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FACTORS CONSTRAINING THE DEVELOPMENT OF PROFESSIONAL PROJECT MANAGERS IN SMALL AND MEDIUM SIZED CONSTRUCTION ENTERPRISES IN SOUTH AFRICA

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A research report submitted to the Faculty of Engineering and the Built Environment, University of Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science in Engineering.



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2013

DECLARATION

I declare that this research report is my own unaided work. It is being submitted to the Master of Science to the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other University.

.....

Senzile Moilwa

21st day of May 2013

ABSTRACT

This dissertation reports an investigation into the factors constraining the development of professional project managers in small and medium sized (SME) construction enterprises in South Africa.

The 2011 census results revealed that South Africa is faced with a number of economic challenges including high levels of unemployment, low levels of investment, income distribution inequality and lack of skills development. In order to address these challenges, the South African government promulgated the Skills Development Act [No. 97 of 1998] with the aim of improving skilled workforce competency as well as providing appropriate education and training.

The South African government has identified that to achieve overall economic benefit, the development of Small and Medium- Sized Construction Enterprises is to be focused on. This is for the reason that they make up about sixty- three percent (63%) of the construction contractors in the country.

Project managers have been identified to play a vital role in the delivery of construction projects. The insufficient development of professional project managers in the construction industry have resulted in poor workmanship, cost overruns, time delays and overall performance deficiencies.

As a result of these identified problem areas, the investigation of factors constraining the development of professional project managers was achieved through the development of a questionnaire to collect the data from seventeen (17) SME contractors registered with the Construction Industry Development Board. The data were collected using close-ended questions, rating questions as well as open- ended questions within the questionnaire. After this process, the data were analyzed through the use of categorization of data and graphs to compare data collected.

The findings revealed that SMEs face financial constraints that ultimately results in lack of investment on improving the skills and competence of practising project managers. As a result, there is lack of professional development due to lack of education and training. This essentially affects effective administering of project management tools and techniques to manage construction projects.

The research concludes that there is need to fully implement the Skills Development Act within the construction industry, to encourage professional managers to register with professional project management associations so as to acquire the knowledge, skills and competencies to manage construction projects competently. The small and medium sized construction enterprises should formulate and implement policies to allocate resources to carry out training of project managers periodically to ensure they acquire the knowledge areas necessary to effectively implement project management in the delivery of construction projects.

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LIST OF ACRONYMS

Acronyms	Description
CBE	Council of Built Environment
CETA	Construction Education Training Authority
CIDB	Construction Industry Development Board
CPD	Continuing Professional Development
CPM	Critical Path Analysis
ETQA	Education and Training Quality Assurance
GDP	Gross Domestic Product
MBSA	Masters Builders South Africa
NASA	National Aeronautical Space Administration
NHBRC	National Home Builders Registration Council
NSA	National Skills Authority
OECD	Organization for Economic Co-operation and Development
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institution
PMSA	Project Management South Africa
RPL	Recognition of Prior Learning
SA	South Africa
SACPCMP	South African Council of Project and Construction Management Professions
SAPOA	South African Property Owners Association
SAQA	South Africa Qualifications Authority
SEDA	Small Enterprise Development Agency
SETA	Sector Education and Training Authorities
SME	Small and Medium- sized Enterprises
SMME	Small, Medium and Micro- sized Enterprises
WBS	Work Breakdown Structure

GLOSSARY OF CONCEPTS

Continuing Professional Development – this is the continuous education system that allows professionals to ensure that competence in practice, taking in knowledge and practical experience are achieved through periodical education activities (PMI).

Professional project management – these are project management certified individuals. The professional project managers are required to have gone through a basic level of formal education to gain the qualification necessary to qualify as a professional project manager. To maintain professional project manager status, individuals must register to continuously improve and develop their skills and competency with the registered professional associations (PMI).

Qualification – a formal education to attain capacity, knowledge or skill at a higher learning that makes someone suitable to be a practitioner for a particular profession (CETA, 2000).

Training – is an acquisition of skills and competencies as a result of practical skills imparted onto the individual professional (CETA, 2000).

Skills- an ability and capacity acquired through knowledge and practice to achieve competence (PMBOK, 2012).

CHAPTER 1

INTRODUCTION

CHAPTER 1: INTRODUCTION

1.0 Introduction

The purpose of this dissertation is to report on an investigation into the factors constraining the development of professional project managers in small and medium sized (SME) construction enterprises in South Africa.

The most recent census results revealed and concluded that South Africa is faced with a number of challenges including high levels of unemployment estimated to be over thirty percent of the population (www.statssa.gov.za), low levels of investment, disparities in income distribution and skills development (Mahadea and Pillay, 2008). As a result the Skills Development Act was enacted in 1998 (Act 97 of 1998). The main purpose of the Act is to help address these challenges through the creation and improvement of a skilled workforce for the national economy (Skills Development Act 97, 1998). With the emerging economy status of South Africa and the country's recently launched National Development Plan 2030; the construction industry has been identified to have a significant role to play in the achievement of South Africa's socio-economic development (www.ceta.org.za).

The construction industry is the main sector of the national economy responsible for the creation of the built environment. Several professionals, artisans and manual workers including skilled, semi-skilled and unskilled workers operate within the construction industry environment (Lenfle and Loch, 2012). One of the major professional roles within the construction industry is the role of the Project Manager (Cicmil *et.al*, 2006). For example, out of the six statutory Councils under the umbrella of the Council for the Built Environment, there is a South African Council for the Project and Construction Management Professions (SACPCMP). Project Managers perform an important function in construction supply chains (Edum-Fotwe and McCaffer, 2000). They help to manage resources on site to ensure completion of projects according to time, cost and quality projections as explained in the Guide to the Project Management Body of Knowledge (PMBOK, 2012).

There are nine main knowledge areas within the Project Management profession (PMBOK, 2012) and project managers constantly need to acquire and develop skills

relating to each of these areas in order to function effectively for the benefit of the construction industry and the national economy. However, according to Crawford *et.al* (2006), this kind of systematic professional development does not always happen in practice as will be explained in this dissertation.

According to the CIDB, the nature of the construction industry structure in South Africa implies that SMEs form more than sixty- three percent (63%) of constructions firms operating within the industry (CIDB, 2004). Therefore it is important to understand the role and development of project managers within such firms and the factors constraining the development of their skills and professional competence.

The remaining part of this introductory chapter comprises of the following sections:

- A general background to explain the context, purpose and importance of the research;
- The primary and secondary research questions;
- The specific objectives of the research;
- A summary of the method adopted for the research as well as the structure of the research report; and
- The scope and limitations of the research.

1.1 Background and need for the Research

The South African construction industry faces unique challenges due to its history. The primary challenge faced is that it was estimated that half of the workforce was unemployed, the majority of which have no skills and minimal education (Kambuwa and Wallis, 2002). Having identified this challenge, the South African government resolved that along with the benefit of basic infrastructure that is much needed in the country, the overall economic benefit has been identified as provision of construction jobs, improvements of work productivity and the growth of small and medium construction enterprises (McCutheon, 2002). This resolution was documented by the Department of Public Works White Paper (1999) which aims at "*creating an environment for reconstruction, growth and development in construction industry*". The policies outlined in the Department of Public Works White paper (1999) demonstrated the need for investment in the growth of SMEs, which are primarily small- scale black contractors, who have been targeted by the government to

improve quality, competitiveness, profitability while meeting the client's needs and desires. Ngowi *et.al* (2005) further stated that in developing countries most of the building is done by small and medium sized construction enterprises. As a result, education and training in the small and medium sized construction firms has been recognized as a long term investment that is expected to result in poverty reduction in South Africa (Kambuwa and Wallis, 2002).

The basis of the need for the development of skills in South Africa came along with the Skills Development Act 97 (of 1998), which came about in the midst of high levels of unemployment in South Africa (Erasmus and Van Dyk, 2003). The aim of the Act is to address the need to improve skills through an increase in investment in education and training of labour. Construction Education and Training Authority (CETA) was established in April 2000 to focus on the development of Skills specifically in the construction industry. It was based on the essence and principles of the Skills Development Act 97 of 1998 (Erasmus and Van Dyk, 2003).

The focus of this dissertation is the investigation into the development of the professional project managers within the construction industry to improve the economy. This is primarily because the construction industry plays a very important role in the process of economy development (Ngowi *et.al*, 2004). This statement is supported by Giang and Pheng (2011) who stated that the role of the construction industry in the economic development is a vital relationship in developing countries. They further state that the use of construction investment as a tool for the government to stabilise the economy also shows the industry's key position in the national development strategy.

In order to improve the economy of a developing country, there must be availability of adequate resources, at the appropriate time, place and cost (Giang and Pheng, 2011).In addition in order to manage the resources, capabilities should be available to convert the resources to physical facilities such as infrastructure in order to accommodate and improve the quality of life. One of the main challenges faced by any growing economy is the lack of resources and acceptable capabilities needed to achieve the basic needs in human settlements (Ngowi *et.al*, 2004). The examination of the construction industry in developing countries is a necessity to allow for the gap between the minimum needs and available resources to be addressed.

As do most developing countries, the South African construction industry faces unique challenges of providing basic services such as water, sanitation and electricity (Bond, 1998). These projects mostly involve basic services such as water provision, municipal services and mostly, job creation. The government's policy is to empower emerging contractors who form small and medium construction enterprises (SME). According to the Construction Industry Development Board (CIDB) SMEs find it difficult to deliver infrastructure appropriately as they face the challenges of lack of resources prohibiting them to invest in resources that would enable the delivery of infrastructure effectively and efficiently (Ngowi *et.al*, 2004).

Although the government aims to address the previously disadvantaged contractors, due to their lack of education and training, they have not been able to deliver projects effectively and efficiently. National Home Builders Registration Council (NHBRC) released a Builders Bulletin statement in 2004, which stated that there is a need for better workmanship on projects as there is poor quality being delivered by SMEs. Therefore, there was a need for competent professional project managers to execute better planning and controlling of projects (NHBRC, 2004). This statement is supported by the Construction Industry Development Board (CIDB, 2004), expressing that "*SMEs lack the requisite management skills in the industry, prevents effective implementation of various project management techniques".*

SMEs by nature are relatively small firms with limited financial resources and little managerial experience. It is for this reason that improved project management techniques are to be implemented in small and medium construction enterprises from the inception stage of the project right through to the completion stage (Berry *et.al.* 2002). In doing so, this could achieve good quality infrastructure and save the client project costs. Another weaknesses discovered in the construction industry of South Africa, specifically in SMEs is low labour productivity as well as excessive underbidding and a scramble for work outside professional's usual fields of operation (CIDB, 2004).

Ofori *et.al* (1996) recognise that training of the construction workforce should be given a priority and to offer employment to the large pool of unskilled workers. Construction Industry Development Board (2004) has identified project management techniques to be crucial in delivering infrastructure to achieve the client's needs as

well as on time and within budget. The importance of effective project management has been supported by Project Management Tools and techniques (2000: 3); the following are encountered when managing construction projects;

- Time delays
- Cost overruns
- Performance deficiencies.

Kerzner (1995) states that effective application of project management allows the delivery of projects to be projected thus dealing with implications of the length of construction and thus sourcing finances from lending institutions. SMEs have limited funds and thus effective planning has to be employed to improve the profitability of the contractors. Another key factor is quality of infrastructure. The construction bodies have a mandate to ensure acceptable quality of infrastructure in South Africa by ensuring there is good workmanship on projects. This can be brought about by proficient planning and control techniques implemented by professional project managers (Bigelow, 2001). Department of Housing White paper (1995) appointed National Home Builders Registration Council (NHBRC) to address poor quality workmanship and establishment of warranty fund to give housing consumers security in case contractors fail to meet required building regulations (NHBRC, Builders Bulletin, 2004).

A key factor to focus on is the development of project management as a profession. The Government of South Africa recognised this need and thus developed a policy to empower emerging contractors who form small and medium construction enterprises (SME). The government has authorised the Council for the Built Environment (CBE), Construction Industry Development Board (CIDB), Construction Education Training Authority (CETA), Masters Builders South Africa (MBSA), South Africa Property Owners Association (SAPOA) and National Home Builders Registration Council (NHBRC) to implement good construction practice and improve performance (Dlungwana*et.al*, 2002).

The poor delivery by SMEs in South Africa is found to be attributed to lack of planning, control and scheduling of construction projects using formal professional project management practices (Bigelow, 2001).Unrealistic infrastructure deliveries made by SMEs default on delivering the project within budget, on time, safely and to

the client's satisfaction of their needs and desires. This is supported by the NHBRC (Builder's Bulletin, 2004) which states that "*because of lack of professionalism and sustainability, homebuilders have a life span of six months in the industry since they experience cash flow problems in their projects."*

Project Management has been identified to play a pivotal role in the construction industry; this is supported by Winter *et.al.* (2006) stating that "*recent industry reports also highlight the growing adoption of project management standards in practices across large numbers of organisations*". Work is increasingly organised through projects and programmes that are undertaken by a project team and thus project management practices are becoming progressively more important. However despite the increase in the demand of Professional Project Managers in construction projects, the competence of project management professionals continue to attract criticism, mainly because there is a difficulty in determining what the role of professionals encompasses (Crawford *et.al.,* 2006). Firstly there is an issue of professionalism with regards to professional project management, followed by the challenge of whether the scope of qualification and associated training and development material is appropriate to the real roles of the professionals. Professional project managers are not registered with professional association boards to govern their practice as well as improve the profession (Gale, 2002).

One of the key challenges is to provide sufficient training to enable project management professionals to move from trained technicians who follow methodologies on well defined projects to professionals who are able to learn, operate and adapt effectively to complex South African construction environment (Gale, 2002).The project management techniques that are applied to actual projects in South Africa are an area of concern as it is a developing country and thus faces the challenges of socio- economic constraints, lack of appropriate technology as well as lack of expertise to deliver projects successfully, among other highlighted challenges that South Africa faces (Bond, 1998). Project managers in construction are responsible for the overall success of delivering the infrastructure projects on time, within the budget, in accordance with the desired quality and safety requirements. According to Crawford *et.al,* (2006) the role of the Project Manager has evolved through time. This is attributable to the changing industry's procurement methods and generally changing industry climate has lead to the research on the

development of project management professionals as well as challenges faced and thus ways to enhance project management practice.

It has been recognised that the majority of practising professional project managers in South Africa have not gone through the necessary project management training, lacked sufficient knowledge, skills and experience and are not registered with the professional project management association to govern the profession, promote and improve the practices (Crawford *et.al,* 2006). The South African construction industry is better off promoting the development of professional project management rather than increasing the number of professionals. Chipulu (2011) sums up this background by acknowledging that there is a lack of qualified and experienced project managers, and for as long as this challenge still exist, the South African construction industry will not expand and improve.

1.2. Problem Statement

The challenges for professional development of project managers in the construction industry have resulted in poor workmanship, cost overruns, time delays and overall performance deficiencies (Crawford *et.al,* 2006). Van Mook *et.al* (2009) define professionalism as a body of knowledge and skills (expertise) put into service for good of others and welfare of the society. Having defined professionalism, van Mook (2009) has gone on to state that the lack of competent project management is primarily due to lack of qualification, training and non- participation in the Continuous Professional Development (CPD) programmes initiated by professional bodies.

The challenges of competent professional project managers firstly originate from the lack of clarity on exactly what the role of the professionals involved in the management of construction projects is (Barry and Sebone, 2009).This seems to be unclear to the stakeholders in the construction industry. However, having said this, the challenge comes in because project management job families and career paths are not well established (CETA, 2004).In addition to the lack of clarity of the functions of project managers, Wysocki *et.al* (2000) stated that the problem is that the term ‘project manager’ is used to cover a very broad range of responsibilities. This is the underpinning problem to the development of project management professionals because, it is not thoroughly defined and so it is a key factor constraining the competency of SME project managers.

Another significant challenge faced by professional project managers is the question of whether there is sufficient training and development material that is appropriate to the real roles played by SME project managers in the current complex construction environment (Liu, 2003). Consequently, the knowledge and practices covered by project management body of knowledge represent a relatively limited part of what is actually needed to fulfil project managers' roles effectively. Twinn (2013) has recommended that serious consideration be taken in to the promotion of registered and recognised professional association bodies as their purpose is to represent the interest of professional project managers, promote the profession to stakeholders, continuously improve the development of the profession to ensure that they are up to date to keep up with the industry and to advance the profession as a whole (Project Management South Africa- PMSA).

The poor image of small and medium construction enterprises in the construction industry in South Africa stems from a failure to plan, control and schedules their construction projects which are constrained by the lack of competency of professional project managers (Ofori *et.al*, 1996). As a result the lack of professional project managers and their development can be addressed by an alignment between the theory and practice of project management (Twinn, 2013).

1.3 Aim of the Research

The aim of the research is to develop a better understanding of the significant factors constraining the development of professional project managers in small and medium- sized construction enterprises in South Africa.

1.4 Research Objectives

To this end, the specific objectives of the study are as follows;

- To ascertain how the business environment and characteristics of SMEs affects the continuous professional development of project managers' skills and competencies.

- To examine the extent to which formal project management techniques are utilized in SMEs; and how this affects the continuous professional development of project managers.
- To analyse the internal and external factors that constrain the continuous professional development of project managers in SMEs in South Africa.

1.5 Primary Research Question

The purpose of this research is to conduct an in-depth investigation into the following main question;

- What are the significant factors constraining the development of professional project managers in small and medium- sized construction enterprises in South Africa; and how can these be addressed?

1.5.1 Key Research Questions

The following sub-questions have been formulated to help address the specific objectives relating to the research question;

- How does the characteristics and business environment of small and medium construction enterprises relate to the development of professional project managers' skills and competencies?
- To what extent is the application of formal project management techniques utilized in small and medium enterprises; and how does this affect the development of skills and competencies of project managers?
- What are the external and internal factors that constrain the development of professional project managers' competency in SMEs?

1.5 Brief Overview of Research Method

The aim and objectives of the research were achieved by using the following research methods and structure;

- An extensive literature review was carried out on project management professional development generally and its development specifically in small and medium- sized construction firms. This helped develop a set of research questions relating to gaps in the existing literature.
- The design and use of structured questionnaires to collect data from the selected sample. The main respondents chosen for the study were senior project managers based in SMEs in South Africa. In each instance, a telephone call was first made to seek the respondent's consent and willingness to participate in the research, and to explain the purpose and nature of the study. This was also done to obtain the email addresses of the respondents over the phone to enable a set of the questionnaire to be emailed to them for self-completion. Altogether, thirty (30) copies of the questionnaires were sent out following this process. Eleven (11) respondents completed their questionnaires within the 2 week period request and emailed them back to the researcher. For respondents who failed to respond within the 2 week period requested for completion, the researcher followed up personally by visiting their offices to remind them to complete the questionnaire. This follow up helped to obtain seven more responses out of which one was discarded because it did not meet the SME criteria. A total of 17 questionnaire responses were therefore used for the analysis.
- The data collected were analyzed using a combination of categorizing the data and employing appropriate statistical techniques.
- This process helped to generate findings relating to the research objectives, which were discussed to draw appropriate conclusions and recommendations.

1.6 Research scope and delimitations

The research scope has been restricted to the following;

- *Geographic*- The study was focused on Small and Medium Construction Enterprises in the Johannesburg, Gauteng area registered with either National Home Builders Registration Council (NHBRC) or Gauteng Masters Builders Association. Research is confined to Gauteng. The main reason for this selection is because a significant population of SMEs are based in the Gauteng Province and can be easily traced and contacted for the purposes of data collection and any necessary follow ups. It has already been explained that the main reason for focusing the study on SMEs is because the CIDB database indicates that they form a majority of the population of construction firms.
- *Management Level*- The study was limited to examining the professional project managers who are senior and middle management. The reason for focusing on senior project managers is because they have a relatively longer period of experience in the construction industry and hence this will enable the researcher to better examine the role and impact of continuous professional development in their careers and skills development over a longer period of time.

1.7 Research Report Structure

The research report is structured into the following six chapters;

- Chapter 1: This serves as an introductory chapter where the purpose of the study is discussed, drawing out the research questions, objectives as well as the aim of the research conducted.
- Chapter 2: This provides a review of the existing literature on the topic of interest to bring to light the existing challenges of professional development in project management practice.
- Chapter 3: This provides an overview on the research design and discusses the data collection techniques selected for this research.
- Chapter 4: This covers the data collection and presentation aspects of the research.

- Chapter 5: This is the analysis and discussion chapter. The discussion of the findings relates the findings of the research to existing findings in the literature and the knowledge gained from the literature review.
- Chapter 6: This chapter summarises the entire study and articulates the main findings and conclusions flowing from the research; presents recommendations; and proposes areas for further study.

CHAPTER 2

LITERATURE REVIEW

CHAPTER 2: LITERATURE REVIEW

This chapter is aimed at reviewing existing literature relevant to this study. This chapter is set out to examine the framework of the constraints of professional project managers in SMEs in the South Africa construction industry and covers the following:

- In order to gain understanding of the purpose of project managers, project management as a profession is introduced and defined. After which, the tools and techniques that fall within the project management discipline is discussed in detail. The development of project managers, constraints of the professional development and literature on how to overcome the constraints is reviewed.
- The introduction and definition of Small and Medium Sized Enterprises is discussed. This is followed by a global perspective of SMEs for comparison, as well as the role played by SMEs within the South African construction industry.
- In order to understand the nature and characteristics of SMEs in South Africa, the country's unique construction industry is discussed. To draw out the uniqueness of the South Africa as a developing country, a brief comparison is done with the global perspective of the construction industry.
- Having explained the SMEs and the construction industry in South Africa, the problem statement is further explained by drawing out reasons of poor performances of South African SMEs.

2.1 Project Management

"*Project management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements"* (PMBOK, 2012). The Project Management Body of Knowledge (2012) further on states that project management is accomplished through the implementation and incorporation of project management tools and techniques that happen at different project stages such as planning, executing, monitoring and controlling, and closing stages. The person responsible for accomplishing all project objectives is termed a Project Manager. Project Managers play a fundamental role in the operational activities of architectural and engineering construction companies and the development of infrastructure in every country.

2.1.1 Project Management Introduction

Project management is one of the most popular and widely applied management systems currently used. According to Lenfle and Loch (2010), the objective of project management is to deliver complex requirements by employing methods, systems and tools to deliver any project successfully, the fundamental of project management lies in the ability to ensure control. Control is usually applied to work of a discontinuous nature and associated with an unpredictable level of change throughout the life of the project. As a result, project management has been deemed necessary in the construction industry.

Project management profession is a relatively modern managerial concept which adopts management techniques for each specific task. According to Burke (2007), project management can be traced back to the First World War when Henry Gantt drew the first project diagrams to manage the building of freighters. Project management can also be traced back to works carried out in the United States of America where they were made popular by the Department of Defence in major weapons system development, the National Aeronautical Space Administration (NASA) in space exploration and major construction and maintenance efforts (Kerzner, 1995).

Kerzner (1995) further states that the concept of project management is not entirely a new invention; the growth of project management was slow and was developed mainly to facilitate the delivery of complex tasks. The slow growth is attributable to

resistance to change due to the fear of unknown, which the construction industry continues to be one that characteristically resists change (Haupt, 2001).

"*The success of effective project management is measured primarily by the ability to ensure that the objective has been met within agreed budget, time frame and to an adequate quality"* (Ashleigh *et.al* 2011). It is for this reason that project management is increasingly being adopted in all areas of the construction industry because of the importance to deliver construction projects on time, within budget and to an acceptable quality. This supports the PMBOK's (2012) definition of project management, which states that project managers are governed primarily by three constraints, namely project scope, time and cost when managing projects. A project consist of a task with defined end target, therefore project management is considered to be tools and methods used to convert the idea of the project and manage the change process to achieve the defined end targets within agreed parameters (Burke, 2007).

However, it must be noted that project management is not applicable to the construction industry only; it has been adapted to be used in any industry to solve a task. Waldt and Knipe (1999) have provided the example of the 1996 Olympic games in Atlanta, where project management techniques were largely employed to build sports facilities and to manage the Games as well.

South Africa has experienced an increase in the use of project management across sectors, from the construction industry, information technology, defence and development, and more recently the government sectors such as education, publishing and the rest of the government divisions (Knipe *et.al*, 2002). Although the concept of project management is not new in South Africa as the tools and techniques have been used, the technology that supports project management is not widely used (Knipe *et.al*, 2002).

Project management has become important in the construction industry due to the recent trend of fragmentation in the industry according to trades, skills and profession. Although this has brought about benefits to the construction industry, it has also resulted in the challenges of coordination, planning and interface relations. It is for this reason that the management of the construction project has become necessary. This statement is supported by Alshawi and Ingirige (2003) who argue

that problems in the construction industry is brought about by lack of fully integrated procurement systems, stringent deadlines set by clients, interference by clients, time constrains and lack of professional coordination. Project management can resolve lack of planning, coordination and lack of overall integrated system that is experienced by the construction industry. According to Faniran (1999) and Miles (1997), it is necessary to develop better project management tools and techniques for developing countries to address their unique challenges that are caused by political unrest and excessive bureaucratic contract procedures and lack of adequate infrastructure in place.

According to Kerzner (1995) the concept of project management has emerged as a specialist management field to deal with the planning, organizing, directing and controlling the complex relationships and activities in any given project. Project management is adopted to fulfil the client's needs of predetermined costs, time and quality. In order to make clear the definition of project management in the context of construction, a definition of project is to be discussed below followed by a complete definition of project management.

2.1.1.1 Defining a Project

The Project Management Institute's guide (PMI) defines a project as "*a temporary endeavour undertaken to create a unique product or service."* It is defined as temporary because every project should have a defined beginning date and ending date thus running for a defined time frame. This is the difference between projects and operations as operations are ongoing as opposed to projects. Projects are termed unique because the product delivered is different in some distinguishing way from all similar products (Burke, 2007).

Projects have special features that distinguish it from operations. These include a clear start and finish date, projects have a lifestyle that comprises a beginning and an end with distinct phases in between, projects involve schedules and timelines, a defined budget often broken down into work packages (PMBOK, 2012). Projects are unique and non- repetitive, coordination of limited resources and they have a single point of responsibility in the form of a project manager or leader responsible for the execution of the whole project by the project team involved (Burke, 2007).

According to Frimpong (2003) Projects often range in type, size, scope, cost and time from small domestic projects which last for a short time to large multi million international projects that are implemented over many years. Burke (2007) states that the current trend is for large companies that have several small projects to adopt management-by-projects approach where all their projects are channelled through a project office. The type of project that is more relevant to this study as it describes construction industry is the painting my number type of project. These are closed projects where the project participants have a high degree of certainty on the project scope, processes, and project tools and know what is to be achieved and how to go about achieving it. This fits construction project as painting by number projects is defined as complex, large and involves many parties. In order to deliver this type of project successfully, effective processes and good workflow is necessary (Frimpong, 2003).

However, it is important to remember that the definition of project management is not merely the merger of the words “management” and “project”, but include central dimension to complete the definition of time, cost, quality (Smallwood, 2000). These parameters are considered to be the project management performance indicators.

2.1.1.2 Defining Project Management

According to the Project Management Body of Knowledge (2012) project management tools and techniques are vital to deliver projects within time, within budget and to acceptable quality standards set out during the project scope definition and planning phases. From this definition, it is apparent that the purpose of project management is to meet the client’s expectations; therefore, the project must be clearly defined from the beginning stages including the project scope, time frame, funds available as well as the quality expected. The PMBOK definition is very broad definition of project management; however, PMBOK has nine knowledge areas within project management, namely, scope, quality, risk, time, human resource management, procurement, cost, communication and integration. These are main areas that project management is concerned with, which is a lot more specific definition of project management.

Having mentioned the nine areas of knowledge, the refined definition of project management is the most efficient way of introducing change, achieved by; a clear

definition of what is to be accomplished in terms of time, cost and quality. Project management involves developing a plan to achieve these and ensuring the plan is adhered to and progress is made in line with the defined scope. Throughout the process the appropriate project management tools and techniques are to be adopted to plan, monitor and maintain progress. Project management also includes the management of human resources; employing the right skilled person for the project including the right project leader to manage a team and ensuring that the team have the resources they need to execute the project successfully.

The PMBOK (2012) describes project management under the nine knowledge areas, which have been elaborated on by Burke (2007). These knowledge areas are as follows;

- Project Scope Management

This involves the identification of all work required to complete the project successfully. This area is primarily concerned with defining and controlling what is or what is not included in the project to meet the client's expectations. It consists of scope planning, definition, scope verification, creating the work breakdown structure, scope control and scope change management.

- Project Time Management

This component of project management is to ensure that the project is completed within the defined time. It includes activity definition, activity sequencing, and the time allocation to each activity.

- Project Cost Management

This is to ensure that the project will be completed within the approved budget. To achieve this resource planning is to be done, cost planning and budgeting, cost control as well as cash flows that are to be maintained for the duration of the project to make sure that the allocated costs have been spent appropriately.

- Project Quality Management

Project quality management is to ensure that the project will satisfy the needs of the client. This is done through quality planning, quality assurance and quality control systems.

- Human Resource Management

These are processes required to make sure the most effective use of people involved in the project. It consists of organization planning, staff recruitment and team development.

- Project Communications Management

This is another knowledge area of project management where processes required ensuring proper collection and distribution of project information is carried out. This is done through communication planning, information distribution, project meetings, progress reporting and administrative closure.

- Project Risk Management

Project risk management includes the process that is primarily concerned with identifying, analysing and responding to project risk. This is done through risk identification, quantification and impact, response development and risk control. It is good project management practice to cost all key risks identified.

- Project Procurement Management

Project procurement management comprises acquiring goods and services from the outside the performing project team and organization. This includes procurement planning, solicitation planning, solicitation, source selection; contract administration and contract close out.

- Project Integration

This involves the processes and activities that integrate the various project management processes and coordinated. These processes are those that integrate the planning, execution and control techniques, where inputs from several knowledge areas are brought together. Specifically, the project charter is developed

through the specification of preliminary project execution, monitoring and controlling project work plan.

To further define project management and its knowledge areas, the Chartered Institute of Building report (CIOB, 2002) added to the definition as the process of planning, organizing, directing and controlling human, material and financial resources as well as the safety elements in the project. Project management is achieved through a sequence of activities which form phases of a project, which then must be transferred to the subsequent phase to achieve the next phase. PMBOK defines the processes as *"a set of interrelated actions and activities that are performed to achieve a pre- specified set of products, results or services".* The cyclical nature of a project is known as the project life- cycle (Frimpong, 2003). Burke (2007) has subdivided the phases into five steps which are linked by the results they produce; one outcome from one phase is often the input of the next phase.

- Initiation Process

The first phase is to establish a need or opportunity for a product, facility or service. This is where the project starts, it is the stage where the project is identified, the charter is drawn up to give the project identity and a feasibility study is put together to ensure that the product can be made and the best use of company resources (Burke, 2007). At this stage the project manager has to perform activities that will establish and assess the size of the project, scope, budget and complexity of the project (Healy, 1997).

- Planning Process

Having designed the project and the drawings and specifications are available, this phase of the project cycle involves clear definition on the activities and the work needed to complete each activity. This part of the phase involves selecting and developing the best course of action to attain the objectives established at the initiation stage (Burke, 2007). Hoffer *et.al* (2002) further states that the planning stage often requires a lot of assumptions made on the requirement and availability of resources. A budget is allocated at this phase as well as procurement for long lead times.

- Execution Process

On acceptance of the baseline plan the actual physical construction takes place; it puts the plans into action through an integration of processes, instructs and coordinates people and resources to implement and carry out management plan.

- Controlling Process

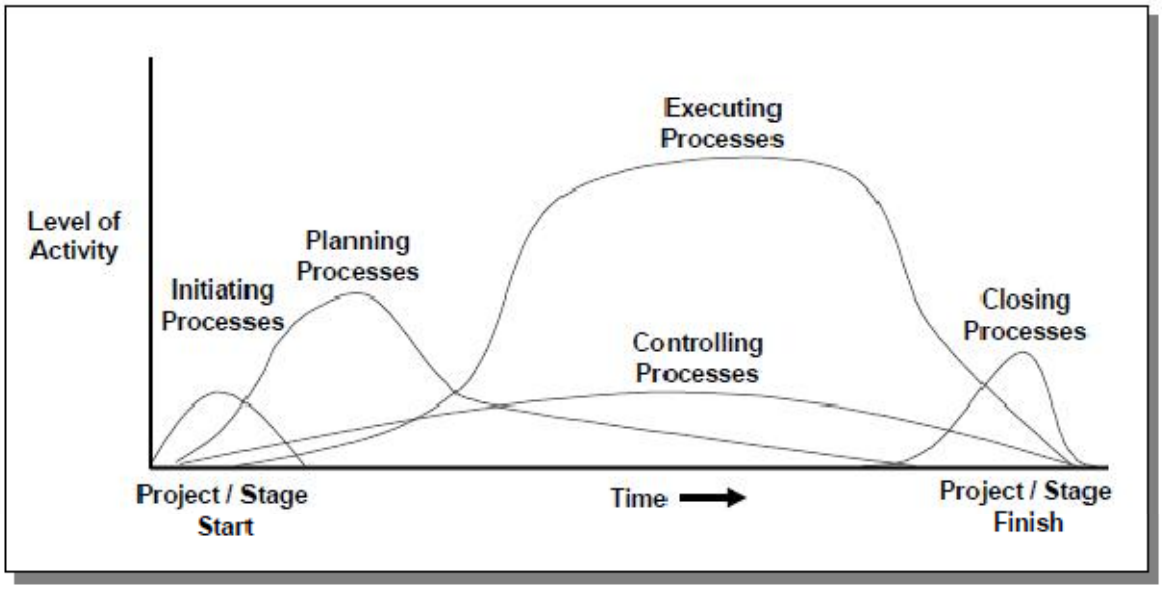
According to Burke (2007) the training process ensures that the project objectives are not deviated from during the implementation of the project by monitoring and measuring progress regularly to identify variances from the management plan.

- Closing Phase

This process involves a formal acceptance of the projects and bringing it to an orderly end. This involves commissioning the product and handing over to the clients. The project is considered to be concluded when all the requirements have been met (Hoffer *et.al.* 2002).

To further explain these processes, Figure 1.0 depicts all the processes, which stage in the project they are used as well as how they interact.

Figure 1.0: Project Management Process Interactions



Source: Duncan (1996)

The project life cycle Figure 1.0 shows an overall picture on the processes involved when managing construction projects. Figure 1.0 shows that at the beginning of the project the initiation stage begins and carries on for a short time at the beginning, which is overlapped by the planning process that has to happen at the beginning stages. The planning processes carry on until close to project completion where it decreases as execution of works increases. It is important to note that the controlling process happens throughout the life of the project, which is one of the project manager's main responsibilities.

To narrow down the definition of project management, the project life cycle stages outlined in Figure 1.0 are to be connected back to the PMBOK's nine knowledge areas in order to understand how the two are brought together. For example, during the inception stage, in order to define the project it must be done so according to scope management by establishing the feasibility study. Another knowledge area to be defined is the time management defined by estimating the duration of the project, cost management defined by identifying the cost estimates as well as quality management which is defined by distinguishing the required quality condition. In order to define a construction project, other areas to be identified at the inception stage is human resources requirements, the risks involved, establishing lead times for procurement and to identify other components to be integrated during the project (Burke, 2007). This is an example for the initiation stage; the same nine knowledge areas apply throughout the cycle of projects.

2.1.2 Project Stakeholders

Project stakeholders are defined as individuals and organizations that are actively involved in the delivery of the project, or whose interests maybe positively or negatively affected as a result of project execution and successful project completion (Frimpong, 2003). In order for the project to be a success, the role players must be identified and have their roles and responsibilities clearly outlined.

It is evident from Table 1.0 that the project manager is responsible for heading the construction project and integrating all the other stakeholders in order to achieve a common goal and satisfy the customer's needs. This structure is supported by PMBOK (2012) stating that the project manager is the individual responsible for managing the entire project. The customer is defined as the person or organisation

that will use the end product. The customer and user are synonymous for the sake of simplicity. The performing organisation has been described as the enterprise whose employees are directly doing the work (PMBOK, 2012). This figure has however not included the project management team, who play a role in ensuring that the project is executed according to the Client's requirements.

Table 1.0: Key Project Stakeholders

Stakeholder	Role
Project Manager	Individual responsible for managing the project
Customer	Individual who will use the product delivered by the project
Performing Organization	Enterprise whose employees are most directly involved in doing the work of the project
Sponsor	Individual or group within the performing organization that provides the final resources, in cash or in kind, for the project

Source: PMBOK (2012)

Table 1.0 is a simplified structure of stakeholders in order to identify them. According to the Project Management Body of Knowledge (2012), it is challenging identifying the stakeholders in construction because not everyone involved in the project is a stakeholder. The definition of stakeholders has been narrowed down into the groups depicted by Table 1.0. The failure to identify the correct stakeholders and where they fall can cause problems for the project manager.

However managing different stakeholders and different disciplines often result in conflict that the project manager must delicately resolve to ensure that the project does not stall. Carassus (2004) states that generally, conflicts between different stakeholders must be resolved by the project manager in favour of the customer without disregarding the needs of the other stakeholders. This is one of the major challenges faced by project management professionals.

2.1.3 Project Management Techniques

The Project Management Body of Knowledge (PMBOK, 2012) contains the innovative, collective and widely applied knowledge that is to be known by professionals of project management. The primary use of the PMBOK is to identify the project management practices that are generally accepted and are applicable in most projects. The project management tools and techniques that are contained in the PMBOK are further explained below.

There are many techniques available to assist with the accomplishing the tasks and executing the roles and responsibilities of project managers. These techniques include project planning, scheduling and controlling. These are part of the principles of project management outlined above. The elements that need to be planned, scheduled and controlled are the scope definitions of project management, the most significant components being time, cost and quality of the end product. In doing so, the resources required such as plant, material and labour can be ordered and organised well in time so as to avoid delays in the delivery of the construction project (Oberlender, 1993). Thorough planning minimises project risk and thus project failure, therefore if applied appropriately, the project management techniques will facilitate a successful delivery of a construction project. Some of the techniques are discussed below.

2.1.3.1 Importance of Planning

Burke (2007) defined project integration as the "*processes required to ensure that the various elements of the project are properly coordinated*". This is important to define for the reason that, as explored, the construction industry has several stakeholders from different disciplines that are involved, consequently in order for the project manager to coordinate and integrate the several activities, they must be involved in thorough planning from the beginning stages and monitor the actual progress compared with the plan to ensure minimum deviation. It involves looking at the project plan holistically and determining the most important and urgent matters and trading among competing objectives and exploring alternatives, depending on the stage of the project life cycle. In addition Kerzner (1995) defined project planning as the determination of what is needed to be done, by whom and by when in order to meet the client's requirements. This is supported by Bigelow (2001) who claims that planning is the most important yet most undervalued element of project management. Planning is the map that gives the project direction in terms of where to start, what input and processes are needed as well as to clearly outline the roles and responsibilities of all stakeholders.

Planning is critical to the project management process because it sets in motion the project scope, schedule, resource availability and requirements as well as risk and integration.

According to Bigelow (2001) planning is often over looked as there is a general perception that it is a process that is time consuming. According to Bigelow (2001) the current industry does not appreciate the value of planning as a result even if there is a plan in place, substantial changes are made to it primarily because the scope is not clearly defined. This is supported by Duncan (1996) who states that "*the bottom line is that we need to be thorough and effective as we construct a comprehensive plan for managing our projects*". Planning is essential, especially in the current trend of complex and ever changing construction industry because it means that the project has not been done before.

To further expand on the definition of planning, Burke (2007) stated that planning can be characterised as strategic, tactical or operational. Where strategic planning is generally for five years or more, tactical is between one year and five years and operational planning is between six months and a year. Most projects planning is operational, however the following must be properly studied and considered; the market, competition, production, financing, personnel and management structure. The planning can be strategic, usually if there is a promise of a follow up project. This would entail the consideration of long term goals and objectives and the planning will have to be reviewed from one period to the next (Kerzner, 1995).

Therefore, in order to achieve the performance parameters of cost, time and quality, one must employ effective planning techniques. In turn, the detailed planning will produce a schedule in which a plan reflects the work as it is implemented.

2.1.3.2 Scheduling a Project

This is the consideration of the work that has been planned to be executed, and to align it with the resources that are available. Duncan (1996) states that there is always a limitation in the resources that are available, thus the planning and scheduling has to take this into consideration and develop a realistic map forward. According to CIOB (2002) the plan and schedule of the client is to be developed from the project manager's working schedule in order to keep the client well informed of the actual progress compared to the planned schedule. As a result, it is imperative for the project manager to periodically review the plan, schedule and the actual progress of the project. This is primarily for the reason that, should new activities arise, that were not anticipated in the plan of the project, the client can be kept up to

date of the implications this will have on the scope set out, such as time delays and cost implications. This way any scope changes made to project can be detected early on, the risk involved can be mitigated and the plan can be adjusted accordingly to reflect the change.

2.1.3.3 Controlling a Project

This technique is applied throughout the life of the project. It involves determining the standard for each element, measuring the performance, testing for deviation and reacting to deviations (PMBOK, 2012). Complete project management involves the management of the project in terms of time, cost and quality. This allows for benchmarks to be set in order to measure performance in these areas against which actual performance can be compared. The project manager is also mandated to make decisions should the need arise, based on the available information and considering the implications of that decision for the remaining work. Control is exerted during the life of the project to ensure that the plan continues to represent the best prediction of what will occur in the project in the future.

2.1.4 Project Management Tools

There are a number of widely adopted project management tools used to assist in the techniques of the techniques of project management, such as planning, scheduling and controlling of a project. These are tools that have been adopted to assist the project management professional to execute their duties and responsibilities and bring a project to a successful completion. These are discussed in detail below.

2.1.4.1 Bar Chart (Gantt Charts)

This is one of the most popular and widely used planning and control tool used for communicating the schedule information (Burke, 2007). It is popular because it is regarded an effective means of presenting scheduling information which is often not easy to understand. The Gantt chart can either be used on its own or linked to the critical path analysis (CPM) to present the schedule of a complex network. This is done by listing on the vertical axis, all tasks to be performed and when they need to be performed. The graphic portion of the Gantt consists of a horizontal bar for each task connecting the period start and period ending column.

According to Frimpong (2003) it is the responsibility of the project manager to produce the Gantt chart as a planning and control instrument. It is also essential that the project team know and understand this chart's purpose and content so that they can know what is expected to be done and record their progress.

2.1.4.2 Critical Path Method (CPM)

If a project is relatively simple and straightforward then a Gantt chart is sufficient to plan and control the project. However, as projects become more complex with an increasing number of participants and inter- dependencies then the critical path method is appropriate to use (Burke, 2007). The critical path method is a relatively more structured sequence of activities network diagram outlining the tasks that need to be done and when, as well as identifying the critical path of activities.

One of the most significant features about this tool of project planning and control is that it identifies and presents logical relationship between project's activities and further identifies the critical activities and the duration of each activity (Frimpong, 2003). The CPM will show the implication of the time aspect of project management, for instance, if an activity is delayed it will in turn affect the subsequent activity and thus extend the completion date of the project. In order for the project manager to develop the critical path diagram they must make use of the work breakdown structure to provide a structure breakdown of the work to be carried out. These work packages are further broken down into activities that are used in the CPM (PMBOK, 2012).

2.1.4.3 Work Breakdown Structure (WBS)

The purpose of the work breakdown structure is to subdivide the scope of work into a number of manageable work packages (Burke, 2007). Breaking down complex construction projects into smaller work packages makes the work easier to execute and track the progress. This is for the reason that it becomes easier to estimate the time and resources needed for each structure as well as to assign a responsible person as the work is broken down into similar work groups. According to Burke (2007) the work breakdown structure is the backbone of the project management planning process. This is supported by Modell (1996) who states that in order to manage a large project one must break it down to small manageable work packages.

The significant aspect of the work breakdown structure is that, having broken down the work into smaller sections, the project manager can refine the planning of the projects by defining the specification of each work package, as well as the duration, quality requirements, procurement, resources, responsibility, materials, budget as well as the labour hours needed (Burke, 2007). This in turn facilitates effective planning of the project by clearly defining each principle of project management practice.

2.1.4.4 Organizational Breakdown Structure (OBS)

The project manager is greatly affected by the environment they work in. If a company is product oriented, the organization structure will be organized so that they are geared towards the manufacturing of this product as well as the sales and marketing of the product. On the other hand a company that provides a service will be organised around providing customer service as opposed to manufacturing products (Oberlender, 1993).

The purpose of organization breakdown structure is to coordinate and guide the human resources, material and financial resources to undertake work of the project in order to deliver project successfully.

2.2 Project Management Professional Development

In order to execute successful project management practices, there is a need to align the project management theory to practice (Madter *et.al*, 2012). According to Crawford *et.al* (2006) project management is viewed as growing primarily from technical skill-set to a broader practice of reflective management. This research specifically looks at the development of the project management profession in SMEs. Project management profession is further defined below, so as to highlight the target of this research paper.

2.2.1 Defining Project Management Professionals

"Professionalism requires skills, competence, and character" (Borgstede, 2005). In project management it is important for a project management professional to acquire formal education on project management as a profession so as to learn and understand the different disciplines within project management. This is necessary to learn the project cycles, the tools and techniques as well as to have the knowledge to inter- link all areas of project management. Although a formal education is necessary, training by a qualified and practicing professional project manager is relevant. As explained, in order to execute a successful project, there need to be an alignment between the theory and practice of project management. This is supported by van Mook *et.al*'s (2009) definition of professionalism as a body of knowledge and skills (expertise) put into service for good of other and; the welfare of the society. There is a further requirement of professionalism to be recognised by fellow professionals or a professional board. By definition project management qualifies as a profession primarily because in order to be a project manager you need to have gone through a form of education to gain the body of knowledge necessary to practise. Another factor is that there needs to be a level of training one has to go through to apply the knowledge acquired to real world projects. A project manager has to follow the necessary procedure to ensure that the end project adheres to the safety requirements needed to serve the public good. Therefore professional project managers have to satisfy the three pillars being expertise, ethics and service (van Mook *et.al,* 2009). To further explore the definition of professionalism, International Competence Baseline (2002) defined project management competence as knowledge, experience and personal attitude. This particular source was focused on the behavioural aspect of being a competent professional project manager.

According to Bordass and Leaman (2012) building professionals are regarded as part of the problem to achieve a successful and sustainable building project. The source further states that project management professionals and their institutions must admit to what they do not know and commit themselves to learning more about the profession they are in. Twinn (2013) agreed with this statement and further added that construction professionals have become slow in keeping up with the ever changing industry. In order to bridge the gap between theory and practice, professional bodies have been formed in response to govern the built environment professionals and promote skills such as integration, planning and control techniques of project management.

Professional Management South Africa- Professional Association

The professional body governing the professional project managers in South Africa is the Project Management South Africa (PMSA). This is a Section 21 making it a voluntary association representing the interests of project, program and portfolio management professionals. The South African Council of Project and Construction Management Professions (SACPCMP) is a juristic person established by Section 2 of the Project and Construction Management Act (Act No. 48 of 2000) to regulate the Construction Project Management Professionals; to protect the public and promote the profession. The purposes of project management bodies have a similar aim to promote professional project management, represent the professionals, administer a code of conduct, consider the interests of stakeholders, and develop a sense of community and to further the development of professional project management (www.projectmanagement.org.za). The major goal is to advance professional project management in South Africa and it is through the development of professional associations that the project managers show that they are aware of what constitutes legitimate practices based on particular standards and project management principles. As a result the formation of PMSA in 1997 has brought about bridging the gap between theory and practice. According to the associations website their objective is on fostering of professionalism, advancing project management, stimulating its application to the benefit of the industry and regulating standards and accreditation. Over and above encouraging the development of professional project management, the association’s role is to provide guidelines for education, training and careers in project management. The website states that aspiring project

managers have the opportunity to become associate members so as to expose them to the professional community at the start of their careers.

The SACPCMP is mandated to do the following;

- Register all professionals and maintain a national register;
- Identify the type and scope of work for the Project and Construction Management Professions;
- Determine the registration criteria;
- Consulting the South African Qualifications Authority (SAQA) to determine the competency standards;
- Conducting accreditation programmes offered at tertiary level;
- Provide advice to any education institution with regards to training and education of registered and prospective persons;
- To develop and main the Continuing Professional Development.

2.2.2 Professional Development and skills development of Project Managers

The development of professional project managers aims to provide a sound knowledge of the key principles of project management. In addition, professional development sets out to offer progressive training and improvement of the professional.

The need to development professionals in South Africa arose due to the high levels of unemployment (Erasmus and van Dyk, 2005). As a result the Skills Development Act No. 97 was promulgated by government in 1998 with the aim of improving skills and increasing productivity in South Africa that will allow the developing country to be competitive globally. The overall objectives of the Act was to develop skills of the South African workforce to improve productivity and competitiveness of employees, to increase levels of investment in education and training in the labour market, to use the workplace as an active learning environment and to improve employment prospects of previously disadvantaged people (Skills Development Act No. 97 of 1998). The Act further on created Institutions to execute their purpose such as the Nationals Skills Authority (NSA) which advises the Minister of Labour on the formulation and implementation of national skills strategy and policy and manages

the allocation of subsidies to the National Skills Fund. NSA liaises with Sector Education and Training Authorities (SETA). This institution is a resultant of the Skills Development Act and aims to develop skills plan in line with the national skills development strategy. SETA approves workplace skills plans submitted by organisations, disburse funds for training to participating companies and provides implementation reports to the NSA (Skills Development Act No. 97 of 1998).

Skills development in the construction industry is closely regulated by the Construction Education and Training Authority (CETA). CETA was established in April 2000 after the promulgation of the Skills Development Act No. 97. The primary objective is to investigate and improve the training and skills development of the construction industry. CETA is accredited by the Education and Training Quality Assurance (ETQA) and by South African Qualifications Authority (SAQA). It is tasked with ensuring that the previously disadvantaged population of the South Africa who did not acquire the qualifications but acquired the skills participate in the Recognition of Prior Learning assessment process which will enable them to be competitive for jobs that require some level of qualifications.

Professional associations such as PMSA encourage the development of project management professionals. When becoming a member of these associations, you are recognised as a professional by peers, and are allowed benefits that assist the growth of the professional. The membership benefits include networking opportunities, access to topical speakers, official publications, access to PMSA library and other on line resources such as site tutorials, groups and reports. This association also offers its members discounts on books so as to encourage them to read and continuously improve their knowledge and thus practice to keep up with the ever changing construction industry.

Through the development of the Skills Development Act and the Construction Education and Training Authority, there was a further development of registered and recognised professional bodies such as the Project Management South Africa (PMSA) and the South African Council of Project and Construction Management Professions SACPCMP. The benefits of PMSA and SACPCPM are supported by the international professional body Project Management Institute (PMI). In essence PMI signifies similar purpose and aims as the SACPCMP and PMSA. It promotes project

management professional development and improvement by allowing access to valuable knowledge, networks and resources that help improve and advance the profession.

Another way to improve professional project managers is for the organisations to offer training in project management. According to Gale (2002) organizations that offer training are more efficient and better equipped for challenges of constantly evolving business environment. This is because when a construction firm undertakes to continuously train its project managers the Client gains confidence in the organisation's processes and the employees are motivated as they feel the company invests in their professional development and thus deliver better results. These construction firms either develop an in- house training programme or employ a company that specialises in training project professionals.

Professional bodies are not only concerned with training practising project managers, they ensure that the professionals have the appropriate background from accredited institutions. PMI and PMSA enlist registered education providers approved by the associations. These institutions go through a rigorous requirement for quality training in project management (www.projectmanagement.org.za).

The development of project management professional is focused around the education and application of project management theory, techniques and tools as outlined above. The development can be done in two ways, namely training or through formal education (Ashleigh *et.al*, 2011). Kloppenburg and Baucus (2004) further explained that formal education is usually provided at tertiary level and is a way to improve the practice of project management as a formalized and structured programme.

A method of developing project management professionals is through formal and informal training. Generally, training is ones off form of instructions, adopted to ensure that the staff develops behaviour necessary for project success that is aligned to the values of the firm as well as the needs of the client (Currall and Epstein, 2003). Formal training is often a short- term education approach; it has structured procedures that exist within the firm aimed at promoting correct practice (Inkpen and Currall, 2004). While informal training is more socially orientated and often unstructured, according to Davila (2005), this type of training is often occurs in

good work relationships. Edum-Fotwe and McCaffer (2000) have rounded up the approach to developing project managers by stating that professional competency in project management is attained by the combination of knowledge acquired during training as well as skills developed through experience and the application of the acquired knowledge.

In training and educating project management professionals, Winter *et.al* (2006) identified the importance to move project management professionals from trained technicians who follow a pre-set of rules and methodologies to execute their work on well defined projects, to that of reflective professionals who have the ability to learn, implement and adapt to the ever changing complex construction projects (Crawford *et.al*, 2006). This transition of project management practice is viewed as a broader application of project management concepts and the ability to manage the project more efficiently. Edum-Fotwe and McCaffer (2000) added to this that project management should remain relevant in the ever- changing construction industry by pairing project management knowledge with information technology. This need was evidenced by seventy percent of project managers who could not meet the demands of jobs required due to lack of information technology resources (Edum-Fotwe and McCaffer, 2000).

Crawford *et.al*, (2006) have identified the need to develop project managers as professionals and to improve the practice of every participant involved in process. This is supported by Morris *et.al* (2006) who stated that since the late 1960's there has been no doubt on the value that that project management adds to construction projects. The development of project management professionals was thus regarded to be one of the most important areas to focus on. This was also attributed to the rising number of project managers globally as evidenced by the growth of project management institutions such as the Project Management Institute which had over two hundred and ten thousand (210 000) members in 2006 (Morris *et.al* 2006). Morris *et.al* (2006) go on to highlight that project management profession is viewed as a 'semi-profession' or a commercialized profession. The authors go on to state that the differing underlying concepts of project management do not necessarily indicate a lack in maturity of the profession. However there are issues to be raised on the definition and application of the project management practice appropriately. The need to develop project management professional is also concurred to by

(Ashleigh *et.al*, 2011) stating that the project management associations ought to emphasize the development of competence in other methods other than merely following the knowledge set out in PMBOK.

2.2.3 Project Management Competency

According to Gale (2002) project management competencies are the capability to manage projects professionally by applying best practices to the planning of the project, management process and the application of project management methods. As already discussed, project management professionals must acquire the knowledge and experience in the field to allow the project to meet its objectives and deadlines.

In order for project management to be truly successful, there is a need to adopt the holistic approach, which provides for both tools and processes of project management as well as the people executing these principles. Ashleigh *et.al* (2011) went on to define the objective of project management as *"to deliver complex requirements by employing methods and tools to bring about successful delivery of an output. The popularity of project management lies in its ability to ensure control*".

If implemented correctly, project management professionals can deliver a project successfully. Hodgson (2004) defined project success as the ability to deliver a project to fulfil the objectives and satisfy the client. This is done primarily through the completion of a project within the agreed budget, on time and to an acceptable quality. Several sources such as El-Sabaa (2001), Ojiako *et.al* (2011) and Chipulu (2011) state that the failure of projects is primarily attributable to human errors such as a lack of leadership in projects as well as lack of competent managers. This statement has been supported by Raheb (1992) adding that a survey in Canada showed that seventy percent (70%) of projects that failed were due to lack of competent project managers.

Project Management Body of Knowledge (PMBOK, 2012) aligns project management practices globally in over 150 countries (http://www.mpmm.com/project-management-best-practices.php). This body of knowledge governs the project management profession as it outlines a collection of processes and knowledge that is widely accepted as best practice within the project management discipline. The above outlined project management processes are

basic definition of project management contained in the PMBOK. These include; initiating, planning, executing, controlling and closing.

According to Morris *et.al* (2006), in order to develop project management professionals, it is important to align project management theories and processes outlined in the PMBOK (2012) with the actual practice of project management. The primary service of PMBOK is largely a share of information dating back from the 1980's onwards as they began certifying project management professionals as meeting a required standard of knowledge. Figure 2.0 shows an alignment between the body of knowledge that states what one needs to do, with how it is actually done.

Figure 2.0; Alignment of project management processes to practice

PMBOK	MPMM
Initiating Processes	
Develop Project Charter	Establish the Terms of Reference
Develop Preliminary Project Scope Statement	Establish the Terms of Reference
Planning Processes	
Develop Project Management Plan	Create a Project Plan
Scope Planning	Create a Project Plan
Scope Definition	Create a Project Plan
Create WBS	Create a Project Plan
Activity Definition	Create a Project Plan
Activity Sequencing	Create a Project Plan
Activity Resource Estimating	Create a Resource Plan
Activity Duration Estimating	Create a Project Plan
Schedule Development	Create a Project Plan

Cost Estimating	Create a Financial Plan
Cost Budgeting	Create a Financial Plan
Quality Planning	Create a Quality Plan
Human Resource Planning	Create a Resource Plan
Communications Planning	Create a Communications Plan
Risk Management Planning	Create a Risk Plan
Risk Identification	Create a Risk Plan
Qualitative Risk Analysis	Create a Risk Plan
Quantitative Risk Analysis	Create a Risk Plan
Risk Response Planning	Create a Risk Plan
Plan Purchases and Acquisitions	Create a Procurement Plan
Plan Contracting	Create a Procurement Plan
Executing, Monitoring and Controlling Processes	
Direct and Manage Project Execution	Build Deliverables
Perform Quality Assurance	Perform Quality Management
Acquire Project Team	Appoint the Project Team
Develop Project Team	Appoint the Project Team
Information Distribution	Perform Communications Management
Request Seller Responses	Contract the Suppliers
Select Sellers	Contract the Suppliers
Monitor and Control Project Work	Monitor and Control

Integrated Change Control	Perform Change Management
Scope Verification	Perform Change Management
Scope Control	Perform Change Management
Schedule Control	Perform Change Management
Cost Control	Perform Cost Management
Perform Quality Control	Perform Quality Management
Manage Project Team	Perform Time Management
Performance Reporting	Perform Communications Management
Manage Stakeholders	Perform Communications Management
Risk Monitoring and Control	Perform Risk Management
Contract Administration	Perform Procurement Management
Closing Processes	
Close Project	Perform Project Closure
Contract Closure	Perform Project Closure
Key Knowledge Areas	
Project Integration Management	All Project Life Cycle Processes
Project Scope Management	Project Change Management
Project Time Management	Project Time Management
Project Cost Management	Project Cost Management
Project Quality Management	Project Quality Management
Project Human Resource Management	Create a Resource Plan

Project Communications Management	Project Communications Management
Project Risk Management	Project Risk Management
Project Procurement Management	Project Procurement Management
(none)	Project Issue Management
(none)	Project Acceptance Management

PMBOK Comparison Matrix

Source; http://www.mpmm.com/project-management-best-practices.php (2007)

2.2.4 Developing Essential Project Management Knowledge

Knowledge needed to manage a construction project is often specific to project management in construction. In order to develop project management professionals, it is essential to outline the areas of knowledge they must acquire through training.

According to Gale (2002) the managing of projects within a pre-set scope requires realistic projections of resource requirements including time, money, people and facilities as well as a thorough understanding of the work, the people (project team), the market, technology and business processes involved.

Figure 3.0 is extracted from Edum-Fotwe and McCaffer (2000) and shows generic areas project managers must know in order to manage construction projects, these areas of knowledge are gathered from Project Management Institute (PMI) and the Association of Project Managers. They are covered by academic programmes and accredited by a recognised project management board. However, it must be noted that modern project management requires that professionals have the generic knowledge as well as technical experience of engineering areas.

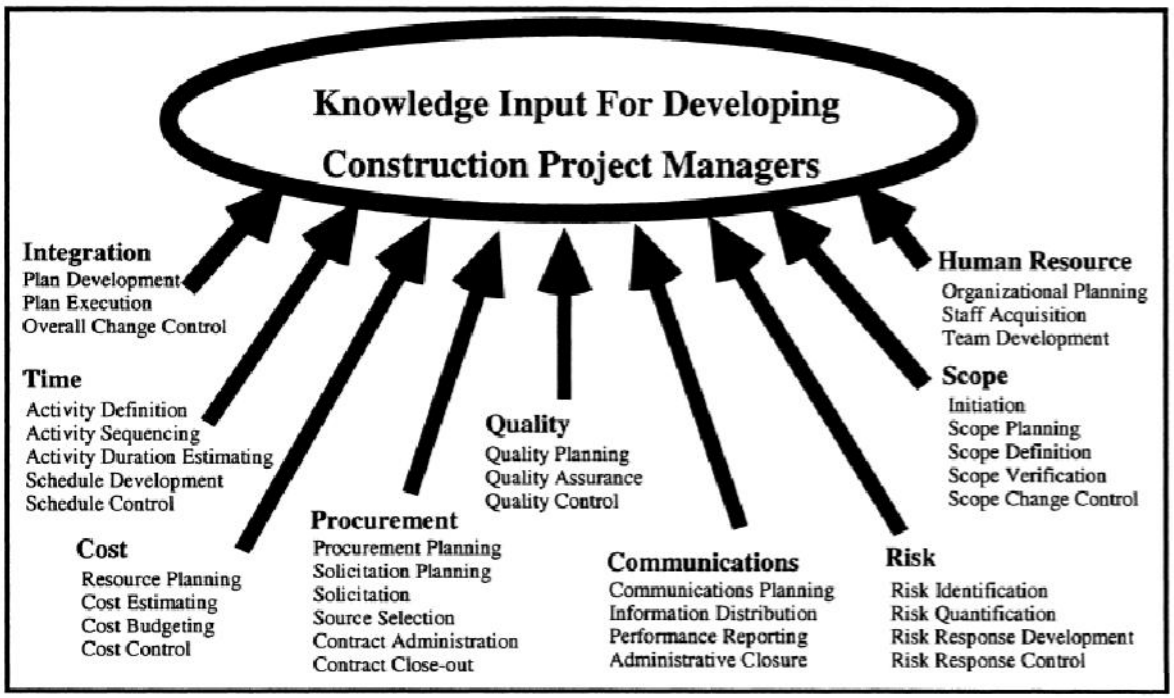
Project management professionals are to acquire and to further develop the following areas;

- Finance and Accounting
- Sales and Marketing
- Strategic Planning
- Tactical Planning

- Operational Planning
- Organisational Behaviour
- Personnel Administration
- Conflict Management
- Personal Time Management
- Stress Management
- Economic Analysis
- Social and political developments
- Information Technology
- Legal Framework
- Statistics, risk assessment and probability theory

This list has been sourced from Edum-Fotwe and McCaffer (2000) and although comprehensive it is not exhaustive.

Figure 3.0: Generic knowledge areas of Project Managers



Source: Edum- Fotwe and McCaffer (2000), adapted from the PMBOK

These areas of knowledge are transferable from the construction field to another discipline. According to Edum-Fotwe and McCaffer (2000), these are the areas that are a foundation for the development of professional project management

professionals. To compliment all the areas of knowledge that have been outlined on Figure 3.0, it is essential for the project manager to possess the following abilities.

Leadership

This entails the ability to effectively provide leadership to the project team in order to establish direction by setting clear goals, adopting strategic planning as well as managing the human resource to the project (Burke, 2007). This includes using effective communication to align the project team and participants to have a common goal and motivating and keeping them inspired to fulfil that common goal (PMBOK, 2012).

Communication

The project management professional must have the ability to communicate with the project team, with the financiers, suppliers and all other participants involved in the delivery of the construction project. This may include keeping track of communication that is done verbally, in writing and listening (PMBOK, 2012).

Negotiating

Negotiation occurs from the inception stage of the project, throughout the life of the project and during the closing and commissioning of that construction project (Edum-Fotwe and McCaffer, 2000). The project management professionals are recommended to possess the ability to negotiate tactically during to achieve the scope, cost and schedule objectives, as well as when changes of the scope, cost or schedule arise. The contract terms and conditions and resource availability and utilisation are fulfilled through effective negotiations (Edum-Fotwe and McCaffer, 2000).

Problem Solving

Problem skills are necessary to assess the problems that have already occurred and minimise the costs incurred and to solve these problems. According to Edum-Fotwe and McCaffer (2000) state that the project management professional must defined the problem first; where the causes and symptoms will be distinguished in order to find a solution to the problems. Problems may be technical; where there is a difference in opinions regarding the design of a project, problem maybe managerial

or interpersonal. The project manager must be able to use innovative measures to solve any problem that may arise during the execution of the construction project.

The above discussed areas of knowledge are acquired and practised by a professional project manager for a successful project. These areas of knowledge should comprise of academic background, skills and experience. According to Edum-Fotwe and McCaffer (2000) project managers that rely predominantly on experience have at least ten years working experience where they have generally worked through six to ten different posts, worked on eleven to fifty different projects that are small to medium in sized and have short time duration. However, it must be stated that the over-reliance for maintaining competency of project managers on experience means that the project management professionals can miss out on the broader outlook on project management as their experience is often specific to one area. Experience has to be built on a sound academic background (Edum- Fotwe and McCaffer, 2000). Therefore understanding where project managers fall short, whether they have gone through academic programmes or have over ten years experience, will allow for training programmes to be designed specifically to improve the development of project management professionals.

2.2.5 Constraints of Professional Project Management Development

Ashleigh *et.al* (2011) stated that although there is an unquestionable increase in the popularity of project management, there is high rate of failure in projects. Liu *et.al* (2003) added to this stating that it is not uncommon to find projects that have cost overruns, poor quality and experience time delays. The high failure rate relates to the mentality of scholars that project managers do not have a desirable level of transferable competency that would make them relevant globally. Ojiako *et.al* (2011) and Chipulu *et.al* (2011) defined transferable skills as non- specific skills that can be used for a wide variety of tasks. The main emphasis is the ability to communicate in writing and verbally, as well numeric problem solving skills (Kemp and Seagraves, 1995). Transferable skills include being able to use technology as well. These types of skills are regarded as an important part of developing project managers as it equips them with the knowledge and know ‘how-to’ to execute the project- based nature of the modern construction industry. Edum-Fotwe and McCaffer (2000) agree with the development of social oriented skills, as relationships with the team as well as other participants needs to be managed well as it is key to success of project

delivery. The development of project managers is vital, for the reasons that each project forms a significant portion of the overall company turnover; therefore, failure of that project could result in the collapse of companies. Although in the past, this role was carried out by engineers, their training and education in universities is mostly geared towards technological content as opposed to management and transferable skills development necessary for these projects. This was supported by Liu *et.al* (2003) who stated that the majority of project managers had not gone through the necessary project management training and lacked sufficient knowledge, skills and experience to successfully manage projects.

Edum-Fotwe and McCaffer's (2000) research has revealed that most project managers generally hold an academic degree in Engineering, which is geared towards technical and science experience. This is also depicted by a research carried out by Liu *et.al* (2003), which showed that the majority of the companies surveyed show that most of their project managers hold a technical bachelor's degree, while a small portion has a management discipline degree. Project managers lack knowledge and skills in management, finance and communications.

According to Liu *et.al* (2003) the lack of qualified and experienced project managers is the most significant constraining factor. Therefore, the transferable skills discussed above are not emphasized, making the project managers more technical than managerial. They further found that recently, Project Managers have resorted to taking up further training to compensate for the knowledge they lacked in such as management and human resources. However, Edum-Fotwe and McCaffer (2000) stated that there was a low rate of professionals that were furthering their training in information technology for project managers. Crawford *et.al* (2006) stated that project managers must be developed to move from trained technicians to project managers that are able to learn, operate and adapt effectively in project environments so as to broaden the application of project managers in the construction industry.

Thomas and Mengel (2008) go on to state that the project management scholars are of the view that there is no development board that supports the project management practice and that there is lack of clarity on transferable competencies and skills that project managers require beyond making extensive to do lists.

Contradicting this theory is a statement made by McLoughling and Luca (2002) stating that there is in fact support provided to the project managers and that studying project management allows the students to ability to liaise with these professional development boards so that they could be acquainted with the benefits while still in school. They further state that the downfall of project management professional development is the lack of research that has been carried out to explore the relationship between the learning strategies and project management skills taught and learnt (Chipulu *et.al*, 2011).

Ashleigh *et.al* (2011) further explores the challenges faced in developing project management professionals to include that a major challenge faced by project managers in the industry is a lack of technology proficiency, which is critical to project management competency. There is no specified standard development plan that has been identified to improve project management practice. It is stated that in order to overcome these challenges, the approach to educate and train scholars is to be adopted so that their perceptions towards the practice of project management is changed (Ashleigh *et.al*, 2011). Further added on the challenges by Ashleigh *et.al* (2011) is that currently there is research that focuses on one method to teach project management competencies. However it should be recognized that there is no single instructional approach to teach project management, but rather to adopt different teaching methods to address the varying needs in development of project management professionals.

The outlined difficulties experienced in developing project management professionals were further followed up by Chipulu *et.al*. (2011), who surveyed one hundred and ninety four (194) students and confirmed that project management lacks clarity on ascertaining on how training and educating project management professionals is linked with the ability to successfully implement practice in projects. Another challenge uncovered by Chipulu *et.al*. (2011) was that in training and educating, both the learners and instructors have not fully explored the option of 'e-learning' options. Over and above lack of understanding on training of professional project managers, it has been noted that organizations that allocate resources towards training their professionals are generally more effective as it motivates their project managers to deliver best practices. However, according to Gale (2002) the majority of the construction firms do not allocate sufficient resources towards

training. This is a significant challenge in developing the professionals as the firms do not invest in training and educating project managers due to financial constraints. The costs associated with training are considered high as it involves several direct and indirect costs such as the opportunity cost of the employee taking time away from work and the management and administrative costs of identifying the candidates to be trained (Gale, 2002). Other costs associated with training are direct costs including attendance of seminars, educational events, other learning resources and management costs associated with acquiring the appropriate education and training programme (Gale, 2002). Due, due to the costs involved in training, it has been discovered that most firms find it challenging to acquire and allocate the necessary resources to improve the project management profession.

Other factors constraining the development of project management professionals include the client's misunderstanding of the project managers' roles and responsibilities. According to Liu *et.al* (2003) this is one of the significant constraints to project management professional development as clients often regard construction supervisors; as project managers are known in China as either 'quality controllers' or 'site-watchers.'

All interviews conducted by Liu *et.al* (2003) point that the time it takes for Clients to appoint project managers is too late to allow the project managers to have an input from inception stage and contribute positively towards the success of the project. CIOB has recommended that project managers be commissioned in the conception stage of the construction project. However, clients appoint the services of a project manager after the design stage and right before construction, which limits the project manager's input.

Lastly the lack of cooperation and respect from other professionals in the industry is a constraining factor for project management professional development. The decline in the client's trust on project managers will lead to a shrinking project management profession which will inhibit the development of project managers. Liu *et.al* (2003) stated that in the China market a major constraint is external; resulting from industrial protectionism and insufficient law thus trapping the development of the entire construction supervision industry. The change of the external factors depends on national economy and legislative reform to establish a proper construction industry.

2.2.6 Overcoming project management professional training and development Constraints.

In order to address the constraints that have been discussed above it is important to highlight literature that discussed overcoming these constraints in the project management profession. Crawford *et.al* (2006) stated that one of the first ways to overcome the difficulties is to determine what the roles of the project management professionals are in the construction industry. This was supported and discussed by Liu *et.al* (2003) stating that clients and other professions are to be educated on the roles and responsibilities of the project managers. This will in turn resolve some of the constraints mentioned above and allow for cooperation by the Client in order to exercise the project managers' duties. One way of identifying these roles and responsibilities would be to review the job families in organisations; however, the challenge in this is that they are also not well defined (Crawford *et.al*, 2006). The use of the term project manager is often used loosely in the industry, referring to a very broad range of responsibilities such as the management of multi- project organisational change which should be managed by a program manager.

Crawford *et.al* (2006) also point out that there is confusion as to whether the project manager is only involved in the execution phase, adhering to the goals of time, cost and quality that have been pre-set or whether project managers are involved in defining these goals in the critical "front-end." Liu *et.al* (2003) specified that it is a challenge for the project manager to be brought in after the design of the construction works to execute the project, therefore, the client needs to be informed of the benefits of involving the project manager from the concept stage.

Another way of overcoming the challenges of most of the project managers having a technical background and geared towards engineering degrees, is to recognise the training and education of project management like the related fields and make it a pre- requisite to practising professionals so as to cover transferable skills that are often lacked in engineering courses. It is up to the accrediting academic programs to ensure that they provide suitable preparation for these skills for practice (Crawford *et.al,* 2006). Crawford *et.al* (2006) highlighted the current status of the academic programmes for project managers by comparing it to the four years full time degrees for engineering with a five day study of project management to qualify. As a result,

Crawford *et.al* (2006) stated the need to address accreditation of project management academic programs. Although the PMBOK guide has a strong influence on the training and development of professional project management professionals, it falls short when dealing with particularly large projects of a more complex nature. Crawford *et.al* (2006) summarise by stating that the development of project management professionals can thus be viewed as narrow and shallow and thus there is a need to recognise these constraints and to further develop the practices of project managers.

To develop the profession of project management, Twinn (2013) has emphasized that there is need to encourage project managers to register with the registered professional associations such as PMSA (Project Management South Africa). As stated in the development of project managers section, the purpose of PMSA is to look out for the interest of project managers, to promote the profession to other stakeholders, to promote the use and benefit of project managers as well as to continuously improve the knowledge and thus practice of professional project managers. Professional bodies have Continuous Development Programs where they are exposed to journals, seminars, workshops and other on- line resources that keep project managers up- to- date with the profession.

Consequently organisations have identified the gap in project management professional development. Effective management requires the development of professionals beyond practising project management or being part of a team, but to develop the practice throughout all levels of organisations from team members, to the board members, to learners and teachers as well to the rest of the industry (Crawford *et.al*, 2006). According to Gale (2002) it is imperative that the professional project managers be aware and be registered members of a professional association such as Project Management South Africa or Project Management Institute. In having more registered professionals it encourages emerging professional project managers to register so as to be recognised by their peers in the industry and gain the knowledge and training needed to stay relevant in the ever changing industry. In addition, construction firms are to be encouraged to register their project manager as well as allocate the resources to carry out training periodically. This has been identified as an underpinning challenge in the development of professional project managers in small and medium sized construction firms (Gale, 2002).

2.3 Small and Medium- Sized Enterprises in the Construction Industry

2.3.1 Introduction

This section of the chapter provides an in-depth exploration into the nature of Small and Medium Construction Enterprises in South Africa. The nature of SMEs contributes to the constraint of developing professional project managers. As a framework to the research, SME are defined and thus the developments of these enterprises are brought to light. The significance of SMEs in the economy is acknowledged and the factors affecting the success and failure of SMEs are explored. This section further sets out to briefly compare the South African practice to global perspectives on SMEs. The developments of professional project management practice are also explored and are specifically related to SMEs in South Africa.

Construction business encompasses a number of small and medium sized contractors which form a major part of the industry (Benjaoran, 2009). The need to develop Small and Medium Construction Enterprises has to be related back to the South African government's important policy of providing infrastructure in underdeveloped areas in order to improve the standard of living. According to the Department of Public Works (DPW, 1999) the development of SMEs is directly linked to the department's policy on job creation, innovation and long-term growth. Miles (1997), Gounden (1997) as well as Van Wyk (2003) support this statement by adding on to express that small and medium sized construction enterprises are vital for the economic growth of South Africa. Governments and policy makers have become aware of the social and economic benefits of SMEs.

Although there was a boom experienced in the construction industry during the preparations for the World Cup 2010 as well as a result of government's considerable infrastructural spending, unfortunately, the growth has not filtered down to the construction SMEs. This statement is supported by Venter *et.al* (2010) stating that a survey carried out in South Africa indicated that seventy to eighty percent (70 – 80%) of small and medium sized contractors fail within the first five years. The major reasons for SMEs failing is due to the lack of managerial development and

more specifically, lack of long-term planning, strategic thinking and limited resources (Benjaoran, 2009).

Small and medium construction enterprises have unique characteristics that influence the manner in which they are structured and organised as well as the management of SMEs. This chapter explores the structure and operation of SMEs and highlights their importance both globally and locally. The chapter concludes by providing the importance of professional project management development and how this can be used and thus improve the development of SMEs. The SMEs improvement in infrastructure delivery is discussed in terms of managing time, cost and quality during the various phases of project management in the construction industry.

2.3.2 Definition and Nature of Small and Medium- Sized Enterprises (SMEs)

The acronym SME stands for Small and Medium- Sized Enterprises. In most countries this has been extended to be SMME which stands for Small, Medium and Micro Enterprise. According to Berry *et.al.* (2002) when defining SMEs it is important to differentiate it from small, micro and medium- sized enterprises (SMME's). Although both terms are used to refer to small businesses, SMME's comprises of a wider range of firms, from "*established businesses employing over one hundred employees to self- employed owners of informal micro- enterprises".* SMEs form an upper end of the ranges contained by SMME's; these are larger in size compared to the micro and very small medium sized enterprises.

The definition of small and medium sized contractors can vary from one country to the other. However, the definition used for this research study will be largely based on turnover and the number of permanent employees. Dlungwana *et.al.* (2002) defines small construction companies in South Africa as those companies with an annual turnover of less than ten million rands (R10 million), while medium contractors have a turnover ranging between ten million rands (R10 million) up to fifty million rands (R50 million). The National Small Business Act No 102, 27 November 1996 (1996) defines small contractors as firms that employ between five (5) and fifty (50) permanent employees, while medium contractors employ between fifty (50) and two hundred (200) permanent employees.

Megginson and Megginson (2006) explore the definition of SME and the distinction between small and medium enterprises further. They state that to meet the criteria of a small contractor the businesses usually have the manager as the owner of the business, the capital and ownership is usually held by an individual or a few individuals, the business mainly operates in its local area and the business is small in terms of number of employees as we all turnover as already discussed above. This definition is included in the National Small Business Act's definition, which prescribes that the business should be managed by the owner or owners to be considered an SME.

Table 2.0 is extracted from the National Small Business Act to define SMEs. The table further classifies businesses as micro, very small, small and medium sized enterprises. However, for the sake of this research, small and medium sized enterprises are focused on not SMME's.

Table 2.0: Micro, Very Small, Small and Medium- Sized Enterprises in Different Sectors defined by the number of permanent employees, turnover and asset value.

Sector or subsectors in accordance with the Standard Industrial Classification	Size or class	Total full-time equivalent of paid employees Less than	Total annual turnover Less than	Total gross asset value (fixed property excluded) Less than
Mining and Quarrying	Medium	200	R30.00 m	R18.00 m
	Small	50	R 7.50 m	R 4.50 m
	Very small	20	R 3.00 m	R 1.80 m
	Micro	5	R 0.15 m	R 0.10 m
Manufacturing	Medium	200	R40.00 m	R15.00 m
	Small	50	R10.00 m	R 3.75 m
	Very small	20	R 4.00 m	R 1.50 m
	Micro	5	R 0.15 m	R 0.10 m
CONSTRUCTION	**Medium**	**200**	**R20.00 m**	**R 4.00 m**
	Small	**50**	**R 5.00 m**	**R 1.00 m**
	Very small	**20**	**R 2.00 m**	**R 0.40 m**
	Micro	**5**	**R 0.15 m**	**R 0.10 m**
Retail and Motor Trade and Repair Services	Medium	120	R30.00 m	R 5.00 m
	Small	50	R15.00 m	R 2.50 m
	Very small	10	R 3.00 m	R 0.50 m
	Micro	5	R 0.15 m	R 0.10 m

Source: National Small Business Act No 102. 27 November 1996. (White Paper on National Strategy for the development of small business in South Africa, 1995).

Table 2.0 shows that the definition of SMEs differ taking into account the industry that is studied. For example, the table above shows that a small to medium seized

enterprise in the Retail and Motor Trade Industry may have between fifty (50) and One hundred and twenty (120) employees, a turn over between fifteen million rands (R15 million) and thirty million rands (R30 million). However, in the construction industry for a business to be categorised as small to medium sized it must have between fifty (50) and two hundred (200) employees, a turnover ranging between five million rands (R5 million) and twenty million rands (R20 million).

Global Definition of SMEs

It is important to compare the definition of SMEs in South Africa to the SMEs in the rest of the world. This is to ensure that South African standards and definitions are at par with the first world nations. It is common practice to define small and medium-sized enterprises in terms of the number of employees and their turnover. According to Constrinnonet (2004) European Union defined SMEs according to turnover, degree of independence and the number of employees. The turnover for SMEs is not exceeding one hundred Euros (€ 100 million). It defines SMEs as having between zero (0) and two hundred and fifty (250) permanent employees.

Table 3.0: Developed Nations definitions of SMEs in terms of number of employees

Country	Type of SME	Criteria
Australia	Small enterprises: Medium enterprises:	< 20 employees < 100 employees
Canada	Manufacturing: Services:	< 500 employees < 50 employees
Denmark		< 500 employees
Portugal	Small enterprises: Medium enterprises:	< 100 employees < 500 employees
Spain	Small enterprises: Medium enterprises:	< 200 employees < 500 employees
Switzerland	Small enterprises: Medium enterprises:	< 50 employees < 500 employees
United Kingdom	Small enterprises: Medium enterprises:	< 50 employees < 500 employees
United states		< 500 employees

Source: Organization for Economic Co-operation and Development (1997)

It must be noted that when researching for the definition of SMEs in developing countries it is clear that the criteria are considerably lower than those of developed nations. Generally the maximum number of permanent employees must be less than three hundred (300) and the turnover should be no more than approximately fifty-five million rands (R55 million). Therefore, this means that the size of SMEs in developing countries is smaller than developed countries and thus lower contribution towards the economy. Table 4.0 represents the definition of SMEs in selected developing countries.

Table 4.0: Developing Nations definitions of SMEs

Country	SME criteria
Brazil	Varies with industries, less than 500 employees
People Republic of China	Varies with industries, less than 100 employees
Egypt	Less than 100 employees (definition of the Ministry of Finance)
Indonesia	Less than 100 employees
Korea	Manufacture industry: less than 300 employees Service industry: less than 300 employees
Malaysia	Varies, turnover: less than RM 25 million (R55.75 million) and 150 employees. (1 MYR = 2.23432 ZAR)
Mexico	Less than 250 employees
Philippines	Less than 200 employees, less than P 40 million (R6.4 million) assets (1 PHP = 0.161813 ZAR)
Thailand	Less than 200 employees, less than baht 200 million (R45.44 million) assets (1 THB = 0.227245 ZAR)

Source: Hall (2007); Hor (2003) and Rivera (2007)

Although the definition of SMEs differs from country to country, there is a general trend formed by requirements for developed countries listed in Table 4.0 and developing countries shown in Table 4.0. South Africa is a developing country and thus has similar requirements to those listed in Table 4.0. It is worth mentioning that

the definition of SME is similar globally, as the same criteria are used to determine and classify businesses.

2.3.3 Global perspective on SMEs

It has been globally recognised that small and medium enterprises are important mechanisms for job creation, innovation and long- term growth and the development of economies as a whole (Storey, 2000). This statement is supported by Organization for Economic Co-operation and Development (OECD, 2000), which expresses that small and medium- sized enterprises play a major role in the economic growth of OECD member countries. This comprises of United States of America, France, United Kingdom, Australia, Canada, Turkey and Germany. OECD (2000) also states that ninety-five percent (95%) of overall businesses in these regions are classified under SMEs and they account for sixty percent (60%) to seventy percent (70%) of employment in most countries. The downsizing and outsourcing of larger enterprises gives rise to small and medium enterprises.

According to OECD (1996) the reasons for the significance of small and medium sized firms in any given country is that SME form a large portion of the businesses throughout and thus have a large impact on employment creation and creating work opportunities. They play an important socio- economic role in that they are the entry point into the business world and thus are more accessible to unskilled populations. SMEs had a multiplying positive effect on the economy as a whole and as a result provide economic stability and improve the standard of living throughout the demographics of any country.

2.3.4 The role of SMEs in the South African construction industry

SMME's account for over ninety-five percent (95.3%) of all enterprises in South Africa, it is for this reason that the South African government has identified the importance of development of small and medium sized enterprises. The country's White Paper on National Strategy for Development and Promotion of Small Businesses by the Department of Trade and Industry, has stated that SMEs are an important vehicle to address the challenges of job creation in the country (Department of Trade and Industry, 1995). This has led to the National Small Business Act of 1996 to address the challenges of unemployment and poverty in South Africa. The Small Enterprise Development Agency (SEDA) was set up from

the National Small Business Act in December 2004 with the aim to promote small businesses within South Africa. In 2000 Ntsika and Statistics SA estimated that SMME's accounted for about sixty-six percent (66%) of total employment in South Africa and those SMEs contributed over thirty four percent (34%) to the South African total GDP (Berry *et.al*, 2002).

South Africa still faces a challenge of a large number of low-skilled workers and so identifying the development of SMEs as an opportunity for South Africa to emerge from poverty. Small, medium and micro enterprises (SMME's) account for over 50% of employment and Gross Domestic Product (GDP) in South Africa (Van Wyk, 2003). In conclusion the small and medium enterprise sector has been identified and targeted as a means to stimulate economic growth.

2.3.5 The factors of success and failure of SMEs in the South African Industry

According to Rwingera and Venter (2004) between seventy and eighty percent (70 – 80%) of small businesses fail within the first five years in South Africa. This illustrates that a large portion of small to medium businesses lack effective business management and do not last. Byrd (2006) supports this statement by expressing that the failure of small businesses is affected by inadequate management skills, lack of financial resources, lack of proper recordkeeping and poor planning. There are several shortcomings that small and medium construction enterprises experience. These shortcomings are discussed below.

Lack of Management Skills

This is often the most common cited reason for the failure of small and medium sized construction enterprises. There is a need to improve the quality and capabilities of the owner or managers of SMEs by encouraging management training and development. Lack of managerial skill is the basis of poor cash flow management, inadequate human resource management, poor risk management, ineffective planning and strategies thus resulting in low turnover for the SMEs. In order for the small and medium sized contractors to survive the competitive construction industry, they must have in place adequate, well trained professional project managers to execute business processes effectively.

Financial Constraints

The construction industry is by nature very competitive mainly by prices, therefore to succeed contractors have to be efficient and continuously improve processes. In order for the businesses to improve business processes they must invest in new efficient technologies, research and development as well as appropriate information technology systems. The difference in profitability, survival and growth of SMEs compared to larger companies can be attributed to financing. This is supported by OECD (2000), stating that SMEs generally tend to be confronted with higher interest rates due to their risky nature, as well as credit limitation due to lack of security.

According to a World Bank Report on the South African Business Environment for Industrial Small and Medium Enterprises (1996), South African banks, in comparison to other developing countries are relatively more flexible. Although there are problems of lack of finance facing the SMEs in the country, South African banking system allows collateral that is not strictly immovable. This is different from other developing countries, where one hundred percent (100%) collateral is demanded from small firms in the form of immovable property. It was stated that the South African Banking System accepts equipment, debtors' books, and insurance policies as collateral.

Usually banks evaluate loan requests based on the contractor's level of risk of default. As a result, banks tend to be cautious about loaning emerging contractors and small firms. However, the World Bank Report (1996) stated that medium sized firms are "moderately constrained" in their access to finance. The South Africa Finance Institutions take into consideration the size and age of the firms. This is supported by the World Bank Report (1996) stating that firms that had more than twenty (20) employees and that had been in business for more than four years were reported to have access to finance.

Subcontracting Arrangements

The public sector has identified subcontracting as an effective measure to involve SMEs in the construction industry. Gouden (1997) has argued that subcontractors in South Africa tend to have very little negotiating power with the main contractor. There are often put at a disadvantage as there is little formalised protection against

late payments to SMEs as well as protection against the main contractor going insolvent. It is for the reason that emerging contractors are very keen to get exposure in the industry and to generate revenue. Subcontractors do not have the bargaining power to demand risk distribution accordingly between subcontractors and main contractors (Gouden, 1997).

Recession and volatility in construction

The construction industry, like most other industries depends on the state of the economy. If the South African economy experiences a recession, there is a cut back made on infrastructure expenditure, thus affecting job opportunities. This is supported by Miles (1997), stating that an estimated thirty-five percent (35%) of employees lost their jobs during the mid 1970's recession and at least a further thirty percent (30%) employees were laid off in the late 1980's and early 1990's recession. The increase of interest rates in 2002 slowed down the construction industry as it became expensive to access loans. This is supported by the Department of Public Works (1999) which expresses that South African SMEs contractors are under pressure and even failed due to the volatility of demand.

Inadequate Personnel

Small firms tend to invest less in training therefore there is a general human resource problem; such as lack of skilled technicians and management as well as lack of competent workers. According to the World Bank Report on the business environment for South Africa's industrial SMEs, firms with fewer that fifty (50) workers have relatively lower human resource constraints than medium sized firms. This has been attributed to simpler business processes that small firms engage in making is simple to identify incompetent workers as there is a very personal interaction between the management and/ or owners and the work force. The World Bank report states that medium sized firms have a more serious human resource constraint. Therefore, SMEs do not allocate adequate funds towards training their employees and the staff management techniques are to be reviewed and improved.

Lack of training is one of the key factors hindering the SMEs from improving their business processes, skills and development of competent workers. Small and medium sized contractors are often unregistered and unaffiliated with recognised

professional bodies hindering adequate training (DPW, 1999). SMEs often had no or have limited access to training programmes offered by training boards.

Another problem that hinders the human resource development is the skill shortage that South Africa experiences. According to Mahadea and Pillay (2008) the skill shortage makes the recruitment process for small to medium sized contractors expensive because skilled workers often jump from one firm to the other in pursuit of higher salaries and benefits.

Lack of innovation

Small and medium sized contractors largely rely on manual, paper- based data, intuition and experience but not technology (Benjaoran, 2008). Information technology is the opportunity of improvement for all businesses; however, SMEs struggle to adopt this system largely due to financial constraints. Lack of innovation within SMEs is pointed out by Yang *et.al* (2007) who state that most field managers in SMEs prefer to use Excel for recording and processing different types of data, in place of specialised computer packages for managing construction projects. Yang *et.al* (2007) concluded by stating that the larger the firm sizes the more intensive use of IT contractors adopt. "*This is not surprising because application of ICT's come with a large amount of investment and that is a limitation of construction SMEs".* As already mentioned, a lot of the small and medium contractor's limitations can be attributed to lack of funding.

In conclusion, the small and medium sized contractors experience challenges accessing the markets especially international markets. SMEs tend to operate in their local areas, primarily due to inexperience, lack of managerial ability and financial constraints. As a result the above discussed constraints limit the growth and development of small and medium sized contractors in South Africa. Failure of effective professional management in SMEs, to address long-term planning, financial planning as well as strategies to operate effectively leads to SMEs failing.

2.4 An overview of the Construction Industry

2.4.1 Introduction

This section sets out to outline the construction industry. This is done to give context to the industry that is being studied in this research. This is primarily because the construction industry is a unique and complex industry that needs to be explored in order to understand the nature of the SMEs within the industry as well as the stakeholders involved. The need and necessity of the industry is highlighted and it is specifically applied to the South African conditions.

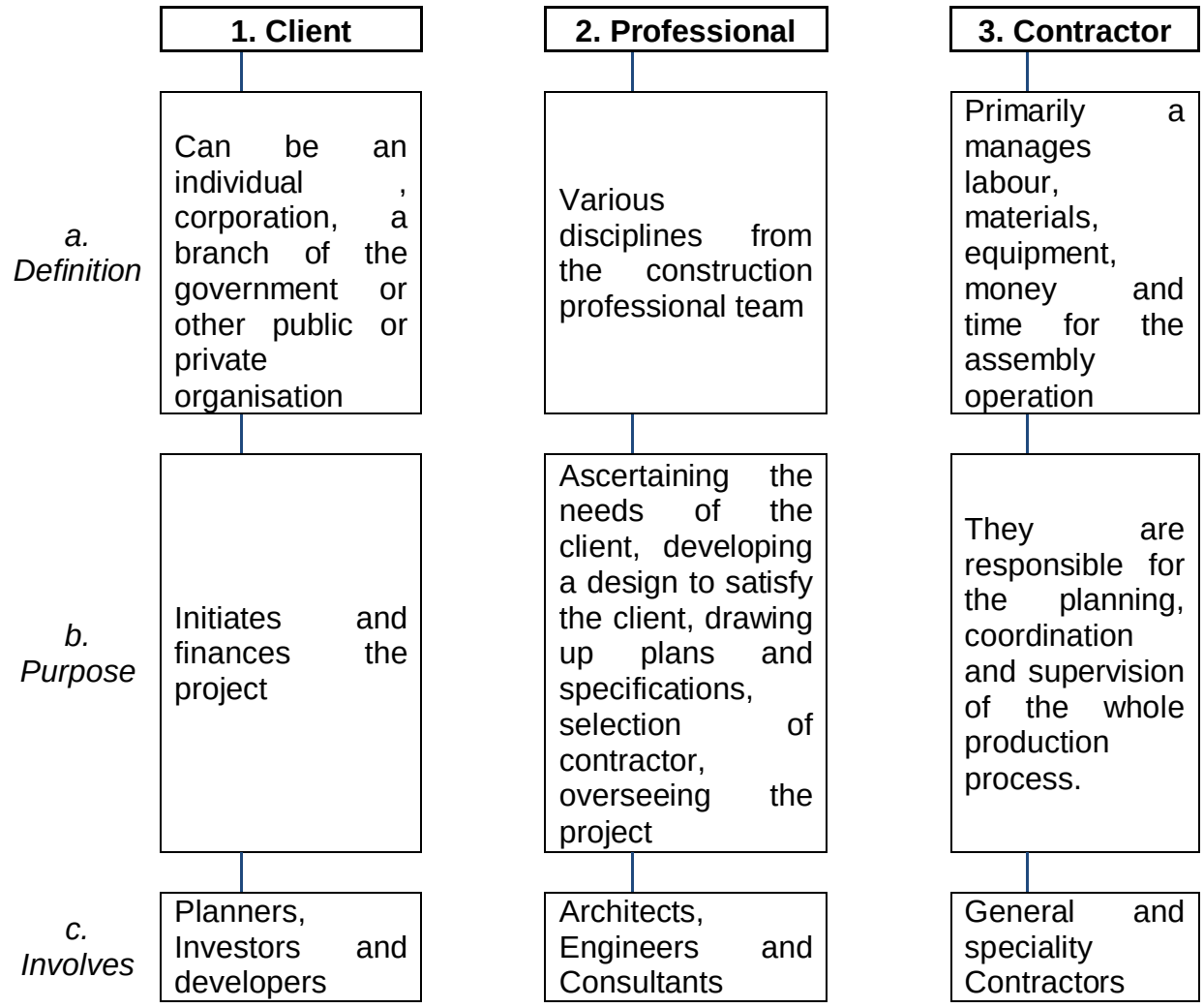
According to Van Wyk (2003) approximately over one billion people globally lack the basic infrastructure; accesses to safe water, while over two billion people do not have adequate sanitation and lack energy supply and over nine hundred million people in rural areas do not have reliable roads in the sub-Saharan Africa. It is for this reason that the development of infrastructure is an on-going challenge in developing countries. The World Bank invested US$ 15 billion into developing infrastructure, however this amount needs to be doubled to US$ 30 billion in order to meet the Millennium Development Goals aimed at reducing poverty by the year 2015 (Van Wyk, 2005). Approximately seventy percent (70%) of the construction investment is attributable to the United States of America, Western Europe and Japan (CIDB, 2004). The continent of Africa contributes about one percent (1%) to the construction investment pool. This is substantiation for the fact that the developing countries need to invest more funds into developing their infrastructure. The South African Government has identified this need and thus views construction industry as a "*national asset that should be developed, maintained and transformed*" (CIDB, 2004).

2.4.2 Defining the Construction Industry

The United Nations defines construction as comprising "*economic activity directed to the creation, renovation, repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature, and other such engineering constructions as roads, bridges, dams and so forth"* (United Nations, 2001). This however is a narrow definition of the industry, which confines attention to the activities that take place on-site. According to Carassus (2004) the broad definition also includes professional services such as management, architecture, design and

facilities management and other construction participants. This is supported by Constrinnonet (2004) stating that the broader definition of construction industry includes enterprises whose principal activity involves some aspect of design and control of construction works such as architects, quantity surveyors, project managers and other consultants. This is depicted in Figure 4.0, to give an overview of the construction participants.

Figure 4.0: Construction Industry Participants



Source: Ofori (2000)

Figure 4.0 depicts a broader definition of the construction industry and the different roles that are involved. It shows that the different consultants are responsible for the management of construction projects. These consultants are involved from the inception phase of the project cycle entailing putting together the brief, the design,

and quantification of the materials, labour and machinery as well as the procurement needs (Carassus, 2004). According to Giang and Pheng (2011) the professional group is often the least advanced sector of the construction industry in developing countries. It is for this reason that the developing countries tend to rely on the designs executed in developed countries, which poses a problem as they are often poorly suited to local labour, materials and equipment. Another significant point to draw out of the participants in the industry of the developing countries is that, the Contractors are mostly small to medium sized contractors, who do not specialise in any field. Therefore, there is a lack of specialised firms which serve a local market.

The construction industry is project-specific and often very complex. It is for this reason that each project is unique and requires different approach to meet the different requirements in terms of size, and scope, location and terrain, range of skills and materials required for that particular project. The Construction Industry is not static as it involves a different combination of project participants to be put together for every project (Miles, 1997). The following characteristics of construction summarise what sets it apart from other industries as highlighted by Carassus (2004);

- Custom-built nature
- High initial expense
- High complexity
- Immobility of the projects
- Construction demand is unstable due to its unique character for each facility, the project- oriented nature of production, seasonability, demographic influences and economic fluctuations.
- Continuously changing technology
- Service industry in that the Client has to determine a need for a facility and decide to procure the services of other professionals to execute it.
- There is a complex procedure for financing construction projects. They are largely financed by the customer rather than the manufacturer. The manufacturer is paid in periodic payments during the production. More specific to the developing countries is that, the source of the funds is usually

attained through loans which are secured by the very facility being constructed.

- In developing Countries, it is common for the client to be international agencies, with the experience, reputation and enough securing capital to obtain a loan for financing construction projects.
- Construction labour force is generally floating and not permanent; they are hired on a project to project basis. Therefore job security is a challenge.

The characteristics highlight the difficulty in Small and Medium- sized construction enterprises to adapt to the ever changing and complex construction environment.

2.4.3 The Global Perspective on the construction industry

According to an Oxford Economics report on Global construction perspectives (2010), the recent economic slump that took place from 2007 to 2009 has been harsh and severely impacted the construction industry globally. In developed countries the economic downturn has caused the developed companies such as the United Kingdom and Germany to trim down spending in construction by over six hundred and fifty billion United States Dollars ($650bn) combined.

However, as from the end of 2010 there was evidence that the economy was recovering and an upturn is expected. The report projected that the world economy would grow by about three to four percent (3% - 4%) in the decade from 2011. The growth of the construction industry can be partly attributable to emerging markets such as China and India creating more opportunities in the construction sector. The report went on to state that other emerging markets such as Brazil as well as India have strong population growth which will in turn affect the increase in a demand for higher living standards which will have a positive effect on the construction industry. However, with the entire expected boom in the construction industry in the decade from 2010 to 2020, the developed countries will experience fiscal deficits, meaning the government will experience constraints on infrastructure spending. This is unlike the emerging markets that are the developing countries, which are expected to increase government spending on bettering their infrastructure as there is a demand for it.

The construction industry was recorded to have over eleven million (11 000 000) people worldwide working in the industry, which makes it a significant employment generating industry (Van Wyk, 2003). The construction industry is viewed as an economic multiplier as one job created in the construction industry leads to a creation of several other jobs in construction and elsewhere in the economy (Van Wyk, 2003). According to Global Construction Perspectives report (2010) they forecast that "*the most dynamic growth for construction over the next decade will come from emerging markets in India, China, Asia Pacific, South and Central America, Middle East and Africa and some part of East Europe*". The construction in emerging (developing economies) will account for double the size by 2020, growing by an estimated one hundred and ten percent (110%). Conversely developed countries accounted for an estimated sixty- five percent (65%) of global construction in 2005; however it is expected to fall to forty-five percent (45%) contribution while emerging markets contribute fifty- five percent (55%). This drift is mainly due to the fact that developed countries such as the UK and Germany are more oriented towards renovation, maintenance, repairs and replacements, while developing countries are geared towards new infrastructure such as upgrading transport systems, utilities and builds. This statement is supported by the Global Construction Perspective Report (2010) stating that the "*emerging markets will grow by a staggering one hundred and twenty- eight percent (128%) over the next decade, compared to just eighteen percent (18%) over in developed countries".*

2.4.4 The South African construction industry environment

The South African construction industry plays a key role in the South African Economy (Dlungwana *et al*, 2002). This statement is supported by Barry and Sebone (2009) stating that the construction of the GauTrain, the Stadiums and other World Cup developments has stimulated an increase in the economy and its growth. The construction industry contractors can be categorised according to disciplines such as civil, building, drilling and refractory. It is worth noting that this research specifically looks at civil and building contractors in South Africa that are small and medium sized. According to Merrifiel (1999) small and medium sized construction enterprises tend to focus on building and civil engineering contractors and many of these firms obtain their work through negotiation.

Expanding infrastructure and service delivery in South Africa has been identified as priority by the government. This is primarily attributable to apartheid and extremely skewed legacy of economic development. South Africa is the second largest unequal country in the world, after Brazil. The income share of the top 20% of the population exceeds 60%, while the poorest 20% of the population earns only 3% of the national income (Bond, 1998). Roughly 38% of the "African" families have access to basic services such as water, sanitation and electricity and the majority still live under very poor conditions.

The South African government aims at focusing on Small and Medium Enterprises (SMEs) as the preferred vehicle of delivery in order to reduce poverty (Ofori *et.al*. 1996). The government's policy is to empower emerging contractors who form small and medium construction enterprises (SME) according to the Construction Industry Development Board (CIDB), who find it difficult to deliver infrastructure appropriately. The government has authorised the Council for the Built Environment (CBE), Construction Industry Development Board (CIDB), Construction Education Training Authority (CETA), Masters Builders South Africa (MBSA), South Africa Property Owners Association (SAPOA) and National Home Builders Registration Council (NHBRC) to implement good construction practice and improve performance.

The Soweto City Council launched in 1988 the Soweto Contractor Development Programme which underpins the policies of community- based contractors employed to aid community development and to introduce professional management, supervision and skills implementation to ensure development. Trainee- contractors were categorised into levels indicating their developmental needs. There were positive results from this initiative that saw over a 100 projects being awarded under the programme in five years, projects completed on time, to the required quality and reasonable cost. The outcome of this initiative acknowledged the development of professionals, project managers and contractor's managerial personnel, and the requirement of education on these fields (Ofori, *et.al*. 2000).

However, the South African industry has unique characteristics which are mainly the easy entry into the construction industry. This is primarily due to lower levels of capital outlay required. In spite of the low requirements to enter the market, there are high numbers of failures by companies in the construction industry (Barry and

Sebone, 2009). This in turn affects the economy as South African construction industry is primarily labour intensive. According to Van Wyk (2003) one of the major challenges faced by South Africa is the high unemployment rate and the increase on the number of people who are able and keen to find jobs. This challenge is compounded by the fact that South Africa has the second biggest income gap between the rich and poor, therefore GDP growth of six percent (6%) is necessary to close the gap between the rich and poor. Although there is a global recession, as in most sectors, the construction industry in one of the few to have increased contributions towards the GDP (KPMG International, 2009). South African faces unique challenges such as lack of technological development due to lack of funds in the industry; a lot of entry level firms do not have the resources to allocate towards technological development as well as innovation in the industry. South Africa also faces global challenges such as the nature of the industry being project- based and thus aiming at producing a defined project.

Although there are challenges faced by the construction industry, the government has identified this industry as the tool for growth in the country as even during recession it continues to grow in terms of the GDP contribution. In spite of this the growth in the South African construction industry has not trickled down to the Construction SMEs in the country. As already mentioned earlier the small, medium and micro enterprises (SMME's) account for over fifty percent (50%) of employment and Gross Domestic Product (GDP) in South Africa thus it is important for the growth of the industry to translate to the success of SMEs.

2.4.4.1 South African Construction SMEs

According to South African Federation of Civil Engineers Contractors (SAFCEC, 2004) the majority of the construction SMEs in South Africa are black- owned and black managed firms, this is in line with the government's policy of empowering black contractors to battle the challenge of a large gap between the rich and the poor. SMEs are powerful generators of income and employment creation as it is labour intensive and can thus address the key economic issue experienced by South Africa. One of the advantages in developing SMEs in South Africa is that they can be competitive in terms of price against larger firms as they have lower overheads. Therefore, to close the gap between the rich and the poor in South Africa, the

government has empowered SMEs to develop them and allow ownership and control by previously disadvantaged part of the population.

Small and medium sized construction enterprises in South Africa are registered through and managed by the Construction Industry Development Board (CIDB). According to a report by CIDB (2010) there are a high number of lowest level contractors. This is supported by Cameron (2007) who states that the bottom structure of the CIDB databases is overloaded, whilst the top structure has a few contractors who have the benefit of tendering or being pre-qualified for large multi million projects the SMEs can only tender for small, non- complex and less risky projects. This is supported by CIDB (2010) stating that the Eastern Cape is particularly a concern as it has a very high number of grade one registered contractors; a total of ninety one point seven percent (91.7%) of all registered contractors fall within grade one and are not moving up the grading system.

The Construction Industry Development Board (CIDB)

The Construction Industry and Development Board (CIDB) is an important part of the construction industry in South Africa. It plays a vital role in the economic and social development by providing physical infrastructure. It registers, regulates as well as manages the construction SMEs in South Africa. The aim of CIDB was to have in place a statutory body aimed at driving the country's integrated development strategy (CIDB Act, No 38 of 2000). The Construction Industry Development Board; a schedule 3A public entity was established by Act of parliament (Act 38 of 2000) in October 2000 to "*promote regulatory and developmental framework that builds the construction delivery capability for South Africa's social and economic growth and to deliver global competitive standards"* (www.cidb.org.za/about/overview/default.aspx) The CIDB monitors all contractors more especially entry level contractors and promote best practice to stimulate growth and improvement of practices in the South African Construction Industry.

The South African unique challenges have been discussed above and it is for that reason that a brief description on CIDB is outlined. According to the Construction Industry Development Board the apartheid legacy has left challenges in the construction industry which CIDB aims to address. These include the improving

public sector spending, employment creation and job stability, to improve access of opportunities and finance and training, more especially for construction SMEs.

In order to fulfil its objectives outlined above, the CIDB has come up with four programmes to improve the industry's development, performance and best practice; procurement and delivery management, construction registers service, construction registers service industry development and growth and contractor development (CIDB, 2007).

In terms of Section 5(2) of the CIDB Act 2000, the Board is mandated to register, regulate and manage contractors in South Africa. The registration service currently consists of two interlinked national registers, containing The Register of Contractors and the Register of Projects. Used together, these registers offer Employers and Contractors great benefits in identifying opportunities within the South African construction industry. The register for contractors grades and categorises contractors according to their works and financial capability. Contractors must register with CIDB in order to be awarded public sector contracts. The registration reduces risks for both clients and contractors as the client is able to match the right project to the correct contractor thus reducing the failure rate of contractors in South Africa (CIDB, 2008). This has been outlined as one of the major challenges faced by the South African construction industry in the section above. The register provides statistical data and provides for a basis in contractor development programmes.

The register allows contractors to register in different categories depending on disciplines; civil engineering, general building, mechanical engineering, electrical engineering and specialist work (CIDB, 2007). The contractor register has established nine grades, each stating a range of tender values each contractor can tender for. Table 5.0 shows the grading requirements for registration by the CIDB. Grade one contractors can tender up to a value of two hundred thousand rands (R200 000), while grade nine (9) contractors have an unlimited tender value.

Small and medium sized construction enterprises are registered in grades three (3) to seven (7). The report produced by the Bureau for Economic Research (BER, March 2012) for the CIDB indicate the business confidence for building contractors rose in the first quarter of 2012, specifically levels of grades three, four, five and six rose sharply. These categories are construction SMEs, which shows that there was

an improvement in the confidence level of construction SMEs in South Africa as a whole, including Gauteng province. Grade one (1) and (2) are Micro sized construction firms, which for the sake of this research are not being studied.

Table 5.0: CIDB grading system. Registration requirements for different categories.

Grade	Upper Limit of Tender Value Range	Best Annual Turnover	Largest Contract	Available Capital	Available Capital
1	R 200,000.00	No Requirement	No Requirement	No Requirement	No Requirement
2	R 650,000.00	No Requirement	R 150,000.00	No Requirement	No Requirement
3	R 2,000,000.00	R 1,000,000.00	R 500,000.00	R 100,000.00	No Requirement
4	R4,000,000.00	R 2,000,000.00	R 1,000,000.00	R 200,000.00	No Requirement
5	R6,500,000.00	R 3,250,000.00	R 1,600,000.00	R 650,000.00	R 1,300,000.00
6	R13,000,000.00	R 7,800,000.00	R 3,250,000.00	R 1,300,000.00	R 2,600,000.00
7	R40,000,000.00	R 24,000,000.00	R10,000,000.00	R 4,000,000.00	R 8,000,000.00
8	R130,000,000.00	R 90, 000, 000.00	R 32,500.000.00	R13,000,000.00	R 26,000,000.00
9	R99,999,999,999.00	R 270, 000, 000.00	R 100,000,000.00	R 40,000,000.00	R 80,000,000.00

Source: CIDB, 2004

Table 6.0 shows the total registration of contractors in all regions of South Africa as at Monday 28th May 2012.

Table 6.0 Grading registered by class of work, as at Monday, May 28th, 2012.

Grade	*CE – Civil Eng*	*EB-Elect Eng*	*EP-Elect Eng*	*GB-General Building*	*ME-MechEng*	*SW-Specialist Work*	**Total Grades**	**% ratio**
2	*1,436*	*120*	*120*	*1,945*	*198*	*464*	4,283	33.66%
3	*610*	*79*	*81*	*579*	*90*	*136*	1,575	12.38%
4	*789*	*144*	*193*	*846*	*140*	*148*	2,260	17.76%
5	*671*	*132*	*252*	*624*	*205*	*237*	2,121	16.67%
6	*701*	*40*	*80*	*592*	*87*	*72*	1,572	12.35%
7	*229*	*29*	*46*	*209*	*46*	*32*	591	4.64%
8	*84*	*5*	*13*	*80*	*16*	*9*	207	1.63%
9	*41*	*2*	*16*	*26*	*17*	*13*	115	0.90%
Total	*4,561*	*551*	*801*	*4,901*	*799*	*1,111*	**12,724**	

Source: www.registers.cidb.org.za (CIDB, 2011)

It can be noted from Table 6.0 that the majority of the contractors registered are in grade two (2), which can tender up to the values of six hundred and fifty thousand

Rands (R650 000). The table has been summarised to show total number of contractors registered as well as a percentage apportionment to depict that a large number of contractors are small and medium sized enterprises in South Africa.

Table 6.0 shows that there is a large number of construction SMEs in South Africa, according to this table, there is over sixty three percent (63%) construction SMEs registered in all classes of work, of which the majority are in the General Builders class of work.

With the establishment of registration of contractors, it has allowed the CIDB to facilitate the National Contractor Development Programme aimed at supporting contractor development and emerging contractor participation in the industry. It is a partnership between the CIDB and the national and provincial public works (CIDB, 2007).

2.4.5 Reasons of the poor performances of South African Construction SMEs

According to Benjaoran (2008) the construction industry is "*very competitive business mainly by prices. To maintain success, contractors have to continuously improve the efficiency of their business processes".* The management of small and medium construction enterprises in South Africa is very limited which is one of the major growth constraints for SMEs. This is supported by Dlungwana *et.al (*2002) who state that one of the major challenges faced by SMEs is poor performance and poor quality due to poor management. To further support this research, Smallwood (2000) conducted a survey to investigate the client's perspective towards construction SMEs performance. It was concluded that the reasons for poor performance is attributable to poor management and low skills amongst workers.

Construction SMEs have very limited resources in South Africa, these stem from lack of funding by commercial banks in South Africa. This is supported by Dangalazana and Newadi (2005), who state that lack of funds is affecting construction SMEs because private lending by the banking sector is important but the level of collateral required and documentation needed by the banks from the SMEs puts them at an advantage. It is a risk for the formal lending institutions because small and medium-

sized contractors in South Africa often do not have adequate fixed assets and have unstable income to put up as collateral (Barry and Sebone, 2009).

A lot of the challenges faced by construction SMEs are due to lack of resources. It is for this reason that Construction SMEs do not invest in business management skills, as there is no formal training in business management (Barry and Sebone, 2009). The lack of skilled construction management manpower directly affects all areas of construction businesses and it is regarded as a major problem in the construction industry in South Africa.

According to Dlungwana and Rwelamila (2004), the development intervention for small and medium sized construction enterprises can have a huge improvement in the South African construction industry. The benefits include sustainable employment, increased spending in the local economy and most importantly, and competent construction project managers to improve delivery of infrastructure in the country (Dlungwana and Rwelamila, 2004).

CHAPTER 3

RESEARCH METHODS AND DESIGN

CHAPTER 3: RESEARCH METHODS AND DESIGN

The purpose of this chapter is to discuss research methods designed and selected to investigate the constraints of project management professional development in small to medium sized construction enterprises in South Africa. The first section of this chapter is an introduction that highlights the research questions to be answered. The research questions determine the research design and data collection methods used.

A review of the different types of data methods is reviewed, followed by a classification of the nature of the research. These data are important as it will give a framework to the research methods available and will thus allow an informed selection. The research strategies are then discussed, discussing the type of data collection techniques selected and ensuring a suitable the strategy selected. This is then followed by a discussion on the types of data collection techniques that may be applicable to this research as well as their assessing the validity of the collected for each technique. Having outlined the different methods and strategies, the selection for this research is justified.

3.1 Introduction

The research is an exploratory study that is designed to explore the factors faced in the South African construction industry that inhibit the development of project management professionals in the small and medium sized enterprises.

Chapter 2 provided a background study and comprehensively reviewed existing literature on;

- Project Management as a tool and technique to manage construction projects
- Developing the practice of professional project managers
- Factors constraining the development of professionals in the south African SMEs
- Small and medium sized construction enterprises (SMEs)
- The construction industry, globally and specific to South Africa

Having reviewed existing literature, enough background was provided to design data collection method and execute the research. The selection of appropriate

methodology in order to gather information proved to be challenging because of the vast geographical area of South Africa. As a result the Gauteng area was studied and assumptions were made that results will represent the country as a whole. Questionnaires were developed to answer the research question and distributed to small and medium sized contractors in the Gauteng area.

3.2 Method Selection

Saunders *et.al* (2012) define research design as the general plan mapping out details of how research questions will be answered. This is the first step to consider when designing the way the data will be collected in order to address the research questions. The steps of designing the research data collection is discussed below.

The first methodological choice to be made when doing research design is to determine whether the research will be quantitative or qualitative. Saunders *et.al*(2012) go on to define the two methods and state that although the definitions distinguish the two, in reality many business and management research designs are likely to have a combination of both methods.

3.2.1 Quantitative Research

According to Saunders *et.al* (2012) quantitative research is used where any data collection technique, such as questionnaire, or data analysis procedure, such as graphs are employed to gather numerical data. This is 'objective' in nature. Creswell (1994, cited by Naoum, 2007; p.39) define quantitative research as "*an inquiry into a social or human problem, based on testing a hypothesis or a theory composed of variables, with measured numbers and analyzed with structural procedures".* This type of research aims to prove the hypothesis to be true or not.

The characteristic of quantitative data is that it examines relationships between variables, which are measured numerically and analysed through multiple statistical techniques. This type of method is usually associated with experimental or survey research strategies which will be fully explained in the following section of this chapter. The survey research strategy is usually conducted through the use of questionnaires or structured interviews (Saunders *et.al*, 2012).

3.2.2 Qualitative Research

The application of this method is used alongside any data collection technique such as interviews, or any data analysis procedure, such as categorising data, that generates or uses non- numerical data (Saunders *et.al,* 2012). This type of research is 'subjective' in nature (Naoum, 2007). It deals with putting across the meanings, experiences, (often verbally described) and description of the subject being investigated. According to English *et.al* (2003) qualitative data are confirmed to be based on opinions and perceptions.

Collecting data for this type of research method is not standardised, it depends on the design of the technique used to gather data to answer the research questions. Furthermore, non- probability sampling techniques are most likely used to gather data (Saunders *et.al*, 2012).

3.2.3 Combination of the Methods of Research Design

It is important to highlight that the methods, as mentioned could be combined in order to answer research questions. Saunders *et.al* (2012) gave an example using the type of sampled data collection technique, stating that if a researcher uses questionnaire to explain a quantitative research the respondents may be requested to answer some open questions in their own words as opposed to ticking a box. Another example given is that it may be necessary to follow up questionnaires with interviews to seek explanations from the questionnaire. Therefore qualitative data may be analysed quantitatively and vice versa.

3.3 The Nature of the Research Design

The way in which the research question is asked will involve exploratory, descriptive or explanatory answers (Saunders *et.al*, 2012). These are further discussed in this section to assist in method selection appropriate for this type of research.

3.3.1 Exploratory Studies

This type of study is a way to ask open questions in order to discover what is happening in the industry and to gain insight about the topic of the research (Saunders *et.al*, 2012). This definition is supported by (Thames Valley University, 2009), stating that exploratory research occurs when there are no previous studies to refer to for information. It focuses in gaining insight on a research area where vigorous research is required to be carried out. To conduct exploratory studies

interviewing ‘experts’ can be conducted, these interviews will most likely be unstructured as the researcher has to allow flexibility and the ability to adapt to the change in the direction of the research (Saunders *et.al*, 2012).

3.3.2 Explanatory Studies

This type of research is commonly used where there is a limited amount of knowledge about the subject under study. According to Naoum (2007), in this instance an interview is usually selected as a method of data collection. The main purpose of this type of study is to bring forward a recognised problem in that area of study. Saunders et.al (2012) further states that explanatory studies emphasize on studying a situation or a problem in order to explain the relationships between variables. Naoum (2007) stated that explanatory research is conducted for three interrelated reasons:

1. To diagnose a problem
2. To explore alternatives
3. To discover new ideas on how to solve that problem.

3.3.3 Descriptive Studies

“*The objective is to gain an accurate profile of events, persons or situations*” (Saunders *et.al*, 2012). This is to an extent an extension of explanatory research as it is important for the researcher to have knowledge on the research topic prior to collecting data.

3.4 Research Strategies

In general terms Saunders *et.al* (2012) define a strategy as a plan to achieve a goal. As a result a research strategy can be defined as a plan of how the researcher will execute the research so that the research questions can be answered and objectives achieved. In selecting a research strategy the methods selected for the design, whether quantitative or qualitative have a limited influence on the type of strategy selected. For example an experimental strategy is linked with quantitative methods, while survey is linked with qualitative. However, Saunders *et.al* (2012) stated that the choice of a suitable qualitative research method causes the greatest confusion due to the diversity of the research.

Naoum (2007) defines the research strategy as "*the way in which the research objectives can be questioned".* Different research strategies are discussed in detail in this section.

3.4.1 Experiment

This type of strategy is based on the natural science research. Saunders *et.al* (2012) defines experiment as "*the study of probability of a change in an independent variable causing a change in another dependent variable*". Experiments use hypothesis rather than research questions to anticipate whether or not the relationship between the variables will exist. The hypothesis will have one of two outcomes, either it is a null hypothesis; predicting that there will be no relationship between variables; and alternative hypothesis, predicting that there may be a relationship between the variables (Saunders *et.al* 2012).

3.4.2 Surveys

This type of strategy is common in management researches and is most frequently used. It is used to answer the 'what', 'who', 'where', 'how much' and 'how many' questions (Saunders *et.al*, 2012). There are different methods that can be used for collecting data in this type of strategy, the most popular being questionnaires as they allow collection from a sizeable population. This is supported by Naoum (2007) who states that when gathering data from a relatively large number of respondents within a limited time frame, surveys are recommended. Another advantage of surveys is that it enables the researcher to compare the data collected and analyze accordingly. The type of data collection techniques belonging to the survey strategies are discussed later in this chapter, drawing out the advantages and disadvantages of selecting any particular data collection technique. These data collection techniques include, but not limited to interviews, questionnaires, semi-structured interviews and so forth. The above mentioned are the most popularly employed techniques for research.

3.4.3 Case Study

Naoum (2007) defines the case study approach as the researcher's intent to support his/ her argument by an in-depth analysis of a group of persons, an organization or a particular project. This is supported by Fellows and Liu (2003) who state that a case study is used when the research needs to back up their study by researching on

previous data that has been published on the particular topic at hand. This type of research is undertaken in context, to gain a rich understanding of the research topic at hand.

According to Saunders *et.al* (2012) the case study strategy can also answer the questions ‘why’, ‘what’ and ‘how’. It can be used as an explanatory or exploratory study using qualitative or quantitative methods. The data collection techniques used may include interviews, observation and questionnaires.

3.4.4 Other Research Strategies

The three research strategies discussed are not exhausted; there are several more research strategies that will be touched on briefly. These strategies are not applicable to this research paper but will be explained briefly. The archival research strategy is employed in instances that make use of administrative records and documents as a principal source of data. This type of strategy is not limited to recent data only; it also makes use of historical data that is studied. It allows for research questions that focus upon the past and changes over time (Saunders *et.al*, 2012). Another research strategy is the use of Ethnography; developed to study cultures historical societies that had been brought under rule of colonial power.

3.5 Data Collection Techniques

This section aims to touch on the data collection techniques available. The different types of collection techniques and the application have already been mentioned in sections above. The techniques applicable to this research are discussed and the selection technique justified. The purpose is to shortlist the techniques that could be used so as to serve as a comparison.

3.5.1 Interviews

This is a form of dialogue between two people where the researcher (interviewer) engages a research subject (interviewee) on the research topic (Gillham, 2000). The interviewing technique is most suitable to be used in the following situations;

- When the people being interviewed share the same characteristics
- When the interviewer has knowledge of the interviewee so only the important questions are tactically addressed.

- When interpersonal interaction is necessary to highlight and explain the questions and responses.
- When details of the questions need to be given to address the how and why questions
- When the responses are more that yes and no, or agree or disagree, following with an explanation as to why the responses are as they are.
- When time and cost permit
- When observation of behaviour is important
- When the sample size allows it
- The flexibility of interviewing the selected sample is now possible, whether it is face to face or by telephone (Kothari, 1995).

The following instances prompt the use of interviews in order to gather data for a research. However it must be brought to light that there are several ways for interviewing, which is discussed below.

Open- ended or Unstructured Interviews

"*The interviewee gets to practice a greater amount of flexibility to answering questions"* (Naoum, 2007). Although there is a great deal of flexibility, the interviewer prepared questions in advance and are asked in a way that permits the interviewer to guide the interview. According to Nachimas and Nachimas (1994) typically the interviewer will develop new questions as the interview progresses and continues to say that this type of interviewing is adopted in situations where information is obtained which cannot be predicted. However, the amount of information to be provided during the interview may be large, and therefore may not be covered due to time constraints (Naoum, 2007).

These types of interviews are best suited at the beginning of any research (explanatory interviews) when the research has little knowledge about the topic at hand. At this stage a clear research outline is necessary to carry the general points across to the interviewee.

Structured Interviews

"The interviewer has full control of the questionnaire throughout the entire process of the interview" (Naoum, 2009, p.57). This type of interviews has a considerable formal nature to them. With this technique, the questioning may start with some 'open' questions but the questions become more structured and specific as the interview is defined further. Unlike the 'open' question interviews, the respondent is allowed a choice of answers to select from. This is confirmed by Kothari (1995) stating that the aim of choosing this method is to achieve defined answers to defined questions, while allowing for the further development of the answers provided. Nachimas and Nachimas (1996) as cited in Naoum (2007), listed the following assumptions of the structured interview;

- The respondents have a sufficiently common vocabulary to ensure that the questions asked have the same meaning for each of them
- That it is possible to phrase all questions in a way that all the respondents will find the same meaning.

The three main advantages of a structured interview are;

- The answers are more accurate
- The response rate can be high, especially if the respondents have been contacted directly.
- The answers can be explored by finding out 'why' the particular answers are given by interviewees.

Semi- Structured Interviews

According to Gillham (2000) although there is a fair amount of structure, semi-structured interviews are a combination of closed questions and open questions. The interviewer arranges the questions in a way that obtain the respondent's answers on a certain topic as opposed to "*leading the interviewee toward a preconceived choice"* (Naoum, 2007). Naoum (2007) goes on to cite Merton and Kendal (1946) who outlined characteristics on semi-structured interviews;

- It takes place with respondents known to have been involved in a particular experience.

- It refers to situations that have been looked at prior the interview
- An interview guide is usually set out before hand to steer the interview in a certain direction
- It is focused on the respondents' experiences regarding the situation under study.

According to Naoum (2007), semi- structured interviews start by asking indirect questions in order to gain understanding of the respondent and then to explore the specific issues that are too concerned with the particular research. Gillford (2000) stated that this kind of data collection method is ideal to gather a wide- range of information on a particular topic and continued to state the underlying principles pertaining to semi- structured interviews;

- The interviewer should avoid leading the interview
- To create a relaxed and comfortable conversation

These above mentioned principles will allow the interviewer to get the interviewee to relax and make it easy for them to provide useful information that will add to the research at hand.

Application of interview data collection approach

Figure 5.0; Uses of different types of interview for each main research categories

	Exploratory	**Descriptive**	**Explanatory**
Structured		★ ★	★
Semi- Structured	★		★ ★
Unstructured	★ ★		

The interview approach is for various approaches, the most frequent match is the use of structured questionnaire for a descriptive study, the use of semi- structured for an explanatory study and the use of unstructured interview when one is looking to explore the core issues of the topic of interest (exploratory).

Limitations of Interview Approach

Having highlighted the purpose and strengths of the different above mentioned interview methods, it must be noted that there are limitations with interviews as a form of gathering primary data.

In order to make sure that the questions asked in the interviews are specific to the subject being researched, it is up to the interviewer to ensure that an investigation into the subject matter is carried out prior to designing the data collection method. The investigation for this particular research is carried out in Chapter two, being the literature review and introduced in Chapter One.

According to Naoum (2007), conducting an interview is a complex and demanding technique Naoum (2007) further justifies this statement by highlighting the three main challenges of conducting interviews, especially if it is an unstructured interview. The first challenge faced when conducting an interview is that it is a time consuming exercise. Naturally unstructured interviews would take longer than structured or semi- structured interviews.

The second challenge is that in an unstructured and semi- structured interviews is for the interviewer to able to take control of the direction and pace of the interview. Lastly, the other challenge experienced with adopting interviews as a data collection method is that it is challenging to examine the data ones collected.

The interviewer must have the ability to ensure that the respondent's answers are accurate and complete, which is a challenge as people do not often provide accurate information as they can harbor feelings of embarrassment, nervousness, extreme bias opinion and sometimes lack of knowledge on the topic (Fellows and Liu, 2003). Fellows and Liu (2003) further on stated that respondent's answers can be highly influenced by personal opinion and may not completely relate to the facts. Therefore the interviewer must be careful in accepting all information and thus must have some knowledge on the topic at hand so as to validate and make sense of the data gathered.

Validity and Quality issues of data collected

The findings derived from using in- depth or semi- structured interviews are not meant to be repeated as they are applicable to a time when they were collected in a situation that maybe subject to change (Marshall and Rossman, 2006). The assumption behind this type of data collection technique is that the type of research is complex and dynamic; therefore, semi- structured interview is adopted to explore the complexity of the matter.

The interviewee has a challenge to make sure they remain impartial throughout the interview phase. This refers to the preparation of the interview as well as conducting the interview. The interviewee has to ensure that they have gained knowledge about the content of the organization and culture, select an appropriate location, ensure they are appropriately presentable for the interview, ensure the nature of the opening comments are neutral, approach to questioning should also remain neutral and must show the ability to listen intently (Saunders *et.al*, 2012).

3.5.2 Questionnaires

A questionnaire is a structured technique that is used as a primary data collection method, where each respondent is asked to respond to the same set of questions (Saunders *et.al*, 2012). This is confirmed by Fellow and Liu (2003) who state that it involves a series of written questions to which the respondents provide the answers to. Fellow and Liu (2003) define a questionnaire as a "*research instrument that entails a series of questions for the purpose of gathering data*". This type of data gathering method is best suited for the use of statistical analysis.

Questionnaires are better suited to be used for the explanatory and descriptive approach where relationships can be examined between variables. Questionnaires are often not used as the only technique for collecting data (Saunders *et.al*. 2012).

The use of questionnaires is advantageous when compared to other methods of data collection as it is an affordable method and does not require much effort from the respondents (Naoum, 2007). This is for the reasons that questionnaires usually have a listed set of options that the respondent can select from, if conducted verbally or by telephone then it is comprised of frequently standardised answers which in turn make it easier to compile the results, compare them and analyse them.

The questionnaire requires the respondent to fully understand the questions being asked, if they do not understand then this method of data collection is impractical to apply (Fellow and Liu, 2003). Therefore it is important for the person conducting the research to ensure that the questions are clear and their use is clearly explained and attached to the questionnaire.

Questionnaires have been selected as appropriate for application in this particular type of research, for the reason that the target sample are professionals in the

construction industry, therefore interpersonal contact is not essential to explain and break down language barriers. This type of technique is used to explain and answer the question of the nature of SMEs in South Africa. It is employed alongside semi-structured interview, which focuses on the constraints of the development of professional project managers.

Validity and Quality issues of data collected

According to Saunders et.al (2012) one of the major challenges on the quality issues of the data collected is to ensure that the data will enable research questions to be answered. The recommended method in ensuring data validity and quality is to create a data requirements table, where the outcome is summarized. The table will help ascertain the level of detail that is required, the variables for which data are to be collected and thus to develop the questions.

3.6 Justification for the selection and application of strategy

The section above explored the methods, approach, strategies and the different data collection techniques that can be used to collect data for this research. After having done research and a review of the different methods, the method that is suitable for this research is the Qualitative method. This is primarily due to the non- numerical nature of the data collected. The research is set out to investigate the factors constraining the development of professional project managers in South African SMEs. It primarily deals with putting across experiences to describe the subject of interest.

The nature of the research involves explanatory study to be conducted. Having reviewed the three different types of approach, this was the most appropriate as there is a limited amount of literature pertaining to the topic at hand that has already been studied and reviewed in the literature review chapter. The main purpose is to bring about an identified problem in the industry as per the research problem outlined. There are reports of poor delivery of projects executed by SMEs in South Africa such that the projects are not delivered within the allowed time frame, with cost overruns and compromised quality of the finished product. It is due to this recognized problem in the industry that the constraints keeping the professionals in charge of managing projects from delivering within time, budget and quality is studied and investigated.

The selected strategy is the use of Surveys, primarily because it satisfies the ‘what’, ‘who’, ‘how much’ and ‘how many’ questions which are contained in this research. This strategy was selected looking at the large number of professionals that were reviewed in chapter two through the Construction Industry Development Board (CIDB)’s registration of all SMEs in the country.

The information gathered is done on a first hand basis from the research subject. The type of data collection chosen for this research is a questionnaire. The research adopted two different types of questions. This was dictated by the type of questionnaire sent out, which was self- completed by respondents. Questionnaires are relatively structured as stated above. The respondent follows the questions outlined by the researcher in order to gather research related data. The main advantage of this type of data collection method is that when compared to other methods, questionnaires do not require too much time and effort from the respondents. This was important for the reasons that when interviewing working professionals during working hours time is a major factor.

Questionnaires are standardized questions with several options for answers, which make it easier to compile results, compare and analyze the output. As stated above, this method was selected looking at the sample subjects targeted. Inter personal contact is not essential for project managers as they are professionals and the questions asked are clear the questionnaire will be effective for data gathering.

In order to make sure that the questions formulated for the questionnaires are specific to the subject at hand, research was done on the literature review outlined in chapter 2. The review of existing literature concerning the factors constraining the development of project managers in construction SMEs is helpful as it allows for a more in- depth approach when drafting the questionnaires.

Questionnaire technique was selected based on a study conducted on the type of data collection methods available and their limitations outlined above. In order to ensure that the most effective type of data collection is selected, the other methods had to be fully explored in order to choose a specific type of data collection method for this particular study. Explanatory research projects are usually conducted using interviews, however, this type of method proved to be challenging. This is for the reasons that apart from the fact that it is relatively time consuming for the

respondents, it proved to be a risk to lose direction of the interview in that the interviewer needs to be experienced in conducting interviews. The risk is mostly attributable to the ability of the interviewer to take control of the interview because the questions are dependent on the responses received and that could derail the topic at hand. This is supported by Naoum (2007) stating interviews are complex and highly demanding, they need to be conducted with careful consideration to the respondents as well as the research question.

The choice of a questionnaire technique was influenced by the fact that professionals are targeted and thus a properly designed questionnaire would attain the information required in the appropriate time. There was a confidence that the right person would respond, this was assured by preceding the questionnaires with a phone call to the respondents to explain the purpose of the questionnaire and request a response.

3.6.1 The design of the questionnaire

When designing the questionnaire the flow and layout of the questionnaire was determined before designing the actual question content. The intention was to make sure that there is logical flow of the questionnaire and to minimise the risk of respondents skipping questions as they find them ‘annoying’. The length of the questionnaire is to be kept manageable for a busy professional to get through and easy to complete. Covering the questionnaire was a letter to explain the purpose of the questionnaire; over and above this the emailing of the questionnaire was preceded by a phone call. This was done primarily to get permission from the respondents to email questionnaires and to clarify the purpose of the questionnaire.

The first section of the questionnaire set out to answer the first sub- question of the nature of the small and medium- sized construction enterprises as well the project managers employed by these firms. This was a section entailing short questions accompanied by a list of possible answers which are split into ranges to select from. The second section of the questionnaire included combination of the ‘multiple choice’ effect and allowed the respondents to expand on their answers. This section set out to determine if the SMEs know and implement different project management tools and techniques set out in the literature review. The last section of this questionnaire was semi- structured; where respondents were asked to list or give reasons as to

what they feel are the constraints of project management profession development in their firms and externally.

The questionnaire design involves structuring the questionnaire into the types of questions to be put across to gather information. Having established the general structure, the types of questions were explored and decided upon. The first section, where the responses deal with the nature of the SMEs the questions are forced-choice questions where a number of alternative answers is provided, where the respondent can select one of the choices. This was done because there is a defined classification of SMEs described in the literature review; as a result it is quick and easier to answer and to extract relevant information for the research. This type of data is selected as it is easier to compile, compare and analyze. Category questions were incorporated into this section as it allowed ranges to be selected. The general rule was to ensure that there are no more than five responses per category.

The second section of the questionnaire aims to extract information about the project management tools and techniques and the implementation thereof. This section called for the use of open questions as well as rating questions. The open questions were to allow the respondent to select methods used to manage projects and to rate how well the techniques are implemented. The last section of the questionnaire set out to uncover the constraints of developing project managers in SMEs and as a result open questions were designed for this section. The reasoning being that this was the major concern area where a problem was set out to be discovered therefore the respondent had to be given the flexibility to answer according to their experiences.

The questionnaire was closed with a short thank you message as well as the details of the researcher. The collection of the questionnaires was done via a reply to the email. Alternatively questionnaires were collected by hand from respondents.

3.6.2 Validity of the data collection technique selected

The validity of the data collection technique was taken into consideration when designing the questionnaire to ensure that the data collected represented the reality of what is going on in the construction industry. The questions were designed to ensure that they cover all aspects of the research study. The literature was extensively reviewed and applied when designing the questions used to collect data.

Another validity measure considered is called predictive validity. This refers to the ability of the questionnaires to make accurate predictions. The questions had to be clear and precise so that they remain consistent and are not misinterpreted by the respondents. The way in which the questionnaire is structured was to give the respondent a clear indication of what information is required, so as to produce consistent findings.

Validity of the questionnaire was carried out by comparing the data with the existing literature on the topic. The data collected were compared to test the consistency and the reliability of the responses. To further test the validity of the data, two different project managers from the same SME were contacted and asked to complete the questionnaire.

Appendix A shows an example of the questionnaire circulated to all Contractors sampled for the purpose of this research and was done to respect the respondents' time and to keep them interested in completing the questionnaire.

When designing the questionnaire, research was done on the previous studies carried out to adopt questions where necessary. This measure was taken as a reliability assessment step, as it will allow data findings to be compared for correlation with previous studies.

3.7 The Sample Size and selection

Having selected a questionnaire as a data collection technique, data sampling and generalizing of results was possible. This research did not allow for the data to be collected from the entire population of professional project managers in SMEs as there are thousands of registered SMEs spread across the country as depicted by Table 7.0. The major constraints resulting to a sample selection is time and budget constraints.

The literature review has outlined the total number of CIDB registered contractors to show that a large number of the registered contractors fall in the SMEs category in South Africa. The table below shows a summary of different levels of registered contractors in South Africa and depicts that SMEs make up sixty- three percent (63%) of all contractors registered in South Africa, which is a substantial number.

Table 7.0 Grading of registered contractors, as at Monday, May 28th, 2012.

Grade	Total Grades	% ratio
2	4,283	33.66%
3	1,575	12.38%
4	2,260	17.76%
5	2,121	16.67%
6	1,572	12.35%
7	591	4.64%
8	207	1.63%
9	115	0.90%
Total	**12,724**	

Source: www.registers.cidb.org.za (CIDB, 2011)

The decision to sampling was based on Saunders *et.al* (2012) flow diagram used to determine if there is a need to sample and the type of sampling that is relevant for the research. Firstly it was determined that there is a need for sampling and that there is a sampling frame available.

Having established the available sampling frame of, selection was based on random sampling of contractors to represent small to medium sized enterprises in South Africa. It was important to interview companies that had been operating for more than one year as the liquidation rate of small and medium sized contractors is high as specified in the literature review.

The relationship between sample selection, purpose and focus of research is important to establish. Saunders *et.al* (2012) formulated a table as a guide to the sample size for each nature of study, summarized by Table 8.0.

Table 8.0: Minimum sample size

Nature of Study	Minimum sample size
Semi- structure Questionnaires and interviews/ in-depth interview	5 to 25
Ethnographic	35 to 36
Grounded theory	20 to 35
Considering a homogeneous population	4 to 12
Considering a heterogeneous population	12 to 30

Source: Saunders et.al (2012)

The sample size in this case is directly influenced by the research questions and objectives, in that what is needed to be found out and useful to answer the research questions will be from credible sources thus generalizing from the responses would render the data valid. The target sample size for this research is thirty (30) different contractors that fall within grade three (3) to grade seven (7), which is the SME category. The sample size was chosen with the importance of high response rate in mind. This was keeping in mind there will be non- responses experiences in reality.

Senior managers have been targeted for this study, for the reason that they have relatively more experience in order to give an idea of the practice in the field, as well as to draw out trends of SMEs in South Africa in terms of developing the project management professional field.

3.8 Analyzing Data Collected

Due to the nature of the research method selected, the best suited approach to analyze the qualitative data collected is through the use of the deductive approach. This has been described by Lyn (2009) as the type of approach adopted where existing theory has been made use of to formulate research questions and objectives. This is applicable to this type of research and as a result the use of the framework reviewed will be helpful to organise and analyse the data collected.

The data collected are categorised, firstly according to the nature of the SMEs and comparing the results. Secondly the responses on the implementation of project management tools are categorised, and a pattern established as to the most popular and widely used techniques in SMEs. This will assist with detecting a pattern that could possibly result in the reason why most projects are coming in over budget, delayed time frame and to a compromised quality as revealed in existing literature reviewed. Categorising the data and mapping the relationship of responses to the research question will be the focus of the analysis of this research report.

This will be achieved through the use of graphs and tables to display the data collected through questionnaires. The data display and analysis were done through data reduction, where the data were summarised and simplified by displaying the collected data in the form of tables and graphs. The reason for using graphs is that they are easy and quick to read and interpret and they allow for comparison between

responses so as to draw a relationship in the responses given to answer the research question.

To further analyse the project management tools and techniques, the use of calculating the mean of respondents utilising each specific project management techniques has been done. The mean was displayed in descending order to detect the trend of the project management tools and techniques most implemented and least implemented.

3.9 Ethical Statement

To ensure that this research adheres to the School of Construction Economics and Management policy regarding research ethics, ethical challenges that might arise during this research were considered. The questionnaires sent out to different small and medium sized contractors had a full disclaimer explaining what the purpose of the research is so as to notify the recipients that they are used as a subject for research. The disclaimer will also ensure the contractors that the Data Protection Act is followed, for example their particulars will not be distributed for any purpose and that the information provided will be treated with confidence. This will give way to a formal form of consent. Lastly, any data obtained will be treated with anonymity unless permission has been attained prior to the publication of the research.

During data collection, the contractors providing data will not be less than the age of sixteen (16) years and have the right to discontinue participation should they wish to without reason. The data collected and analysed during this research are made available to all contractors who participated on request.

CHAPTER 4

DATA COLLECTION AND PRESENTATION

CHAPTER 4: DATA COLLECTION AND PRESENTATION

The purpose of this chapter is to present the data collected through the use of a questionnaire. The first section is the introduction that recaps on the data sample selected as well as the manner in which the data was collected. This has already been described in detail in chapter three.

Section 4.2 of this chapter focuses on the first section of the questionnaire that is set- out to establish the nature of the SMEs and to ensure that the data collected satisfy the criteria set out by CIDB of SMEs. The respondent is then asked to answer questions pertaining to them as a project manager, the number of years they have been in practice, qualifications and whether they belong to a registered professional association or not. The purpose is to establish the caliber of practicing project managers in the field.

Section 4.3 collects data based on the different project management tools and techniques that are employed by project managers in managing construction projects. This is to examine the way in which projects are managed and to identify if all the project management theories are applied to real life projects. Lastly Section 4.4 is an open question section that allowed the respondents to list the factors constraining the development of project management professionals in SMEs. These factors are categorized according to internal constraints that are due to the nature of SMEs as well as external factors. The next chapter will then review the data presented, categorize and display in graphs so as to interpret and analyze the findings.

4.1 Selection of construction firms

When considering the method and techniques to be used for this study, the best suited data collection techniques decided on was the use of questionnaires. The data was gathered by randomly identifying thirty SME contractors; six from each grade three to grade seven. This is according to CIDB (2007) definition of small and medium sized enterprises outlined in Chapter 2, stating that SMEs in construction are registered in grades three (3) to seven (7). The CIDB grading system table shows that Grade three registered contractors have an annual turnover of no more

than one million rands, while grade seven contractors have a turnover of no more than twenty four million rands.

Targeting different grade registered contractors was done to compare small to medium sized contractors so as to attempt to identify a trend of professional development in relation to the size of the contractors. The approach of data collection has been outlined in detail in Chapter 3.

The responses have been discussed below as per question asked on the questionnaire. The responses of all project managers have been categorised and displayed in table format so as to facilitate the analysis and discussion of results.

4.2 Impact of the business environment on the nature and characteristics of SMEs in South Africa

The first section of the questionnaire was aimed at asking questions that would attend to the first research sub- question and objective point, and that is to understand the nature and characteristics of small and medium sized construction enterprises in South Africa. The second part of the questionnaire was designed to understand the type of project managers in question, their experience, and qualification as well as training. The ability to understand the project managers, their background and whether or not they are registered with any registered professional association of project managers will enable the comprehension of the type of professionals, whether they can be categorised as professionals and the type of training they have acquired.

4.2.1 Question 1

What field of business does your company specialise in?

Table 4.2.1 Nature of business conducted by SME Contractors

Type of SMEs	No. of respondents	Percentage
Building Construction	11	64.71%
Home Improvement	0	0.00%
Civil Engineering Construction	5	29.41%
Other	1	5.88%
	17	

The Small and Medium Sized Construction Enterprises were purposely sampled, which was a pre-determined exercise as explained above and it was to verify that the enterprises selected fall within the SME categories ascertained. From the results in Table 4.2.1 above most of the respondents are in the Building Construction field. This number is then followed by the five Civil Engineering Construction Contractors interviewed. There was one other contractor who responded to the questionnaire, it was discovered during the telephone chat that this Contractor is primarily an electrical installation contractor.

4.2.2 Question 2

Does your company have a person responsible for project planning on given projects?

Table 4.2.2 Titles of personnel responsible for project planning

Project Planning Personnel	No. of respondents	Percentage
Yes	17	100.00%
No	0	0.00%
	17	

All the Contractors have indicated there is a designated person who does the project planning. These designated people are indicated to be contracts managers or managing directors. Every decision taken on planning for project is usually run by the managing director, which attests to the fact that many small and medium sized enterprises are managed by a single source, usually the owner of the firm as indicated by Yang *et. al* (2007).

4.2.3 Question 3

What is your company's estimated annual turnover?

Table 4.2.3 The range of annual turnover of different Contractors questioned

Annual turnover of firms	No. of respondents	Percentage
Less than R1 million	5	29.41%
Between R1 million and R10 million	12	70.59%
Between R10 million and R50 million	0	0.00%
Above R50 million	0	0.00%
	17	

Table 4.2.3 shows that from a total of seventeen small and medium sized respondents over seventy percent of them have a turnover between one million and ten million Rands per annum. The remaining contractors had less than one million turn over annually. According to the definition of small and medium sized enterprises by the National Small Business Act No. 102, 27 of November 1996, based on this category alone, the majority of the contractors are medium sized and five are small sized construction enterprises. The data was therefore collected from the targeted sample population of SMEs in South Africa.

4.2.4 Question 4

How many permanent employees does your company have?

Table 4.2.4 Number of permanent employees in respondents' companies

Number of Employees	No. of respondents	Percentage
Less than 20	1	5.88%
Between 20 and 200	16	94.12%
More than 200	0	0.00%
	17	

According the Table 4.2.4, the definition of small and medium sized enterprises is adhered to. Over ninety- four percent of the contractors have between twenty and two hundred permanent employees. According to the National Small Business Act No. 102 (1996) small contractors have between five and fifty employees, while the medium sized contractors have between fifty and two hundred employees. This concurs with this definition as all the respondents indicated that their firms have up to two hundred employees. According to the responses collected only one of the Contractors had less than twenty employees namely the electrical contractor. This might be attributable to the amount of work being undertaken by the contractors concurrently.

4.2.5 Question 5

What is the average size of your current projects?

Table 4.2.5 Average value of the current projects

Value of current projects	No. of respondents	Percentage
Less than R1 million	6	35.29%
Between R1 million and R10 million	8	47.06%
Between R10 million and R40 million	2	11.76%
Above R40 million	1	5.88%
	17	

This is linked with the annual turnover of each firm, attesting to the observation that most contractors are medium sized enterprises, this is concurred by the National Small Business Act No 102 (1996) which stated that the turnover of medium sized firms ranges between ten and fifty million rands a year. The reasoning for medium contractors taking on projects with a higher value is that they have the competitive advantage over the small firms even though the magnitude of the job might be more appropriate for smaller contractors.

4.2.6 Question 6

How many projects do you have running at this point in time?

Table 4.2.6 Number of currently running projects

Number of running projects	No. of respondents	Percentage
Between 0 - 2	7	41.18%
Between 3 - 10	10	58.82%
Between 11 - 20	0	0.00%
More than 20	0	0.00%
	17	

The aim of this question was to ascertain whether the contractors have some work they are busy with and thus a source of income. Table 4.2.6 demonstrates that forty-one percent of the contracts have between zero and two projects they are currently running, while ten of the contractors have specified to have between three and ten active projects. These results show that all the respondents have work to do at the time they were questioned. This confirms an element of confidence that the

contractors are busy with work, hence using their project management expertise and applying them to the active projects.

4.2.7 Question 7

What is your current position in the company?

Table 4.2.7 Different positions held in the Companies studied

Designation	No. of respondents	Percentage
Construction Manager	5	29.41%
Project Manager	8	47.06%
Managing Director/ Partner	4	23.53%
	17	

The majority of the respondents indicated that they are project managers within the organisation under study. The remaining respondents were either construction managers or managing director in the small and medium sized enterprises. The personnel interviewed are involved in planning for the execution of construction projects, however, as stated above it was observed that this is always under the guidance of the managing director who is often easily accessible within small and medium sized enterprises.

4.2.8 Question 8

How long have you been in this position?

Table 4.2.8The number of years the respondents have been practising their field

Length of Designation	No. of respondents	Percentage
Less than 3 years	2	11.76%
Between 3 - 10 years?	12	70.59%
More than 10 years	3	17.65%
	17	

Table 4.2.8 demonstrates that from all the respondents, over seventy percent indicated to have between three and ten years working experience in the field, seventeen percent have more than ten years experience while the remaining eleven percent have less than three years experience. These results show that most of the

respondents have some working experience ranging from three to ten years, while only a few have ample experience of more than ten years.

4.2.9 Question 9

What is you highest education qualification?

Table 4.2.9 Level of Education qualification of the respondents

Qualifications	No. of respondents	Percentage
Matric	1	5.88%
Certificate	3	17.65%
Diploma	7	41.18%
Bachelor's degree	5	29.41%
Post- graduate degree or diploma	1	5.88%
	17	

Table 4.2.9 shows that only one of the respondents has a matric qualification, while the rest have different tertiary qualifications. The majority; over forty percent of the respondents indicated that they hold a diploma; five of the respondents were degree holders, while one has a post graduate qualification. It was noticed that many of the projects were run by personnel with some degree of tertiary education, while only one construction manager had a matric qualification, they indicated that they have between three to ten years work experience in their field. Of the entire managing directors questioned only one possess a diploma, one has a post- graduate degree and the rest have a bachelor's degree. This indicates that the respondents in high positions were both qualified and have a number of work experience.

4.2.10 Question 10

Are you registered with any recognized professional association for project managers?

Table 4.2.10 The number of respondents registered with professional body governing project managers

Professional Registration	No. of respondents	Percentage
Yes	4	23.53%
No	13	76.47%
	17	

Table 4.2.10 shows that there are only four (4) of the project managers interviewed are registered with a professional association that governs the professional project managers. This makes it twenty three percent of the respondents, while the remaining seventy six percent of the respondents are not registered professional project managers.

If the answer to question ten was yes, the respondents are asked to elaborate on the number of times per year they attend the CPD programs that are organized to improve the profession of project managers.

If yes, how often do you engage in the Continuous Professional Development Programs made available by professional bodies?

Table 4.2.10b Regularity of attendance of Professional Bodies CPD programs

Regularity of training	No. of respondents	Percentage
Every 6 months	3	75.00%
Every 1 year	1	25.00%
Not Applicable	0	0.00%
	4	

The results demonstrate that out of the four respondents that are registered, three of them attend CPD programs every six months, while one indicated to attend once a year.

4.2.11 Question 11

Table 4.2.11, is evidence that over eighty percent of the respondents indicated that they go for refresher courses every one and a half years, if at all.

How often does your company arrange refresher courses of project management?

Table 4.2.11 Regularity of attendance of project management courses

Attendance of courses	No. of respondents	Percentage
After 1 year	3	17.65%
After 1.5 years	14	82.35%
	17	

Upon collection of the questionnaires, about five respondents made a note that they never attended training courses. This goes to the root of this research, identifying lack of project management training as a core research problem identified.

4.3 Extent of application of Project Management Tools and Techniques in SMEs

This section is an open questionnaire where the respondents are given the opportunity to select an answer about the project management techniques and has space to expand. After having specified the type of techniques used, the extent to which they are implemented is indicated and evaluated.

This section of the questionnaire focuses on the project management techniques that have been defined by the Project Management Body of Knowledge (PMBOK) as the three pillars of Project Management, namely Time, Cost and Quality Management. This was concurred by Ashleigh, Ojiako, Chipulu and Kai Wang (2011) stating that the "*The most effective project management is measured primarily by the ability to ensure that the objective has been met within the agreed budget, time frame and to an adequate quality".*

Firstly it was ascertained whether the respondents feel it was necessary for construction projects to be run using project management tools and techniques.

4.3.1 Question 12

How necessary is to have project management in your projects and implement the tools and techniques?

Table 4.3.1 The number of respondents who rate the necessity of PM tools and techniques when executing projects

Necessity of PM Tools	No. of respondents	Percentage
Completely necessary	17	100.00%
Neutral	0	0.00%
Unnecessary	0	0.00%
	17	

According to Table 4.3.1, the respndents unanimously agree with Lenfle and Loch (2010) who stated that Project Management is one the most popular, widely applied

and when correctly used the most effective way to manage large and complex construction projects. Having established this, all the respondents' answers were consolidated so as to display results that can be easy to interpret.

In order to get an indication as to if the Contractors are aware of the project life cycle in project management, the following table was included in the questionnaire for all respondents to tick the phases that they use in their respective firms.

4.3.2 Question 13

How necessary is it to have project management in your projects and implement the tools and techniques?

Table 4.3.2 Project Life Cycle phases that are implemented by respodents

Project Life Cycle Phases	No. of respondents	Percentage
Initiation Phase	17	100.00%
Planning Phase	17	100.00%
Execution Phase	17	100.00%
Controlling Phase	17	100.00%
Closing Phase	17	100.00%

All respodents ticked all phases of a project life cycle. According Table 4.3.2 one hundred percent of the respondents have knowledge and appreciation of the project life cycle and thus use this concept to execute their projects. This translates from the project initiation stage to the closing stage as outlined by the Project Management Body of Knowledge, and supported by Burke (2007) and the Chartered Institute of Building (CIOB, 2002).

4.3.3 Question14 - Time Management

Question 1 of this section was based upon how well the SMEs handle the time of completion factor of any project they are working on. When asked what kind of techniques the SMEs have in place to measure time, almost all the respondents specified that there is a planning process that they engage in. This stated that this process involves consulting the programme for acquiring materials as well executing the job within the time given. This marks the milestones that the Contractor aspires to adhere to and these milestones are used to check the progress of the projects and

ensure that they are still working within the allowed time frame. Some of the Contractors have stated that the time is monitored through the use of team work.

From the results provided the following table was derived and consolidated all the responses given by the respondents.

Q: Which of the following project management techniques do you use during the design and planning stage?

Table 4.3.3a Different techniques used during the design and planning stage

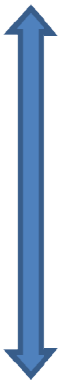
Planning Stage Techniques	No. of respondents	Percentage
Project feasibility study	6	35.29%
Work breakdown structure	17	100.00%
Resource plan	17	100.00%
Cost Analysis	17	100.00%
Critical Path Analysis	17	100.00%
Statement of work	17	100.00%
Organizational breakdown structure	5	29.41%
Specifications and standards	9	52.94%
Project plan	17	100.00%

When asked to expand on the extent of planning that goes into a project during the initial stages, the respondents showed that they adapt a lot of the project management techniques listed in Table 4.3.3a. All the respondents have indicated that at this stage they carry out work breakdown structures, a plan on how to distribute their resources, critical path analysis is incorporated within their programme, as well as statement of work and project plan as it is a requirement for most tender documents. About fifty percent of the respondents indicated that they review and plan for the specifications and standards. On the other hand about thirty percent have shown that they do a feasibility study and organizational breakdown structure.

This table is used to ascertain the extent of planning that goes into projects. In addition to this the respondents were asked how well time management techniques are implemented. The following are the results gathered.

Table 4.3.3b The extent to which time management techniques are implemented

A Very Low Extent



A Very High Extent

Rating	No. of Respondents	Percentage
1	0	0%
2	0	0%
3	2	12%
4	1	6%
5	1	6%
6	6	35%
7	8	47%
8	0	0%

Table 4.1.3b exhibits that over eighty percent (80%) of the respondents show that, within their small and medium sized construction enterprises the time management tools and techniques are used at a very high extent. Although they stated that they implement and use the project management planning techniques to monitor time, there is room for improvement as they have selected six (6) and seven (7) instead of the rating eight (8) which is the most efficient percentage.

Two of the respondents have indicated that implementation lacks in their companies while one respondent has shown that although they implement the techniques outlined, there is still a lot of room for improvement.

When asked what their personal opinion is, some respondents chose to leave the field empty while the eleven who answered stated that the inefficiency is due to personal competence of the team. Some respondents stated that the ability of the team to work well together determines how well time management of the project during the implementation stage will run.

4.3.4 Question 15 - Cost Management

This part of the questionnaire was based on how well the SMEs under study maintain management on the required cost of their projects. The aim of this type of management is to ensure that projects are completed within the approved budget. This question ties in with the previous time management question, primarily because in order to achieve this type of management there has to be extensive planning; cost planning and budgeting. Having established that the respondents use the project management planning tools and techniques, specifically to plan for the resources

such as financial budgets and constraints, it was imperative to find out the type of tools used during construction. The type of tools and technique used during construction, coupled with the planning tools could potentially allow the SMEs to complete their projects within the budget allowed. The information gathered, is summed up in Table 4.3.4a.

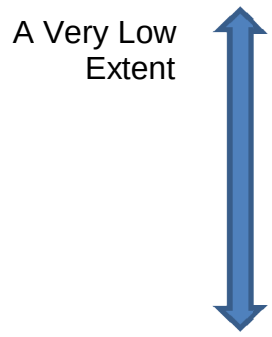
Table 4.3.4a Construction management techniques used during construction

Construction Phase Techniques	No. of respondents	Percentage
Establishing reporting techniques	17	100.00%
Monitoring project progress against the plan	13	76.47%
Communicating with project team	17	100.00%
Cost Control techniques	17	100.00%
Performance measurement	17	100.00%
Quality Control	17	100.00%

According to Table 4.3.4a all the techniques are used by the respondents regularly. Respondents seemed to have understood these techniques more than those employed during the planning stages. This is because some of the respondents outlined in the section where they are asked to give opinions that they are aware of the project management tools and techniques however the techniques are not used extensively. Three of the respondents stated that they are usually incorporated within particular techniques.

When asked how well these techniques are implemented to ensure that cost management is carried out effectively, the following results came to light.

Table 4.3.4bThe extent to which cost management techniques are implemented



Rating	No. of Respondents	Percentage
1	0	0%
2	0	0%
3	2	12%
4	4	24%
5	0	0%
6	4	24%
7	7	41%
8	0	0%

Seven of the respondents have indicated that the cost management techniques are eighty- eight percent implemented in their corporations. One quarter of the respondents show that there is about seventy- five percent implementation, while the other quarter show that the implementation is about fifty percent. There are two respondents who indicated that there is a fairly low extent of implementation in their companies.

4.3.5 Question 16 - Quality Management

This particular part of the questionnaire is focused on how well small and medium sized enterprises handle the quality assurance of any given project. When asked on the type of measures taken to ensure that adequate quality is achieved at the end of the project, the general consensus was that there is a management procedure in place throughout the execution of the project.

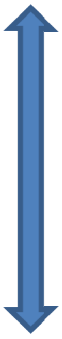
This section ties in with the cost management question, where table 4.1.16 above shows that all the firms indicated that quality control measures are adhered to during the execution of the projects.

Three of the respondents stated that the quality requirements are determined at the tender stage, where the standards and specifications are outlined and the materials and equipment quoted in the tender have to adhere to the quality standards. One the managing directors specified that, when a tender is awarded, the Contractor is required to attain approval of the materials and equipment used from the Client's Project Manager, to ensure the quality standards are satisfied. Seven of the respondents stated that they have to monitor the progress of the project closely and implement quality control measures. While, two respondents stated that quality is checked at the close out stage before hand over to the client.

When asked how well implemented the quality assurance plans are the following table sums up the responses from all seventeen contractors questioned.

Table 4.3.5a The extent to which quality management techniques are implemented

A Very Low Extent



A Very High Extent

Rating	No. of Respondents	Percentage
1	0	0%
2	0	0%
3	1	6%
4	5	29%
5	1	6%
6	8	47%
7	2	12%
8	0	0%

Table 4.3.5a demonstrates that six of the contractors have indicated that the implementation of quality control tools and techniques is fairly low. While about half of of the respondents have selected the rating six, to indicate that the quality control procedures are reasonably implemented. Only about twelve percent (12%) of the respodents indicated that the quality management procedures are highly implemented in their companies.

In order to sum up the three pillars of project management tools and techniques highlighted above, the respondents were asked on the techniques they use at the close our phase of a project. Contract close- out techniques are used by all respondents, while post project review technique is used by almost half the respondents.

Table 4.3.5b The techniques employed at the project close- out phase

Close-out Phase Techniques	**No. of respondents**	**Percentage**
Post Project Review	8	47.06%
Closing the client's contract	17	100.00%

Reviewing the projects should be a key factor as the project team is able to identify where they have achieved their plans as well as where they have gone wrong. In doing so, they are able to identify their short comings in terms of project management of construction projects and tackle their short comings moving forward.

4.4 Factors constraining the development of professional project managers in South African SMEs

To finish off the questionnaires, the small and medium sized enterprises under study were asked to reveal what they think are the most significant internal and external constraints to the project management practice, as well as the development of the profession. This part of the questionnaire is an open question set- where the respondents are allowed to put down non- standardised answers and elaborate if need be.

4.4.1 Question 17

1. *What are internal factors that constrain the development and implementation of project management techniques in SMEs*

Small and medium sized construtions companies in South Africa face several challenges that inhibit the development of its project managers. The respondents were asked to provide in their words what they felt were the constraints within their firms. The results could not be tabulated as the answers were all phrased differently. Some of the answers drawn out were similar. Most of the respondents listed two to three reasons as to the factors within the construction companies, the most popular response being lack of motivation by the construction team. This was listed by nine of the seventeen respondents, one of them stated that the construction team is not motivated to work well together. Four of the respondents further stated that it is lack of effective teams. One of the medium sized construction project manager stated that the lack of construction team building is due to employees changing jobs regularly and thus having to build new teams frequently.

Another reason stated by eight respondents is that there is general lack of skilled project managers. It was gathered that the lack of skill translates to the rest of the team, thus resulting in lack of sufficient teams. This reason was linked to the three respondents that stated lack of leadership as a constraints for project management professional development.

Five of the respondents listed financial constraints as one of the internal constraints for the development and implementation of project management professionals. It

was revealed that the small and medium sized construction enterprises do not invest in the training and developing the skills and techniques of project managers in the South African construction industry. They attributed lack of training to financial constraints. This is one of the major constraints that has been uncovered and most of the responses regarding finances came from the project managers. Therefore the cost of training has been identified as one of the major constraints of project management professsional development.

One of the managing directors of an SME stated that one of the constraints is lack of qualified project managers. He further noted that it is a challenge to find driven, motivated and knowledgable project managers in South Africa.

4.4.2 Question 18

2. *External factors that constrain the development and implementation of project management techniques in SMEs*

This question was not as well answered as the internal constraints as a number of respondents left this field blank. The eleven respondents that answered stated that there are a lot of institutions that offer project management courses and it is discovered that most of them are either not accredited or applicable to the South African construction industry.

Another external factor put forward that some respondents listed as an internal factor states that the banks consider SMEs to be a risk and thus do not provide sufficient funds to SMEs. This has caused lack of additional funds to be allocate towards training their project managers.

It was further stated that a lot of practicing project managers do not understand the Clients they are dealing with, in that they do not ascertain precisely what the Client's expectations are so that they can deliver a finished product to suit the specifications. Another lack of understading cited by one respondent is that there is no professional body that governs andthat is dedicated towards the development and improvement of project management practice.

Five of the respondents stated that it seems project management in the construction industry is a fairly recent career that a lot of the stakeholders do not fully understand.

It is for this reason that some clients do not see it necessary to allow for project management fees in an effort to cut costs.

4.3 Summary

This chapter has outlined the findings of the research, the seventeen respondents have provided answers that have been summed up and revealed in this chapter in order to track and trace different responses. The questionnaire was summarised through table format in order to reveal the most popular responses, while the semi-structured questionnaire portion was summarised and the responses summed up. The structure of the questionnaire was aimed at addressing the research questions and objectives, it was laid out to explain and address the research findings aimed at uncovering the following;

- The nature and characteristics of small and medium sized construction enterprises in South Africa.
- To explore how adequately SMEs in South Africa employ and implement project management practices to manage construction projects.
- To investigate the internal and external factors constraining the development of project management profession in SMEs based in South Africa.

The following chapter will analyse the results, with an aim of psynching the entire research by linking the findings to the literature that was previously reviewed in Chapter 2. The discussions of each section will be done following the analysis of results.

CHAPTER 5

ANALYSIS AND DISCUSSION OF RESULTS

CHAPTER 5: ANALYSIS AND DISCUSSION OF RESULTS

This chapter focuses on reviewing the data collected and presented in chapter four. This has been achieved through categorizing and analyzing the data and relating the findings of this research to the theoretical framework outlined in Chapter two of the research. The data collected and grouped, will be analyzed according to the research problem questions and objectives. The structure of this section will be similar to how the data collected were presented; this is in the order of the research questions. This structure is adopted from the sub- questions of the research, aimed at helping to answer the primary research question. The nature and characteristics of the SMEs and their management personnel will be reviewed. This will be followed by analysis and discussion of findings relating to the project management techniques implemented when managing construction projects and lastly the internal and external factors constraining the development of the project management field as a profession. This will be summed up by a general discussion of the findings to match the separate sections of the data collected with the existing literature reviewed.

5.1 Analyzing the data collected

In Chapter four, the data were summarized and displayed in table format so as to draw out the concern areas. The data have been categorized in chapter four, however it is important to note that it was done according to the questions asked. This section will aim to consolidate all the data collected, group into appropriate fields and thus make it easier to compare and analyze.

Graphs and tables were used further in this chapter to display the consolidated data and determine the frequency of each answer. This was done because graphs are easy and quick to read and interpret.

5.2 Exploration on how the business environment and characteristics of SMEs affects the professional development of project managers.

This first section sets out to consolidate the findings discussed above, to enable a comparison and analysis of the results in comparison to the existing literature. This section of the analysis specifically focuses on addressing the objective and

answering the research problem that is out to discover the nature and characteristics of South African small and medium- sized construction enterprises.

5.2.1 Background of the Small and Medium Sized Construction Enterprises

The table below sums up the type of small and medium sized construction enterprises approached during the research and summarises their characteristics. According to Table 5.2.1 below, there are five smallest firms and this is shown by the fact that they are all categorised as grade 3.

As uncovered during the presentation of the findings most of the respondents were medium sized contractors as determined by the turnover ranging between ten and fifty million rands. Table 5.2.1 was created to compare and ensure that all the contractors fell into the SME category as defined in chapter two. This was to ensure that only SMEs are focused on. The definition of SMEs was derived from categories set out during the literature review (Ofori, 1996).

The aim of the research was to question the respondents who were in a position to provide reliable information as they were currently practising in the project management field. The positions held by the respondents studied verify the research problem revealing that the term ‘project manager’ is used to cover a very broad range of responsibilities and is often not properly defined. This is because the positions are different although the respondents are executing the same duties. This is exhibited by the different titles of project manager, contracts manager, project engineer, managing director and construction manager.

The results from Table 5.2.1 concur with the definition of SMEs in South Africa as drawn out by The Construction Industry Development Board (CIDB) in 2007. The CIDB’s mandate is to monitor all contractors within South Africa and promote best practice to stimulate growth and improvement in the South African construction practice. As mentioned in the literature review the CIDB Section 5 (2) of their 2000 Act has been mandated to register and regulate and manage contractors. This has allowed this research to be able to ensure that all the candidates outlined in the research findings above comply with the definitions of SMEs. There was no deviation from this outlined definition and Table 5.2.1 sets out to summarise the characteristics of all the Contractors approached during the execution of this research. Therefore

the sample selection was fulfilled to cover small and medium sized categories of contractors.

Table 5.2.1 Summary of the SME characteristics

Respond-ents	Grade	Size of Contractor	Type of Business	Position of the interviewee	Annual Turn-over	No. of Employees
1	3	Small Contractor	Civil Engineering Construction	Project Engineer	Less than a R1mil	20 - 200
2	4	Small Contractor	Building Construction	Construction Manager	Between R1-R10Mil	20 - 200
3	4	Small Contractor	Building Construction	Construction Manager	Between R1-R10Mil	20 - 200
4	7	Medium Contractor	Building Construction	Construction Manager	Above R40 million	20 - 200
5	4	Small Contractor	Building Construction	Contracts Manager	Less than R1 million	20 - 200
6	4	Small Contractor	Civil Engineering Construction	Project Manager	Between R1-R10Mil	Less than 20
7	6	Medium Contractor	Building Construction	Associate	Between R10-R40Mil	20 - 200
8	4	Small Contractor	Building Construction	Construction Manager	Between R1-R10Mil	20 - 200
9	4	Small Contractor	Building Construction	Construction Manager	Between R1-R10Mil	20 - 200
10	3	Small Contractor	Other- Electrical Contractor	Managing Director	Less than a R1mil	20 - 200
11	4	Small Contractor	Civil Engineering Construction	Contracts Manager	Between R1-R10Mil	20 - 200
12	3	Small Contractor	Building Construction	Project Manager	Less than a R1mil	20 - 200
13	6	Medium Contractor	Building Construction	Project Engineer	Between R10-R40Mil	20 - 200
14	5	Medium Contractor	Building Construction	Project Manager	Between R1-R10Mil	20 - 200
15	3	Small Contractor	Civil Engineering Construction	Director	Less than a R1mil	20 - 200
16	3	Small Contractor	Building Construction	Contracts Manager	Less than a R1mil	20 - 200
17	4	Small Contractor	Civil Engineering Construction	Managing Director	Between R1-R10Mil	20 - 200

5.2.2 Experience of the Small and Medium Sized Construction Enterprises

The second part of the structured questionnaire sets out to discuss the experience the contractors as well as their personnel. This question arose from the statement made during the problem statement in chapter one, where the National Home Builders Registration Council (NHBRC, 2004) stated that there is need for better workmanship on project as there is poor quality being delivered by SMEs. NHRBC identified the need for competent professional project managers to execute better planning and controlling of projects in order to alleviate this problem being faced.

This is concurred by Benjaoran (2008) who stated that the major challenge faced by SMEs is poor quality project managers due to lack of experience and improper training.

The experience of the SMEs and their project managers was tested through asking them on the number of tenders that are currently running as well as the monetary average size of those tenders. This was to ascertain if the contractor is busy with a number of projects because the busier the contractor the more experience and confidence they have acquired in the industry to deliver projects within the acceptable time frame, within budget and to the client's desired quality. As revealed in the above chapter, there are over forty percent of the contractors who indicated to have between zero and two running projects. This number is low however it could be attributable to a number of factors such as the current dip in the economy. This is used as an indication of the performance of the contractor, not the determinant and works well when compared to other indications outlined.

Over seventy percent (70%) of the respondents indicated to have between three and ten years experience in the field they are involved in. Seventeen percent of the respondents had ample experience of over ten years in the field. The three respondents with more than ten years experience were the managing directors questioned, which shows that they have ample experience in the positions they are in. This is an important factor in the development of project manager in SMEs in South Africa, Barry and Sebone (2009) concurred with this, stating that lack of skilled construction managers is regarded as a major root problem in the development of the South African Construction Industry.

5.2.3 Qualifications and Training of the Project Managers

According to van Mook (2009) it is important for project managers to acquire formal education, training and to continuously engage in educational activities that can keep them up to date with the industry and improve their profession. Twinn (2013) has agreed with this definition of professionals and has added on that there is a gap between the theory and practice of project management. It was identified that the use of built environment professional bodies that are mandated to govern the profession and improve are necessary. However, during the data collection stage it has been revealed that four out of seventeen respondents are registered. The rest of

the project managers practicing are not registered with any professional association board.

As a result the majority of the project managers in South Africa are not engaged with Professional Management South Africa, which according to Section 21 is to promote, represent and develop professional project managers in South Africa. This is a demonstration that the project managers are not aware of the advantages that exist to improve their profession and are thus not taking advantage of them. The benefits offered by all recognised and registered professional bodies include among other things the opportunity to network, highly experienced speakers and seminars, access to publications, workshops and other initiatives aimed at keeping the professionals up to date and to continuously improve their profession.

According to Bond (1998) the majority of practicing professional project managers in South Africa have not gone through the necessary project management training and lacked sufficient knowledge, skills, and experience to manage projects successfully. This is supported by a report produced by the World Bank (1996) which states that small firms tend to invest less in training thus a general human resource problem.

This statement was put to test during the data gathering stage of this research. The respondents were firstly asked what their highest education qualification is and as per results revealed in the chapter above, about twenty four percent of the respondents had a certificate and matric qualification. Most of the respondents indicated that they held a diploma in project management. This is indicative that most of the respondents hold a lower qualification at tertiary level, which concurs with the literature that has been touched on. It was only six of the respondents who held a degree and higher, which is not an acceptable number.

The question that followed to determine the training done on the project managers asked them to indicate how often they attend refresher project management courses. It is alarming that over eighty two percent of the respondents revealed that they are offered courses after one and a half years if at all. This is substantiation that small and medium sized enterprises do not invest sufficient time and funds in training and growing the project management profession within their firms.

5.3 Extent to which various project management tools and techniques used by SMEs are implemented

This section of the analysis focuses on consolidating and displaying in an interpretable manner, the type of project management tools and techniques employed by SMEs in South Africa, and most importantly, to address whether these techniques are adequately implemented or not. This addresses the second objective of the research, in order to understand the factors constraining the development of project management professions in SMEs based in South Africa.

Table 5.3.1 Implementation of project management techniques in SMEs

PM Techniques	1	2	3	4	5
Project administration meeting	0	4	9	3	1
Project Feasibility study	0	2	1	11	3
Scope Study	1	2	6	7	1
Work breakdown structure	0	1	0	14	2
Resource plan	0	0	3	9	5
Preliminary Schedule	0	0	0	2	15
Cost Breakdown	0	0	0	1	16
Baseline project plan	0	3	10	2	2
Gantt chart	0	0	0	5	2
Critical Path Analysis	0	0	2	7	8
Brainstorming	0	3	8	4	2
Specifications and standards	6	2	6	3	0
Reporting procedures	0	1	5	8	2
Monitoring project progress	4	1	3	8	1
Communicating the project status	0	4	8	5	0
Quality Control	4	7	4	2	0
Performance Measurement	6	4	4	2	1
Control Charts	1	5	2	8	1
Progress Review Meetings	0	3	5	8	1
Post Project Review	9	1	4	3	0
Closing down Client Contract	0	1	3	11	2

Key to scales:
1 - Extremely Inadequate
2 - Somewhat Inadequately
3 - Inconsistent
4 - Somewhat Adequate
5 - Extremely adequate

5.3.1 Project Management Tools and Techniques

This section of the questionnaire allowed the respondents some flexibility in order to explore various project management techniques at different phases of project management when managing construction projects. The table below is a summary of project management tools and techniques used at the planning stages, execution as well as project close out stages. The summary shows how well the SME under study implement these techniques within their organisations.

The mean per item is calculated using the following formula:

$$\frac{N_1 + 2N_2 + 3N_3 + 4N_4 + 5N_5}{5 \times 17}$$

Table 5.3.1b MEAN of Implementation of project management techniques in SMEs

		N_1	N_2	N_3	N_4	N5
Project Management Techniques	**MEAN**	**1**	**2**	**3**	**4**	**5**
Gantt chart	0.353	0	0	0	5	2
Post Project Review	0.412	9	1	4	3	0
Quality Control	0.447	4	7	4	2	0
Performance Measurement	0.459	6	4	4	2	1
Specifications and standards	0.471	6	2	6	3	0
Project administration meeting	0.612	0	4	9	3	1
Communicating the project status	0.612	0	4	8	5	0
Monitoring project progress	0.612	4	1	3	8	1
Baseline project plan	0.635	0	3	10	2	2
Control Charts	0.635	1	5	2	8	1
Scope Study	0.659	1	2	6	7	1
Brainstorming	0.659	0	3	8	4	2
Progress Review Meetings	0.682	0	3	5	8	1
Reporting procedures	0.694	0	1	5	8	2
Closing down Client Contract	0.765	0	1	3	11	2
Project Feasibility study	0.776	0	2	1	11	3
Work breakdown structure	0.800	0	1	0	14	2
Resource plan	0.824	0	0	3	9	5
Critical Path Analysis	0.871	0	0	2	7	8
Preliminary Schedule	0.976	0	0	0	2	15
Cost Breakdown	0.988	0	0	0	1	16

Table 5.3.1b shows the mean calculated per tool of project management and arranged in descending order. Chapter four is the findings chapter, where all the findings were revealed to find out if whether the SMEs in fact implement the project management tools or not. The question was extended to appreciate to what extent these tools are implemented within the South African small and medium sized construction enterprises. It is indicated by the mean calculation that the least used project management tool is the Gantt Chart and the most widely used tool is the Cost Breakdown during planning stages.

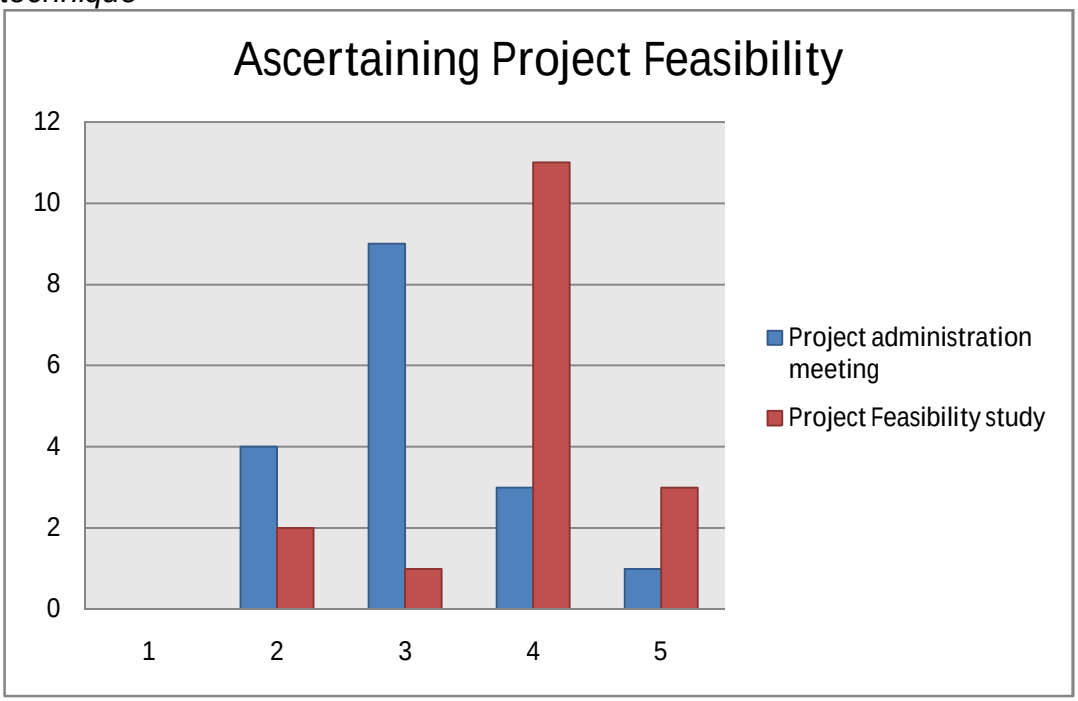
The above project management tools were derived from the Project Management Body of Knowledge (PMBOK) stating that it is imperative for a project to be defined accurately from the beginning stages to ascertain project scope, time frame, funds available as well as the quality expected. These are listed in the above tables that the respondents were asked to tick and complete. The summary has been put together and displayed above for so as to enable an easier comparison and analysis of each technique used.

5.3.1.1 Project Initiation Stage

To analyse the above results the bar distribution chart will be used to ascertain the distribution of the firms on the application of the techniques outlined. The first technique that is outlined to be essential to identifying the scope and other requirements of the project is the Project administration meeting. The graph below demonstrates that the highest number of SMEs state that this technique is inconsistently implemented in their firms.

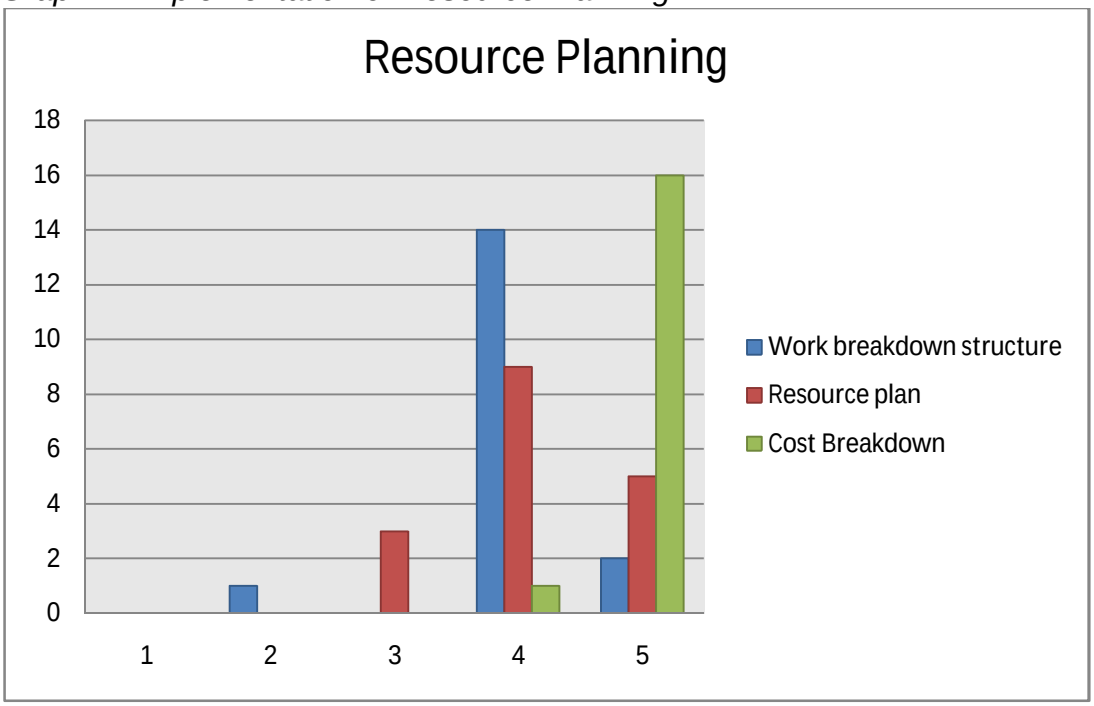
As revealed in chapter four, the respondents specified that in order to manage the time frame given effectively, the planning is engaged. This graph however, is proof that the planning phase does not start out as recommended by Bigelow (2001). It was stated that the planning phase is often overlooked as it is often perceived as a process that takes time. The two graphed stages are the stages that will allow the contractor to determine the feasibility of the project; this will also facilitate an open communication link with the rest of the project members. This is concurred by Burke (2007) stating this is the initiation process of the project life cycle, which will allow project identity to be ascertained as well the feasibility study to ensure the product can be made and the best use of company resources.

Graph A: Implementation of Project administration meeting and Feasibility Study technique



5.3.1.2 Project Planning of Resources Available

Graph B: Implementation of Resource Planning

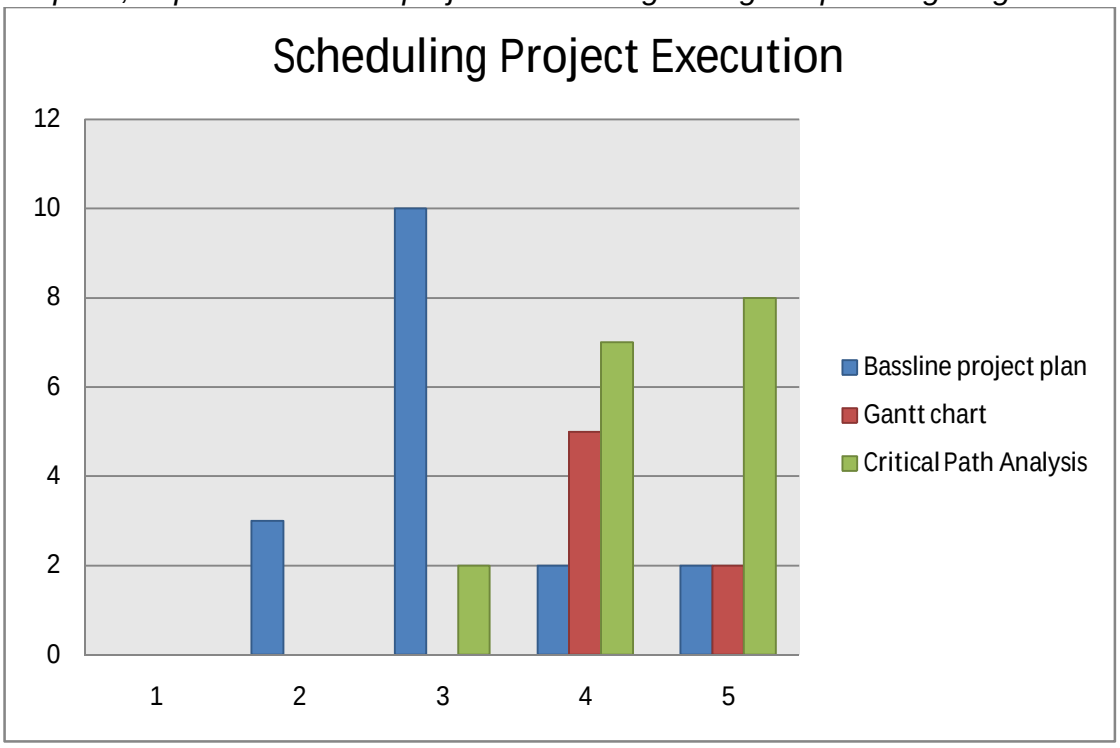


Having identified the objectives and the feasibility of the project, the resources available have to be planned and allocated to the project to facilitate the completion

within time, budget and to the expected quality. However, it must be noted that to plan the resources a work breakdown structure must be clear and well defined. The table above supports what was discovered in chapter four that almost all the respondents show that they carry out, somewhat adequately the work breakdown structure and derive a cost breakdown from the WBS. Burke (2007) stated that breaking down complex construction projects into manageable work packages makes work easier to execute and track the progress. This has identified not to be a major shortcoming as far as planning for a project goes. The SMEs in South Africa seem to appreciate this project management tool and thus implement it throughout all their projects.

5.3.1.4 Scheduling a Project

Graph C; Implementation of project scheduling during the planning stage



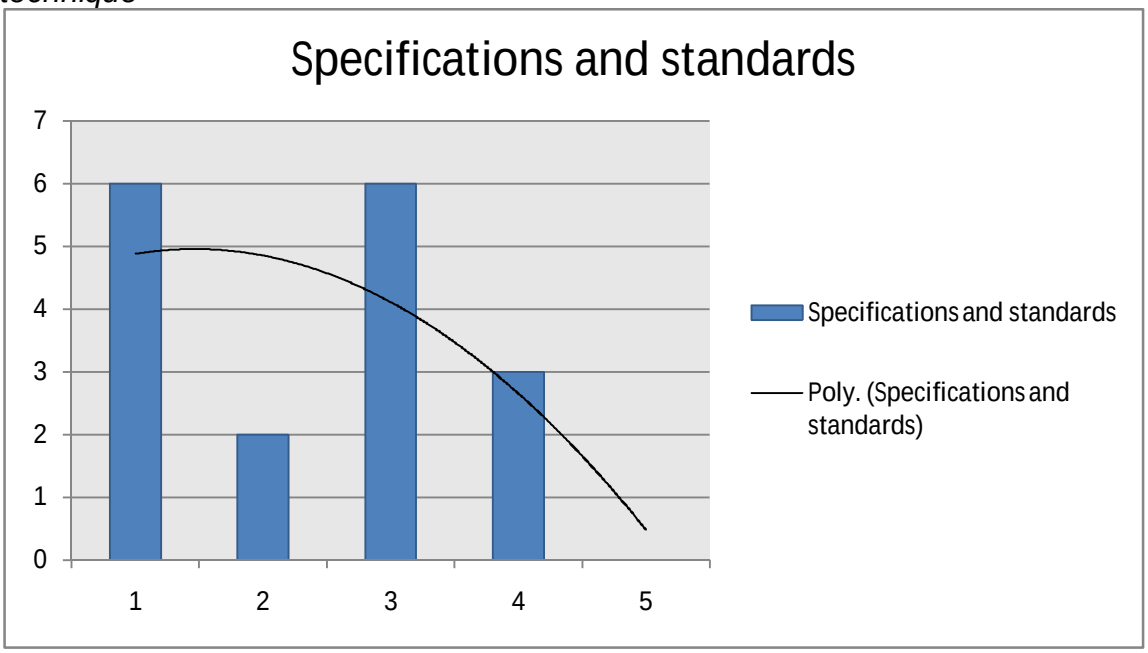
Chapter four revealed that all the respondents recognise that the baseline project plan as well as tools used to scheduling the project such as Gantt charts and critical path analysis is important. The extent to which they are implemented however, show that the baseline project plan is not consistently drawn by the small and medium sized contractors. This is important as the baseline project plan is used by the Client as well to monitor the progress according to the plan and should be periodically

adjusted by the project manager to update new activities that may arise (CIOB, 2002).

Burke (2007) states that Gantt Charts and Critical Path Analysis are two of the most popular and widely used planning tool used to communicate the schedule of the project. This is primarily due to the straightforward nature of developing these tools and interpreting them (Burke, 2007). This is proven to be true in this case as most of the respondents adequately implement these tools in the execution of their projects.

5.3.1.4 Specifications and Standards

Graph D: Implementation of specifications and standards project management technique



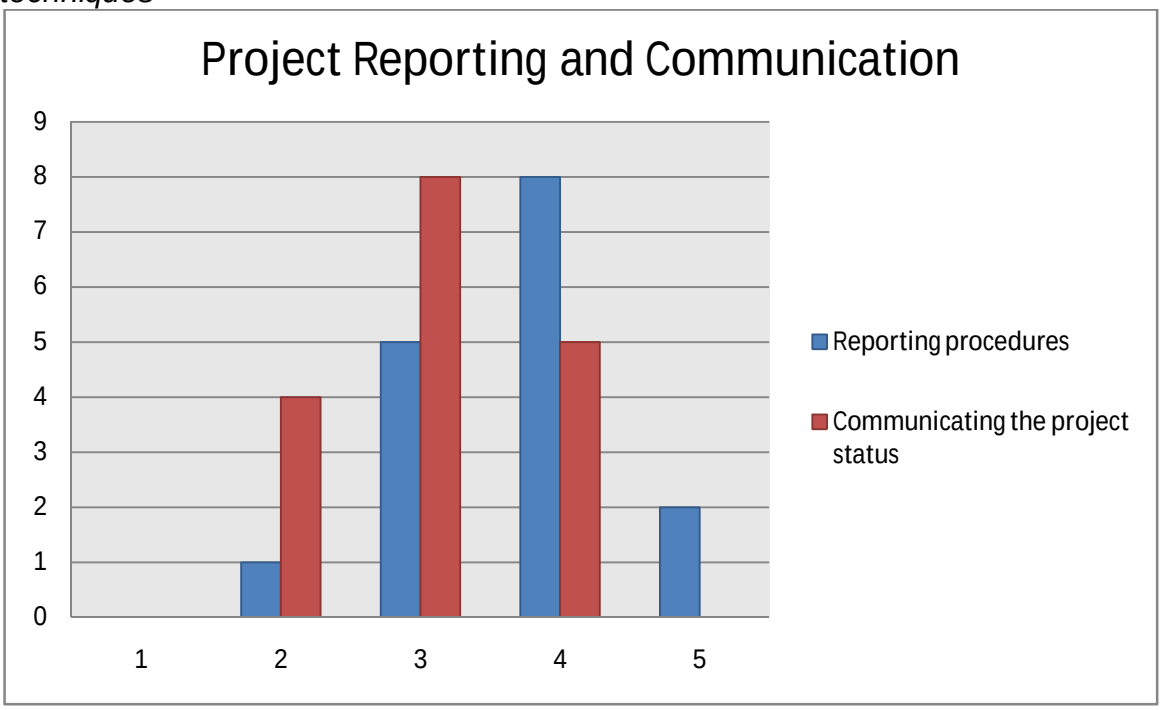
This is an important project management tool that has a direct effect on the quality of the end product. The results, which have been discussed in chapter four, indicate that this is one of the most poorly implemented project management techniques. This is supported by the table above that shows that over thirty five percent of the respondents do not use this technique as part of their project planning. The other thirty five percent indicate that it is implemented, although it is inconsistent. The three out of seventeen respondents understood and appreciated the importance of this technique.

This technique is adopted from the planning stages of the project in order to ascertain the correct standard and specifications of the materials ordered and

installed as well the actual work standards expected. This will allow the contractor to plan and cost accordingly as they can ascertain the precise specification of the work to be carried out. This has been discovered to be one of the biggest challenges experienced by South African SMEs.

5.3.1.5 Project Reporting and Communication Techniques

Graph E: the implementation of project reporting and communication tools and techniques



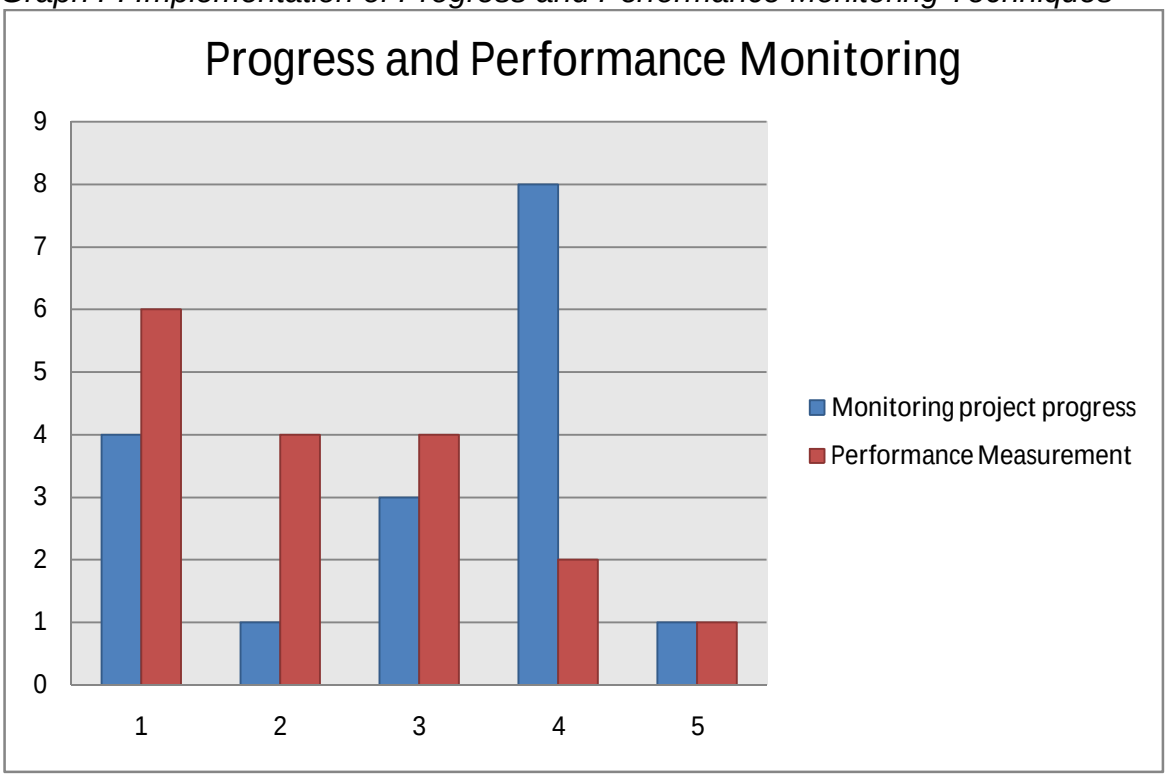
During the execution, monitoring and controlling process of the project life cycle a project manager must have the ability to communicate with the project team and other stakeholders (Edum-Fotwe and McCaffer, 2000). The respondents consistently and somewhat adequately implement these project management techniques. This could be improved as good monitoring and communication can motivate the project team to work and do their best and thus complete the project within time, budget and to the acceptable quality standards.

5.3.1.6 Progress and Performance Monitoring

According to Kerzner (1995) complete project management in terms of time, cost and quality allows performance measurement through benchmarking the progress against the plan of the project and assessing deviations. Although most of the respondents indicated that they adequately monitor project progress, a fairly large portion of the respondents do not consistently monitor the progress and the reason

could be linked to the discovery that a lot of the contractors do not spend enough time during the planning stages coming up with a baseline plan. This plan would be used to monitor and keep actual progress of the project in check compared to the plan.

Graph F: Implementation of Progress and Performance Monitoring Techniques



Even worse results are that fourteen out of the seventeen respondents do not adequately measure the performance of the project against the time, budget and quality plans derived at the beginning stages. According to Bond (1998) in South Africa it is not uncommon to find projects with cost overruns, poor quality and time delays. Lack of performance measurement can be one of the major challenges that inhibit the delivery of construction projects within time, budget and to the required standard of quality.

<u>Discussion of the nature of SMEs and how well the project managers within these corporations implement project management tools and techniques</u>

To execute project management successfully the theory and practices must be aligned to improve the profession (Crawford 2006). The above sections in chapter four and chapter five set out to ask the respondents to indicate whether they

implement the project management theories outlined in the literature review and to what extent the practices are implemented.

It was discovered through the use of the questionnaire that all the respondents in the SMEs were aware of the theories of project management however these were not effectively implemented hence the challenges faced by SMEs.

The research problem stated that SMEs find it difficult to deliver infrastructure appropriately. This has been further explained as to deliver good quality infrastructure within the time frame allowed and the budget set. SMEs have been identified to play a very significant role in the South African Construction industry as the development of SMEs is linked to the South African Government Policy on job creation and the long- term economic growth of the Country (Van Wyk, 2003). This statement is supported by Gouden (1997) stating that SMEs in South Africa play a vital role in the economic growth of the country.

Due to work becoming increasingly organised through projects and programmes that are undertaken by project teams (Winter *et.al*, 2006) the demand on the profession of project managers has increased substantially. Project Managers in the Construction industry are responsible for the overall success of delivering the infrastructure projects on time, within budget and in accordance with the desired quality requirements.

Having outlined the project management tools and techniques discussed at length in the literature review and comparing to the implementation of these techniques, it has been observed that there is lack of monitored implementation thus inconsistencies throughout the project life cycle. The lack of consistent techniques described above result in the cost overruns, exceeding budget limits and poor quality that gives small and medium sized construction companies a negative image in the Country. This is primarily due to the challenges faced by SMEs. One of the major challenges that have been uncovered through questions surrounding the training offered to project managers is the lack of resources available to SMEs in South Africa. This result in limited funds allocated, if at all, towards the development and training of professional project managers in the country. Lack of training directly affects the quality of project being delivered by SME contractors within the country. Lack of resources affect the turnover and as a result limits the tenders that SMEs can bid for. The results of poor

performance discussed above are due to poor management, which is attributable to lack of qualifications and appropriate training of project management.

Successful project management is achieved through using multiple tools and techniques as well as attaining and learning certain competencies that assist in delivering successful projects. Small and medium sized enterprises experience a lot of challenges discussed that inhibit this development. According to Chipulu *et.al* (2011), it was confirmed that lack of project management clarity of education and training is directly linked to the ability to successfully implement practice in projects.

5.4 Factors Constraining the development of Project Management Profession in small and medium sized construction enterprises in SA

Analysis and Discussion of results

According to Crawford *et.al* (2006) in order to execute successful project management practices, there is a need to align the project management theory to practice. The project management tools and techniques highlighted above are necessary as they are needed to ensure planning, control and successful execution (Ashleigh *et.al*. 2011).

According to the results discussed in chapter four, the most prevailing reason cited by the respondents as a factor constraining the development of project management profession in the industry is lack of effective teams. This has been revealed in several existing literature by El- Sabaa (2001), Ojiako *et.al* (2011) and Chipulu (2011), all stating that failure of projects is primarily attributable to human errors such as lack of leadership. This is directly linked to the respondents' factor of lack of teams. For a team to be efficient and effective, it must have a motivated and experienced leader to drive the team. However, this has been discovered as a shortfall in a lot of SMEs in South Africa. This can also be linked to the fact that most of the senior project managers do not have the appropriate qualifications and thus find it a challenge to adopt the holistic approach that links the theory to practice.

Crawford *et.al* (2006) concur with all the existing literature cited above that there is need for competent managers in order to successfully improve and grow the project management profession in small and medium sized enterprises South Africa. One of the major factors revealed during this research was the lack of motivation that exists

within the SMEs. This can also be linked to the lack of competent managers that have been cited by Chipulu (2011).

The findings revealed that some of the managing directors felt that there is general lack of qualified project managers in the industry. This is directly linked to the external constraint discussed the deficiency of accredited institutions that train for project management. The respondents expressed that there is a lot of institutions out there that offer project management as a course and are not registered and accredited by the respective boards to ensure that the education provided is of good quality and is relevant to the field. Kloppenburg and Baucus (2004) further explain that formal education as a means to improve the practice of project management is important. This is supported by Edum- Fotwe and McCaffer (2000) stating that research has revealed that most project managers generally hold an academic degree in Engineering, which geared is towards technical and science experience. This leaves a gap for qualifications concerning project management. It is also supported by findings of this research, which stated that most of the respondents are not sent for training by the SMEs they are employed by to allow for continuous development of project management as a profession. Therefore, this expresses that formal education, which is currently lacking in the South African construction industry is imperative to improving the project management profession as a whole. As stated, the alignment of theory and practice is important to improve the delivery of projects within cost, time and acceptable quality.

To sum up the importance of qualifications and training, Inkpen and Currall (2004) have stated that there are two types of training; namely the formal training that ends in a qualification and informal training. The formal training is explained as a structured, short- term education aimed at promoting correct practice, while informal training is more socially oriented, unstructured and occurs in good work relationships. Both types of training are necessary for the development of project management profession in SMEs.

A constraint that can be linked to most of internal constraints highlighted by respondents is financial constraints experienced by SMEs. This has already been discussed when reviewing the nature of SMEs in the South Africa. Lack of resources has been sighted as one of the major constraints of the development of project

managers and SMEs in South Africa by Dangalazana and Newadi (2005). The authors stated that lack of resources and funding stem from limited available funding by commercial banks in South Africa. It is further explained that emerging contractors do not often have the collateral required by banks to provide lending, thus restraining the SME and putting them at a disadvantage to develop further and invest in training and educating their project managers. This is supported by Barry and Sebone (2009) stating that SMEs do not efficiently invest in business management skills as there is no formal training. This short fall is confirmed by Benjoaran (2008) as well as Newadi (2005) stating that lack of resources has restricted investment in training by SMEs, which is primarily attributable to the constricted development of project management professionals in the South African construction industry. Project management techniques have been described in chapter two, as vast and they change constantly to keep up with a changing industry as established in the research problem by Kambuwa and Wallis (2002). It is for this reason that it is highly advisable for the respondents to get involved in courses that will keep them up to date with the current project management techniques that are construction related.

One of the constraints highlighted by the respondents was that project managers do not take the time to get to know and understand who their clients are and what their expectations pertaining to particular projects are. This in turn causes the project manager to incorrectly define the project, which dictates the entire project execution. This problem however, was not discovered during the reviewing of existing literature. However, the contrasting revelation made in chapter two was that Clients are misinformed of the roles played by project managers in construction projects. This was supported by Liu *et.al* (2003), who states that one of the biggest constraints uncovered was that it takes time for Clients to appoint project managers, and often by the time they are appointed it is too late to allow project manager to have an effective input in the definition and planning of a project. This is a major problem as discovered during this research, in that, everything that is related to the success of a project stems from how well the planning stage has been executed and put together.

About five of the respondents stated the constraints experienced could be due to the fact project management is a newly recognised career and so stakeholders do not seem to understand the profession and the value of project managers in properly

executed construction projects. This has been supported by Ashleigh *et.al* (2011) who stated that project management is a recent profession that has become unquestionably popular. However, there are a large number of project managers in the industry with a few being qualified and competent to execute projects successfully.

In conclusion, according to Morris *et.al* (2006) in order to develop project management professionals it is important to align project management theories and processes that have been explored according to the Project Management Body of Knowledge in chapter two. It is for this reason that this research was designed in this manner; to firstly understand the SMEs, their characteristics as well as the challenges they face, then to explore, at length the project management tools and techniques and their implementation thereof. After having addressed the objectives outlined in chapter one, the explanation of the factors constraining the improvement and development of project management as a profession in small and medium sized enterprises can be clearly explained in accordance with a similar structure. The development of project managers important as it is vital for the overall success of delivering construction projects within allowed cost, time and acceptable quality.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

The purpose of this chapter is to establish and summarize the main findings and conclusions in relation to the research questions. The structure of the order of the research objectives and questions has been maintained. The sub- questions have been addressed to help answer the main research question of the constraints to development of professional project managers in small and medium- sized construction enterprises in South Africa.

6.1 The business environment and characteristics of SMEs and how they affect professional development of project managers.

The selected SMEs are aligned with the definitions of what SMEs are in South Africa and globally. CIDB's mandate to monitor and regulate all contractors within South Africa ensures that contractors with the same characteristics are compared to each other. It can be drawn from the results and the literature review that SMEs make up a very large portion of the construction industry as there are over twelve thousand SMEs registered and operating within South Africa which make up more than sixty-three percent (63%) of the contractors.

All small and medium sized construction enterprises comply with the requirements of being an SME, which include the type of business they engage in, the annual turnover and total number of employees. It can be concluded that the SMEs in South Africa face very similar characteristics and thus challenges. The challenges discovered during this research that coincide with the literature that has been reviewed include lack of management skills. This is considered the most common cited reason by most the respondents. There is a need to encourage and improve project management training and development. Lack of managerial skills is the basis of poor cash flow management, inadequate human resource management, poor risk management, ineffective planning and execution of projects resulting in low turnover for SMEs.

Another significant challenge faced by most SMEs is financial constraints. The SMEs have to be competitive to remain relevant in the industry resulting in low profit margins. However for businesses to improve their practice they have to invest in new

efficient technologies and training for their managers. SMEs are further faced with the challenge of high interest rate by lending institutions as they are a higher risk, therefore further crippling their financial ability to invest in project management in an effort to yield more successful projects and thus grow. It can be concluded that most SMEs do not have the resources to invest in their project managers. This has been identified by the respondents as well as in existing literature, stating that training is expensive for the SMEs. It involves a lot of costs ranging from the opportunity cost of being away from the office during training to the direct costs of training and education. It is primarily for this reason that most of the respondents indicated that they have been for training once in several years. Therefore, majority of the project managers are not aware of the opportunities that exist to assist in their improvement and thus do not take advantage of them.

As a conclusion, SMEs face similar challenges, in South Africa as well as globally. They experience challenges accessing the markets primarily due to inexperience, lack of managerial ability and financial constraints. These challenges are all linked with the financial inability for SMEs to train their project managers or encourage them to register with professional associations.

6.2 Extent to which Project Management Tools and Techniques are implemented by SMEs.

It can deduce that all the respondents are aware of the project management theories. Project management theories play vital point in the development of project management professionals. This is primarily because it determines where practice is drawn from. The objective of project management is to deliver complex construction projects by employing project management methods, systems and tools to deliver any project successfully.

Therefore project management tools focused on for the purpose of this research were outlined to cover the project life cycle stages to ensure that certain tools and techniques are employed from the inception stage of a project right through to the close out stages. It can be concluded from the results that the majority of the project managers are aware of the project life cycle, and there are certain tools administered at different stages of the project. Project life cycle is important as it is a clear way to explain major processes and activities to manage a project. The project

management nine areas of knowledge, as defined by PMBOK, apply throughout the cycle of projects. Therefore, the knowledge of the project life cycle as well as connecting each stage to project management tools and techniques is vital for successful project management. It can be concluded that although SMEs have indicated that they know the cycle, different knowledge areas are not properly implemented throughout the life of a project.

From the inception stages the respondents implement the Project Feasibility Study as well as to a certain extent the scope study. However, the project administration meeting is one of the most poorly implemented tools and techniques. It can be concluded that a work breakdown structure is one of the most popular and implemented tool of managing a project within the South African SMEs as well as the resource plan, preliminary schedule as well as a cost breakdown. On the other hand, the project baseline plan is inadequately implemented by contractors. This lack of planning is one of the major constraints of the development of project management because a project must be clearly defined from the beginning stages, in order for the project manager to coordinate and integrate the several activities of a project they must do thorough planning at the beginning stages and monitor actual progress compared with the plan to ensure minimum deviation. As a result the lack of methodical planning the project manager is not able to monitor the project progress according to the baseline plan. This is said to be one of the reasons for cost overruns, time delays and compromised quality of the finished product in SMEs (Bigelow, 2001). This is also demonstrated by the lack of quality control implemented in projects. Small and medium sized enterprises did not fully appreciate the benefit of quality control technique in their projects, which is due to lack of proper planning and results in one of the highlighted major problems; being inadequate quality infrastructure delivered by SMEs. Performance measurement, or lack thereof, in SMEs, leads directly to the inability to measure weather the project is being executed according to the agreed quality, time and cost. It leads to the inability to compare the progress with the baseline plan and thus measure progress. It can be concluded that project management tools and techniques revealed in this research are interlinked and failure to implement one of the tools at the beginning stages will cause ripple effect throughout the life of the project.

6.3 Factors constraining the development of project managers' profession in small and medium sized construction enterprises in South Africa.

It has been revealed through this study that most of the project management professionals lack the skills and expertise to deliver projects successfully. This has resulted in this type of research that set- out to investigate the constraints that are keeping the project management profession from developing and improving their practices to eliminate incompetency.

According to the results revealed in chapter four and discussed in chapter five, the biggest constraint with the project managers practicing in SMEs in South Africa is that there is lack of project management knowledge and training. Project Managers lack the transferable competency skills, the main emphasis being effective leadership, ability to communicate in writing and verbally and lack of appropriate qualifications of project management. These skills are regarded as an important part of project managers as it equips them with the 'know-how' to execute different projects effectively. Although there is a lack of qualifications that has been established, there is also a general lack of social oriented skills, such as relationships with the team as well as other project participants that need management to achieve a successful project delivery. This leads to the lack of effective leadership that was cited by most respondents as well as lack of motivation for the project team.

The general consensus from the research is that one of the major constraints of the development of project management as a profession in South African SMEs is the lack of general qualified project managers. It can be concluded that this is due to the fact that most professionals do no deem it necessary to get a separate training for project management. They hold an academic degree in Engineering for example, which is insufficient for planning and executing projects successfully. The degrees are mostly geared towards technical and engineering skills as compared to the desired management skills required to manage a project. Therefore, it is for this reason that although SMEs know about the project life cycle, there is not a full appreciation and thus lack of implementation of project management tools and techniques that could improve the field.

This can also be attributable to the project management institutions that are not registered or accredited to train candidates for project management. However, it can be concluded that the lack of qualifications is coupled with the lack of training. One of the most effective ways to improve the project management profession would be to continuously train project managers, so they can keep up to date with the ever changing construction industry and stay relevant. It has been revealed that SMEs do not have the funds to send their project managers for training to gain the theoretical aspect of project management and thus align the theory to practice. Formal training and informal training are significant in developing effective project managers and should thus be focused on.

In conclusion, according to Morris et.al (2006) in order to develop project management professionals it is important to align project management theories and processes that has been explored according to the Project Management Body of Knowledge (2012) in chapter two. It is for this reason that this research was designed in this manner; to firstly understand the SMEs, their characteristics as well as the challenges they face, then to explore, at length the project management tools and techniques and their implementation thereof. After having addressed the objectives outlined in chapter one, the explanation of the factors constraining the improvement and development of project management as a profession in small and medium sized enterprises can be deduced. The development of project managers is important as it is vital for the overall success of delivering construction projects within allowed cost, time and acceptable quality. This has been supported by the development of the Skills Development Act [No 97 of 1998] to improve and promote the training and development of skills in South Africa. The Construction Education and Training Authority (CETA) aims to encourage companies to develop the professionals within their industries. The implementation of this government initiative can encourage SMEs, to invest resources towards the development of professional project managers. To maintain the competence of professional project managers in SMEs it is important to register with professional bodies mandated to govern the profession such as South Africa Council of Project and Construction Management Professions so as to continue developing their skills in line with the changes in the construction industry.

Therefore, the delivery of infrastructure projects in South African can be improved when experienced and educated project managers use project management techniques adequately. This will assist the SMEs locate and trace their faults in projects delivery and thus work towards implementing the tools and techniques to improve project delivery. Project management has been identified as playing a pivotal role in the execution of projects successfully and thus the constraints discovered in this research and previous literature must be taken note of.

6.4 Recommendations

The summary of recommendations drawn is as follows;

- The Skills Development Act No. 97 of 1998 should be fully implemented in SMEs. This can be done by creating an incentive for SMEs to invest in the training and education of their project managers to ensure that they remain competent. In encouraging training and education by SMEs the project managers can learn and understand the principles of project management and implement them in the execution of projects to overcome the cost overruns, time delays and compromised quality of the end products.
- Project managers should be made aware that they can opt to register with professional associations so as to gain the benefits of networking with fellow peers, to attend seminars, workshops and other continual professional development programmes arranged by these professional bodies. This will allow the professional project managers to remain up to date with efficient project management practice. This will in turn help grow the SMEs, improve their profit margins and thus boost the economy of South Africa as a whole.

6.5 Areas of further research:

The following areas need further exploration and research;

- The comparison of small and medium sized enterprises with the larger construction companies in order to further explore the challenges faced and map a way forward to overcome challenges that have been specified in section 6.1 outlining a conclusion on the business environment and characteristics of SMEs and how they affect professional development of project managers.

- The exploration of the conception and initiation of a project, to further breakdown the project life cycle and the techniques implemented by project managers.

REFERENCES

Agumba, J.N. (2006). Evaluating the use of Project Management Techniques in Infrastructure Delivery by South African Small and Medium sized Contractors. Unpublished masters' thesis, University of Johannesburg, Johannesburg, South Africa.

Alshawi, M., Ingirige, B. (2003). Web-enabled project management: an emerging paradigm in construction. Automation in Construction, 12 (1), 349-364

Ashleigh, M., Ojiako, U., Chipulu, M., Kai Wang, J. (2011).Critical learning themes in project management education: implications for blended learning. International Journal of Project Management, 30, 153 – 161

Beach, R., Webster, M., Cambell, K.M. (2005). An evaluation of partnership development in the construction industry. International Journal of Project Management, 23, 611-621.

Benjaoran, V. (2009). A cost- control system development: A collaborative approach for small and medium- sized contractors."International Journal of Project Management, 27, 270-277

Bigelow, D. (2001). Planning is important: Why don't we do more of it? PM Solutions [online]. (www://www.pmsolutiona.com) last accessed 18 May 2012.

Bordass, B. and Leaman, A. (2012).A new professionalism: remedy or fantasy? Building Research and Information, 41, 1-7.

Borgstede, J.P. (2005) Professionalism. Colorado Springs Radiologists Chair man Memo.

Burke, R. (2007) Introduction to project management. London: Burke Publishing Company.

Carassus, J. (2004). The Construction Sector System Approach: An International Framework. Report by CIB W055-W065, Rotterdam.

Cicmil, S., Williams, T., Thomas, J., Hodgson, D. (2006) Rethinking Project Management: Researching the actuality of projects. International Journal of Project Management, 24, 675-686.

Chartered Institute of Building (2002).Code of Practice for Project Management for Construction and Development.3rd Edition. Blackwell Publishing Limited.

Chipulu, M., Ojiako, G.U., Ashleigh, M., Maguire, S. (2011). An analysis of an interrelationship between project management and student experience constructs. Project Management Journal. 42 (3), 91-101.

Construction Education Training Authority CETA (2004). Sector Skills Plan. (www.ceta.org.za/sectorskillsplan/chapter_3.htm) Last viewed 12/01/2013.

Construction Industry Development Board (2008). Inbrief Information- Reasons for Contractor Registration. Republic of South Africa.

Crawford, L., Morris, P., Thomas, J., Winter, Mark. (2006). Professional development: From trained technicians to reflective professionals. International Journal of Project Management, 24, 722-733.

Currall, S., Epstein, M. (2003). The fragility of organizational trust: lessons from the rise and fall of Enron. Organizational Dynamics 32(2), 223-248.

Davilla, T. (2005). *An* exploratory study on the emergence of management control systems: formalizing human resources in small growing firms. Accounting organizations and Society, 30, 223-248.

Duncan, W.R. (1996). A guide to the project management body of knowledge. Upper Darby, PA: Project Management Institute.

Department of Public Works (1999). White Paper on Creating an Enabling Environment for Reconstruction Growth and Development in the Construction Industry. Republic of South Africa. (http://www.info.gov.za/whitepaper/1999/environment.htm) Last viewed 05.05.2012

Dlungwana, W. S., Noyana, C., Nxumalo, X.H., Rwelamila, P. D., and van Huysteen, S. (2002). Development and Implementation of the South African Construction Excellence Model (SACEM). International Conference on Construction in the 21st

Century: Challenges and opportunities in Management and Technology 26 – 26 April 2002, Miami, Florida, USA.

Dlungwana, W.S. and Rwelamila, P.D. (2004). Contractor- Development Models that meet the challenges of globalisation- A case for Developing Management Capability of Local Contractors.
http://researchspace.csir.co.za/dspace/bitstream/10204/1936/1/Dlungwana_2.004.pdf. Accessed 27th May 2012.

Edum-Fotwe, F.T., McCaffer, R. (2000) Developing project management competency: perspectives from the construction industry. International Journal of Project Management, 18, 111-124.

El- Sabaa, S. (2001). The skills and career path of an effective project manager. International Journal of Project Management, 19 (1),. 1 -7

Erasmus, B.J. and van Dyk, P.S. (2005) Training Management in South Africa. Cape Town, Oxford University Press.

Faniran, O.O. (1999). The role of construction project planning in improving project delivery in developing countries: a case study in Nigeria construction industry. International Conference on Construction Industry Development.27th – 29th October. The Pan Pacific, Singapore.

Fellows, R., Liu, A. (2003). Research methods for Construction. Blackwell Science 2nd Edition.

Frimpong, M. (2003). Project Management for non-profit organizations- A practical guide for managing developmental projects.

Gale, A. (2002). Project management professional development- An Industry led programme. Unpublished masters' thesis at Manchester Centre for Civil Construction Engineering UMIST. Manchester, United Kingdom.

Giang, D.T.H., Pheng, L. S. (2011) Role of Construction in economic development: Review of key concepts in the past 40 years. Habitat International, 35. 118-125.

Gillham, B. (2000). Case Study Research Methods. Continuum International Publishing Group.

Global Construction Perspectives and Oxford Economics (2010). A global forecast for the construction industry over the next decade to 2020. (http://www.joinricsineurope.eu/uploads/files/RICSGlobalConstructionForecast2020.pdf) Last viewed 17.05.2012.

Gounden, S.M. (1997). Transforming public sector construction in South Africa- A focus on promoting small and medium construction enterprises. Paper presented to the first International Conference on Construction Industry Development, Singapore.

Haupt, T.C. (2001). The performance approach to construction worker safety and health. PhD Dissertation University of Florida.

Healy, P.L. (1997). Project Management: Getting the Job Done on Time and in Budget. Australia: Butterworth- Heinemann.

Hodgson, D. (2004). Project work: The Legacy of bureaucratic control in the post bureaucratic organization. Organisation Issue 11, 81-100

Hoffer, J., Jeffrey, A., George, J. F., Valacich, F.S. (2002) Modern Systems Analysis and Design. Pearson Education, Inc. Prentice Hall.

IPMA (2002).International Competence Baseline. International Project Management Association. www.ipma.ch/certification.html

Inkpen, A., Currall, S. (2004). The co-evolution of trust, control and learning in joint ventures. Organization Science 15(5), 586-599.

Jonas, D. (2010). Empowering project portfolio managers: How management involvement impacts project portfolio management performance. International Journal of Project Management, 28. 818-831.

Kemp, I., Seagraves, l. (1995). Transferable skills: can higher education deliver? Studies in Higher Education 20(3), 315-328.

Kloppenburg, T.J., Baucus, M.S. (2004). Project Management in local non-profit organizations: Engaging students in problem based learning. Journal of Management Education 28, 610-629.

Kerzner, h. (1995). Project Management: A Systems Approach to Planning, Scheduling and Controlling. 5th Edition, Van Nostrand Reinghold. New York, USA.

Knipe, A., Van der Waldt, G., Van Nierkerk, D., and Neil, K. (2002). Project Management for Success. Heinemann Publishers, Sandown, South Africa.

Lenfle, S., Loch, C. (2012) Exploration, project evaluation and design theory: a reading of the Manhattan Case. International Journal of Managing Projects in Business. 5. 486-507.

Leong, C. (1991) Accountability and project management: a convergence of objectives. International Journal of Project Management , 9 (4), 240-249.

Liu G., Shen, Q., Li, H., Shen L. (2003). Factors constraining the development of professional project management in China's construction industry. International Journal of Project Management 22, 203-211.

Madter, N., Bower, D.A. and Aritua, B. (2012).Projects and personalities: A framework for individualising project management career development in the construction industry. International Journal of Project Management , 30. 273-281.

Mahadea, D. And Pillay, M. (2008) Environmental conditions of SMME development in South Africa Province. South Africa Journal of Economic and Management Sciences.11, 11-20.

Marshall, C., Rossman, G.B. (2006). Designing Qualitative Research. 4th Edition. Thousand Oaks, CA: Sage.

McCulloh, A. (2009). The student as co-producer: learning from public administration about the student- university relationship. Studies in higher education 34(22),171-183.

Miles, D. (1997). Appropriate Infrastructure; No choice but change. Paper presented to the twenty- third Water Engineering Development Conference (WEDC) on Water and Sanitation to All: Partnerships and Innovations. Durban, South Africa. Pp 426-429.

Moavenzadeh, F. (1978). Construction Industry in Developing Areas. Massachusetts Institute of Technology. Work Development, 6, 97-116.

vanMook, W.N.K.A., de Grave W.S., Wass, V., O' Sullivan H., Zwaveling, J.H., Schuwirth, L.W., van der Vleuten C.P.M. (2009). Professionalism: Evolution of the concept. European Journal of Internal Medicine 20, E81-e84.

Morris, P. (1994). The management of projects. Telford

Morris, P.W.G., Crawford, L., Hodgson, D., Shepherd, M.M., Thomas, J. (2006). Exploring the role of formal bodies of knowledge in defining a profession- The case of project management. International Journal of Project Management. 24, 710-721.

Modell, E.M. (1996). A Professional's guide to systems analysis. 2nd Edition McGraw Hill.

Nachimas, C. and Nachimas, D. (1996) Research methods in the Social Sciences. 5th Edition. Arnold.

Naoum, S.G. (2007) Dissertation Research and Writing for construction students. Butterworth- Heinemann. 2nd Edition. Oxford.

National Small Business Act (1996).Number 102 of 1996. Republic of South Africa

Ngowi, A.B., Pienaar, E., Talukhaba, A., Mbachu, J. (2004). The globalisation of the construction industry- a review. Building and Environment, 40, 135-141.

National Home Builders Registration Council, Builders Bulletin (2004). (http://www.nhbrc.org.za/news/builders.htm) last viewed 07.05.2012

Oberlender, D.G. (1993). Project Management for Engineering and Construction. McGraw-Hill book, Co. Singapore.

Ofori, G. (1996). International contractors and structural changes in host- country construction industries: Case of Singapore. Engineering, Construction and Architectural Management. 3(4), 271- 288

Ofori, G. (2000). Satisfying the customer by changing production patterns to realize sustainable construction. Construction Management Economics. 18, 257-262.

Ojiako G.U., Ashleigh, M., Chipulu, M., Maguire, S. (2011). Learning and teaching challenges in project management. Internation Journal of Project Management 29(3), 268-278.

Organization for Economic Co-operation and Development. (2004). Small and Medium- Sized Enterprises: Local Strength, Global Reach. June 2000 Policy Brief. OECD website (http://www.oecd.org) last viewed 05.05.2012

Pearce, D. (2003). The Social and Economic Value of Construction: The Construction Industry's Contribution to Sustainable Development. London.

Project Management Institute (2000). A guide to the Project Management Body of Knowledge (PMI). (http://www.pmi.org) last viewed 26th May 2012.

Project Management Institute (1996). A Guide to the Project Management Body Knowledge. 2nd Edition, PMI website (http://www.pmi.org) last viewed 26th May 2012.

Project Management South Africa PMSA. www.projectmanagement.org.za Accessed 18/02/2.13.

Raheb, D. (1992). There's no excuse for failure. Canadian Manager 7(3),18-19.

Rwigema, H., Venter, R. (2004). Advanced Entrepreneurship. Cape Town: Oxford University Press.

Saunders M., Lewis, P. and Thornhill, A. (2012). Research methods for business students. 6th Edition. Pearson Education Limited. London.

Smallwood, J. (2002). Contractor Performance: Clients' Perception, Proceedings of the CIB Task Group 29. Construction in Developing Countries. 128-139.

Statistics South Africa (2012). Census 2011. www.statssa.gov.za [Accessed 18/02/2013].

Telkom SA (2000) Project Management: Tools and Techniques. Centurion.

Thames Valley University (2009) 'Dissertation Guide' [online] Available from http://brent.tvu.ac.uk/dissguide/hm1u1/hm1u1text2.htm. Accessed 12/04/2012

The South African Government (1998). Skills Development Act No. 97.

Thomas, J., Mengel, T. (2008). Preparing project managers to deal with complexity: advanced project management education. International Journal of Project Management 26(3), 304-315.

Twinn, C. (2013) Professionalism, sustainability and the next public interest: what next? Building Research and Information, 41. 123-128

United Nations (2001).International Recommendations for Construction Statistics. Series M, No. 47, Rev. 1, United Nations. New York.

Van Wyk, L. (2003). A review of the South African Construction Industry. Part 1: Economic, Regulatory and Public Sector Capacity Influences on the Construction Industry. CSIR website (www.csir.co.za/akani/200.PDF) Last viewed 05.05.2012

Venter, R., Rwigema, H., Urban (2010). Enterpreneurship: Theory in Practice. Oxford University Press.

Walliman, N. (2001). Your Research Project: A Step-by-Step Guide for the First-Time Researcher.1st Edition. Sage Publications. London, England.

Wideman, R.M. (2000). First principles of project management. Vancouver, Canada, AEW Services.

Winter, M., Smith, C., Morris, P., Cicmil, S. (2006). Directions for future research in project management: The main findings of a UK government- funded research network. International Journal of Project Management, 24, 638-649.

Wysocki, R.K., Beck, R. Jr. and Crane, D.B. (2000) Effective Project management. 2nd Ed. New York: Wiley.

Yin, R.K. (2009) Case Study Research: Design and Method.4th Edition. Sage. London.

APPENDICES

APPENDIX A: QUESTIONNAIRE

Letter of Introduction

Department of Construction Management and Economics

University of Witwatersrand

Jan Smuts

Johannesburg

2nd July 2012

TO WHOM IT MAY CONCERN

This letter serves to inform you that, I, Senzile Moilwa guarantee to treat the following questionnaire in the strictest confidence. This will be done by assigning all participants a unique code that will be used to refer to them throughout the research findings.

The purpose for this questionnaire is solely to fulfil the research for the studies of a Graduate MSc Building (specialising in Project Management) through the Witwatersrand University. The research is being conducted under the supervision of Dr Samuel Laryea and the topic is on "*factors constraining the development of*

professional project management in Small and Medium Construction Enterprises in South Africa."

As part of this research, information on the competency of project managers in South African Small and Medium Sized Construction Enterprises will be evaluated and thus factors constraining the development of professional project managers will be evaluated.

It would be highly appreciated if you can oblige and assist in any way possible. By doing so, you will be adding valuable contribution towards the expansion of knowledge in an area which is important to the South African construction industry and the economy as a whole.

Should you wish to know the findings of the research, the information will gladly be sent to you in a summary of the results.

With Thanks,

Senzile Moilwa

My details:

Senzile Moilwa

Student No. 0607263G

Email senzile@yahoo.com

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Questionnaire to evaluate factors constraining the development of professional project managers in the South African Small and Medium sized construction enterprises

Purpose of Section 1:

- To establish the nature and characteristics of Small and Medium- Sized Construction Enterprises in South Africa.
- To establish the characteristics of the professional project managers.

Please tick appropriate answer.

Background Information

1. What field of business does your company specialize in?

◯ Building Construction

◯ Home improvement

◯ Civil Engineering Construction

◯ Others

2. Does your company have a person/ team responsible for project planning on given projects?

◯ Yes

◯ No

3. What is your company's estimated annual turnover?

◯ Less than R1 million

◯ Between R1 million and R10 million

◯ Between R10 million and R50 million

◯ Above R50 million

4. How many permanent employees does your company have?

◯ Less than 20

◯ Between 20 - 200

◯ More than 20

5. What is the average size of your current projects?

◯ Less than R1 million

◯ Between R1 million and R10 million

◯ Between R10 million and R40 million

◯ Above R40 million

6. How many projects do you have running at this point in time?

◯ Between 0 - 2

◯ Between 3 - 10

◯ Between 11 - 20

◯ More than 20

7. What is your current position in the company?

◯ Construction manager

◯ Project manager

◯ Managing director/ partner

◯ Other

8. How long have you been in this position?

◯ Less than 3 years

◯ Between 3 – 10 years

◯ More than 10 years

9. What is your highest education qualification?

◯ Grade 11 or standard nine and below

◯ Matric

◯ Certificate

◯ Diploma

◯ Bachelor's degree

◯ Post- graduate degree or diploma

10. Are you registered with any recognised professional association for project managers?

◯ Yes

◯ No

If yes, how often do you engage in the Continuous Professional Development Programs made available by professional bodies?

◯ Every month

◯ Every 6 months

◯ Every year

◯ Not applicable

11. How often does your company arrange refresher courses of project management?

◯ After 6 months

◯ After 1 year

◯ After 1.5 years

Project Management Techniques

Purpose of Section 2:

- To ascertain the project management techniques employed by SMEs
- The extent to which they are implemented

12. How necessary is it to have project management tools and techniques implemented in your project?

◯ Completely necessary

◯ Neutral

◯ Unnecessary

13. Which of these project management life cycle phases are implemented in your projects? *(Please tick- can select more than one)*

Initiation Phase	
Planning Phase	
Execution Phase	
Controlling Phase	
Closing Phase	
Not applicable	

Question 14

1. The following is based upon how well the company handles a good level of success in terms of time of completion of your project, based on the following;

1.1 What kind of techniques are there to measure time:

_____

_____

_____

1.2 How well are the techniques implemented in the projects?

a very low extent	1	2	3	4	5	6	7	8	a very high extent

1.3 How well is the project progress measured?

a very low extent	1	2	3	4	5	6	7	8	a very high extent

1.4 What is your opinion about the techniques employed:

_____

_____

_____

Question 15

2. The following is based upon how well the company handles a good level of success in terms of attaining the required cost of your project, based on the following;

2.1 What kind of techniques are there to measure cost:

_____

_____

_____

2.2 How well are the techniques implemented in the projects?

a very low extent	1	2	3	4	5	6	7	8	a very high extent

2.3 How well is the project progress measured?

a very low extent	1	2	3	4	5	6	7	8	a very high extent

2.4 What is your opinion about the techniques employed:

_____

_____

_____

Question 16

3. The following is based upon how well the company handles a good level of success in terms of quality of your project, based on the following;

3.1 What kind of techniques are there to measure quality:

_____

_____

_____

3.2 How well are the techniques implemented in the projects?

a very low extent	1	2	3	4	5	6	7	8	a very high extent

3.3 How well is the project progress measured?

a very low extent	1	2	3	4	5	6	7	8	a very high extent

3.4 What is your opinion about the techniques employed:

_____

_____

_____

Constraints the development of professional project management in SMEs

Purpose of Section 3:

- Ascertain the factors constraining the development of professional project management in the South African SMEs.

Question 17

1.0 What are the internal factors that constrain the development and implementation of project management techniques within your company?

_____

_____

_____

_____

Question 18

2.0 What are the external factors that constrain the development and implementation of project management techniques within your company?

_____

_____

_____

_____

I thank you for taking the time to complete this questionnaire and contributing to the South African construction industry.

Yours sincerely,

Senzile Moilwa

APPENDIX B: RESULTS OF QUESTIONNAIRE

Question 1

What field of business does your company specialize in?

Type of field	No. of respondents	Percentage
Building Construction	11	64.71%
Home Improvement	0	0.00%
Civil Engineering Construction	5	29.41%
Other	1	5.88%
	17	

Question 2

Does your company have a person/ team responsible for project planning on given projects?

Project Planning Personnel	No. of respondents	Percentage
Yes	17	100.00%
No	0	0.00%
	17	

Question 3

What is your company's estimated annual turnover?

Annual Turnover	No. of respondents	Percentage
Less than R1 million	5	29.41%
Between R1 million and R10 million	12	70.59%
Between R10 million and R50 million	0	0.00%
Above R50 million	0	0.00%
	17	

Question 4

How many permanent employees does your company have?

Number of Employees	No. of respondents	Percentage
Less than 20	1	5.88%
Between 20 and 200	16	94.12%
More than 200	0	0.00%
	17	

Question 5

What is the average size of your current projects?

Value of Current Projects	No. of respondents	Percentage
Less than R1 million	6	35.29%
Between R1 million and R10 million	8	47.06%
Between R10 million and R40 million	2	11.76%
Above R40 million	1	5.88%
	17	

Question 6

How many projects do you have running at this point in time?

Running Projects	No. of respondents	Percentage
Between 0 - 2	7	41.18%
Between 3 - 10	10	58.82%
Between 11 - 20	0	0.00%
More than 20	0	0.00%
	17	

Question 7

What is your current position in the company?

Designation	No. of respondents	Percentage
Construction Manager	5	29.41%
Project Manager	8	47.06%
Managing Director/ Partner	4	23.53%
Other	0	0.00%
	17	

Question 8

How long have you been in this position?

Length in Designated Position	No. of respondents	Percentage
Less than 3 years	2	11.76%
Between 3 - 10 years?	12	70.59%
More than 10 years	3	17.65%
	17	

Question 9

What is your highest qualification?

Qualifications	No. of respondents	Percentage
Grade 11 or standard nine and below	0	0.00%
Matric	1	5.88%
Certificate	3	17.65%
Diploma	7	41.18%
Bachelor's degree	5	29.41%
Post- graduate degree or diploma	1	5.88%
	17	

Question 10

Are you registered with any recognized professional association for project managers?

Professional Registration	No. of respondents	Percentage
Yes	4	23.53%
No	13	76.47%
	17	

Question 10b

If yes, how often do you engage in the Continuous Professional Development Programs made available by professional bodies?

Attendance of CPD	No. of respondents	Percentage
Every Month	0	0.00%
Every 6 months	3	75.00%
Every 1 year	1	25.00%
Not Applicable	0	0.00%
	4	

Question 11

How often does your company arrange refresher courses of project management?

Attendance of Project Management Courses	No. of respondents	Percentage
After 6 months	0	0.00%
After 1 year	3	17.65%
After 1.5 years	14	82.35%
	17	

Question 12

How necessary is it to have project management tools and techniques implemented in the execution of your project?

Necessity of PM tools	No. of respondents	Percentage
Completely necessary	17	100.00%
Neutral	0	0.00%
Unnecessary	0	0.00%
	17	

Question 13

Which of these project management life cycle phases are implemented in your projects?

Life Cycle Phases	No. of respondents	Percentage
Initiation Phase	17	100.00%
Planning Phase	17	100.00%
Execution Phase	17	100.00%
Controlling Phase	17	100.00%
Closing Phase	17	100.00%
Not applicable	0	100.00%

Question 14

Which of the following project management techniques do you use during the design and planning stage?

Planning stage Techniques	No. of respondents	Percentage
Project feasibility study	6	35.29%
Work breakdown structure	17	100.00%
Resource plan	17	100.00%
Cost Analysis	17	100.00%
Critical Path Analysis	17	100.00%
Statement of work	17	100.00%
Organizational breakdown structure	5	29.41%
Specifications and standards	9	52.94%
Project plan	17	100.00%

Question 15

Which of the following project management techniques do you use during the construction?

Construction Phase Techniques	No. of respondents	Percentage
Establishing reporting techniques	17	100.00%
Monitoring project progress against the plan	13	76.47%
Communicating with project team	17	100.00%
Cost Control techniques	17	100.00%
Performance measurement	17	100.00%
Quality Control	17	100.00%

Question 16

Which of the following project management techniques do you use during the close out phase?

Close-out Phase Techniques	No. of respondents	Percentage
Post Project Review	8	47.06%
Closing the client's contract	0	0.00%

Question 17

What are internal factors that constrain the development and implementation of project management techniques in SMEs?

Responses	Frequency
Lack of innovation by construction team	9
Lack of skilled and competent project managers	8
Lack of effective teams	4
Lack of effective leadership	3
Company Financial Constraints due the state of the economy	5
High Cost of training	6
Lack of qualified project managers	2

Question 18

Lack of accredited institutions	5
General Engineering/ Construction Qualifications	3
Lack of understanding by project managers on the Client's requirements	4
Stakeholders in the construction industry lack understanding of purpose of project managers	5
Financial constraints as banks make it difficult to provide lending to SMEs	3
No professional body to improve the profession of project management	1