used to determine if the project is on budget. It is a technique used simply to compare what have been received or produced to what have been spent in the project. According to Abba (2012:12), Earned Value Technique is the best way to determine the real status of a project as well as indicating how much has been spent on the project. Heldman et al. (2007:428) state that the EVT continuously monitors the planned value, earned value and actual costs expended to produce the work of the project. Heldman et al. (2007:428) further states that the primary function of the Earned Value Analysis technique is to determine and document the cause of the variance, to determine the impact of the variance and to determine whether a corrective action should be implemented as a result. Abba (2012:12) further states that EVT provides an objective measurement of what has been achieved on a project, enables accurate forecasting, shows stakeholders whether stakeholders are getting value for money and enables detailed project comparisons across programmes.

### **3.6.6 Critical Ratio (CR)**

Critical Ratio is an index number computed by dividing the time remaining until due date by the work time remaining and as opposed to priority rules, critical ratio is dynamic and easily updated (Monson, 2012:5).

The critical ratio is:

$$\frac{\text{actual progress}}{\text{scheduled progress}} \times \frac{\text{budgeted cost}}{\text{actual cost}}$$

The critical ratio is an index used by project managers as a tool to determine the status of a task. From the calculations, a value of 1.0 shows the project is "on schedule." A value less

than 1.0 shows the project is behind, and larger than 1.0 is ahead of schedule (Monson, 2012:8). To compute the critical ratio, divide the time to scheduled completion by the time expected to finish it. This will help the Project Manager for trend analysis, but will also help determine if budgeting changes are needed due to resource re-allocations or changes on a project if it is behind, or ahead of schedule (Abba, 2012:15).

Managing a project is a challenging task with many complex responsibilities. In an effort to ensure that projects are successfully implemented, a number of tools and techniques have been devised by different project management institutions/bodies and they assist in accomplishing the project tasks and execution of responsibilities. A brief discussion of these tools was carried out earlier in this chapter. Some of these tools require a computer with supporting software while others can be used manually. Depending on the size and complexity of the project, Project Managers should choose project management tools that best suit their management style and also that suit the project itself so that a project could be guided all the way to its successful completion.

### **3.7 CONCLUSION**

This chapter discussed the theoretical and conceptualisation of control and monitoring used during project implementation. In this chapter, the concept of control and monitoring were closely examined and various tools and techniques used during project implementation were also discussed. Discussions in this chapter revealed that control and monitoring are management tools used for tracking progress and reporting on ongoing projects. The basic idea in control and monitoring is to compare actual performance with plans and to measure actual results against expected results. This chapter outlined control and monitoring function as an integral part of project implementation. It is simply a way of making efficient project follow-up and to provide systematic, consistent and reliable information on project progress. Once in place, control and monitoring will save time and effort for the project team and facilitate project follow-up and reporting. The following chapter will focus on the theoretical and conceptualisation of project implementation prerequisites as well as contribute to the laid down framework on project implementation.

## **CHAPTER 4**

### **THEORETICAL AND CONCEPTUALISATION OF PRE-REQUISITES FOR PROJECT IMPLEMENTATION**

#### **4.1 INTRODUCTION**

This chapter primarily discusses the pre-requisites for project implementation. It provides a framework which will lead to answering one of the research questions of this study which asks, “*What are the prerequisites for project implementation in the public sector*”. Therefore the Chapter will discuss the general pre-requisites for project implementation as prescribed by different Project Management authors. Before the commencement of the project implementation phase, it is imperative that the project is extensively planned so that its objectives are achieved. Thus, this chapter also examined project planning while focusing on various project planning tools and other project plans which constitute the project baseline plan which is the core of the project implementation phase. Therefore, as project implementation is the foundation of this chapter, it is of critical importance to discuss project implementation since project planning, monitoring and control mainly occurs during implementation.

#### **4.2 PROJECT IMPLEMENTATION**

As discussed earlier under project life-cycle (Section 2.2.1.1), implementation constitutes the life-cycle of a project. It is a phase whereby each task and activity listed on the project plan is executed. In order to gather a clear understanding of the concept project implementation, the term implementation needs to be defined. *The Longman Contemporary English Dictionary* defines implementation as the act of putting a plan in practise. In Project Management context, it means putting a project plan into practise. Project implementation sometimes referred to as project execution is the project phase or a period of high energy and excitement to the project stakeholders. This is so because they begin to realise that change is actually going to happen and that what they are doing will make a difference. The implementation of a project usually begins immediately following the approval of the appropriation request document. An appropriation request is a document containing a formal request for funds to start a project (Kliem et al., 1997:101).

Project implementation is a process that requires all the traditional skills of sound management, keeping people motivated and focused on goals, mediating between senior management and general staff in making decisions, allocating scarce resources to their highest uses and reallocating resources to deal with emerging problems. Project implementation involves monitoring and control adherence to the schedule, budget and quality standards (Davidson, 2000:10).

During the project implementation phase, the project manager coordinates all the elements of a project. This involves a number of responsibilities. These include controlling work progress to see that it is carried out according plan, providing feedback to those working on the project, negotiating for materials, supplies and services and resolving differences among those involved with the project. To carry out the aforementioned skills, diverse and a variety of skills and methods are required in project implementation (Davidson, 2000:12).

According to Young (1999:57), at the end of the project planning phase, the project plan baseline is produced and agreed and authority given to proceed with the project implementation phase. During this phase the planned project objectives must be achieved. Fringenti and Comminos (2002:211) claim that the project implementation phase has to do with monitoring and control, and applying corrective responses as necessary. Fringenti and Comminos (2002:211) further states ‘a poorly developed plan will result in a poorly executed project with accompanying loss of time, cost and quality’.

Fringenti and Comminos (2002:211) claim that a project must be implemented with the aim of achieving the project objectives and this is done by:

- Monitoring project progress and performance
- Comparing and evaluating against the planned objectives
- Taking corrective action where required

The essential functions explained by Fringenti and Comminos (2002:211) are outlined below:

- **Monitoring** is the collecting, recording and reporting of information concerning all aspects of performance that the project manager and others wish to know
- **Evaluation** is judging the quality and effectiveness of project performance
- **Controlling** is using the gathered information to bring actual performance in line with planned performance

## **4.2.1 PROJECT IMPLEMENTATION PROCESS**

The project implementation process as discussed in Frigenti and Comminos (2002:211) consists primarily of the following steps:

- a) Project kick-off
- b) Establish the monitoring and control tools
- c) Monitor and evaluate project performance and progress
- d) Produce progress status and performance reports
- e) Apply control feedback and problem solving
- f) Revise the integrated project plan baseline if required

### **4.2.1.1 Project implementation kick-off meeting**

It is very important to start the project by a meeting with everyone involved in the project. The purpose of the meeting is to ensure that all the essential elements are in place, that the team understands what is to be achieved and that all participants are motivated and committed to achieving project success. At this meeting, all problems and queries are addressed and responded to in an open manner by the project sponsor and manager. Frigenti and Comminos (2002:212) state that at this meeting, the integrated project plan baseline should be presented in a summarised form and also to consider the project organisation and responsibility matrices to ensure that roles, authorities, accountabilities and responsibilities are clear and accepted.

### **4.2.1.2 Establish monitoring and control systems and infrastructure**

The monitoring and control systems and the project infrastructure must be established. Project information needs to be measured through meaningful control systems in an economical manner and systems need to be appropriate for the size and complexity of the project. Efficient monitoring and control systems will enable project participants to receive relevant and accurate information in a consistent and timely manner. Frigenti and Comminos (2002:212) state that during the project planning phase, the project manager would have already considered reporting standards, progress measurements methods, costing procedures, purchasing procedures, change control and configuration management procedures, and progress meetings so that the systems and infrastructure required for implementation will be put in place.

#### **4.2.1.3 Monitor and evaluate project performance and progress**

Monitoring is an essential part of control and is the activity that determines whether the project is proceeding according to plan and reports any variances. Fregenti and Comminos (2002:215) stresses that the purpose of monitoring is not to provide a basis for penalising or rewarding project members but is to highlight deviations from the plan, identify the need for possible corrective action and establish a basis for taking corrective action before the situation becomes irrecoverable or uncontrollable.

#### **4.2.1.4 Produce progress status and performance reports**

If a project is to be successfully completed, all relevant project participants must be kept informed about the status of the project. Everybody involved in the project should be aware of the objectives and how well they are being achieved. They should know what should be done and they will be motivated to work towards remaining goals. Fregenti and Comminos (2002:27) claim there are no set standards for communicating project status, various schedules, graphs and reports can be used as long as they report enough information to indicate status of the project and allow decision making without causing an information overload.

According to Fregenti and Comminos (2002:27), a typical progress report could contain the following.

- Project status overview
- Schedules such as cost reports, Gantt charts, activity schedules, performance reports (earned value calculations)
- Progressed milestone objective chart
- Quality report
- Issue lists
- Performance, cash flow and production graphs
- Problems and possible solutions
- Risk evaluation
- Decisions required

Fregenti and Comminos (2002:28) further states that for business-focused projects, a concise summary report containing the following may be sufficient:

- Project status which is determined by milestone delivery, time status at any given time and cost variance at any given time
- Project objectives achievability at the time of report
- Stakeholder satisfaction at reporting time (primary stakeholders mainly considered)
- Indication of the high risk areas that require careful management
- Critical issues that require management intervention; number of open and closed issues, together with ageing information
- Available resources compared with resources required to complete

#### **4.2.1.5 Apply control, feedback and problem-solving**

During implementation of the project, day-to-day problems are addressed as they arise. Problems arising that can be dealt with rapidly should not wait to be reported on first at a regular meeting. Managers at all levels particularly the project manager must be resolute in taking action. They must act for the sake of the project and must be seen to be taking action by the project team to reinforce the need for control and to motivate the team. The project manager must hold formal and regular review meetings individually with the project team, management and the client to discuss the status of the project, resolve problems and decide on action.

#### **4.2.1.6 Revise the project plan baseline**

During the project execution phase many changes will be made to project plans, budgets and specifications. These changes can arise from changes in the method of work, client changes, corrective action, external factors and others. All changes to the project need to be evaluated in terms of the baseline, and the baseline amended to reflect the change. Failure to do so will result in a distorted baseline against which to measure the performance of the project.

Another project implementation process model as presented by the PMBOK (1996:42) is not farfetched from the model presented by Fregeni and Comninos (2002:28). According to PMBOK (1996:32), the implementation process includes core processes which include:

- a) **Project plan execution:** - PMBOK (1996:42) states that project plan execution is the primary processes for carrying out the project plan. To carry out this process, the vast majority of the project budget will be expended. In this process, the

project manager and the project team carry out all the project work and that the product of the project work is actually created here.

- b) **Scope verification:** - Scope verification is the process of formalising acceptance of the project scope by the stakeholders such as sponsors, clients and customers. It requires reviewing work products and results to ensure that all were completed correctly and satisfactorily. If the project is terminated early, the scope verification processes should establish and document the level and extent of completion (PMBOK, 1996:56).
- c) **Quality assurance:** - As discussed by PMBOK (1996:88), quality assurance is all the planned and systematic activities implemented within the quality system to provide confidence that the project will satisfy the relevant quality standards. PMBOK (1996:88) further state that quality assurance should be performed throughout the project and recommends the development of the ISO 9000 series (PMBOK, 1996:88). Quality assurance is often provided by the Quality Assurance Department which should be established for the project.
- d) **Team development:** - Team development includes both enhancing the ability of stakeholders to contribute as individuals as well as enhancing the ability of the team to function as team (PMBOK, 1996:99). Team development occurs throughout the project and it is critical to the project's ability to meet its objectives since individuals with appropriate skills and expertise will be identified into the project team to implement project work (PMBOK, 1996:99).
- e) **Information distribution:** - Information distribution involves making needed information available to project stakeholders in a timely manner and it includes implementing the communication management plan as well as responding to unexpected requests for information (PMBOK, 1996:106).
- f) **Solicitation:** - According to PMBOK (1996:129), solicitation involves obtaining information (bids & proposals) from prospective sellers on how projects needs can be met.
- g) **Source selection:** - Source selection involves the receipt of bids or proposals and the application of the evaluation criteria to select a provider (PMBOK, 1996:130).
- h) **Contract administration:** - As explained by PMBOK (1996:129), contract administration is the processes of ensuring that the seller's performance meets contractual requirements.

### 4.3 PROJECT PLANNING

As one of the phases in the Project Management cycle, Project Planning, is a phase prior to implementation. It is a phase that shapes and directs the implementation phase. As stated by Frigenti and Comminos (2002:211) ‘a poorly developed plan will result in a poorly executed project with accompanying loss of time, cost and quality’. Young (1999:85) defines planning as a process of creating order out of apparent chaos, made complex by the environment in which human beings operate, where man continually faces change. Young (1999:87) further states that planning is a dynamic and continuous process to enable someone to remain proactive throughout the project. Although Lewis (2007:55) claims that planning is a difficult concept to define, he argues that planning requires answering the following questions in order to define it. What must be done? How should it be done? Who will do it? By when must it be done? How much will it cost and how good does it have to be?

According to Lockyer and Gordon (1996:56), project planning defines the project activities and end products that will be performed, and describes how the activities will be accomplished. Lockyer and Gordon (1996:56) further state that the purpose of project planning is to define each major task, estimate time and resources required, and provide a framework for management review and control. As discussed by the Project Management Journal (1997:1), project planning activities and goals include defining the specific work to be performed and goals that define and bind the project, estimates to be documented for planning, tracking and controlling the project, commitments that are planned, documented and agreed to by affected groups and project alternatives, assumptions, and constraints. The Project Management Journal (1997:1) further states that the planning process includes steps to estimate the size of the project, estimate the technical scope of the effort, estimate the resources required to complete the project, produce a schedule, identify and assess risks, and negotiate commitments.

From the views above about project planning, Lewis (2007:55) provides a simplistic definition of project planning by asking the questions stated above which according to Lewis (2007:55) have to be answered in order to define project planning. In agreement with the above definitions, project planning is a discipline for stating how to complete a project within a certain timeframe, usually with defined stages and with designated resources. One major view of project planning includes setting of objectives, identifying deliverables, planning the schedule and making supporting plans.

### 4.3.1 PROJECT PLANNING STEPS

Project planning can be translated into a process that consists of consecutive steps that constitutes the project planning process. In agreement with the aforementioned, Lewis (1995:42) rightly states that project planning must be viewed as a process and below are the basic steps in project planning as portrayed by Lewis (1995:43):

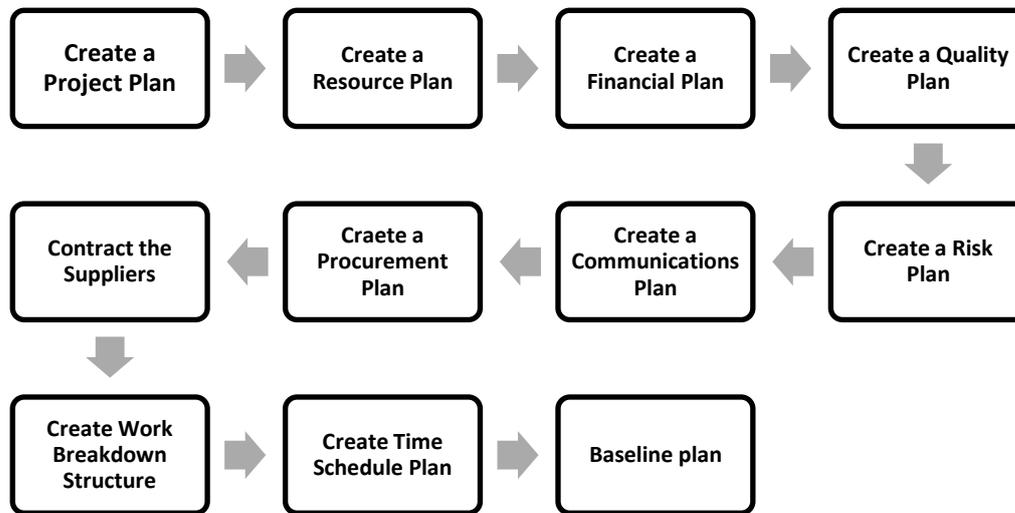
- Define the problem to be solved by the project
- Develop a mission statement, followed by statements of major objectives
- Develop a project strategy that will meet all project objectives
- Write a scope statement to define project boundaries
- Develop a Work Breakdown Structure (WBS)
- Using the WBS, estimate activity durations, resource requirements, and costs
- Prepare the project master schedule and budget
- Decide on the project organisation structure – whether matrix or hierarchical
- Set up the project notebook
- Get the plan signed off by all project stakeholders

According to Lewis (1995:44), all the above mentioned activities should be taken into consideration by the project team when planning the project.

On the same point of view by Lewis (1995:44) above, the Project Management Journal (1997:2) states that the planning process consists of the following basic tasks:

- Define the technical approach used to solve the problem
- Define and sequence the tasks to be performed and identify all deliverables associated with the project
- Define the dependency relations between tasks
- Estimate the resources required to perform each task
- Schedule all tasks to be performed
- Define a budget for performing the tasks
- Define the organisation used to executing the project
- Define the process used for ensuring quality
- Define the process used from specifying and controlling requirements

**Figure 4-1** below illustrates project planning process presented in a graphical form adapted from Westland (2010:9).



**Figure: 4-1:** The project planning process (Westland, 2010:9).

Although the project planning processes presented by Westland (2010:9) differs slightly from Lewis (1995:44) and the Project Management Journal (1997:2) point of view, it needs to be noted that the project planning model by Westland (2010:9) provides a comprehensive approach to creating a project baseline plan which is viewed as the crux of the project implementation process. The baseline plan mainly comprise of various accompanying plans as portrayed in the project planning process model presented by Westland (2010:9). A brief discussion about accompanying project plans follows.

#### 4.4 PROJECT PLAN

A project plan is a formal, approved document that is used to manage and control a project (Project Management Journal, 1997:2). Project Management Journal (1997:2) further states that the project plan forms the basis for all management efforts associated with the project and it is a document that is expected to change over time.

Lewis (1995:51) rightly states that the project plan should be documented and it should include the WBS which includes a hierarchical set of phases, activities and tasks to be undertaken on the project. The WBS will be discussed later in this chapter. Lewis (1995:52) further states that in the project plan, the activities and tasks are sequenced, resources are allocated and a detailed project schedule is formed.

Figure 4-2 below shows a Project Management Plan of a construction project adapted from Allan (2004:58).

Customer: Daydream PTY (LTD)				Contractor: Tops Architecture Company																
Project Plan: Daydream PTY (LTD) Office Block																				
Project Task (s)	D(s)	Start	Finish		Week 1				Week 2				Week 3				Week 4			
Project kick-off meeting	1	3/1/14	3/1/2014	Jan	■															
Tour of the project site	1	6/1/14	6/1/2014		■															
Project architectural design	19	7/1/14	31/1/2014	Feb	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Project team recruitment	20	3/2/14	28/2/2014		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Acquisition of supplies & equipment	10	3/3/14	14/3/2014	Mar	■	■	■	■	■	■	■	■								
Foundation lay-out	10	17/3/14	31/3/2014		■	■	■	■	■	■	■	■								
Inspect and commission	1	1/4/14	1/4/2014	Apr	■															
Casting of the walls	25	2/4/14	30/4/2014		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Erection of beams and pillars	6	1/5/14	9/5/2014	May	■	■	■	■	■	■	■	■								
Roofing	15	12/5/14	30/5/2014		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Internal plastering	10	2/6/14	13/6/2014	Jun	■	■	■	■	■	■	■	■								
External plastering	10	16/6/14	27/6/2014		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Fitting of doors & window panes	5	1/7/14	4/7/2014	Jul	■	■	■	■	■	■	■	■								
Inspect and commission	1	7/7/14	7/7/2014		■	■	■	■	■	■	■	■								
Electrical wiring	4	8/7/14	11/7/2014		■	■	■	■	■	■	■	■								
Fitting of lights, sockets & switches	4	14/7/14	17/7/2014		■	■	■	■	■	■	■	■								
Inspect and commission	1	18/7/14	18/7/2014		■	■	■	■	■	■	■	■								
Plumbing	4	21/7/14	24/7/2014		■	■	■	■	■	■	■	■								
Inspect and commission	1	25/7/14	25/7/2014	Aug	■	■	■	■	■	■	■	■								
Flooring	4	1/8/14	7/8/2014		■	■	■	■	■	■	■	■								
Inspect and commission	1	8/8/14	8/8/2014		■	■	■	■	■	■	■	■								
Fittings installation	5	11/8/14	15/8/2014		■	■	■	■	■	■	■	■								
Internal and external painting	10	18/8/14	29/8/2014		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Inspect and commission	1	1/9/14	1/9/14		■	■	■	■	■	■	■	■								
Project handover	1	8/9/14	8/9/14	Sep	■	■	■	■	■	■	■	■								
Project closure	5	15/9/14	19/9/14		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Figure 4-2: Project Management Plan (Allan, 2004:58).

According to Lewis (1995:52) the following items constitute a project plan.

- A problem statement
- Project mission statement
- Project objectives
- Project work requirements (a list of all deliverables, such as reports, hardware and software)

- Exit criteria. These criteria are used to determine when each milestone has actually been reached
- End-item specifications (engineering specifications, architectural specifications, building codes, government regulations, etc.)
- End-item specifications to be met: including building codes, government regulations etc
- Work Breakdown Structure (WBS). These identify all of the tasks that must be performed in order to achieve project objectives. WBS is also a good graphical portrayal of the project scope
- Schedules: both milestone and working schedules should be provided
- Required resources including people equipment, materials, and facilities. These must be specified in conjunction with the schedule
- Control system
- Major contributors: use a linier responsibility chart for this
- Risk analysis with contingencies when available
- Statement of work (SOW) – this is optional

In concurrence with Lewis (1995:52) and the Project Management Journal (1997:2), a project plan is viewed as a formal document designed to guide the control and execution of a project. A project plan is the key to a successful project and it is the most important document that needs to be created before undertaking any project. A project plan is basically used to document and communicate project expectations, to control schedule and delivery and to calculate and manage associated risks. Immediately after the project plan is formulated, other significant plans that go with the project plan are formulated. These plans are discussed below.

#### **4.4.1 RESOURCE MANAGEMENT PLAN**

The resource plan is necessarily used to allocate the resources that are required to undertake each of the activities and tasks within the project plan (Hamilton, 2004:113). According to Hamilton (2004:113), in order to draw up an accurate resource plan, a detailed resource assessment is required to identify the types of resources, total quantities of each resource type, roles, responsibilities and skill-sets of all human resources, specifications of all equipment resource and items and quantities of material resource. Hamilton (2004:113) further states that a time schedule should be assembled for each type of resource so that the

Project Manager can assess the resource allocation at each stage in the project. PMBOK (1997:17) states that the Resource Managements Plan does not only include the resources that are allocated to undertake the project, it also includes the human resources who are people involved in undertaking the project. The Resource Calendar should also be included as part of the Project Plan as it identifies key resources needed for the project and the times/durations they will be needed (Westland, 2010:15). **Figure 4-3** below illustrates a Resource Management Plan of a construction project adapted from Westland (2010:15).

<b>Project Resource Plan</b>							
<b>Project Name:</b>		Daydream PTY (LTD) Office Block					
<b>Prepared by:</b>		C.B. Lucas – Project Manager					
<b>Prepared on:</b>		13 December 2013					
<b>Authorised by:</b>		V.C. Samuel – Director, Daydream PTY (LTD)					
<b>Project Skill Requirements</b>							
Phase	Task/Deliverable	Resource Type	Source	Skill Level	Quantity	Hours	Controller
07/01/14 To 31/01/14	Project design	Architect	Rona Architects	Building plan	1	160	Design Consultant
	Tour of the project site	Stakeholders	Stakeholders	Project kick-off	1	8	Project Manager
03/02/14 To 28/02/14	Project team recruitment	Human resource	Labor market	All skills required	All	40	Recruitment Manager
	Acquisition of supplies & equipment	Supplies Manager	Supplies Dept	Contracts	1	40	Resource Manager
15/5 To 30/5/2014	Roofing	Structural Engineer	Rona Architects	Structure, Beams & pillars	2	160	Project Manager
2/6 To 16/6/14	Internal plastering	Builders	Project team	Wall plastering	25	80	Project Manager
	External plastering	Builders	Project team	Wall plastering	25	80	Project Manager
17/06/14	Inspect and commission	Quality Manager	Project team	Report	5	8	Project Manager
01/07/14 To 14/07/14	Fitting of doors & window panes	Carpenters & Fitters	Project team	Fitted doors & panes	15	40	Project Manager
	Electrical wiring	Electrician	Project team	Circuit development	10	40	Project Manager
	Fitting of lights, sockets & switches	Electrician	Project team	Electrical accessories	10	40	Project Manager
19/09/14	Project closure	Project team	Project team	Complete project	All	40	Project Manager

**Figure 4-3** Resource Management Plan (Westland, 2010:15).

In concurrence to Hamilton’s (2004) view, a Resource Plan summarises the level of resources needed to complete a project. Usually, a properly documented Resource Plan will specify the exact quantities of labour, equipment and materials needed in order to complete the project.

#### 4.4.2 FINANCIAL MANAGEMENT PLAN

According to Hamilton (2004:115), the Financial Management Plan is simply prepared to identify the quantity of money required for each stage in the project and that includes the total cost of labor, equipment and materials. The Financial Management Plan clearly defines how the costs on a project will be managed throughout the project lifecycle and it sets the format and standards by which the project costs are measured, reported, and controlled (Westland,

2010:18). Hamilton (2004:112) further states that the Financial Management Plan provides the Project Manager with an understanding of the forecast spending versus the actual spending throughout the project. Figure 4-4 below illustrates a Financial Management Plan of a construction project adapted from Westland (2010:18).

<b>Daydream PTY (LTD) Office Block</b>											
Financial Management Plan											13 December 2013
Type	Description	Monthly breakdown									Sub total
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
Staff costs	Staff salaries	100 000	100 000	100 000	100 000	100 000	100 000	100 000	100 000	100 000	600 000
	Staff training	20 000	20 000	20 000	20 000	20 000	20 000	20 000	20 000	20 000	180 000
	<b>Sub-Total</b>	<b>120 000</b>	<b>120 000</b>	<b>120 000</b>	<b>120 000</b>	<b>120 000</b>	<b>120 000</b>	<b>120 000</b>	<b>120 000</b>	<b>120 000</b>	<b>780 000</b>
Consultancy fees	Rona Architects	15 000	0	0	15 000	15 000	0	0	15 000	0	30 000
	Feasibility study	45 000	0	0	0	0	0	0	0	25 000	70 000
	<b>Sub-Total</b>	<b>60 000</b>	<b>0</b>	<b>0</b>	<b>15 000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>25 000</b>	<b>100 000</b>
Staff expenses	Travel/subsistence	5000	1000	3000	1000	3000	2000	10 000	1000	2000	28 000
	<b>Sub-Total</b>	<b>5000</b>	<b>1000</b>	<b>3000</b>	<b>1000</b>	<b>3000</b>	<b>2000</b>	<b>10 000</b>	<b>1000</b>	<b>2000</b>	<b>28 000</b>
Capital	Ground leveling	50 000	0	0	0	0	0	0	0	0	50 000
	Foundation	0	250 000	0	0	0	0	0	0	0	250 000
	Walls	0	0	200 000	0	0	0	0	0	0	200 000
	Fitting	0	0	0	200 000	0	0	0	0	0	200 000
	<b>Sub-Total</b>	<b>50 000</b>	<b>250 000</b>	<b>200 000</b>	<b>200 000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>700 000</b>
Direct costs	Equipment hire	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	250 000
	Training facility	10 000	10 000	10 000	10 000	10 000	10 000	10 000	10 000	10 000	90 000
	<b>Sub-Total</b>	<b>35 000</b>	<b>35 000</b>	<b>35 000</b>	<b>35 000</b>	<b>35 000</b>	<b>35 000</b>	<b>35 000</b>	<b>35 000</b>	<b>35 000</b>	<b>315 000</b>
Central costs	Accommodation	50 000	50 000	50 000	50 000	50 000	50 000	50 000	50 000	50 000	450 000
	Catering	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	25 000	225 000
	HR services	10 000	10 000	10 000	10 000	10 000	10 000	10 000	10 000	10 000	90 000
	<b>Sub-Total</b>	<b>85 000</b>	<b>85 000</b>	<b>85 000</b>	<b>85 000</b>	<b>85 000</b>	<b>85 000</b>	<b>85 000</b>	<b>85 000</b>	<b>85 000</b>	<b>765 000</b>
<b>Total Costs</b>		<b>355 000</b>	<b>491 000</b>	<b>443 000</b>	<b>456 000</b>	<b>243 000</b>	<b>242 000</b>	<b>250 000</b>	<b>241 000</b>	<b>267 000</b>	<b>2 988 000</b>

**Figure 4-4:** Financial Management Plan (Westland, 2010:18).

From the views above by Hamilton (2004:112) and Westland (2010:15), it can be deduced that a Financial Management Plan is a document that entails putting the available funds to the best advantage in terms of fulfilling the project objectives. It is mainly concerned with strategising on the financial resources and their effective utilisation towards achieving the project goals.

#### 4.4.3 QUALITY MANAGEMENT PLAN

As stated by Lewis (2007:21), quality management is the process by which the organisation not only completes work, but completes the work to an acceptable standard. According to Young (1999:112), meeting the quality expectations of the customer is critical to the success

of the project. Young (1999:112) further states that to ensure that the quality expectations are clearly defined and can reasonably be achieved, a quality plan is produced and documented.

Figure 4-5 below illustrates a Quality Management Plan of a construction project adapted from Westland (2010:23).

<b>Daydream PTY (LTD) Office Block</b>							
<b>Inspection Test Plan &amp; Log</b>						<b>13 December 2013</b>	
<b>Item</b>	<b>Specifications Section</b>	<b>Test Required</b>	<b>Frequency</b>	<b>Test by</b>	<b>Date Completed</b>	<b>Date received (Control Officer)</b>	<b>Remarks</b>
Project architectural design	Architecture & project design	Design project plans	At the beginning	Project Manager			
Project team recruitment	Project Team	Qualifications	At the beginning	Human Resource Manager			
Acquisition of supplies & equipment	Project resources & equipment	Function & efficiency	At the beginning	Project Chief Engineer			
Foundation lay-out	Building foundation	Design specifications	After phase completion	Project Manager			
Casting of the walls	Walls	Specifications	After phase completion	Project Manager			
Erection of beams and pillars	Beams & pillars	Specifications	After phase completion	Project Manager			
Roofing	Trusses & roof	Specifications	After phase completion	Structural Engineer			
Internal plastering	Walls	Specifications	After phase completion	Project Manager			
Fitting of doors & window panes	Doors & windows	Specifications	After phase completion	Carpenter			
Electrical wiring	Wiring, lights & sockets	Specifications	After phase completion	Electrician			

**Figure 4-5:** Quality Management Plan (Westland, 2010:23).

According to Hamilton (2004:114), the quality management plan:

- Defines what quality means in terms of a particular project
- Lists clear unambiguous quality targets for each deliverable. Each quality target provides a set of criteria and standards which must be achieved to meet the expectations of the customer
- Outlines a plan of activities which will assure the customer that the quality targets will be met (i.e. a quality assurance plan)
- Identifies the techniques used to control the actual level of quality of each deliverable as it is built (i.e. quality control plan)

Hamilton (2004:114) provides a more elaborate description of the quality plan as it outlines the characteristics of the quality plan. In essence, a Quality Management Plan is a document

that describes a quality system in terms of the project structure, policy and procedures. It also entails interrogating the functional responsibilities of management and staff, lines of authority, and required interfaces for those planning, implementing, documenting, and assessing all activities conducted.

#### 4.4.4 RISK MANAGEMENT PLAN

PMBOK (1997:47) defines risk management planning as the process of deciding how to approach, plan and execute risk management activities for a project. According to PMBOK (1997:47), the practice of risk management planning identifies, analyses, and develops strategies to manage, control and respond to project risk.

**Figure 4-6** below shows a Risk Management Plan of a construction company adapted from Westland (2010:18- 19).

<b>Daydream PTY (LTD) Office Block</b>			
<b>Risk Management Plan</b>			<b>13 December 2013</b>
<b>Potential Risks</b>	<b>Risk Description</b>	<b>Rating</b>	<b>Action taken to reduce risk</b>
Cuts and wounds	Workers may injure themselves as they work	High	<ul style="list-style-type: none"> <li>▪ Emergency procedures followed</li> <li>▪ Incident report completed</li> <li>▪ First aid kit used/hospital contacted</li> <li>▪ Cleaning and maintenance schedules adhered to</li> <li>▪ Staff induction on safe practices and handling</li> <li>▪ Display of instructions, safety rules and regulations</li> </ul>
Fire hazard	Some machine may ignite fire	Low	<ul style="list-style-type: none"> <li>▪ Fire extinguishers installed</li> <li>▪ Emergency procedures followed</li> <li>▪ Incident report completed</li> <li>▪ Display of instructions, safety rules and regulations</li> </ul>
Falling/flying objects	Flying of cuts-off and object at site	High	<ul style="list-style-type: none"> <li>▪ Display of instructions, safety rules and regulations</li> <li>▪ Wear protective clothing at all times</li> </ul>
Wet floors	Spillage of lubricants and water	Moderate	<ul style="list-style-type: none"> <li>▪ Staff warned of slippery paths</li> </ul>
Electrical shocks	Some electrical wires can be exposed	Low	<ul style="list-style-type: none"> <li>▪ Display of instructions, safety rules and regulations</li> <li>▪ Incident report complete</li> </ul>
Dust	Dust production by equipment	High	<ul style="list-style-type: none"> <li>▪ Use extractors</li> <li>▪ Wear protective clothing</li> </ul>
Financial mismanagement	Misuse and embezzlements of funds	High	<ul style="list-style-type: none"> <li>▪ Implementation of internal controls</li> <li>▪ Timely auditing</li> </ul>
Theft & vandalism	Misuse, damage and theft of equipment and tools	High	<ul style="list-style-type: none"> <li>▪ Implementation of internal control</li> <li>▪ Timely inventory checks</li> </ul>

**Figure 4-6:** Risk Management Plan (Westland, 2010:18)

As stated by Center for Disease Control and Prevention Journal (2013:4), project risk management includes the processes from conducting risk management planning, identification, analysis, responses, and monitoring and control of a project. The journal further states that the objectives of project risk management are to increase the probability and impact of positive events and decrease the probability and impact of events adverse to

project objectives. Hamilton (2004:275) states that the foreseeable project risks are documented within a risk register and a set of actions to be taken are formulated to both prevent each risk from occurring and reduce the impact of the risk should it eventuate. Hamilton (2004:275) further states that developing a clear risk plan is an important activity within the planning phase as it is necessary to mitigate all critical project risks prior to entering the implementation phase of the project. In concurrence with PMBOK (1997:47) and Hamilton (2004:275), a Risk Management Plan is a document that a Project Manager prepares to foresee risks, estimate impacts, and define responses to issues.

#### 4.4.5 COMMUNICATION MANAGEMENT PLAN

In simple terms, communication in Project Management is the exchange of project specific information with the emphasis on creating understanding between the sender and the receiver. Hamilton (2004:54) concurs by stating that the communication plan identifies the types of information to be distributed, the methods of distributing information to stakeholders, the frequency of distribution and responsibilities of each person in the project team for distributing information regularly to stakeholders.

**Figure 4-7** below shows a Communications Management Plan of a construction project adapted from Westland (2010:28).

<b>Daydream PTY (LTD) Office Block</b>						
<b>Communication Plan</b>				<b>13 December 2013</b>		
<b>Nature Of Communication/message</b>	<b>Target Audience</b>	<b>Delivery Method</b>	<b>Timing</b>	<b>Communicator</b>	<b>Date/Time held</b>	<b>Sign Project Manager Communicator</b>
Project kick-off meeting	Stakeholders, Project Team	E-mail, Meeting	Beginning of project	Director		
Induction meeting	Project Team	Memo, Workshop	Before start	Project Manager		
Budget allocation	Stakeholders, Project Team	Memo, Meeting	Beginning of Project	Finance Manager		
Project progress update	Stakeholders	Site visits	Fortnightly	Project Manager		
Scope change requests	Stakeholders, Project Team	Meeting	Monthly	Project Manager		
Project progress update	Stakeholders	Site visits	Fortnightly	Ass Project Manager		
Project closure	Stakeholders, Project Team	Meeting, site visit	At the end	Project Manager		
Commissioning & hand over	Stakeholders	Ceremony	At the end	Project Manager, Director		

**Figure 4-7:** Communications Management Plan (Westland, 2010:28).

As stated by Westland (2010:38), the Communications Management Plan defines the following:

- Communication requirements based on roles
- Information to be communicated
- Medium of communication
- Time of information distribution
- Communication provider
- Communication receiver
- Communication conduct

In summation, taking into consideration the views above by Hamilton (2004:54) and Westland (2010:28), Communication Management Plan is a document that describes the communication needs and expectations for the project. It entails how and in what format information will be communicated, when and where each communication will be made and who is responsible for providing each type of communication.

#### **4.4.6 PROCUREMENT MANAGEMENT PLAN**

According to Yeong (2013:4) Procurement Management Plan includes all the processes necessary to purchase or acquire products, services, or results needed from outside the project team. Yeong (2013:4) further states that the Procurement Management Plan includes:

- The contract management and change control processes required to develop and administer contracts or purchase orders issued by authorised project team members,
- Administering any contract issued by an outside organisation (the buyer) that is acquiring the project from the performing organisation (the seller), and administering contractual obligations placed on the project team by the contract.

As stated by Hamilton (2004:171), Procurement Management is the last planning activity within the planning phase where elements of the project which will be acquired from external suppliers to the project are identified. According to Hamilton (2004:171), the Procurement Plan provides a detailed description of the products like goods and services to be procured from suppliers, the justification of procuring each product externally, as opposed to from within the business, and the schedule for procurement. Hamilton (2004:171) further states that the Procurement Plan also references the process for the selection of a preferred supplier

by tendering process and the process for the actual order and delivery of the procured products by the procurement process. **Figure 4-8** below illustrates Procurement Management Plan of a construction project adapted from Westland (2010:58).

<b>Logist Investment PTY (LTD) Office Block</b>									
<b>Procurement Plan</b>					<b>13 December 2013</b>				
<b>Procurement Work Step</b>				<b>Inquiry issued to Bidders</b>	<b>Tender Evaluation and Client Approval</b>	<b>Purchase Order Placement to Vendor</b>	<b>Final Inspection Finished</b>	<b>Delivery at Site</b>	
<b>Procurement Work Step Weight Factors (Equipment)</b>				10%	5%	10%	5%	5%	
<b>Procurement Work Step Weight Factors (Materials)</b>				10%	5%	10%	5%	5%	
<b>No</b>	<b>Equipment Material description</b>	<b>Work Category Group</b>	<b>Requisition No</b>	<b>Inquiry issued to Bidders</b>	<b>Tender Evaluation and Client Approval</b>	<b>Purchase Order Placement to Vendor</b>	<b>Final Inspection Finished</b>	<b>Delivery at Site</b>	<b>Planned PO Amount</b>
1	Cement	Material	MR-001	10/10/13	20/10/13	27/10/13	28/10/13	30/10/13	P65 000
2	Bricks 6"	Material	MR-002	11/10/13	21/10/13	28/10/13	29/10/13	30/10/13	P46 000
3	Columns & vessel	Material	MR-003	10/08/13	10/09/13	25/09/13	30/09/13	02/11/13	P25 000
4	Compressor	Equipment	MR-004	20/10/13	11/11/13	25/11/13	26/11/13	07/12/13	P25 000
5	Water Pump	Equipment	MR-005	20/10/13	11/11/13	25/11/13	26/11/13	07/12/13	P15 000
6	Control Valves	Equipment	MR-005	21/10/13	12/11/13	25/11/13	27/11/13	07/12/13	P5 000
7	Electrical Cables	Material	MR-006	02/11/13	10/11/13	15/11/13	21/11/13	19/12/13	P12 000
8	Timber	Material	MR-007	02/11/13	10/11/13	15/11/13	21/11/13	19/12/13	P11 000
9	Paint	Material	MR-008	02/11/13	10/11/13	15/11/13	21/11/13	19/12/13	P9 000

**Figure 4-8:** Procurement Management Plan (Westland, 2010:58).

Yeong (2013:4) and Hamilton (2004:171) above provide a comprehensive discussion on procurement management. Procurement Management Plan is a document that defines products and services to be acquired and also describes how procurement processes from developing procurement documentation through contract closure will be managed.

#### **4.4.7 SUPPLIERS CONTRACT**

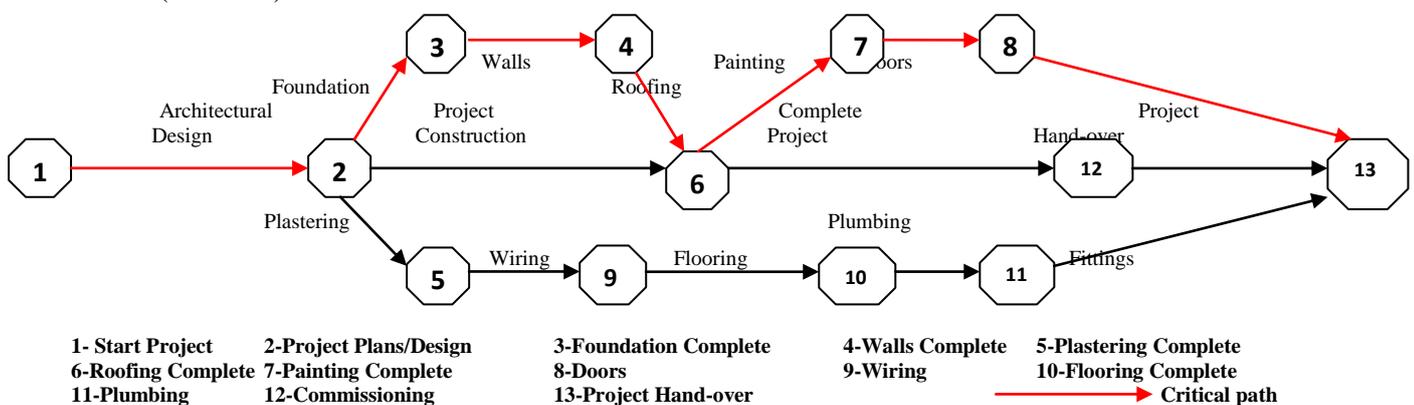
External suppliers may be appointed at any stage of the project, contrary to the usual practice of appointing suppliers after the project plans have been documented but prior to the implementation phase of the project (Burke, 1993:237). Burke (1993:237) argues that it is only at this point where the Project Manager will have a clear idea of the role of the supplier and the expectations for the delivery. According to Davidson (2000:76), the identification of potential suppliers is kick started by a formal tendering process to identify a short-list of interested suppliers and select a preferred supplier to meet the procurement needs of the project. Davidson (2000:76), further states that the tender process involves creating a

statement of work, a request for information and request for proposal to obtain sufficient information from each potential supplier to select a preferred supplier and once a preferred supplier has been chosen, a supplier contract is agreed for the delivery of the requisites product. In conclusion, a supplier contract is an agreement between a project team and external supplier for the completion of a defined scope of work within a project.

#### 4.4.8 TIME/SCHEDULE MANAGEMENT PLAN

The Time Management Plan normally states the planning and scheduling elements that must be undertaken from the commencement of the project planning to the completion of the project or settling the final account (PMBOK, 1997:156). As discussed by Knipe, Van Der Waldt, Van Niekerk and Nell (2002:19), the project schedule provides a graphical representation of predicted tasks, milestones, dependencies, resource requirements, task duration, and deadlines. Knipe et al., (2002:19) further state that the project master schedule interrelates all tasks on a common time scale and it should be detailed enough to show each WBS task to be performed, the name of the person responsible for completing the task, the start and end date of each task and the expected duration of the task. In addition to the above, Elbeik and Thomas (1998:32) stated that effective schedule management is necessary for ensuring that tasks are completed on time, resources are allocated appropriately, to help measure project performance. According to Burke (1993:322), the elements of the Time Management Plan normally consist of inputs to the planning process, the planning process, the forecasting to completion process, the reactive process of tracking project activity time actual expended against activity planned time and how to deal with changes to the project's time based plans.

**Figure 4-9** and **4-10** below illustrate the PERT and Gantt Chart respectively adapted from Burke (1993:46).



**Figure 4-9:** PERT Chart (Burke, 1993:46).

As stated by Project Management Journal (1997:11), the type of schedule associated with a project relates to the complexity of the implementation as for large, complex projects with a multitude of interrelated tasks, a PERT chart may be used as a time/schedule tool and for small projects, a Gantt Chart (or bar graph) is adequate. The above mentioned Project Management tools (Gantt Chart and PERT) were discussed in detail in the preceding Chapter 3.

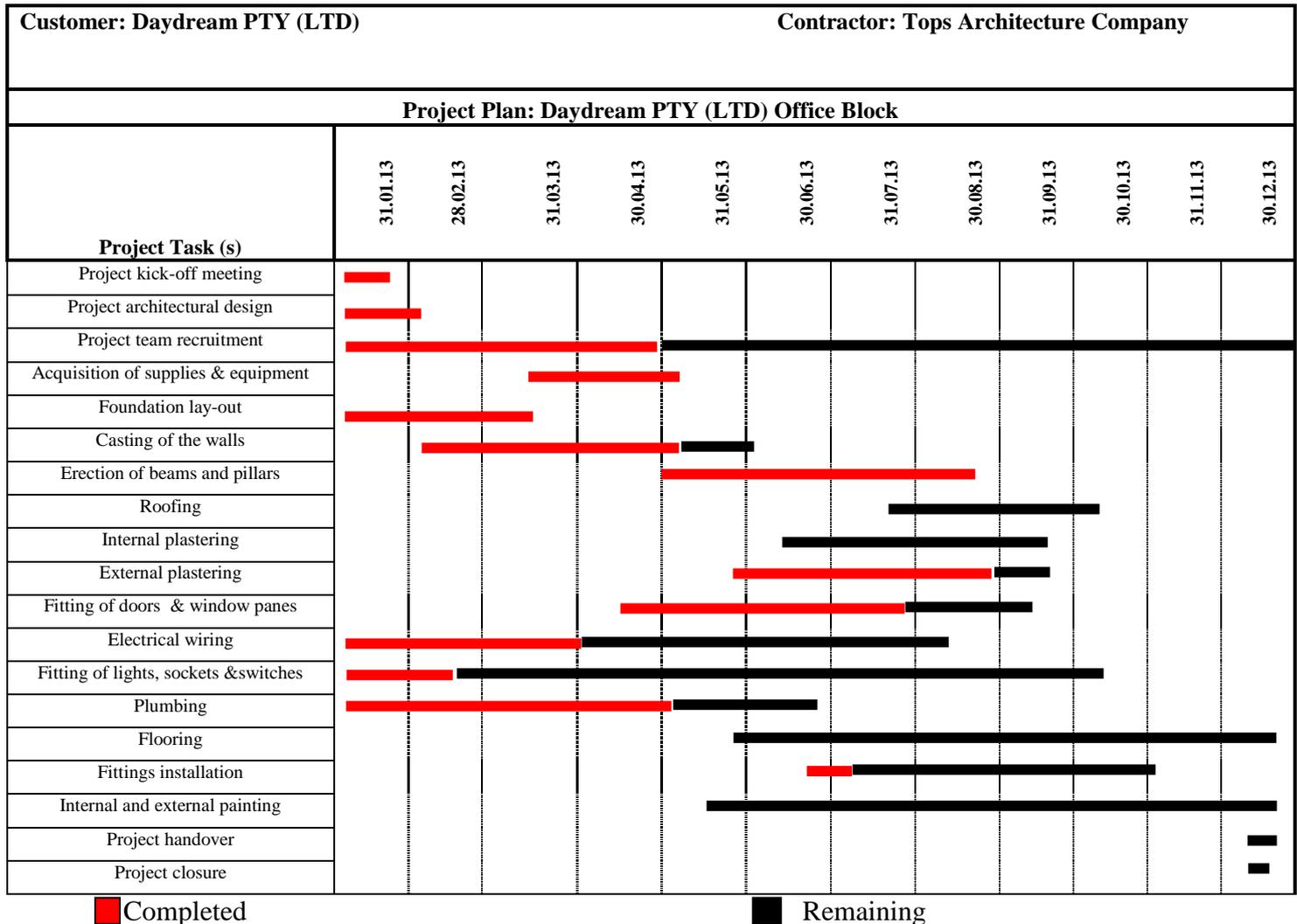
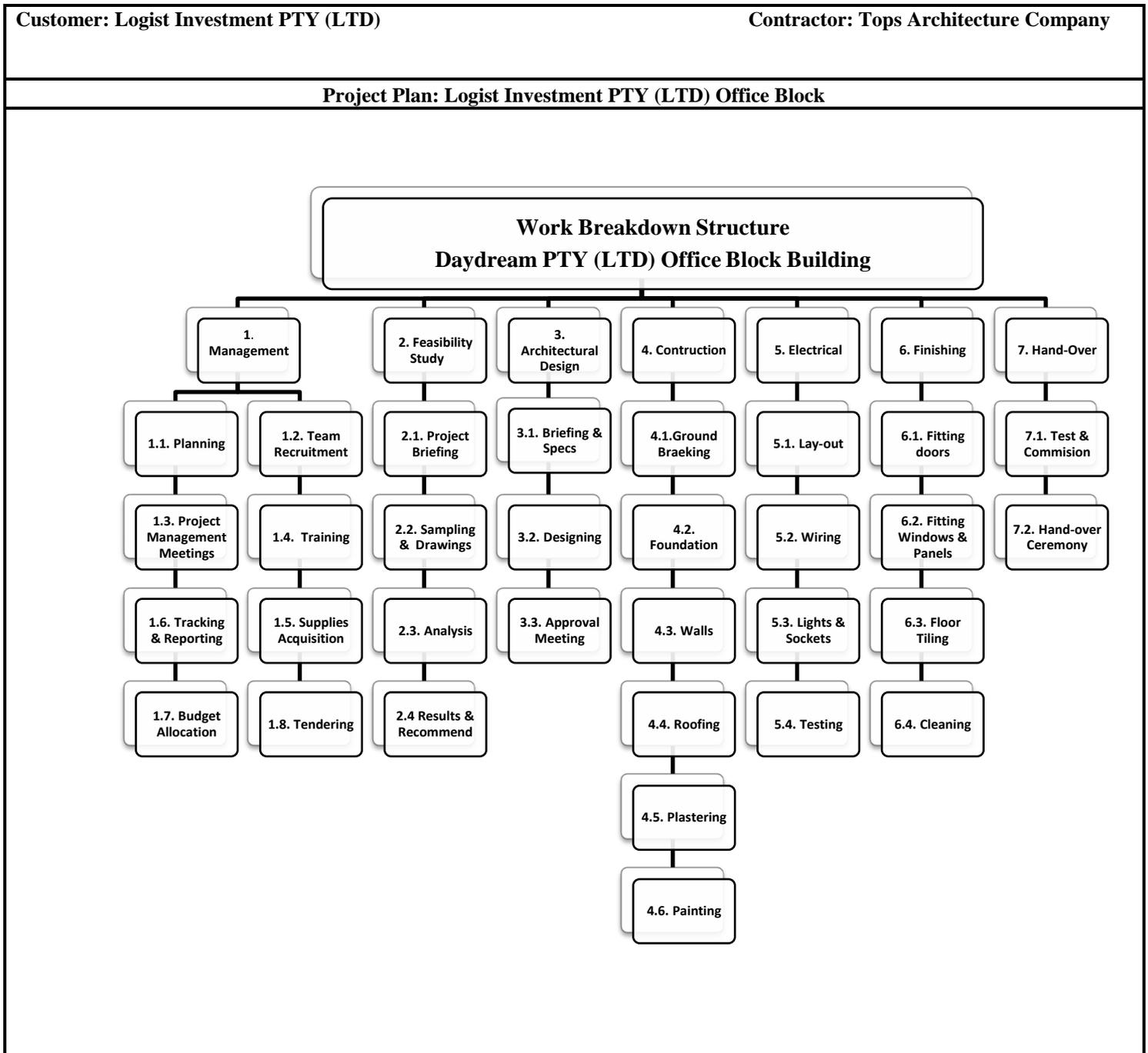


Figure 4-10: Gantt Chart (Burke, 1993:47).).

#### 4.5 WORK BREAKDOWN STRUCTURE (WBS)

As stated by Davidson (2000:54), all projects irrespective of their size or complexity, need a work breakdown structure (WBS) created as early in their life cycle as possible. In addition to Davidson’s observation above, Hamilton (2004:315) views a WBS as the framework for assembling project work elements, allocating resources, time and cost allocation and

performance monitoring and many other matters that impact on the planning, executions and control of a project. **Figure 4-11** below shows an example of a WBS adapted from Hamilton (2004:215).



**Figure 4-11:** WBS (Hamilton, 2004:215).

Hamilton (2004:314) further states that a WBS divides a project into product-related and discipline-related packages of work which are then defined in greater and greater levels of

detail until the individual tasks have been identified. Hamilton (2004:314) further states that a WBS should define the scope of work envisaged to be within the project from concept to commissioning to handover and during each stage and at the end of each stage a WBS should be revised to include the most up-to-date scope of the project.

In concurrence with Hamilton (2004:215), a WBS is a chart in which the entire project work is graphically subdivided into manageable work elements sometimes referred to as tasks. The WBS also shows the allocation of responsibility and identifies the resources required and time available at each stage for project monitoring. In agreement with Davidson (2000:54), the graphical nature of the WBS helps the Project Manager to predict project outcomes based on various scenarios which can ensure that optimum decisions are made whether or not to adopt suggested procedures or changes.

#### **4.6 PROJECT BASELINE PLAN**

The project baseline plan indicates the completion of the planning phase of the project which ushers in the next phase of the project which is the project implementation and control using the baseline plan as the means to achieving the project objectives and outline of the required condition (Lockyer and Gordon, 1996:96). Burke (1999:91) views project baseline plan as a portfolio of documents which outline how to achieve the project objectives and that it should be a coherent document to guide the project through the implementation and project control cycle. Burke (1999:91) claims that the baseline plan may be seen as the course to steer, with the tracking and monitoring functions ascertaining the project position with respect to time, procurement, resources and costs. Burke (1999:92) further states that, at the end of the planning phase, the project baseline should be produced to ascertain the commencement of the implementation phase and this is normally performed at the phase review meeting. As stated by Burke (1999:93), the phase review meeting is basically a checkpoint to ensure that the project has achieved its stated objectives as planned. According to Qureshi (2013:4), the baseline plan uncovers main functional requirements and tracks the project in the correct direction. Qureshi (2013:4) claims that the baseline plan also removes all misunderstandings and uncertainties regarding the project stakeholders. Qureshi (2013:4) further states that the baseline plan provides some benefits as users can make up their mind before a detailed analysis is made. It also helps to maintain a feedback loop among customers, analysts and the

developers as it is easy for the analyst to trace and manage the effects of the baseline whenever change is made in the project scope or goals.

#### **4.7 CONCLUSION**

Project planning is regarded as a major pre-requisite for project implementation. It can be viewed as the project road map which clearly shows how project work will be performed but also it is a tool for decision making. Various project plans that are produced during planning suggest alternative approaches, schedules and resource requirements from which the project manager can select the best alternative. A complete plan will clearly state the tasks that need to be done, why they are necessary, who will do what, when it will be completed, what resources are needed, and what criteria must be met in order for the project to be declared complete and successful. Project planning reduces uncertainty which is rife in projects, it increases understanding of all project work and improves efficiency in implementing all project work. All the mini-plans or documents that are produced during project planning are therefore put together to produce a well-furnished document called project baseline plan. With all these requirements in place, a project will now then be ushered into the next stage which is the implementation phase.

## **CHAPTER 5**

### **RESEARCH DESIGN AND METHODOLOGY**

#### **5.1 INTRODUCTION**

This chapter presents the research design and methodology of the study to ensure a proper examination and investigation of the Project Management control and monitoring techniques applied on Botswana public sector projects during implementation. It describes and justifies the methods and processes that were used in order to collect data used in answering the research questions. The chapter includes the research approach taken, the measuring instruments used, details on target population and sampling done, and the proposed data analysis. The findings of this study will contribute positively to public sector project implementation by way of recommendations on suitable methods and strategies that should be used to successfully implement projects.

#### **5.2 RESEARCH DESIGN**

Kothari (2003:23) defines research as a pursuit of truth with the help of study, observation, comparison and experiment like a systematic method of finding solutions to a research problem identified. Babbie (1990:19) also views research as a process of systematic inquiry that is designed to collect, analyse, interpret and use data to understand, describe, predict or control an educational or psychological phenomenon or to empower individuals in such contexts. Kothari (2003:25) further argues that the process of research is a systematic method that includes the following procedures in logical sequence:

- Enunciating or defining the research problem
- Formulating the hypothesis/research questions from the research problem
- Designing the appropriate research processes
- Collecting facts or data to help answer the research questions
- Analysing the data
- Reaching certain conclusions from the analysed data hence answering research questions

### **5.2.1 RESEARCH QUESTIONS**

The research questions for the study were derived from the following research problem:

*“How can public sector project implementation by government departments be improved to become efficient and effective?”.*

The research questions were:

- 1. What are the prerequisite for project implementation in the public sector?*
- 2. What methods, techniques and processes that are applied to ensure efficient and effective public sector project implementation?*
- 3. What are the control and monitoring methods that are used in the public sector during project implementation?*

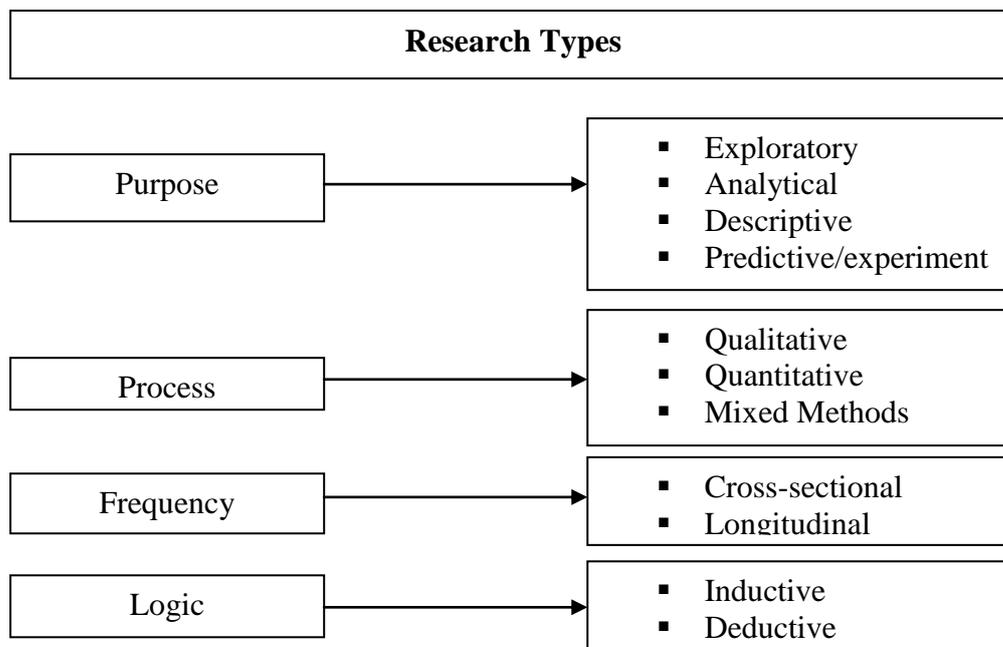
After reiterating the research questions that guided the research, it is imperative that an appropriate research method to collect necessary data to adequately answer the questions is identified. In order to optimally choose the ideal method, a review of different research methods was necessary outlining the salient features, the pros and cons of each method in relation to the identified research questions. Various research methods are then reviewed below.

### **5.2.2 CLASSIFICATION OF RESEARCH**

In order to categorise and review different research methods, a discussion of different types of research may be sufficient as different research problems require different research methods. According to Davidson (2000:119), research can be categorised into four and these categories can be deemed relevant to this research. The aforesaid categories are illustrated in **Figure 5-1** below adapted from Davidson (2000:124). The different types of research under the respective categories are also highlighted and discussed further in this chapter.

### **5.2.3 RESEARCH PROCESS**

Research can be classified according to the process it takes and the categories would include qualitative, quantitative and mixed methods each is explained below.



**Figure 5-1:** Classification of the different research types (Davidson, 2000:124).

### 5.2.3.1. Qualitative

Qualitative research is concerned with describing phenomena in words to gain an understanding of the issues being researched within the context of the researcher (Kothari, 2003:31). According to Kothari (2003:32), this type of research is concerned with subjective assessment of attitudes, opinions and behaviors and the data generated are not subjected to rigorous quantitative analysis. Leedy and Ormrod (2005:45) claim that qualitative research design's purpose is to gather a comprehensive understanding of human behavior and the reasons that govern such behavior. Although there are several different approaches to qualitative analysis, they are all focused on a phenomenon in its natural setting in the real world and they involve studying the phenomenon in all its complexity in a multifaceted dimension (Leedy and Ormrod, 2005:47).

As stated by Leedy and Ormrod (2005:50), listed below are strengths of the qualitative method:

- They are useful when a subject is too complex to be answered by a simple yes or no hypothesis
- These types of designs are much easier to plan and carry out
- Qualitative research methods are not as dependent upon sample sizes as quantitative methods

The weaknesses of the qualitative method as stated by Leedy and Ormrod (2005:51):

- This method requires a lot of careful thought and planning, to ensure that the results obtained are as accurate as possible
- The data from qualitative analysis cannot be mathematically analyzed in the same comprehensive way as quantitative results, so this method can only give a guide to general trends
- It is a lot more open to personal opinion and judgment
- Any qualitative research design is usually unique and cannot be exactly recreated, meaning that they do lack the ability to be peer reviewed

### 5.2.3.2. Quantitative

Quantitative research is concerned with measuring of quantity or amount and involving statistical manipulation, or hypothesis testing. It deals with numbers and their manipulation in order to gain insight in that which is being studied (Davidson, 2000:171). Kothari (2003:53) concurs by defining quantitative research as that which involves generation of data in quantitative form, which is then subjected to rigorous quantitative analysis in a formal and rigid way. Data collecting techniques would include questionnaires, and actual physical measurements of the phenomena such as weight, height, ages, and duration of projects. According to Yin (1994:114), the quantitative research design is sometimes referred to as true science as they utilize traditional mathematical and statistical means to measure results. As defined by Yin (1994:114), quantitative research design,

*“...is to determine the relationship between one thing (an independent variable) and another (a dependent or outcome variable) in a population. Quantitative research designs are either descriptive (subjects usually measured once) or experimental (subjects measured before and after a treatment). A descriptive study establishes only associations between variables. An experiment establishes causality”*

Listed below are the strengths of the quantitative method as stated by Leedy and Ormrod (2005:120).

- This method is an excellent way of finalizing results and proving or disproving a hypothesis
- The quantitative structure is standard across many scientific fields and disciplines

- Following the statistical analysis, a comprehensive answer is obtained and the results can be legitimately discussed and published
- This method tries to filter out external factors, if properly designed, and so the results gained can be seen as real and unbiased
- Quantitative experiments are useful for testing the results gained by a series of qualitative experiments, leading to a final answer, and a narrowing down of possible directions for follow up research to take
- The weakness of the quantitative method as stated by Leedy and Ormrod (2005:121)
- The studies must be carefully planned to ensure that there is complete randomisation and correct designation of control groups
- This method usually requires extensive statistical analysis

### **5.2.3.3. Mixed methods**

Based on the complementary strengths of quantitative and qualitative research methods, this research study took a mixed method approach. A quantitative research method where a case study design approach is used has been adopted to conduct this study. On the other hand, a qualitative method where a questionnaire with close-ended and open-ended questions was used to collect data for the study therefore a mixed methods research was adopted hence the need to apply triangulation in the research. As stated by Johnson and Onwuegbuzie (2005:92), triangulation is sometimes used to refer to instances in which two or more research methods are employed. Thus, it might be used to refer to multi-method research in which a quantitative and a qualitative research method are combined to provide a more complete set of findings than could not be arrived at through the administration of one method alone. Triangulation refers to the use of more than one approach to the investigation of a research question in order to enhance confidence in the ensuing findings. Since much social research is founded on the use of a single research method and as such may suffer from limitations associated with that method or from the specific application of it, triangulation offers the prospect of enhanced confidence in research (Johnson and Onwuegbuzie, 2005:92).

## **5.3 POPULATION**

A population can be defined as the complete set of subjects that can be studied: people, objects, animals, plants, organisations from which a sample may be obtained (Shao, 1999:245). Researchers usually cannot make direct observations of every individual in the

population they are studying. Instead, they collect data from a subset of individuals (a sample) and based on sample observations researchers make inferences about the entire population (Baruch, 2004:57).

The total population of public sector Project Managers in Botswana was extracted from the Project Implementation Division in the Ministry of Infrastructure, Science and Technology which has 50 Project Managers. The aforesaid division has Project Managers/officers in every government ministry and they are tasked with overseeing implementation of projects in the respective ministries. A purposeful convenient sample of 30 Project Managers/officers was selected from Gaborone across Project Management departments in government ministries including the umbrella Project Implementation Division.

#### **5.4 SAMPLING**

Sampling is the process by which respondents are picked out of the population to represent that population. This process can either be done through probability or non-probability methods (Shao, 1999:258). The eligibility criteria for the study participants were that they had to be project managers at the Project Implementation Division, Ministry of Infrastructure, Science and Technology. In this research, a purposeful convenient sample of 30 Project Managers/officers was selected from Gaborone at Project Implementation Division.

When doing the sampling, no distinction was made on the basis of any demographic variable. Respondents of all races, genders and ages were targeted in an attempt to gain a representative sample of project managers at the department. A demographic profile of the respondents was compiled with the results to clarify what the sample consisted of. Although no demographic distinction was made, it was a prerequisite of the study that all respondents were working as project managers at the time of conducting the study. The amount of experience the respondent has as a project manager was recorded, but not used as a screening variable. Respondents were not identified by names neither were they identified by their portfolios, for the purpose of ensuring anonymity and confidentiality.

#### **5.5 DATA COLLECTION**

Data collection tools used for collecting research data are also referred to as data instruments (Shao, 1999:258). Yin (1994:46) noted that the data collection process for case studies must follow formal methods to ensure 'quality control' of data, thus making it much more complex

than other research methods. The primary instrument that was used to collect data from the population is the questionnaire as described below.

### **5.5.1 QUESTIONNAIRE**

A series of questions that were relevant and ensured response reliability were used in designing the questionnaire. Shao (1999:223) defines a questionnaire as a formal set of questions or statements designed to gather information from respondents that accomplish research objectives. In this research study, the questionnaire which was answered by public sector Project Managers was able to inform us about Project Management tools and techniques used by the PID when implementing projects.

The questionnaire may have structured, semi structured or unstructured questions. Babbie (1990:34) claims that the structured questions are convenient, easy and take less time to answer because options are available to the respondents from which they tick options that best describe their practices, opinions and attitudes. Babbie (1990:34) further states that the disadvantage is that they restrict respondents to choice. The available options from which they select may not be exhaustive to describe the situation of the respondents. The unstructured questions are not restrictive to the respondents. The questions are open and elicit responses from research participants without limiting them to predetermined options and they may fully describe the situation at hand. The disadvantage is that it takes a lot more time for respondents to fill and respondents are required to recall certain information without the benefit of the predetermined options (Babbie, 1990:35).

According to Shao (1999:66), the questionnaire may be disseminated to the respondents in different ways as shown below:

- Mailed to the respondents for them to respond and mail back to researcher,
- Delivered and picked up after respondents have responded,
- It may be administered face to face.

Shao (1999:66) claims, mailing and dropping the questionnaire has advantages of convenience to the researcher and also it ensures maximum coverage as opposed to the face to face administered questionnaire that is time consuming with the constraint of time and cost the researcher has to work in and may limit coverage. On the other hand Shao (1999:66)

argues that although a questionnaire may be convenient to the respondents, it has a disadvantage of low response rate. The researcher mitigated this by constantly checking on the respondents through physical visits, telephone calls and incentives such as promises of provision of research findings as prescribed by Shao (1999:67).

In this study, the researcher used a questionnaire as data collection instrument which was delivered to the respondent's work place. The questionnaire mainly had structured and a few semi structured questions to maximise the advantage of both types of questions.

### **5.5.2 MEASURING INSTRUMENT STRUCTURE**

A questionnaire was designed in order to collect data that was used in answering the research questions. The questionnaire was also divided into the following three sections in order to collect the required data. Each of the sections is briefly discussed below. **Appendix B** indicates the questionnaire that was used as a measuring instrument.

- **Background Information (*Question 1.1 to 1.7*)**

This section sought to establish the relevance of the respondents in this research study, the qualifications they possess especially in the practice of Project Management as well as their experiences in Project Management. The information as solicited from respondents was vital to this study since the questionnaire required individuals with Project Management background in order to be able to respond to the questionnaire. The questionnaire was very much inclined to the practice of Project Management.

- **Prerequisites for project implementation (*Question 2.1 to 2.7*)**

This section strived to establish the prerequisites for project implementation in the public sector. The universal prerequisites in the practice of Project Management were used as baseline data in establishing the prerequisites in the public sector.

- **Control and monitoring methods (*Question 3.1 to 3.16*)**

This section also strived to establish the control and monitoring techniques in Project Management used in the public sector when overseeing projects. Again, the universal control and monitoring techniques used in Project Management were used as baseline data against the one used in the public sector.

At this point it is important to describe the relationship between the research questions, investigative questions and the questions that constitute the questionnaire (measuring questions). **Figure 5.2** below adapted from World Bank Journal (2004:24) illustrate the hierarchy of the questions and brief description of each follows:

- **Research questions**

These are the main questions that guided the research and were derived from the research problem. If the research questions are answered, the research problem is resolved.

- **Investigative questions**

These are sub questions derived from the research questions. Each of the research questions was divided into smaller manageable questions. For example as indicated in **Figure 5-2** below, research question 1 was divided in investigative questions 1 to 7. If the investigative questions under research question are answered, the research question from which they are derived is answered.

- **Measuring questions**

These are questions that constituted the questionnaire. They are mainly asked to establish the frequency or level of a certain phenomena. For example as indicated in **Figure 5-2**, measuring questions 1 to 4.

After the design of the questionnaire, it was piloted with a small group of practitioners in Project Management to test its validity and adjustments and refinements were made. The questionnaire was then hand delivered to the Project Implementation Division (PID) at the Ministry of Infrastructure, Science and Technology. Project Managers in the department were given a questionnaire each. Other questionnaires were hand delivered to other ministry headquarters where there are Project Managers from the PID assigned to those individual ministries. After the delivery of research questionnaires, the researcher took one month awaiting the response from the respondents. Along the process, the respondents were called, checked at their work places prompting and reminding them to respond to the questionnaire. Although the questionnaires that were dispatched were not all returned, a majority of the questionnaires were returned and collected.

**Research Questions**

**Research Question 1:** What are the prerequisites for proper project implementation in the public sector?

**Research Question 2:** What methods, techniques and processes can be applied to ensure efficient and effective public sector project implementation?

**Research Question 3:** What are the control and monitoring methods that are used in the public sector during project implementation?

**Investigative Questions**

**Research Question 1**

1. Prior to project implementation, are you presented with or given the project baseline plan for every project that you oversee?
2. Is the project plan submitted at a meeting (project plan review meeting) with the presence of all stakeholders?
3. Is the project plan signed at the project plan review meeting as a way of accepting the project plan?
4. Which plans do you require or are you presented with, before the commencement of the implementation phase?
5. How often do you require or are presented with the above mentioned plans?
6. What are the other items/documents that you require before the implementation phase?
7. Do you perform a phase review at the end of the planning phase?

**Research Question 2**

1. Prior to the commencement of the project implementation phase, do you convene or hold project implementation kick-off meeting with other stakeholders?
2. Do you hold project implementation kick-off meeting for every project?
3. Do you produce progress status and performance reports for individual projects?
4. Do you give feedback to project stakeholders?
5. Do you recommend problem-solving measures to project stakeholders?
6. Which techniques do you use when there is need to change or amend project baseline plan?
7. Do you have a board in your organisation/department established to review all change requests on ongoing projects?

**Research Question 3**

1. Do you apply project management control and monitoring techniques/tools when overseeing implementation of project?
2. What are the control and monitoring tools/techniques that you apply during project implementation?
3. How often do you carry out control and monitoring on ongoing projects?
4. Do you have enough time to carry out control and monitoring during implementation of projects?
5. Please give any other information on control and monitoring techniques in project management that you use during implementation of projects that may not have been covered by the questionnaire.

**Measuring Questions**

1. How long have you been involved in management of projects?
2. What qualifications do you hold in Project Management?
3. Do you have enough resources in terms of transport and budget to use when monitoring implementation of projects?
4. Do you have enough human resources to carry out control and monitoring during implementation of project?

**Figure 5.2:** Hierarchy of research (Yin, 2009:24)

**5.5.3 MITIGATING THE SHORTCOMINGS OF THE SELECTED RESEARCH INSTRUMENT**

Using the questionnaire to collect data has got some shortcomings that have impact on the validity of the findings. On how those shortcomings were mitigated is discussed below. Using a questionnaire that is hand delivered or mailed to the respondents has a disadvantage

of low response rate (Shao, 1999:70). The researcher mitigated this by writing a covering letter to the respondents that explained the purpose of the research and politely requested the recipients to fill the questionnaire. The respondents were further motivated to participate in the study by promising to provide them with the research findings. The respondents were also assured that they will be given enough time to fill the questions without putting them under pressure. Other measures included constantly checking on the respondents through physical visits, telephone calls as prescribed by Shao (1999:70).

The other shortcoming of the dropped or delivered questionnaire is the challenge of respondents misunderstanding the questions and failing to provide appropriate or relevant answers. This has effect of lowering the validity of the measuring instrument and in effect, the findings of the research study are not a true reflection of the reality the researcher seeks to study (Neumann, 2006:168). The researcher mitigated this by devoting a great deal of time in designing the questionnaire, trying as much as possible to use simple language. The researcher also piloted the questionnaire with friends who are Project Management practitioners in order to identify any ambiguities. Their contributions and amendments were incorporated in the questionnaire.

As Neuman (2006:168) states, questionnaires also have a challenge of limiting the options the respondents have to choose from. This has effect on the findings of the research not capturing or obtaining the reality on the ground. As much as possible, the researcher provided additional space in the questionnaire for the respondents to provide their own options that best described their situation in case they were not captured by the researcher

#### **5.5.4 VALIDITY OF THE MEASURING INSTRUMENT**

According to Diem (2002:145), the validity of the instrument can take four different forms;

- **Face validity**:- this is the extent to which the instrument looks like when measuring a particular characteristic
- **Content validity**:- this is the extent to which the instrument is representative of the content area being measured
- **Criterion validity**:- this is the extent to which the instrument results correlate with a similar, related instrument
- **Construct validity**: - this is the extent to which the instrument measures characteristics that are not obtainable by observation

In order to ensure validity of the measuring instrument, the following steps were taken;

- The literature gathered on the practice of Project Management was used to determine the questions obtained in the measuring instrument. This ensured content validity
- The measuring instrument was piloted on several professionals in the practice of Project Management to determine its efficiency and make amendments. This ensured construct validity
- The measuring instrument was submitted to other researchers for judgment and recommendation in order to ensure criterion validity

### 5.5.5 RELIABILITY OF THE MEASURING INSTRUMENT

As stated by Diem (2002:145), the following forms of reliability can be defined;

- **Inter-rater reliability**:- the extent to which two or more researchers evaluating the same characteristics give the same results
- **Internal consistency reliability**:- the extent to which similar items in the instrument yield the same results
- **Equivalent forms reliability**:- the extent to which different variants of the same instrument yield similar results
- **Test-retest reliability**: - the extent to which the instrument will yield similar results when used on different occasions

Internal consistency reliability was increased by submitting the same questionnaire to all respondents throughout the research population.

## 5.6 DATA ANALYSIS

Data analysis describes the methods of handling and presenting data and outlines the statistical procedures used in this research (Strauss and Corbin, 1990:123). As the data collected in this study is of quantitative nature, the analysis follows suit with various statistical techniques being employed to gain insight into the data and the associated information that it contains to generate meaning (Strauss and Corbin, 1990:124).

The data obtained using the measuring instrument was quantified using the Statistical Package for the Social Sciences (SPSS). The coding process involved attributing numerical representations to answers from close-ended questions and coding for open-ended questions. The data was entered into the SPSS which then analysed the data and gave the results as per the needs of the researcher. Next the open ended questions were collated and grouped under headings to ease analysis. This included the questions on best practices in the organisations, barriers to improvement of project management and areas where improvement is needed. The responses were assigned codes and then ranked from those with the most responses to the least to determine which was most important. Finally, the findings of the analysis were graphically represented by means bar graphs and column charts using the Microsoft Excel spreadsheets.

## **5.7 ETHICAL CONSIDERATIONS**

Most ethical issues are grouped as; protection from harm, informed consent, right to privacy, and honesty with professional colleagues (Leedy and Ormrod, 2007:126). To ensure that this research was managed in an ethical manner, there were various issues considered. These are:

- All communication and information with the various respondents were treated in the highest confidence. No departmental information was disclosed to other department.
- The completion of the questionnaire was completely voluntary.
- All respondents were treated with complete anonymity.

Ethical standards were adhered to throughout the research process, with significant consideration given to objectivity, transparency, fairness, effect on others and confidentiality and accuracy in reporting of results. The research ethical considerations were also fulfilled throughout the research to ensure the protection of research participant's rights and to meet the ethical standards of the Ministry of Infrastructure, Science and Technology. A letter seeking authorisation to conduct the research study was authored to the Permanent Secretary in the ministry who in turn authorised the study to be undertaken. An application was also submitted to University of South Africa Ethics Committee which solicited authorisation to conduct research. This was undertaken to ensure that the research does not violate participants rights and privacy. None of the participants were forced to participate in the study as participation was declared voluntary to them. Although participation in this study did

not pose any risks to the participants, the ethical standards required that prospective participants be fully informed about the procedures and any possibility of risk or discomfort. The confidentiality of the individual respondents was ensured. Any information that they shared was not made available to anyone who was not directly involved in the study. The respondents were assured that their responses would remain anonymous. The measuring instrument did not ask the name of the participants or their personal addresses or phone numbers. In a nutshell, the ethical considerations of the research study were fulfilled to ensure no harm to the researcher, potential research participants and other relevant stakeholders.

## **5.8 CONCLUSION**

This chapter discussed the research methodology taken, the measuring instruments used, the research location, research subjects and also the data analysis methods. The researcher employed a quantitative survey research design where a total of 50 Project Managers formed the target sample for the study. The next chapter focuses on analysis of the results gathered.

## CHAPTER SIX

### DATA ANALYSIS AND DISCUSSION OF FINDINGS

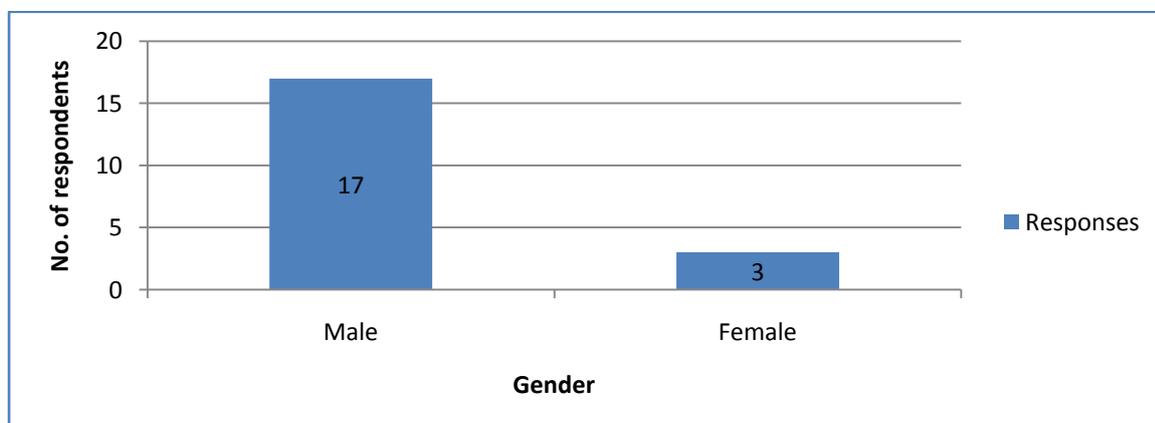
#### 6.1 INTRODUCTION

In the previous chapter, the research methodology was described. This chapter presents the analysis and discussions of the findings from the questionnaire survey conducted. As stated by Ader (2008:48), analysis of data is a process of inspecting, cleaning, transforming, and modelling data with the goal of highlighting useful information, suggesting conclusions, and supporting decision making. In order to arrive at the analysis and interpretation of data, the SPSS statistical software package was used. To graphically present the findings by charts, Microsoft Office package was used. This chapter also consists of the data presentation and detailed findings of the study obtained from the respondents and it is vital at this juncture to reiterate the main questions that this study sought to answer. The study questions are restated below:

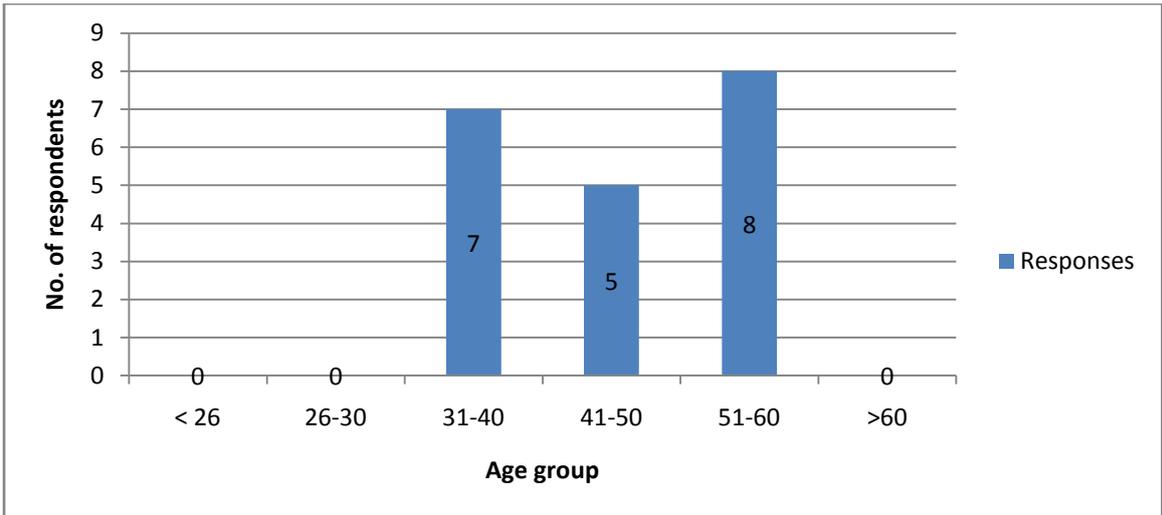
- What are the prerequisite for project implementation in the public sector?
- What methods, techniques and processes that are applied to ensure efficient and effective public sector project implementation?
- What are the control and monitoring methods that are used in the public sector during project implementation?

#### 6.2 DEMOGRAPHIC PROFILE OF RESPONDENTS

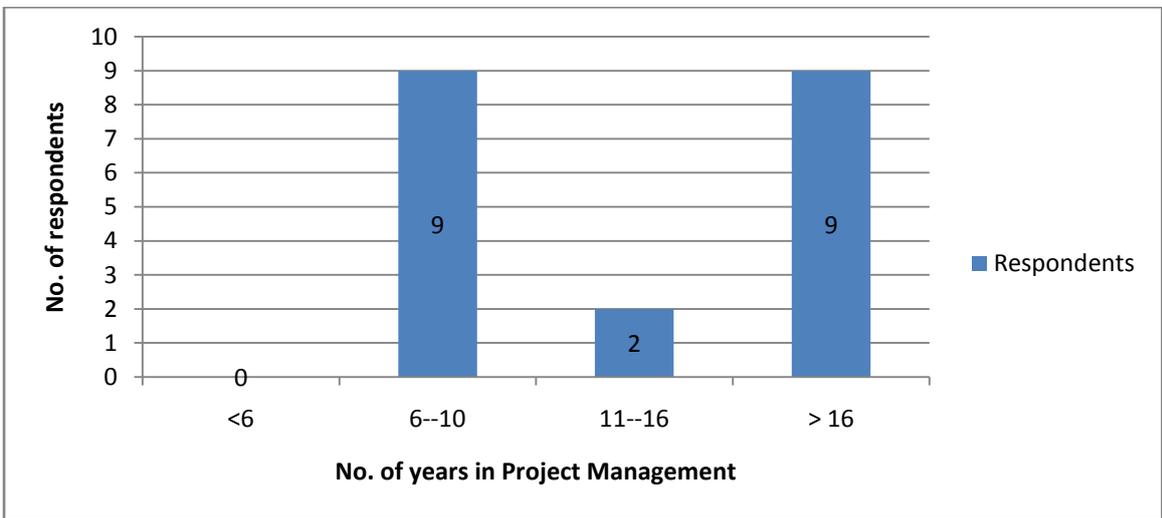
The demographic profile of respondents as presented below shows respondents basic details such as gender, education, age group and qualifications.



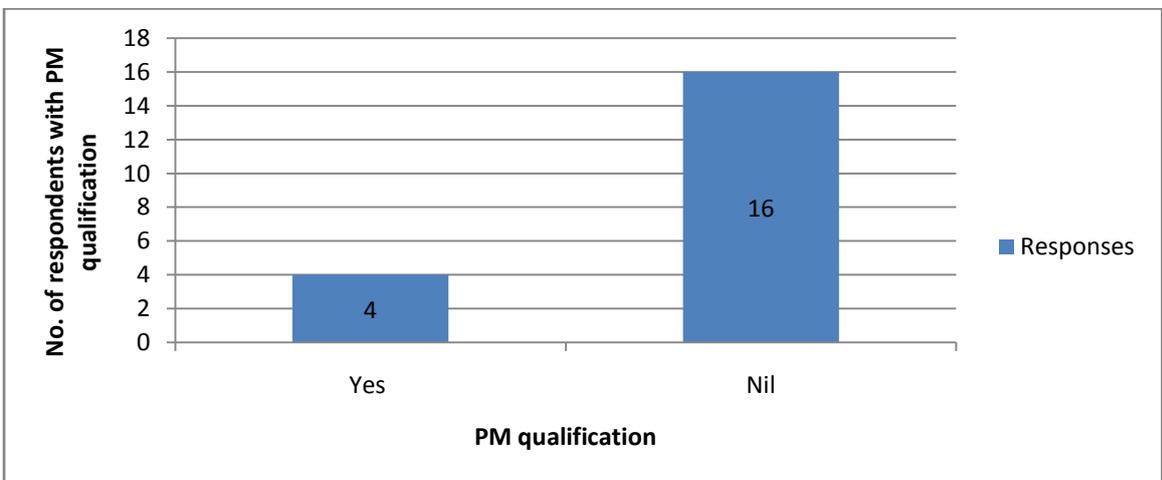
**Figure 6-1: Respondents gender**



**Figure 6-2: Respondents age group**



**Figure 6-3: Project Management experience**

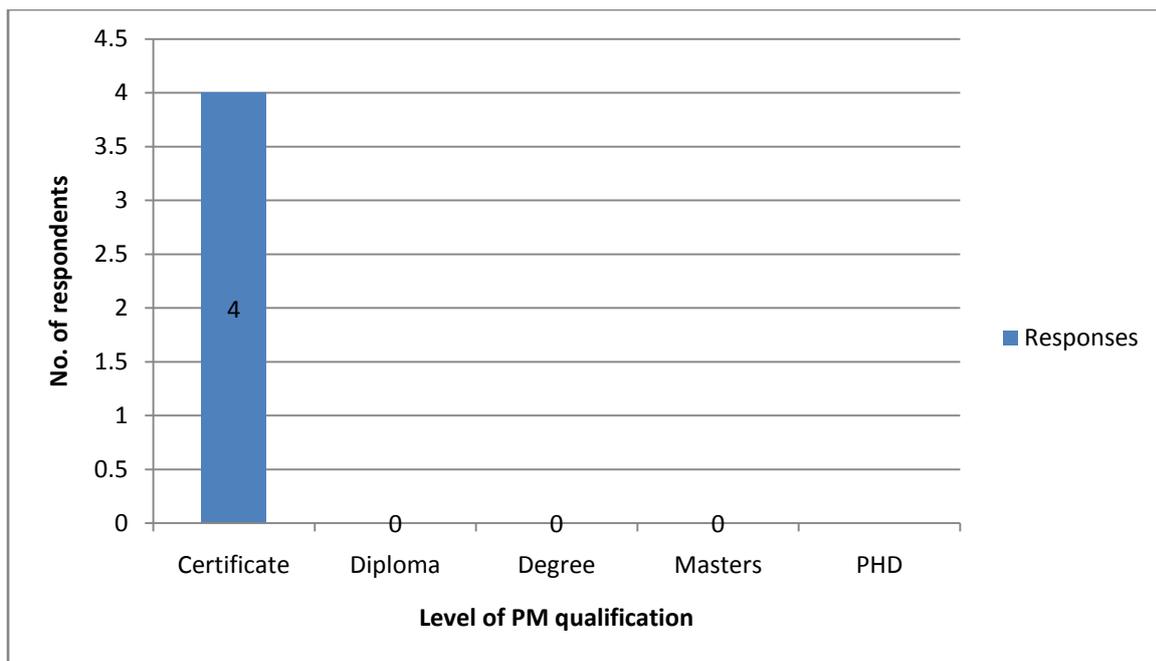


**Figure 6-4: Project Management qualification**

Based on **Figure 6-(1-4)** above the findings below were established. The demographic profile of respondents shows that out of a total of 20 respondents who participated in the study, 85% were male and 15% were females. Regarding their age group, 35% belongs to the 31 to 40 years group followed by the 51 to 60 years group which constitute 45%. The age group of 41 to 50 constitute 25%.

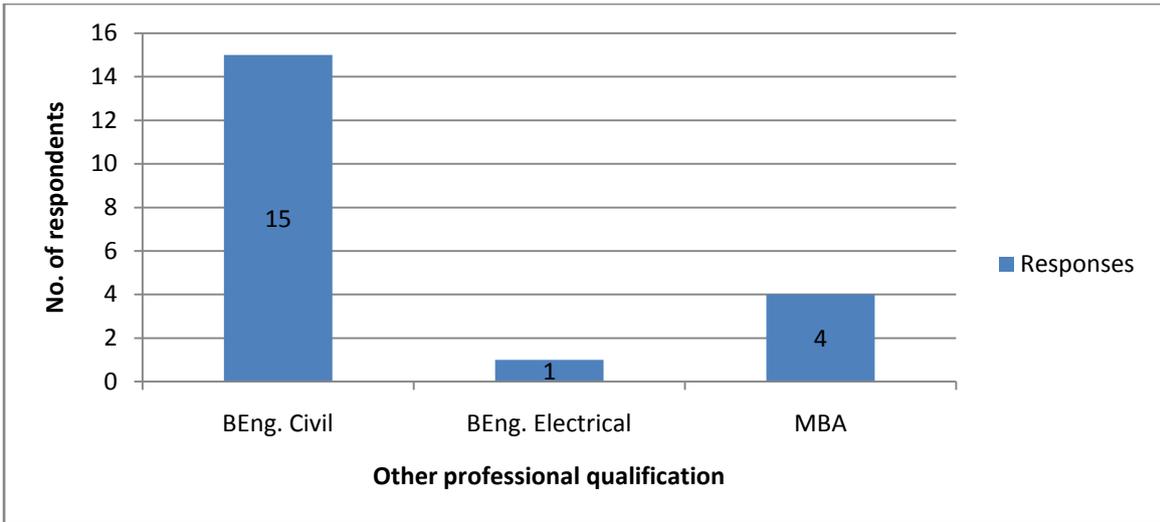
The respondent’s experience in Project Management shows that 45% had 6 to 10 years or above 16 years experience in Project Management and 20% had 11 to 16 years of experience in Project Management. In regard to whether they possess a Project Management qualification, 80% responded by indicating that they do not hold a Project Management qualification compared to 20% that hold a Project Management qualification. The qualification level other than Project Management indicates that 80% hold a degree in a qualification followed by 20% that possess masters degree.

**Figure 6-5** below indicates the highest professional qualification held by respondents.



**Figure 6-5: Project Manager professional qualification level**

As indicated in **Figure 6-5**, 20% of the respondents hold a Certificate in Project Management and 80% are not qualified in Project Management. Other than a certificate qualification level in Project Management, **Figure 6-6** below shows other professional qualifications held by respondents.

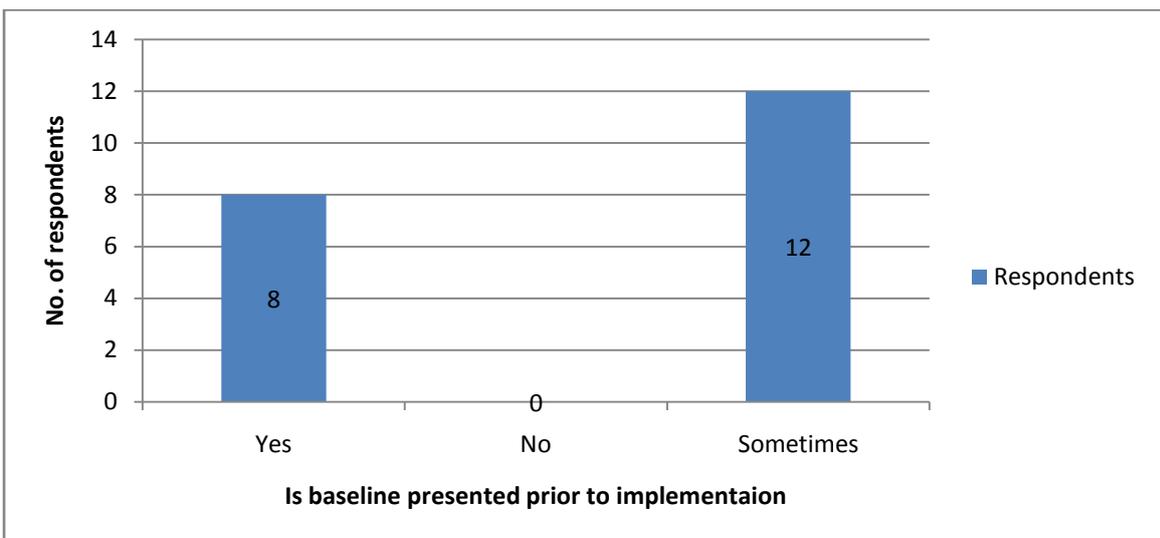


**Figure 6-6: Other professional qualification**

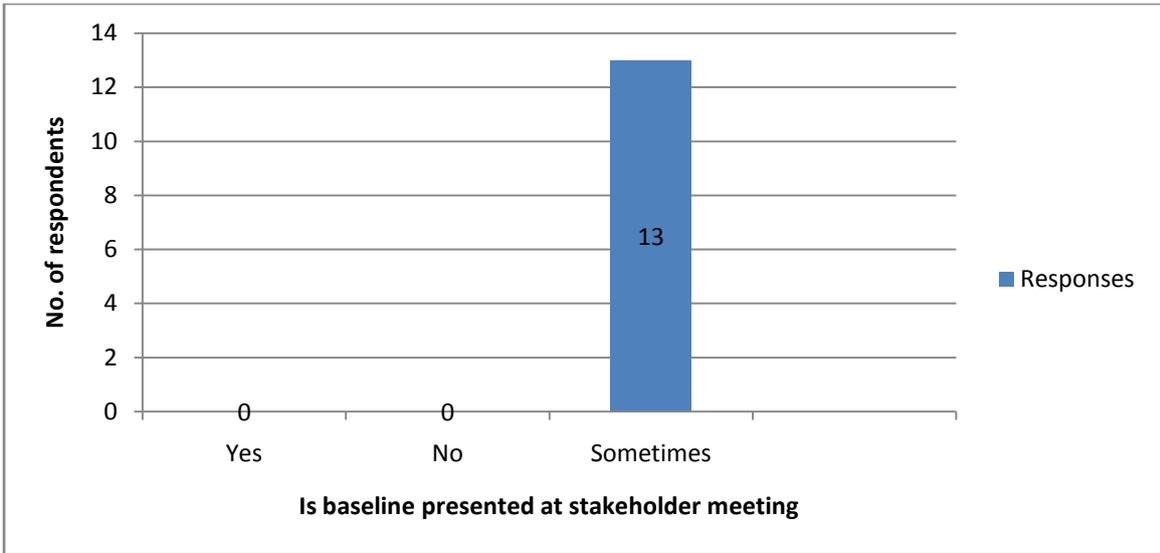
**Figure 6-6** indicates that out of the 20 respondents, 75% hold a Bachelor’s Degree in Civil Engineering followed by 20% of the respondents holding Masters Degree in Business Administration and 5% of the respondents who possess Bachelor’s Degree in Electrical Engineering.

### 6.3 PREREQUISITES FOR PROJECT IMPLEMENTATION

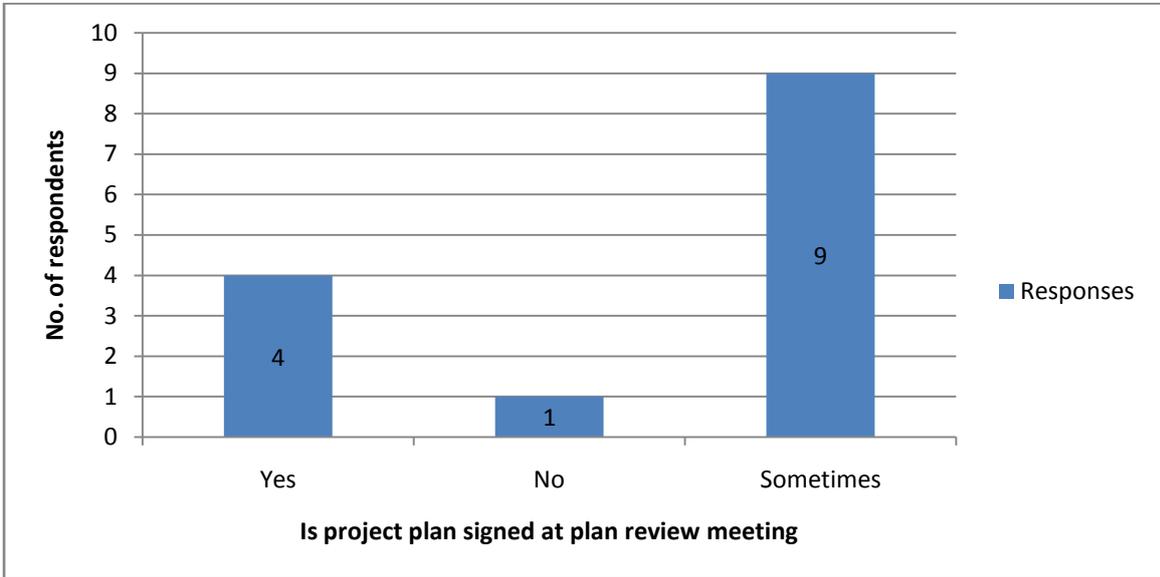
In order to establish the prerequisites for project implementation in the public sector, the respondents were asked some questions on project planning which forms the crux of the prerequisites in project implementation. **Figure 6-7** to **Figure 6-13** below presents the responses from questions which sought to establish the importance of the project planning.



**Figure 6-7: Project baseline plan-presentation prior to implementation**



**Figure 6-8: Project baseline plan-presentation at stakeholder meeting**

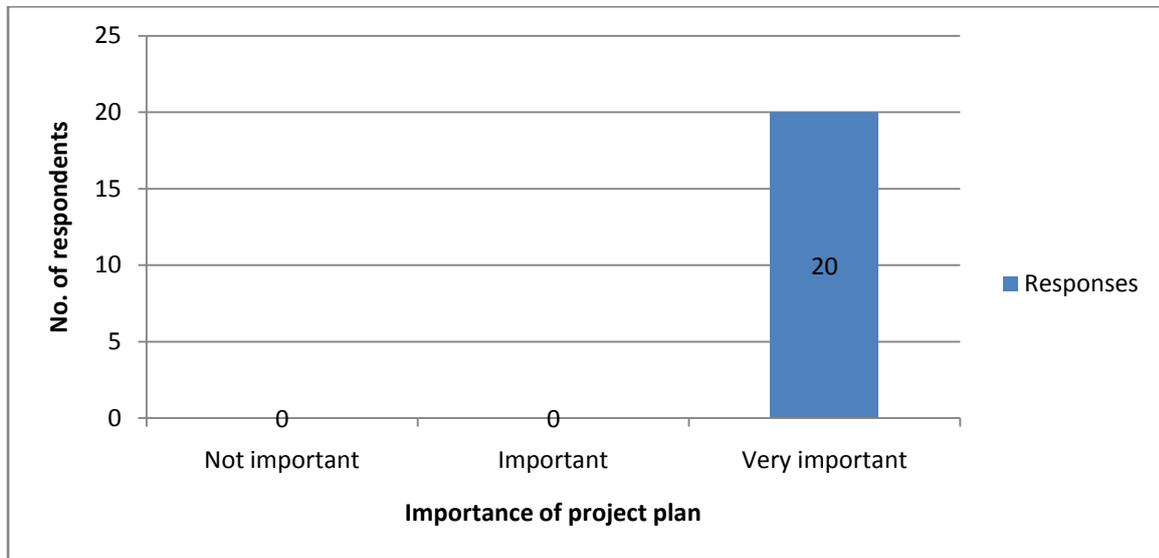


**Figure 6-9: Project plan signing at review meeting**

As illustrated in **Figure 6-7**, prior to project implementation, a project base line plan should be presented as per the Project Management ethics. This is in concurrence with 40% of the respondents. However, 60% indicated that the plan is presented sometimes.

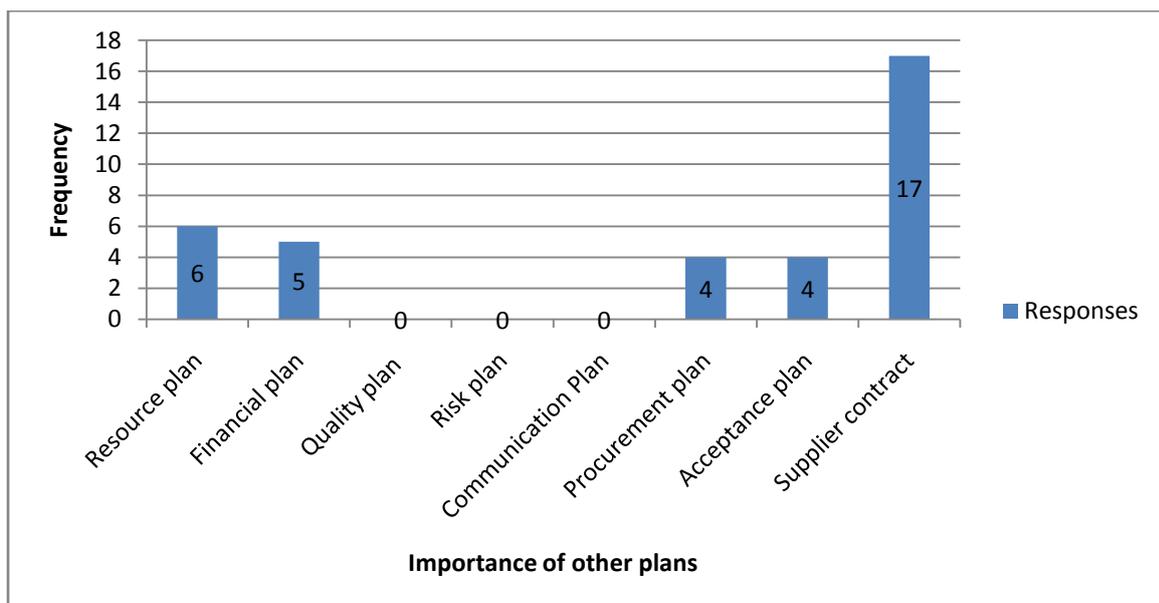
As to whether the project plan is presented at the stakeholders meeting as carried in **Figure 6-8**, 65% of the respondents partially concurred by indicating that the project plan is presented sometimes. However, 35% did not respond to this question. The respondents further indicated that a project plan should be signed at the project plan review meeting as it is indicated by 20% of the respondents in **Figure 6-9** while 45% of the respondents indicated that the project plan is signed at review meeting sometimes. 30% of the respondents did not respond to this

enquiry. In determination of the importance of the project plan, 100% of the respondents indicated that the project plan is very important as illustrated in **figure 6-10** below.



**Figure 6-10: Importance of project plan**

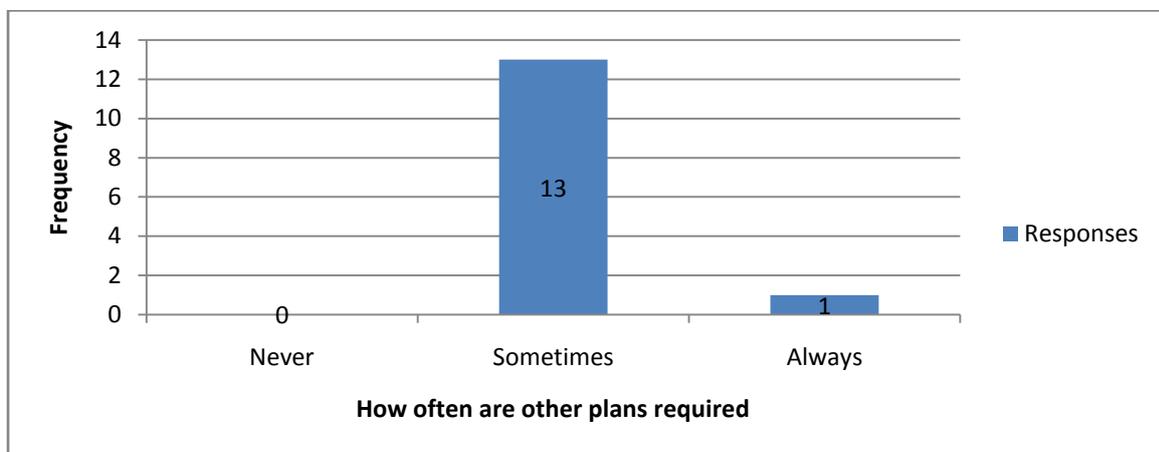
In order to investigate the other plans that are used in public sector Project Management, different plans were given where respondents were asked to identify the plan they utilise more often. The following multiple response **Figure 6-11** below shows different plan requirements. A multiple response option was availed so that the respondents can select more than one option from the list.



**Figure 6-11: Importance of other project plans**

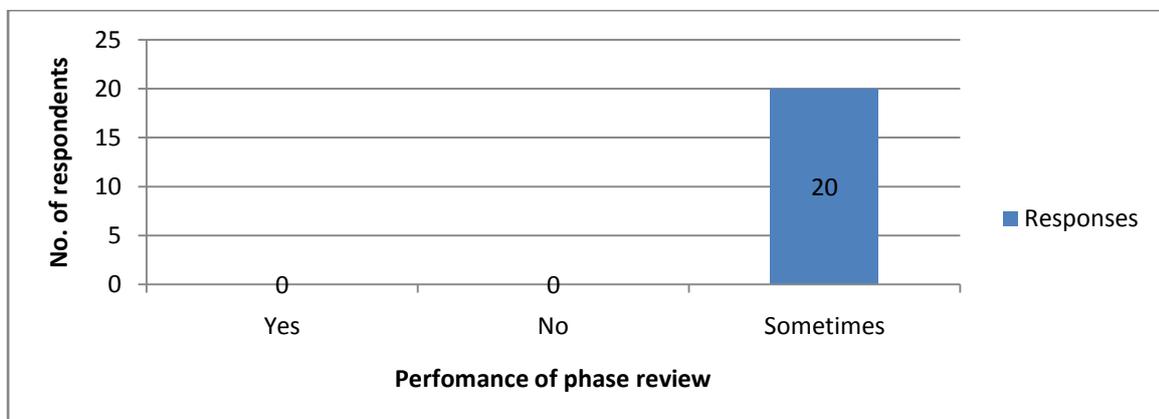
Out of the different plan requirements, the prominent plans were Resource Management Plan and Supplier Contract. 16% out of 36 appearances identified the Resource Management Plan and 47% out of 36 appearances indicated the Supplier Contract as the most important plans they use. Other required plans selected were the Financial Management Plan at 13%, Procurement Plan at 11% and the Acceptance plan also at 11%. The other plans which were available though they were not selected are Quality Management Plan, Risk Management Plan and the Communication Plan.

In determination of how often the aforementioned plans are required, the respondents were given different frequencies to select from as indicated in **Figure 6-12** below.



**Figure 6-12: Other plan frequencies**

The profile depicted that the plans are presented sometimes according to 65% of the respondents and only 5% of the respondents indicated that they are always presented with the plans. 30% did not respond to the question. **Figure 6-13** below carries responses from determining if a phase review is performed at the end of the planning phase.

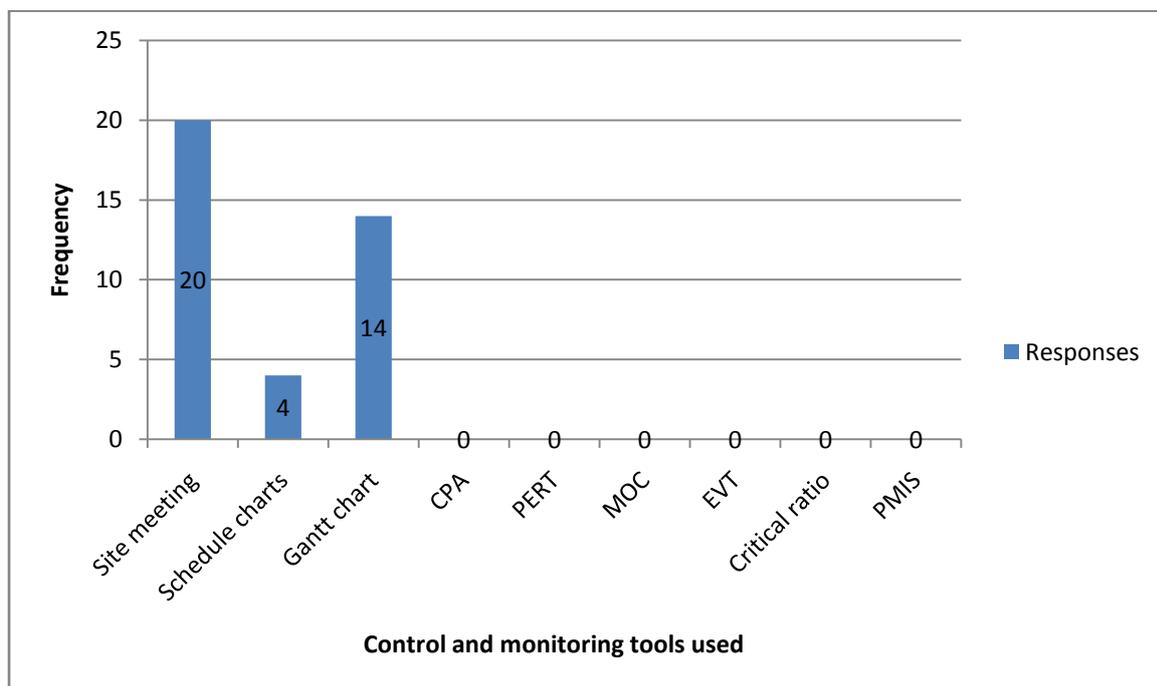


**Figure 6-13: Performance of phase review**

At the end of planning phase, a phase review is sometimes performed. This is accepted by all respondents.

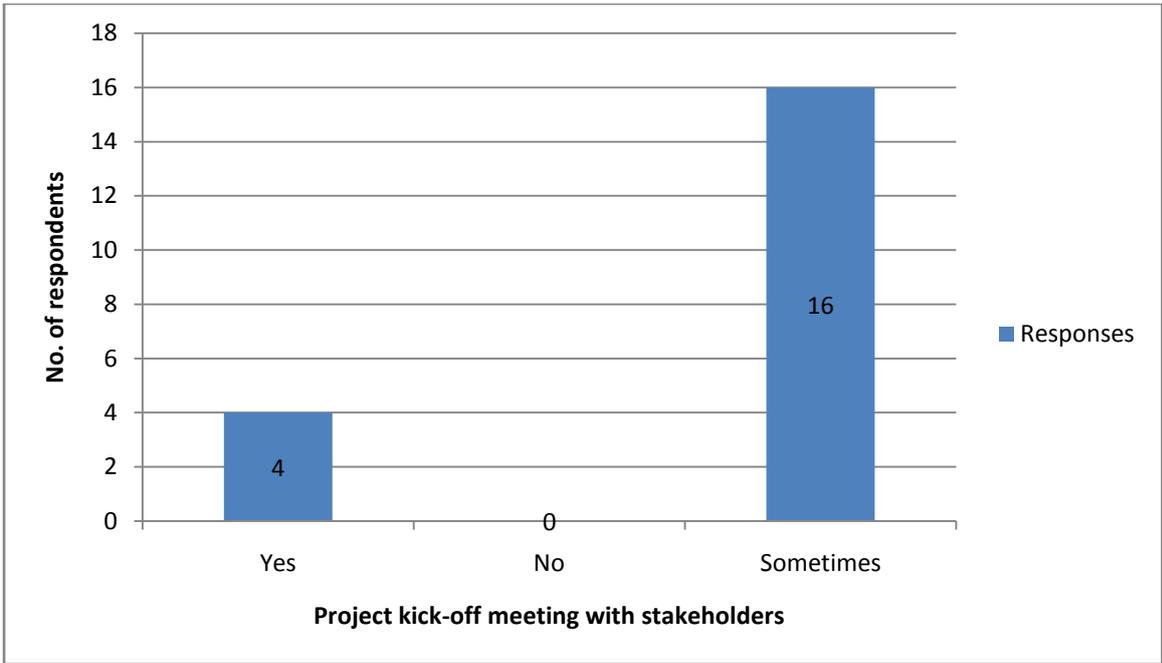
#### 6.4 CONTROL AND MONITORING METHODS

In determination of control and monitoring tools in public sector Project Management, several tools and methods in Project Management were presented for respondents to identify the ones they utilise to ensure efficient project implementation. **Figure 6-14** below illustrates the techniques used in control and monitoring of projects. According to the respondents, divergent techniques are applied to ensure effective and efficient project implementation. This was also a multiple response question where more than one response can be selected. 52.6% which is 20 out of 38 appearances indicated Site Meeting, the Gantt Chart was selected by 36.8% which is 14 out of 36 appearances. The Schedule chart was selected by 10.5% which is 4 out of 38 appearances. However, other techniques which were available but remained unselected are Critical Path Analysis (CPA), Program Evaluation and Review Technique (PERT), Milestone Objective Chart (MOC), Earned Value Technique (EVT), Critical Ratio and Project Management Information System (PMIS).

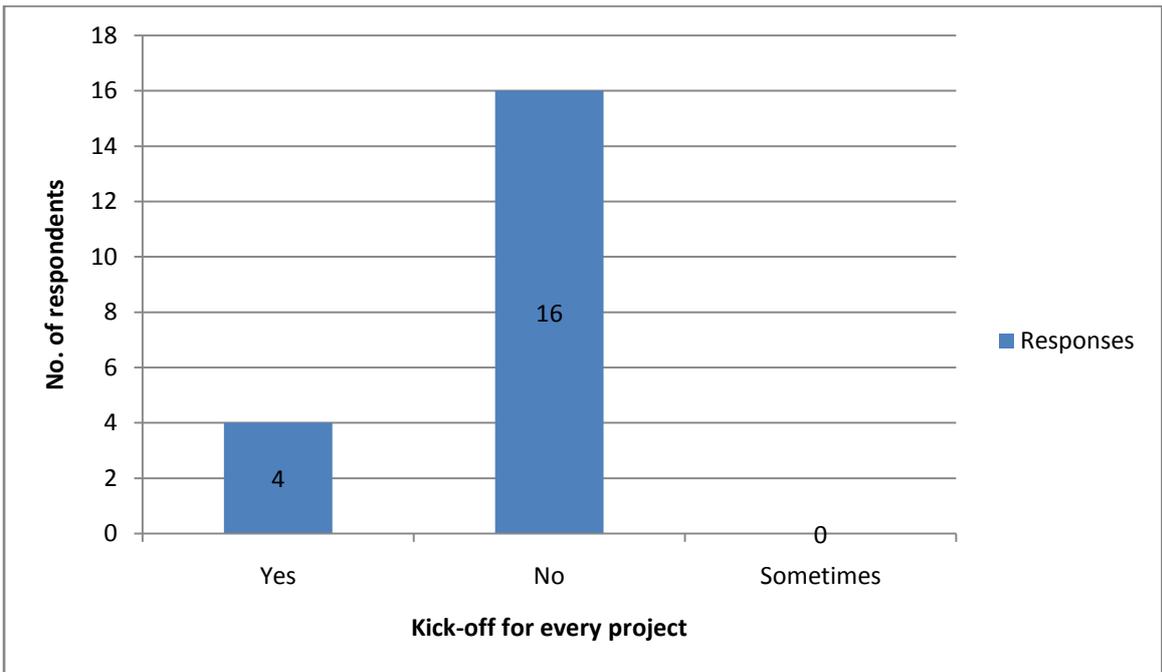


**Figure 6-14: Control and monitoring tools**

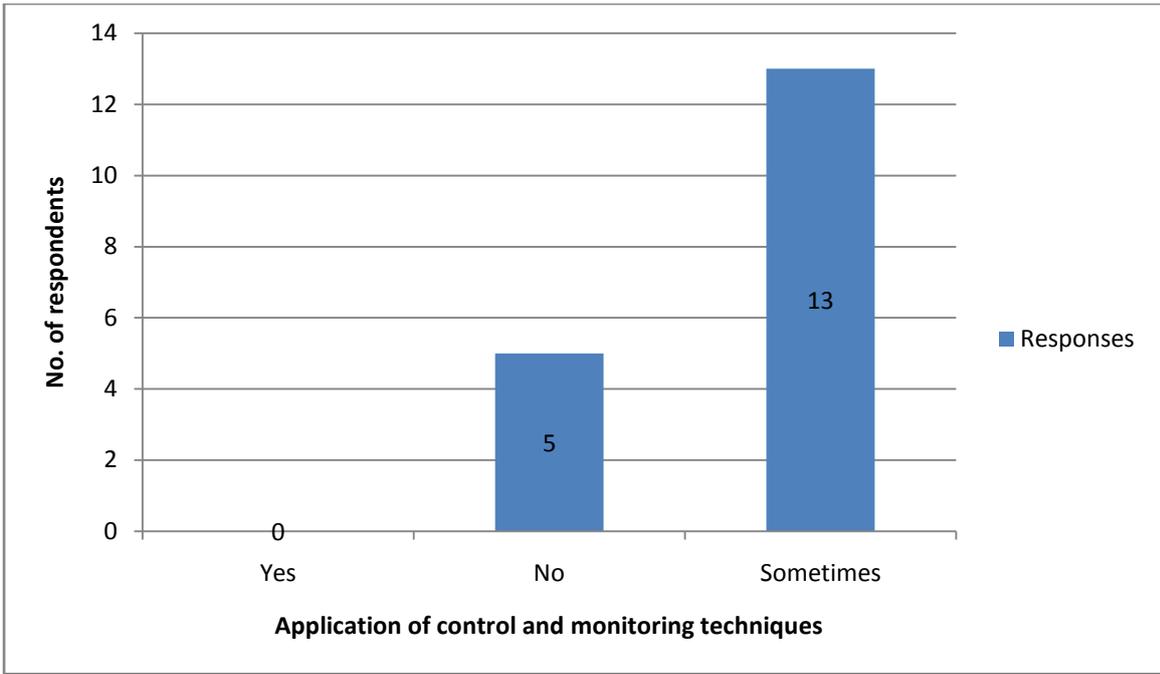
In determining the importance of meeting the project stakeholders, the respondents were asked to establish if a project kick-off meeting is convened with project stakeholders and their responses are illustrated below.



**Figure 6-15: Kick-off meeting with stakeholders**

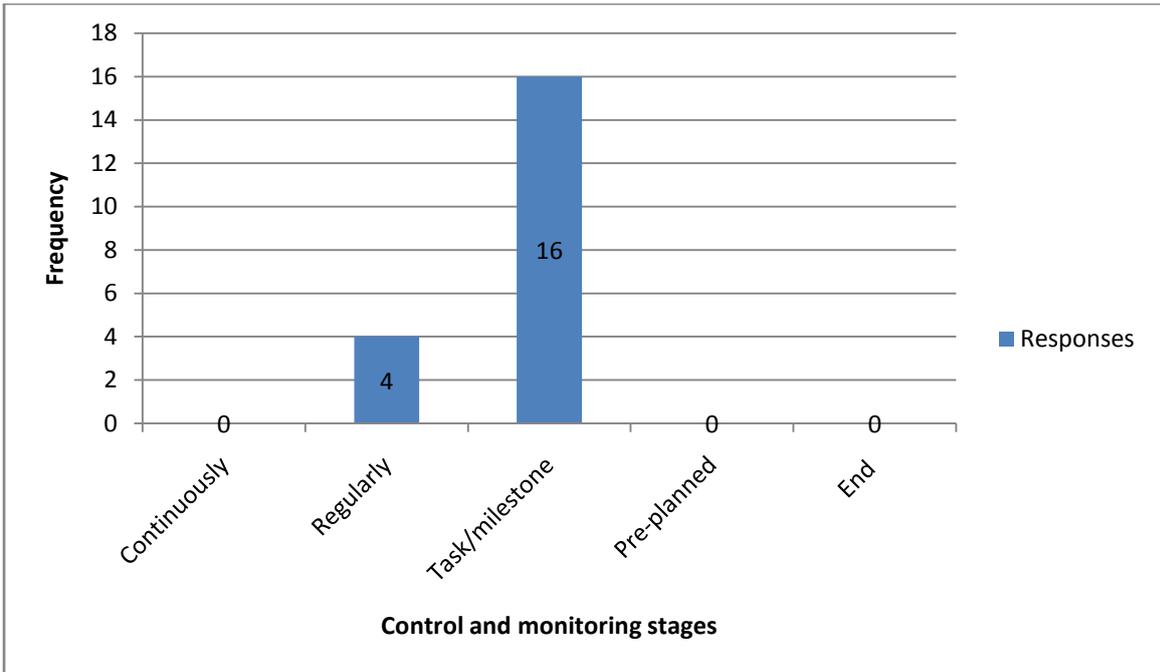


**Figure 6-16: Kick-off frequency**



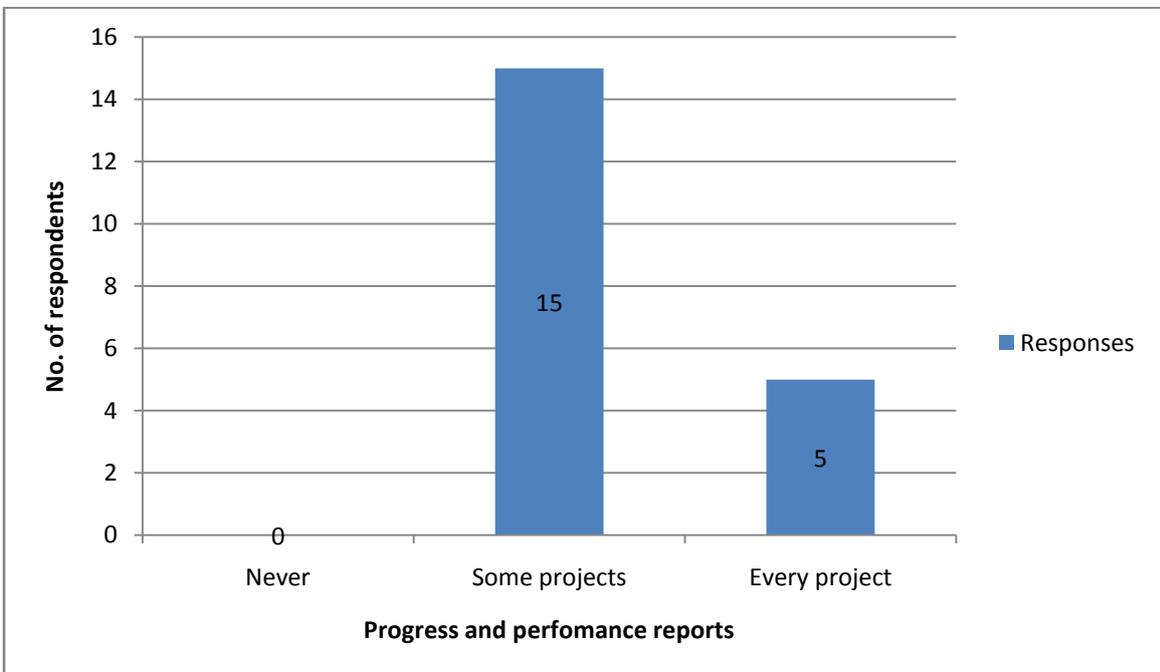
**Figure 6-17: Application of Project Management control and monitoring technique**

As indicated by respondents, 20% indicated that they always convene project kick-off meeting with stakeholders. However, 80% indicated that they sometimes convene project kick-off meeting with stakeholders. 20% of the respondents further indicated that they convene kick-off meeting for every project, while 80% indicated that they do not convene kick-off meeting for every project. In determination of whether there is application of control and monitoring techniques while overseeing projects, 72.2% of the respondents indicated that there is sometimes application of control and monitoring techniques. On the contrary, 27.8% of the respondents indicated that they do not apply control and monitoring techniques during project implementation. As depicted in **Figure 6-18** below which sought to establish the frequency of control and monitoring on ongoing projects, 80% of respondents indicated that control and monitoring is carried out at task or milestone completion and 20% indicated that control and monitoring on ongoing project is carried out regularly. Other options that were available but not opted for are at pre-planned date, continuously and at the end of the project.



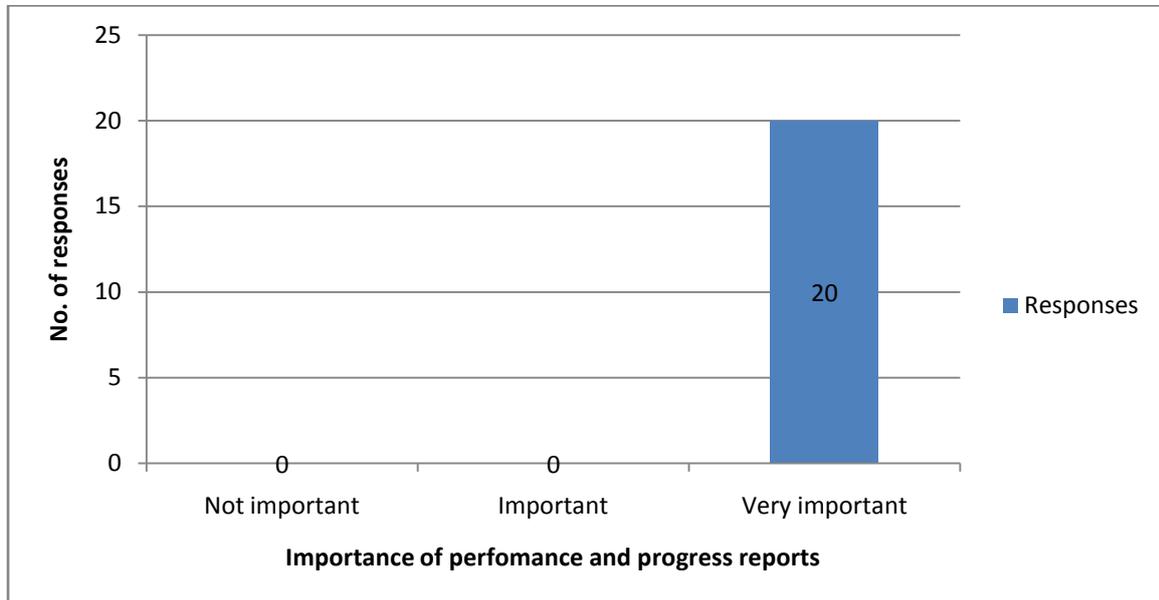
**Figure 6-18: Control and monitoring stages**

In establishing whether the progress status and performance reports are compiled for individual projects, 75% of the respondents indicated that reports are compiled for some projects and 25% indicated that reports are compiled for every project.



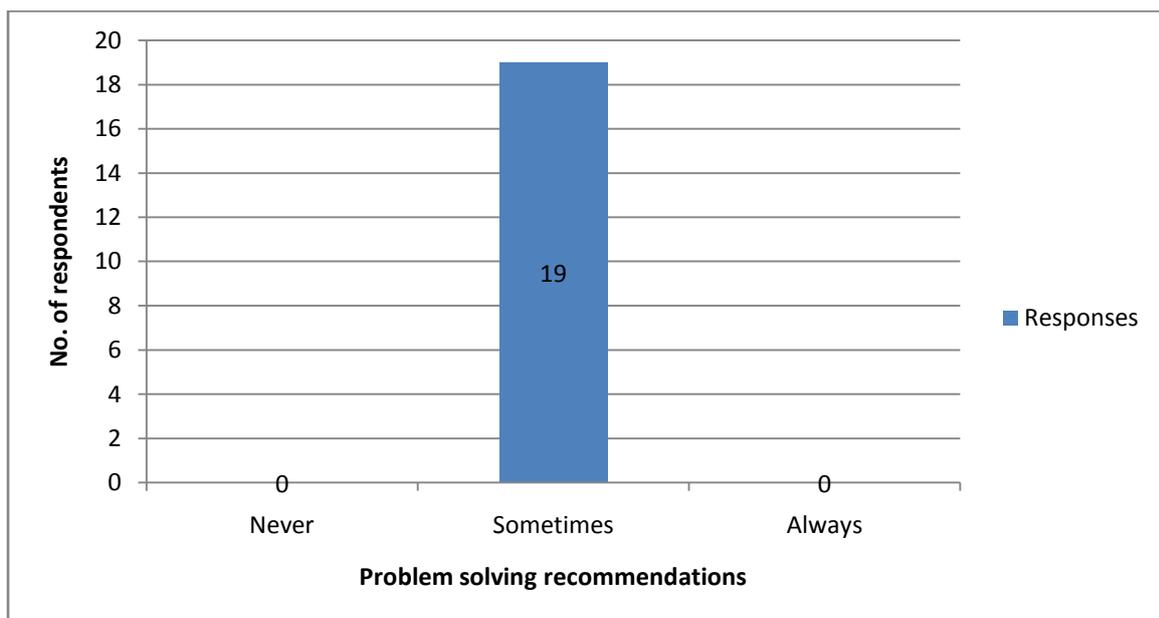
**Figure 6-19: Progress and performance reports**

The importance of the progress status and performance reports was also determined, 100% of the respondents indicated that these reports are very important as depicted in **Figure 6-20** below.



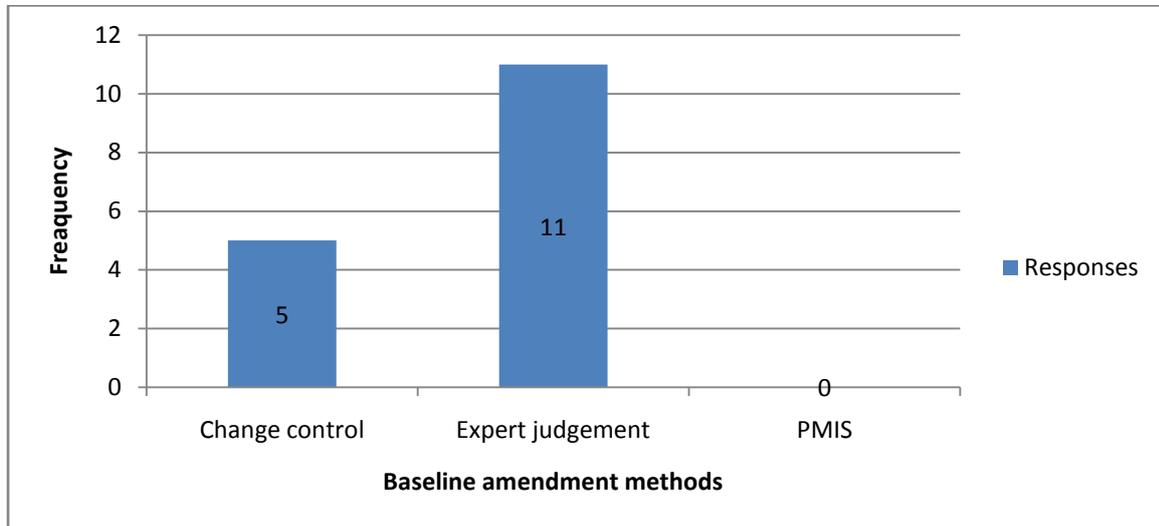
**Figure 6-20: Importance of progress and performance reports**

The respondents were further requested to indicate if they do recommend problem solving measures to stakeholders after monitoring and evaluation. As depicted in **Figure 6-21** below, 95% of the respondents stated that they sometimes submit problem solving recommendations to stakeholders.



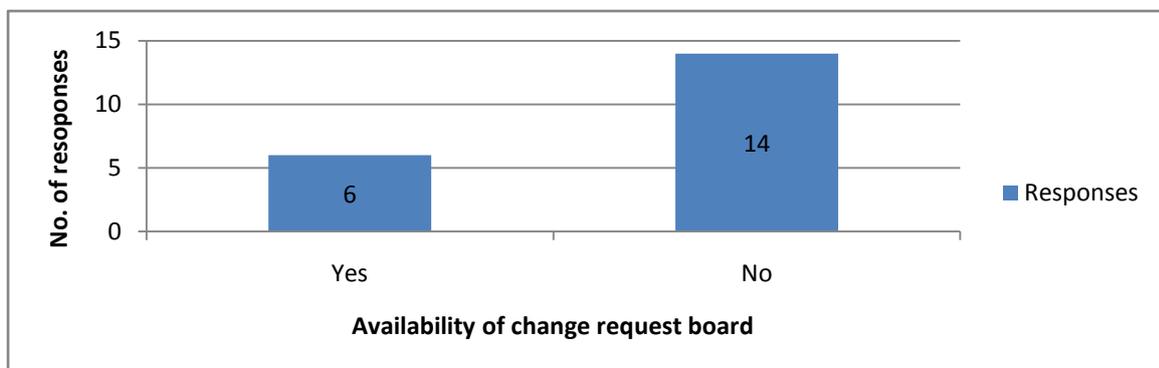
**Figure 6-21: Problem solving recommendations**

In order to establish the methods applied to change and amend the project baseline plan, the respondents were required to identify the methods they use. **Figure 6-21** illustrates the responses given.



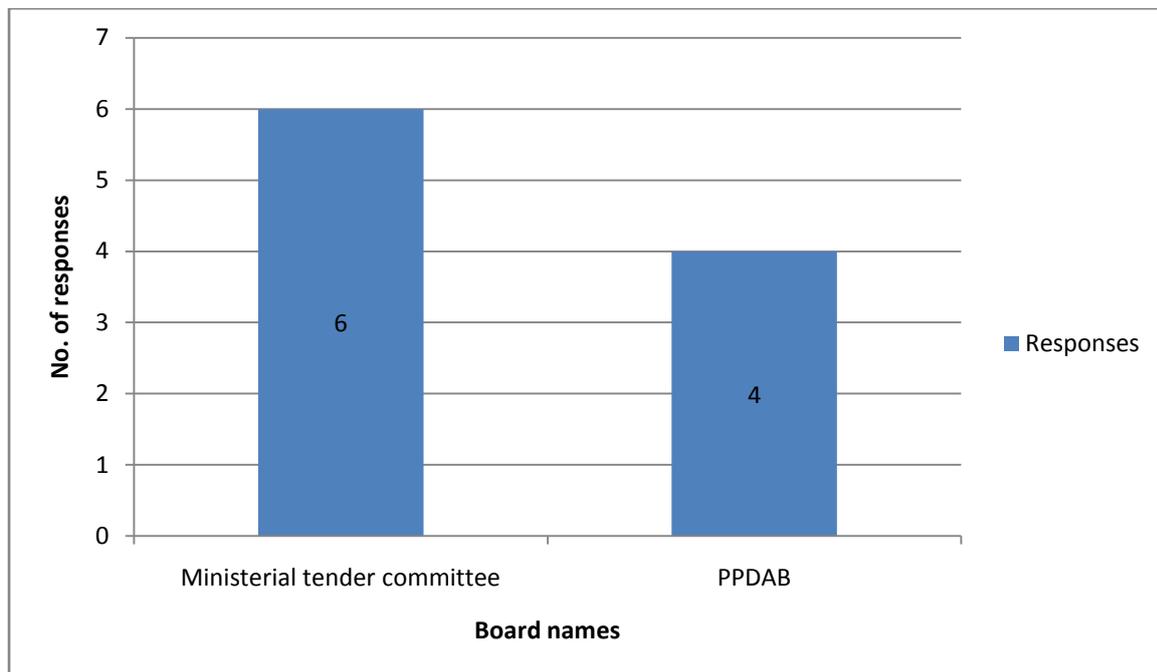
**Figure 6-22: Baseline amendment methods**

Different project techniques are applied as given by respondents to amend the project baseline plan. According to 55% of the respondents, Expert Judgment technique is commonly used followed by Change Control Process identified by 25% of the respondents. However, 20% did not respond to this enquiry as other options available like PMIS were not opted for. A question was advanced to the respondents which sought to establish if there is a board established to review all change requests on ongoing projects. 70% of the respondents indicated that aforementioned board does not exist in their organisation while 30% agreed that they have a board in their organisation as illustrated by **Figure 6-23** below.



**Figure 6-23: Availability of change request board**

As some respondents indicated that there are boards in their organisations. The board names are stated in **Figure 6-24** below.

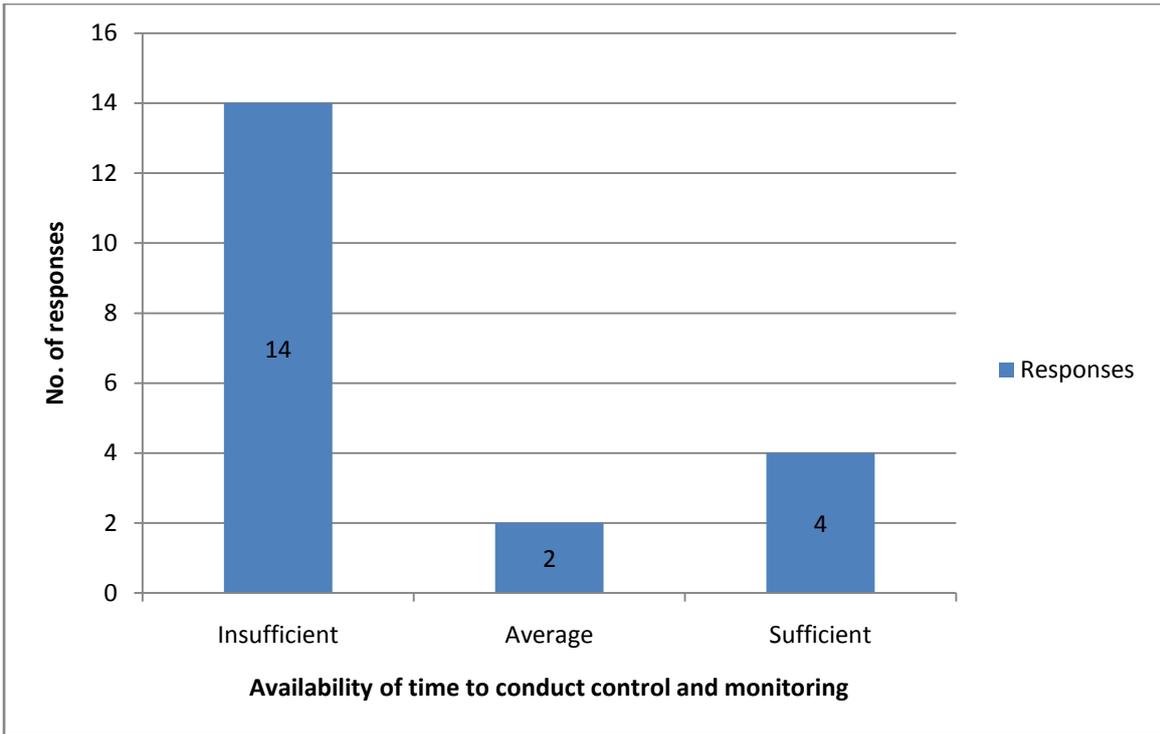


**Figure 6-24: Available board names**

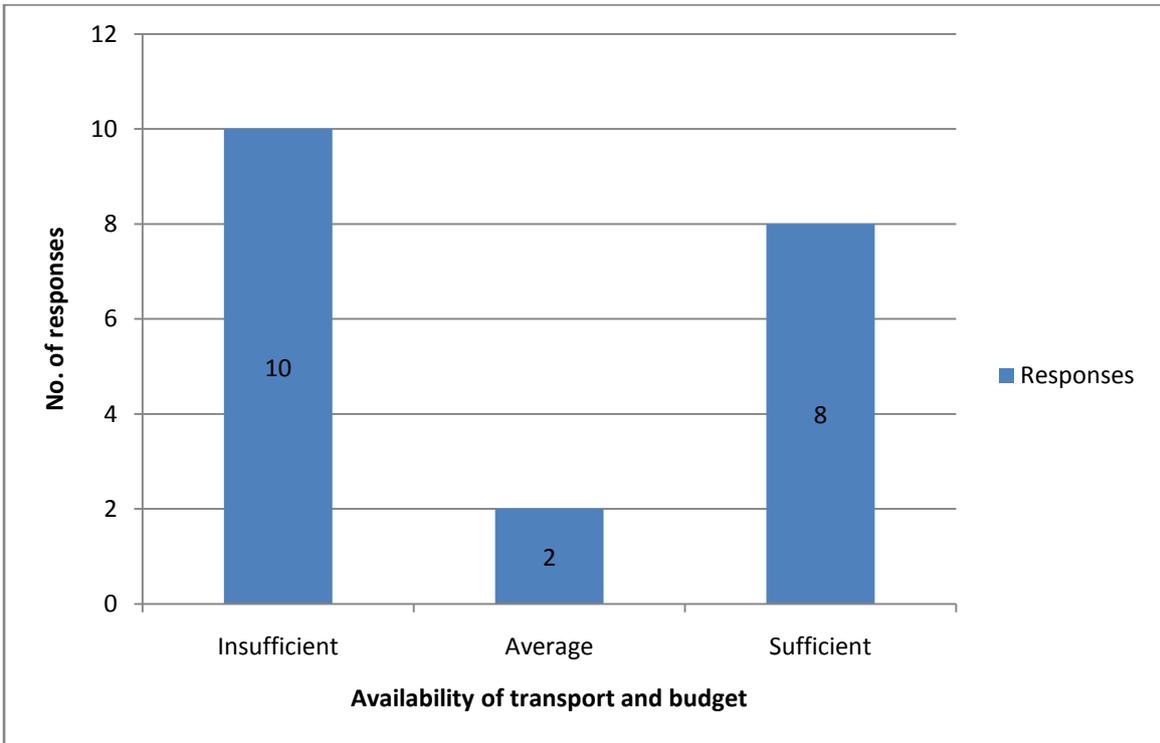
According to the respondents, 30% indicated that they use the Ministerial Tender Committee in their organisation while 20% indicated that they use Public Procurement and Asset Disposal Board.

There was also need to determine the availability of resources, the respondents were required to indicate if they have enough time and resources at their disposal to carry out control and monitoring during project implementation. As illustrated in **Figure 6-25** below, 50% of the respondents indicated that the resources needed to facilitate efficient control and monitoring are insufficient and only 10% indicated that the availability of resources is average. On contrary 40% of the respondents indicated that the resources are sufficient.

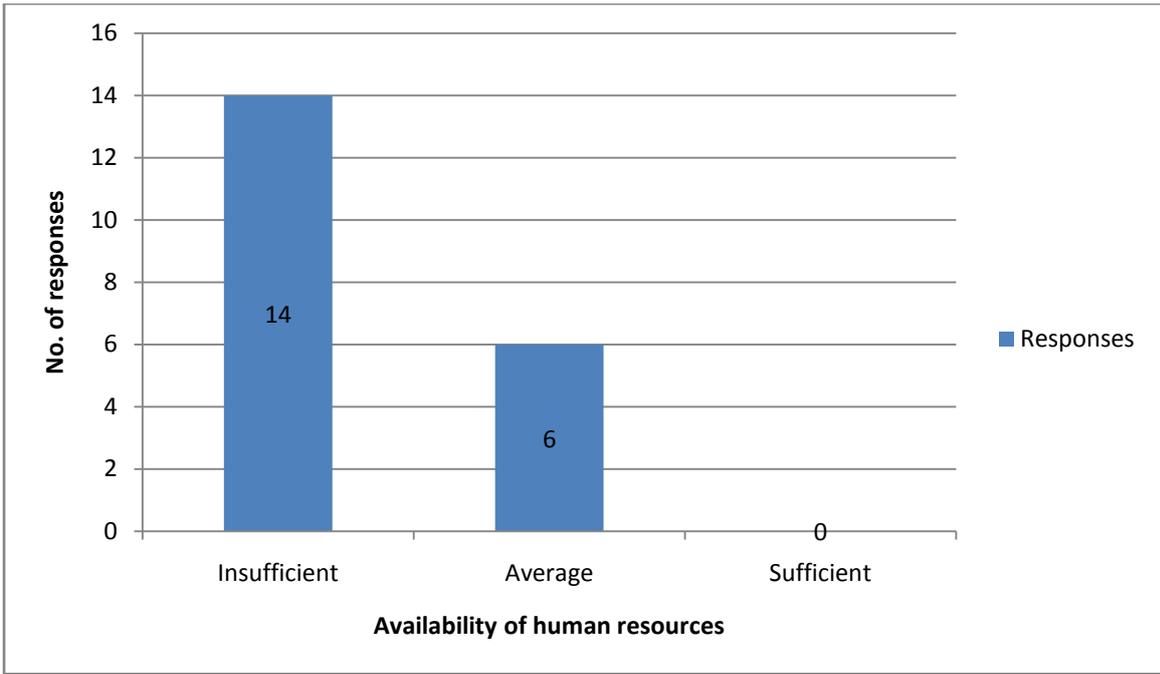
**Figure 6-26** further illustrates the availability of human resources to carry out control and monitoring on projects. 70% of the respondents indicated that the human resources are insufficient. However, 30% indicated that the availability of human resources is average.



**Figure 6-25: Availability of time**

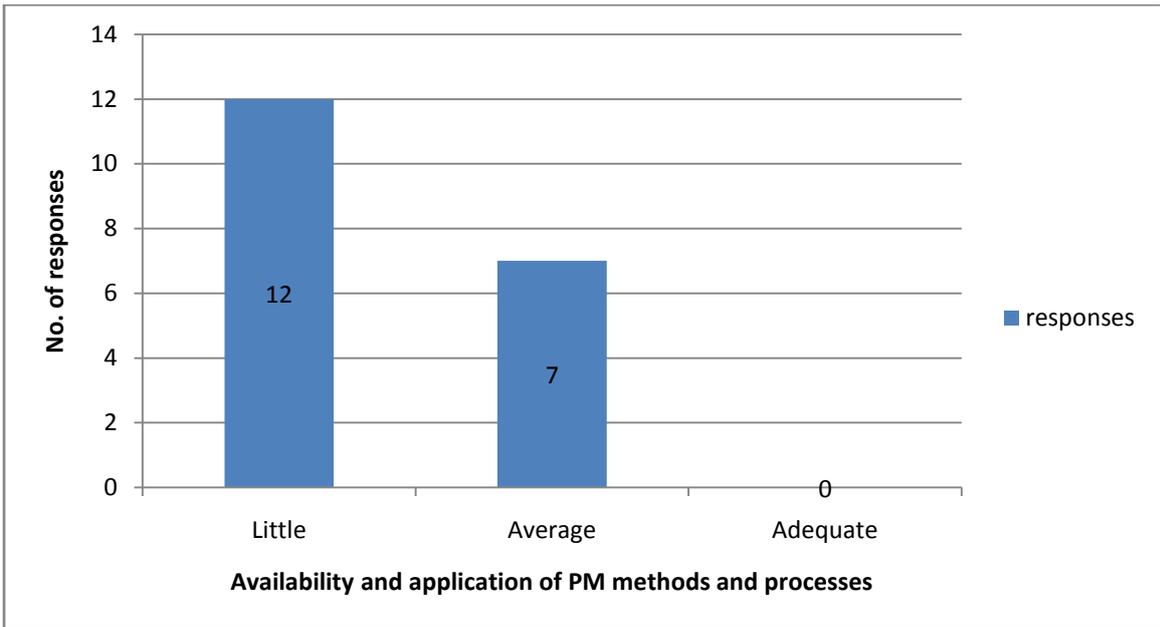


**Figure 6-26: Availability of transport and budget**



**Figure 6-27: Availability of human resources**

In order to establish if there is enough application of Project Management processes in the public sector, respondents were required to indicate the availability and application of Project Management methods and processes in their organisation as illustrated in **Figure 6-28** below. 60% of the respondents indicated that they have little application of Project Management processes, and 35% indicated that application of Project Management processes is average in their office.



**Figure 6-28: Availability and application of Project Management processes**

## **6.5 CONCLUSION**

This chapter presented the results obtained from the survey, starting with the demographic information of the respondents and continuing with the results for each of the research questions highlighted in the preceding Chapter 5.

In the next chapter, the results were discussed and analysed. Conclusions and recommendations stemming from the results were also made as well as suggestions for future research.

## **CHAPTER 7**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **7.1 INTRODUCTION**

In the previous chapter, the detailed results obtained in the study were presented so. This chapter presents the summary of findings, discussions of results and drawn. The limitations of this study will be highlighted then recommendations for further studies were also suggested.

#### **7.2 SUMMARY OF CORE FINDINGS**

The demographic profile of respondents shows that out of the total 20 respondents who participated in the study, 85% were male and the remaining 15% were females. The imbalance in gender obtained from the findings signifies the low participation of women in the practice of Project Management in the public sector.

Regarding their age group, 35% belongs to 31 to 40 age group followed by 51 to 60 which constitute 45%. The age group of 41 to 50 was at 25%.

Respondents experience in Project Management shows that 45% had above 16 years of experience in Project Management, another 45% had 6 to 10 years experience while 10% had 11 to 16 years of experience in Project Management. This shows that Project Managers who participated in this study are experienced in management of projects, which implies that better and effective project management is attainable.

The qualification level shows that 80% hold an Engineering Degree in qualification followed by 20% who possess Masters Degree in Business Management. When it comes to qualification in Project Management, the majority of the respondents are not qualified in Project Management. Only 20% hold a qualification in Project Management which is at certificate level and 80% are not trained in Project Management. Although the respondents are well learned with mostly Engineering and Masters in Business Management degrees, training in the field of Project Management is still very much lacking behind.

Prior to project implementation, a project baseline should be drawn and presented before commencement of very project. According to the respondents, 60% indicated that it is presented sometimes as opposed to 40% who indicated that the plan is always given. This is

not a good practice since it is evident that a lot of projects are implemented without a project baseline.

Although 100% of the respondents indicated that a project plan is very important. 65% of the respondents indicated that a project plan is sometimes presented at a meeting with stakeholders. However, 35% did not respond to this prerequisite. It is an indication that some critical procedures in Project Management are omitted when implementing projects.

According to Project Management standards, a project plan should be signed at the project plan review meeting as a way of accepting the project plan. Only 20% of the respondents indicated that a project plan is signed at a project plan review meeting and 45% indicated that it is signed sometimes.

Out of the different plan requirements, the most common plans were Resource Management Plan and Supplier Contract. A few respondents acknowledged the importance of other plans like the Financial Management Plan, Procurement Plan and Acceptance Plan as crucial. 65% of the respondents reported that these project plans are presented sometimes as opposed to 30% who did not respond to this enquiry. There were other plans which were available on the selection list but they remained unselected. They include, Quality Plan, Risk Plan, Communication Plan and Acceptance Plan. It needs to be noted that all project plans are equally significant during project implementation as they entirely constitute the project baseline plan.

Project implementation also utilises different methods and techniques to ensure effective and efficient project implementation. This includes Site Management as indicated by 52.6% of the responses, Gantt Charts at 36.8% of the responses and Schedule Chart with 10.5% of the responses. The other techniques which were available on the selection list but not selected include Critical Path Analysis (CPA), Program Evaluation and Review Technique (PERT), Milestone Objective Chart (MOC), Earned Value Technique (EVT), Critical Ration and Project Management Information System (PMIS). There is an indication that a few methods and techniques in Project Management are utilised during implementation of public projects.

Although there are divergent approaches to project implementation with some authorities in Project Management viewing it as a process, there is a project kick-off meeting which signifies the commencement of a project. According to 20% of the respondents, kick-off meeting is always convened for projects however 80% of the respondents indicated that

project kick-off meeting is convened sometimes. This signifies that some projects in the public sector are not afforded an appropriate kick-off.

Although kick-off meetings are convened sometimes for projects, 66.7% of respondents are in agreement that project kick-off meetings are convened for every project. On contrary, 33.3% of the respondents reported that they do not convene kick-off meeting for every project.

In order to ensure successful implementation of projects, it is essential that there is constant application of project control and monitoring techniques. According to 72.2% of respondents, the application of control and monitoring techniques is carried out sometimes and 27.8% indicated that there is no application of control and monitoring techniques.

In a case where there is application of control and monitoring on projects, respondents were required to indicate a particular stage during project life-cycle where there is application of control and monitoring. 80% of the respondents indicated that the application of control and monitoring is applied at task/milestone completion and only 20% indicated that the application is regularly carried out. Other control and monitoring stages like continuously, at pre-planned date and at the end of the project were not selected.

During control and monitoring of projects, different reporting has to be carried out as contained in the Communication Plan. According to 75% of the respondents, progress and performance reports are compiled for individual projects. However, 25% reported that they compile reports for every project.

During project implementation, a need may arise to amend the project baseline plan. The respondents were requested to identify the methods they use for baseline amendment. 55% of the respondents reported that they use Expert Judgment and 25% selected Change Control Process. 20% of the respondents did not respond to this question.

As Project Management dictates that they should be a board established to review change requests on ongoing projects, 30% of the respondents concurred that they have a board in their organisation mandated to review change requests. On contrary, 70% of respondents indicated that such a board does not exist in their organisation. The respondents who concurred cited board names like the Ministerial Tender Committee and Public Procurement and Asset Disposal Board.

As effective and efficient project implementation requires enough resources in terms of human resource and capital, 20% of the respondents only indicated that they have enough time to carry out control and monitoring on projects. 10% reported the time to be average while 70% reported that the time is insufficient. Regarding other necessary resources like transport, 40% reported transport to be sufficient, 10% indicated average while 50% reported transport to be insufficient. On the availability of human resources, no respondent reported human resources to be sufficient while 30% reported human resource to be average and 70% indicated that the human resource to be insufficient. Therefore there is a distinct indication that the resources are not sufficient at the Project Implementation Division to ensure effective and efficient project implementation.

The last question on the research instrument required the respondents to indicate if they have enough application of Project Management processes in their department or office. Sufficient, which was an available option was not opted for, while 35% indicated average Project Management and 60% reported Project Management to be little. 5% did not respond to this question. So, it came out evident that there is insufficient application of Project Management at the Project Implementation Division.

### **7.3 LIMITATIONS OF THE STUDY**

The study had several limitations:

- The research instrument used was entirely Project Management based so it required respondents to command prior experience and knowledge in Project Management.
- Due to a limited number of Project Managers at the Project Implementation Division (PID), Ministry of Infrastructure, Science and Technology, only 20 respondents participated in the study.
- The majority of Project Managers who participated in this study were not trained in the field of Project Management.
- Significant information on public sector project implementation might have been omitted due to misinterpretation of questions by respondents due to limited background in Project Management.
- The gender profile of respondents revealed that the respondents were mostly male which could influence the study to take a particular perspective.

- The respondents were from the same department as well as same ministry which could also have an influence on research findings.

## **7.4 CORE FINDINGS WITH REGARD TO THE HYPOTHESIS**

As transcribed in the hypotheses of this study which states that:-

*“Applicable methods, knowledge and skills, strategies, monitoring and supervision used in public projects are important as they can be used as tools in the process of project implementation, and when fully utilised and applied can guide projects through to successful implementation in Botswana”.*

The core findings of this study with regard to the hypothesis are stated below.

### **7.4.1 DEMOGRAPHIC PROFILE**

- As indicated in the demographic profile, Project Managers at the Project Implementation Division are well experienced in management of projects.
- Although Project Managers command a significant number of years in management of projects, the aforesaid managers remain unqualified in Project Management as they have not received any training and certification in the practice of Project Management.

### **7.4.2 PREREQUISITES FOR PROJECT IMPLEMENTATION**

- All Project Managers admitted that a project plan is crucial to the success of a project.
- Although it evidently came out that a project plan is crucial, the study established that some projects are implemented without an approved project plan.
- For those projects with plans, the plans are not always signed at a stakeholders meetings and project review meeting, rather, the signing is done sometimes.
- There are other plans that constitute the project baseline plan, it came out evident from the research findings that the abovementioned plans are not fully utilised during project implementation. They include: quality plan, risk plan, communication plan, acceptance plan and others.
- With regard to different methods and techniques applied to ensure effective project implementation, Project Managers were conversant with only site management, Gantt chart and schedule chart. Other techniques like CPA, PERT, MOC, EVT and PMIS were not popular among managers.

### **7.4.3 CONTROL AND MONITORING METHODS**

- There is a project kick-off meeting which signifies the commencement of a project. This study found out that kick-off meetings are convened occasionally for some projects.
- The study also established that insignificant amount of control and monitoring on project is carried out mostly at milestone or task completion.
- There is also insignificant amount of reporting on the project as carried in communication plan since performance and status reports are compiled for some projects.
- When the need arise for baseline amendment, the study established that the managers relied on one techniques which is Expert judgement. Also, insignificant number of managers indicated that there is a change request board in their division and the popular names were Ministerial Tender Committee and Public Procurement and Asset Disposal Board.
- As effective project implementation requires enough resources, the study found out that the time is not sufficient to carry out effective control and monitoring. Transport was also found to be insufficient and to a greater extent insufficient trained human resource. In a nutshell, resources to facilitate effective control and monitoring of projects were found to be insufficient.
- In summation, the study sought to establish if there is sufficient application of Project Management tools and techniques in the division. It came out evident that there is insignificant application and use of Project Management processes at the Project Implementation Division.

### **7.5 RECOMMENDATIONS**

Project Implementation in Public sector of Botswana faces serious challenges though lots of measures are implemented to monitor and evaluate projects. The study found different anomalies which interfere with effective and efficient implementation of projects. The following recommendations could positively influence efficient project implementation.

- The study needs to be repeated to include a broader representative sample of the population of public sector project managers.

- There is need to create a more robust Project Management Unit or upgrade the existing one based on traditional Project Management principles.
- There is an urgent requirement for a concentrated training of Project Managers in the unit on Project Management so that the current managers can acquire the status of Certified Project Management Practitioners.
- The number of Project Managers in the unit needs to be upgraded significantly in number for them to be at par with the number of projects implemented.
- Adequate resources in terms of transport and budget need to be provided to facilitate control and monitoring of projects.
- For every project a baseline plan should be provided. As stated by Lockyer and Gordon (1996:96), a project baseline plan is a portfolio of documents which outline how to achieve the project objectives and that it should be a coherent document to guide the project through the implementation and project control cycle. So, the project baseline should be presented and discussed in the presence of all stakeholders at the project review meeting.
- It is very important to start the project with a kick-off meeting with everyone involved in the project. According to Frigenti and Comminos (2002:212) the purpose of the kick-off meeting is to ensure that all the essential elements are in place, that the team understands what is to be achieved and that all participants are motivated and committed to achieving project success.
- Monitoring remains an integral part of every project, so there should be enough calculated monitoring frequency prescribed for individual projects. As stated by Burke (1993:61), the frequency of monitoring on a project is dependent on several factors which are; the scope of the project, the number of people working on the project, the skill level of the individuals working on the project, the schedule/time frame of the project, the familiarity of the project, communication needs, the complexity of the project, the level of risk associated with the project and the resources associated with the project. Burke (1993:61) further states that monitoring can be carried out at the end of the project, continuously, regularly, logically, at task completion and at pre-planned decision points or milestones depending on the aforementioned.
- For a project to be successfully completed there should be appropriate and sufficient reporting to indicate the status of the project to project stakeholders. As stated by

Fregenti and Comminos (2002: 27), everybody involved in the project should be aware of the project objectives and how well they are being achieved. They should know what should be done and they will be motivated to work towards the remaining goals.

- The establishment of a change request board in the organisation is very crucial. As stated by Kliem (1997:217), in some organisations, a Configuration Control Board (CCB), Technical Review Board (TAB) or any other change control board are established to review all change requests. The board is given the authority to approve or deny change request as defined by the organization.

## **7.6 RECOMMENDATIONS FOR FURTHER STUDIES**

The research study was limited to investigating control and monitoring methods used by the Project Implementation Division in the Ministry of Infrastructure, Science and Technology so, in future, the study could be broadened up to include the entire public sector.

Since Project Management is a very broad practice with many Project Management institutions like Project Management Body of Knowledge (PMBOK) and Prince 2, further research should be undertaken to establish specific tools and techniques in Project Management that can be prescribed and adopted by the public sector in overseeing implementation of public projects. This will be done to specifically ensure effective and efficient implementation of projects to avoid cost overruns due to overdue or overlapping project duration. In today's world, Project Management is increasingly becoming an essential effective approach to managing and supervising projects and it is globally embraced by leading organisations that are result driven.

## **7.7 CONCLUSION**

The study investigated control and monitoring of public projects by Project Implementation Division (PID) in the Ministry of Infrastructure, Science and Technology in Botswana. The study findings showed that project control and monitoring by the PID were not effectively monitored and controlled due a number of factors that included among others lack of trained Project Management practitioners which culminated in lack of expertise in the area of Project Management. Recommendations were made in order to improve the control and monitoring of project implemented under their auspices.

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## **LIST OF APPENDICES**

### **APPENDIX A: CONSENT LETTER**

**To:** Research participants

**From:** Modise Lucas Sefhemo

**Student No:** 44085877

**Cell No:** 72277025

**Email:** sefhemo@yahoo.com

#### **SUBJECT: INFORMATION LETTER FOR PARTICIPANTS**

Dear Sir/Madam

I am currently studying towards a Masters Degree in Public Administration with the University of South Africa. For the purposes of my study, I intend to carry out research into the root causes of delayed or failure to completion of most government projects in Botswana. Therefore my research is titled: ***“Public Sector Project Implementation in Botswana”***. The investigation requires the completion of a questionnaire by interested Project Managers and project team members currently working on or overseeing public projects. Kindly note that by responding to the questionnaire, you would not only be making a valuable contribution to this research, but also provide invaluable insights into the future prevention of public projects failure in Botswana. It would therefore be appreciated if you would complete the attached questionnaire. Your individual responses are of importance to this research therefore do not consult with colleagues. The completion of this questionnaire should not take more than 20 minutes and you are assured of the confidentiality of your responses. Responses may be anonymous and your name is not required on the questionnaire. Your participation is voluntary and you may withdraw at any time without giving any reasons. This research is entirely free from any danger or risks so it is safe to partake in this study.

When completed with responding to the questionnaire, kindly enclose it in the envelope provided and it will be collected from your office on the agreed date. The completed research findings will be shared with your organisation on completion. All information regarding your organisation will be treated with the strictest confidence.

Thank you for your co-operation and the time that you have set aside for this research.

Yours faithfully

## APPENDIX B: RESEARCH QUESTIONNAIRE

**Title:** Public sector project implementation in Botswana.

This questionnaire has been designed to establish the prerequisites for project implementation in the public sector. The questionnaire is also designed to gauge the extent to which the control and monitoring methods and other techniques in Project Management are used the Botswana public sector by Project Implementation Division during implementation of projects.

All the information given in the questionnaire will be strictly confidential and will be used professionally for academic work only. Thank you for your kind cooperation.

### **1.0. Background information** (Make your choice by ticking inside the box)

#### **1.1. Age**

< 26    26-30    31-40    41-50    51-60    > 60

#### **1.2. Sex**

Male                       Female

#### **1.3. How long have you been involved in the management of projects?**

< 6     6-10     11-16     >16

#### **1.4. Do you possess a project management qualification?**

Yes                       No

#### **1.5. If yes, please tick the professional qualification level you hold in project management:**

Certificate    Diploma    Degree    Masters    PHD

Others (please specify)

.....

#### **1.6. What other professional qualification do you possess?**

.....

1.7. Please tick the professional qualification level you hold in the other qualification(s) given above.

- Certificate    Diploma    Degree    Masters    PHD
- Others (please specify)

.....

**2.0. Prerequisites for project implementation**

2.1. Prior to project implementation, are you presented with or given the project baseline plan for every project that you oversee?

- Yes                       No                       Sometimes

2.2. If yes, is the project plan submitted at a meeting (project plan review meeting) with the presence of all stakeholders?

- Yes                       No                       Sometimes

2.3. Is the project plan signed at the project plan review meeting as a way of accepting the project plan?

- Yes                       No                       Sometimes

2.4. How important do you think the project plan is?

- Not important                       Important                       Very important

2.5. Which of the following plans do you also require or are presented with, before the commencement of the implementation phase?

- Resource plan    Financial plan    Quality plan    Risk plan
- Communication plan    Procurement plan    Acceptance plan
- Supplier contract
- Others (please specify)

.....  
.....  
.....

2.6. How often do you require or are presented with plans above?

- Never     Sometimes     Always

2.7. What are the other items/documents that you require before the implementation phase?

.....  
.....  
.....

2.8. Do you perform a phase review at the end of the planning phase

- Yes       No       Sometimes

**3.0. Control and monitoring methods**

3.1. Prior to the commencement of the project implementation phase, do you convene or hold project implementation kick-off meeting with other stakeholders?

- Yes               No               Sometimes

3.2. If yes, do you hold project implementation kick-off meeting for every project?

- Yes               No

3.3. Do you apply project management control and monitoring techniques/tools when overseeing the implementation of projects?

- Yes               No               Sometimes

3.4. If yes, indicate by ticking below the control and monitoring tools/techniques that you apply during project implementation.

- Site meeting    Schedule charts    Gantt charts  
 Critical path analysis (CPA)    Program evaluation and review technique (PERT)  
 Milestone objective chart (MOC)    Earned value technique (EVT)  
 Critical ratio       Project management information system (PMIS)  
 Others (please specify)

.....  
.....

3.5. How often do you carry out control and monitoring on ongoing projects?

- Continuously    Regularly    At task/milestone completion  
 At pre-planned date       At the end of the project

**3.6.** During and after monitoring and evaluation of ongoing projects, do you compile progress status and performance reports for individual projects?

- Never    For some projects    For every project

**3.7.** How important do you think are these reports?

- Not important    Important    Very important

**3.8.** After monitoring and evaluation, do you recommend problem-solving measures to project stakeholders?

- Never    Sometimes    Always

**3.9.** When the need arises that the project baseline plan has to be changed or amended, which of the following techniques do you use?

- Never get involved    Change control process    Expert judgment

Project management information systems (PMIS)

Others (please specify)

.....  
.....  
.....  
.....

**3.10.** Do you have a board in your organization/department established to review all change requests on ongoing projects? The board should have the authority to approve or deny change requests.

- Yes                                       No

**3.11.** If yes, what is the name given to the aforesaid board?

.....

**3.12.** Do you have enough time to carry out control and monitoring during implementation of project?

- Insufficient                                       Average                                       Sufficient

**3.13.** Do you have enough resources in terms of transport, budget to use when monitoring implementation of projects?

- Insufficient                                       Average                                       Sufficient

**3.14.** Do you have enough human resources to carry out control and monitoring during implementation of projects?

- Insufficient                                       Average                                       Sufficient

**3.15.** Do you have a Project Management in your office?

- Nothing                       Little                       Average                       Sufficient

**3.16.** Please give any other information on control and monitoring techniques in project management that you use during implementation of project that may not have been covered by this questionnaire.

Additional issue 1

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.....

Additional issue 2

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.....  
.....

Additional issue 3

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.....  
.....

**Thank you very much for your participation in this study, your time and effort is greatly appreciated.**

# APPENDIX C: STATISTICIAN CONFIDENTIALITY AGREEMENT



## Confidentiality Agreement Template: Statistician

This is to certify that I, ANIKUTTAN S. KURUP, the statistician of the research project "*Project Implementation in Botswana, A Case Study of the Project Implementation Division, Ministry of Infrastructure, Science and Technology*" agree to the responsibilities of the statistical analysis of the data obtained from participants (and additional tasks the researcher(s) may require in my capacity as statistician).

I acknowledge that the research project is/are conducted by Modise Lucas Sefhemo of the Department of Public Administration and Management, University of South Africa.

I understand that any information (written, verbal or any other form) obtained during the performance of my duties must remain confidential and in line with the UNISA Policy on Research Ethics.

This includes all information about participants, their employees/their employers/their organisation, as well as any other information.

I understand that any unauthorised release or carelessness in the handling of this confidential information is considered a breach of the duty to maintain confidentiality.

I further understand that any breach of the duty to maintain confidentiality could be grounds for immediate dismissal and/or possible liability in any legal action arising from such breach.

Full Name of Statistician: ANIKUTTAN S. KURUP

Signature of Statistician: [Signature] Date: 8/7/15

Full Name of Primary Researcher: MODISE LUCAS SEFHEMO

Signature of Primary Researcher: [Signature] Date: 08/07/15



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## APPENDIX D: EDITOR CONFIDENTIALITY AGREEMENT

### EDITOR CONFIDENTIALITY AGREEMENT

**Date: 26 April 2016**

This is to certify that I Tafadzwa Mutusva ACMA, CGMA have edited this research dissertation titled: **PUBLIC SECTOR PROJECT IMPLEMENTATION IN BOTSWANA.**

The research dissertation was edited on behalf of Modise Lucas Sefhemo for the fulfilment of his Masters Degree in Public Administration at the University of South Africa.

I also do hereby declare that dissertation was edited in confidentiality, and that no information shall be disseminated to anybody without the consent of Mr Modise Lucas Sefhemo.

Kind regards,



Tafadzwa Mutusva ACMA, CGMA