DURBAN UNIVERSITY OF TECHNOLOGY

FACTORS INFLUENCING THE EFFECTIVENESS OF PROJECT MANAGERS IN THE TELECOMMUNICATIONS INDUSTRY IN SOUTH AFRICA

by

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DECLARATION

I, Pholani Ndlovu (Student Number: 21143991), hereby declare that the work presented in this dissertation is based on my own research and that I have not submitted it in part or in full to any other institution of higher learning to obtain an academic qualification.

…… ……

Pholani Ndlovu Date

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- my supervisor, Dr. S. Chetty, who sacrificed countless hours assisting me to review my work and pushed me to do better. Your faith in my abilities was well appreciated and helped me through the tough times when giving up seemed to be an option.

DEDICATION

This dissertation is dedicated to my son, Francis M. Ndlovu, and my daughter, Noluthando N. Ndlovu, who are a constant joy in my life and give me the reason to work hard so that their future can be fulfilling.

ABSTRACT

The South African mobile telecommunications industry has grown into a multi-billion rand industry that employs thousands of people and connects millions of people across the globe. In order to accomplish the latter, multi-million rand capital projects must be initiated and successfully executed. It is against this background that this study investigated the factors influencing the effectiveness of project managers in the telecommunications industry in South Africa.

The target population of the study consisted of project managers in the five telecommunications companies in South Africa who were registered with Project Management South Africa (PMSA). The primary data, which was collected personally by the researcher through self-administered questionnaires, was analysed using the Statistical Package for Social Sciences (SPSS), Version 23.

The study revealed, *inter alia*, that most project managers in the telecommunications industry in South Africa perceived negotiating skills, technical knowledge, and management style as being most important for effectively confronting the many challenges faced by them, *inter alia*, scope management, quality management, and risk management, so that projects were successfully executed. There was unanimity amongst the project managers that training in project management had a positive impact on the performance of project managers. Although three out of every four project managers possessed a postgraduate qualification, the majority of project managers were of the view that a diploma was adequate to practice as a project manager in the telecommunications industry in South Africa. However, it was more important for project managers to possess project management qualifications.

In addition to the above, an analysis of the results revealed that, in order of importance, the effectiveness of the project managers in the telecommunications industry in South Africa was influenced by communication skills, technical skills, education skills, leadership skills, interpersonal skills and negotiating skills.

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LIST OF ACRONYMS AND ABBREVIATIONS

APMG	Association of Project Managers Group
CAPM	Certified Associate in Project Management
GSM	Global System for Mobile Communications
ICT	Information and Communications Technology
ISDN	Integrated Services Digital Network
LAN	Local Area Network
LTE	Long Term Evolution
M2M	Mobile to Mobile
MNO	Mobile Network Operator
MTN	Mobile Telephone Network
OTT	Over The Top
PERT	Program Evaluation Review Technique
PMBoK	Project Management Body of Knowledge
PMI	Project Management Institute
PMO	Project Management Office
PMP	Project Management Professional
PMSA	Project Management South Africa
PRINCE2$^{@}$	Projects IN Controlled Environments
PSTN	Public Switched Telephone Network
UMTS	Universal Mobile Telecommunications System
VOIP	Voice Over Internet Protocol
WLL	Wireless Local Loop

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CHAPTER 1

OVERVIEW OF THE STUDY

1.1 Introduction

This chapter presents an overview of the study and, *inter alia*, the background to the study and the research problem are discussed; the aim and objectives of the study are outlined, and the research design and methodology used in the study, as well as the structure of the dissertation, are also outlined.

1.2 Background of the study

The South African mobile telecommunications industry has grown into a multi-billion rand industry that employs thousands of people and connects millions of people across the globe. Buoyed by the excessive demand for data services, such as internet browsing on smart phones, the telecommunications industry has undertaken numerous multi-million rand capital projects to cope with the demand for its services, and this, in-turn, has created fierce competition among the service providers within the telecommunications industry. In order to remain competitive, *inter alia*, project managers within the industry are expected to successfully manage and deliver projects, like the one undertaken by Neotel and MTN in 2009, to build a national long-distance fibre optic network that covered approximately 5 000 kilometres, and connected major cities across South Africa, at a cost of between R1.7 billion and R2 billion (Gillwald, Esselaar and Rademan 2016:46).

Delivering projects comes with its own challenges. Ogunleye and Van Belle (2014:7) assert that there are three ways where a project can be considered as failed. The first one is referred to as total failure, where a project is never implemented, or it is implemented and immediately abandoned; the second one is referred to as partial failure, where major outcomes are unattained, or there are undesirable outputs, and the last one is referred to as sustainability failure, where a project first succeeds then it is abandoned after a year or so. According to West (2014:14), projects are inherently collaborative efforts, and at the heart of every project is the project manager, whose task is to balance all the elements of a project; namely, time, cost, scope, risks and stakeholders. While factors such as increasing complexity, uncertainty in the project environment and shorter lead-times impact on the success of a project, ultimately, the success of a project depends on the effectiveness of the project manager (Thomas 2012:40).

By virtue of their unique nature, projects are mired in uncertainty (Lechler, Edington and Gao 2012:65), and this creates difficulties for the project manager even before the project starts. Globally and across all industries, the success rate of projects is low. According to Sudhakar (2012:54), only 39% of all surveyed projects were considered to be successful, in terms of on-time delivery, within budget, and with the required features and functions. This could be attributable to, *inter alia*, project management practitioners having not fully acquired and transferred knowledge learned from past projects to ensure a higher success rate for current and future projects.

1.3 Research Problem

Projects within the telecommunications industry are usually multi-million rand projects, and if not delivered on time and within budget, may adversely impact an organisation's market share and profits. Despite the many challenges confronting project managers within the telecommunications industry in South Africa, the project manager is ultimately responsible for the success or failure of a project. Due to the relatively low success rate of projects in general; the huge investments made in projects undertaken in the telecommunications industry in South Africa, and the critical role played by the project manager in determining the success or otherwise of a project, this study investigates the factors influencing the effectiveness of project managers within the telecommunications industry in South Africa.

1.4 Aim and Objectives of the study

The following are the aim and the objectives underpinning this study.

1.4.1 Aim of the Study

The aim of the study is to establish the factors influencing the effectiveness of project managers in the telecommunications industry in South Africa.

1.4.2 Objectives of the study

The research objectives underpinning this study are:

- to identify the perceptions of project managers within the telecommunications industry in South Africa regarding the skills required for the successful execution of a project;

- to determine the criteria that should be used to evaluate the effectiveness of Project Managers within the Telecommunications industry in South Africa;

- to determine if training enhances the performance of project managers in the telecommunications industry in South Africa, and

- to establish the major challenges confronting project managers in the telecommunications industry in South Africa.

1.5 Research Questions

- What are the perceptions of project managers within the telecommunications industry in South Africa regarding the skills required for successful execution of a project?

- What criteria should be used to evaluate the effectiveness of project managers within the Telecommunications industry in South Africa?

- Does training in project management enhance the ability of project managers within the telecommunications industry in South Africa to deliver a project successfully?

- What challenges are perceived to pose the greatest threat to project managers in the telecommunications industry in South Africa?

1.6 Significance of the study

The findings of the study will add to the body of knowledge in the field of project management in general, and the telecommunications industry, in particular. Project managers within the telecommunications industry in South Africa will benefit from the study in that they can use the findings emanating from this study to enhance their performance. Project management institutions, such as Project Management of South Africa (PMSA), will also benefit from the study, as the researcher intends to present the findings from this study to PMSA.

1.7 Scope of the study

The study was limited to the telecommunications industry in South Africa, and targeted project managers practising in the five mobile and fixed line service providers.

1.8 Research Methodology and Design

A literature study using secondary sources of information was conducted for the purposes of establishing, assembling and integrating theory regarding performance of project managers in telecommunications industry. There are five telecommunications companies in South Africa that employed approximately 100 project managers, who were the target population for this study. Most of the 100 project managers were registered members of the Project Management Institute (PMSA) of South Africa. The researcher utilized the PMSA database to access the e-mail addresses of the target population.

Primary data was collected through an online closed-ended questionnaire (a questionnaire where alternative responses are given and the respondent chooses amongst the responses). The questions for the questionnaire were informed by the literature reviewed as well as the aim and objectives of the study. A pilot test was administered among five project managers with a view to evaluating the design and feasibility of the questionnaire.

The questionnaire was sent to the respondents by PMSA through e-mails to be completed on-line. Returned questionnaires were organized and numerically referenced to facilitate the process of data capturing and analysis. The Statistical Program for Social Sciences (SPSS) version 23, was used to analyse the data and to perform relevant statistical tests.

1.9 Structure of the dissertation

Chapter 1: Introduction

Chapter 1 introduces and provides the scope of, and background to the research. It includes, *inter alia*, a brief discussion on the significance of the research; the research problem; the aim and objectives; the scope of the study, and the research methodology that will be employed.

Chapter 2: Literature Review

The existing body of literature pertaining, *inter alia*, to project management; factors influencing the effectiveness of project managers in general, and more specifically, in the telecommunications industry, is reviewed, analysed and discussed.

Chapter 3: Research Methodology and Design

This chapter offers a detailed explanation of the research methodology and design employed in the study.

Chapter 4: Presentation, Analysis, and Discussion of findings

This chapter presents, analyses, and discusses the findings emanating from the empirical study.

Chapter 5: Summary of the main findings, conclusion and recommendations

The research concludes with a summary of the main findings of the study and recommendations for improving the effectiveness of project managers in the telecommunications industry in South Africa.

1.10 Conclusion

This chapter presented an overview of the study. More specifically, the background to the study; the problem statement; the aim and objectives of the study; the scope of the study, as well as the research methodology used, were outlined. In the next chapter a detailed literature review related to project management, project managers, as well as the telecommunications industry in general, and the telecommunications industry in South Africa, is undertaken.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature by scholars and experts in the fields of the telecommunications industry and project management. The chapter covers the following major areas: the global telecommunications industry; the telecommunications industry in South Africa; the evolution of project management; requisite skills of a project manager; the value of training on the performance of a project manager, and the challenges encountered by project managers in the telecommunications sector.

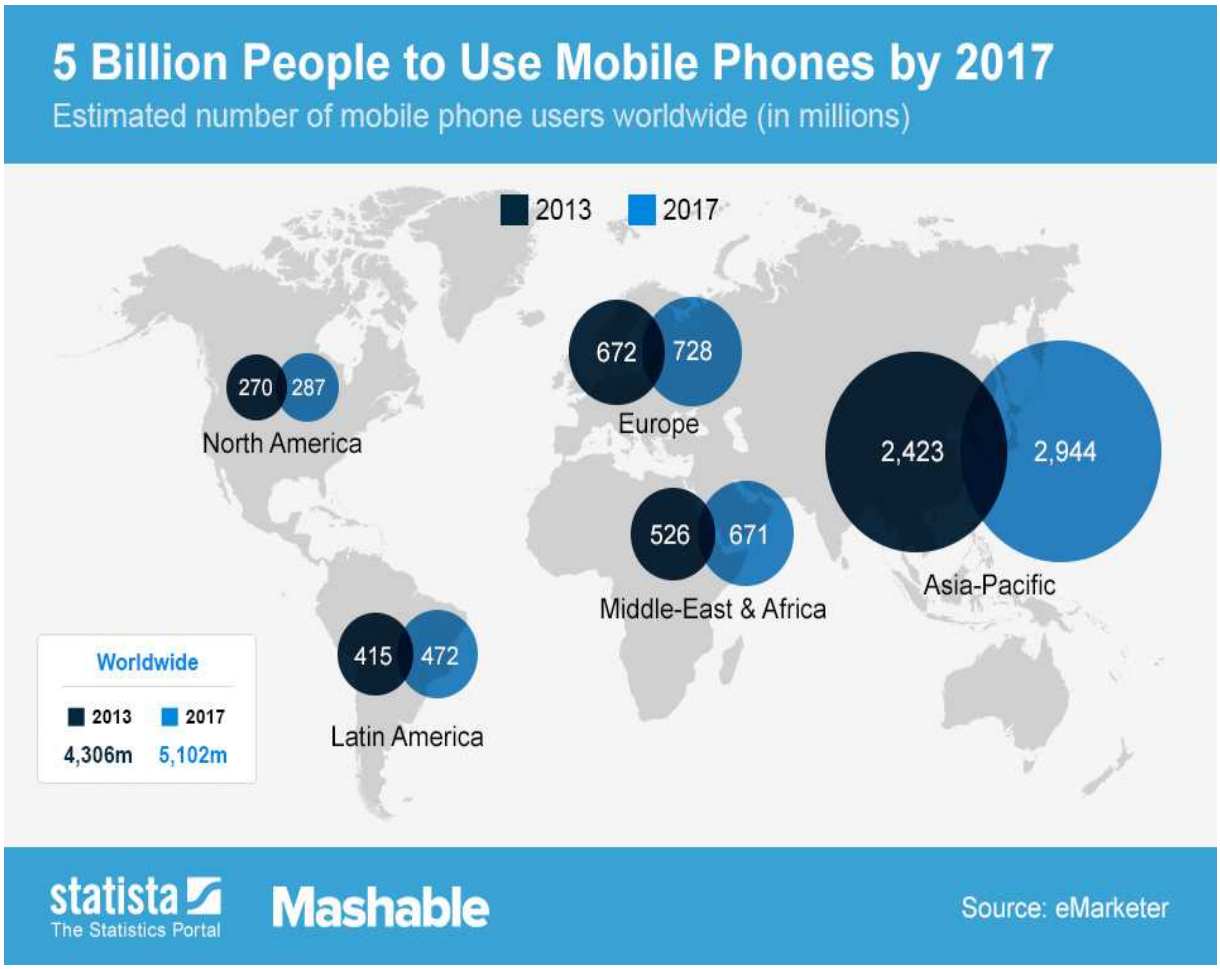
2.2 The global telecommunications industry

The telecommunications industry, by definition, encompasses not only the customary areas of local and long-distance telephone service, but also unconventional technology-based services, including wireless communications; the internet; entertainment of all types; fiber-optics, and satellites *(www.plunkettresearch.com).* According to Plunkett Research (2015:8), it was likely that the number of wireless service subscriptions globally would increase to approximately 7.5 billion (95% of the global population) by 2016. In 2016, the global telecommunications industry was characterized by a move from commercial and business telephones to voice over internet protocol (VOIP); a change from the use of landlines telephones to wireless; greater rivalry between cable and wired services providers, and progression in the amount of data and video accessed through the internet and over wireless devices for information and entertainment, particularly video. The industry was also characterized by the emergence of more advanced and cost effective satellites; continued growth in machine to machine communications; the ongoing progression of innovative wireless technologies, comprising powerful smartphones, and the imminent introduction of high speed 5G services (Friess 2013:22).

The telecommunication's industry focus is also on improving mobile and fixed broadband set-up for the future. 4G or LTE (Long Term Evolution) positioning is the major trend globally. There is also a large investment in fixed broadband based on fibre, and it is estimated that over 140 countries have a National Broadband Network (NBN) policy or plan to implement

broadband setup projects. Figure 2.1 below illustrates the global estimated number of mobile phone users in 2017.

Figure 2.1 Estimated mobile usage from 2013 to 2017 worldwide

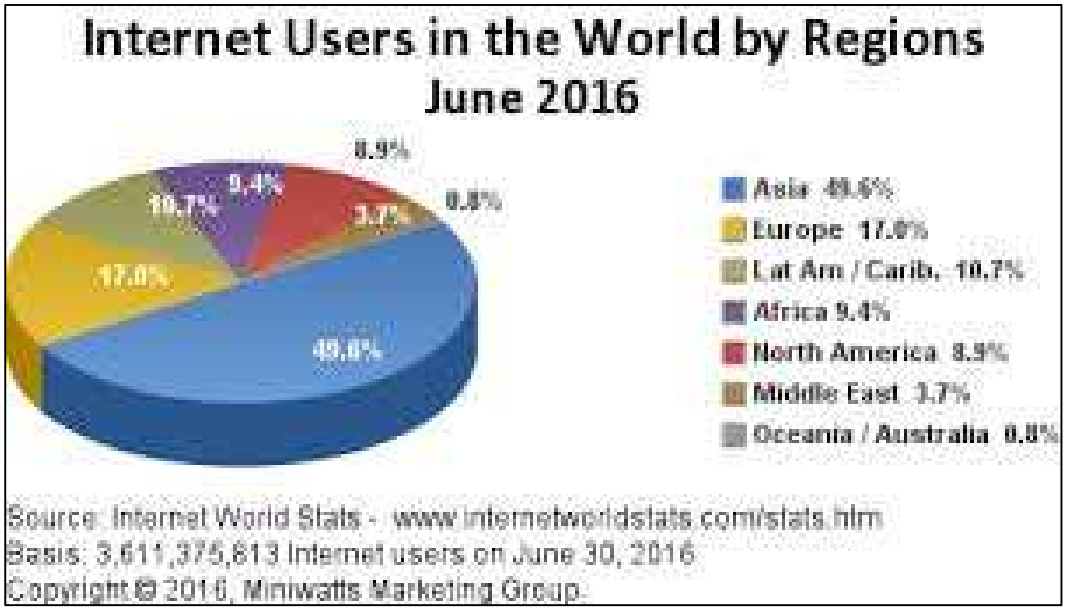


Source: Internet World Stats (2016: 15)

Figure 2.1 above shows that in 2013 there were 4.306 billion mobile phone users. It is estimated that by 2017 there will be 5.102 billion people using mobile phones globally. However, the number of internet users in 2016 was much higher compared to that of mobile phone users. As of June 2016, there were 3 611 375 813 internet users globally

(http://www.internetworldstats.com/stats.htm). Figure 2.2 below depicts the distribution of internet users throughout the world at the end of September 2016.

Figure 2.2 Distribution of internet users throughout the world



Source: Internet World Stats (2016:24)

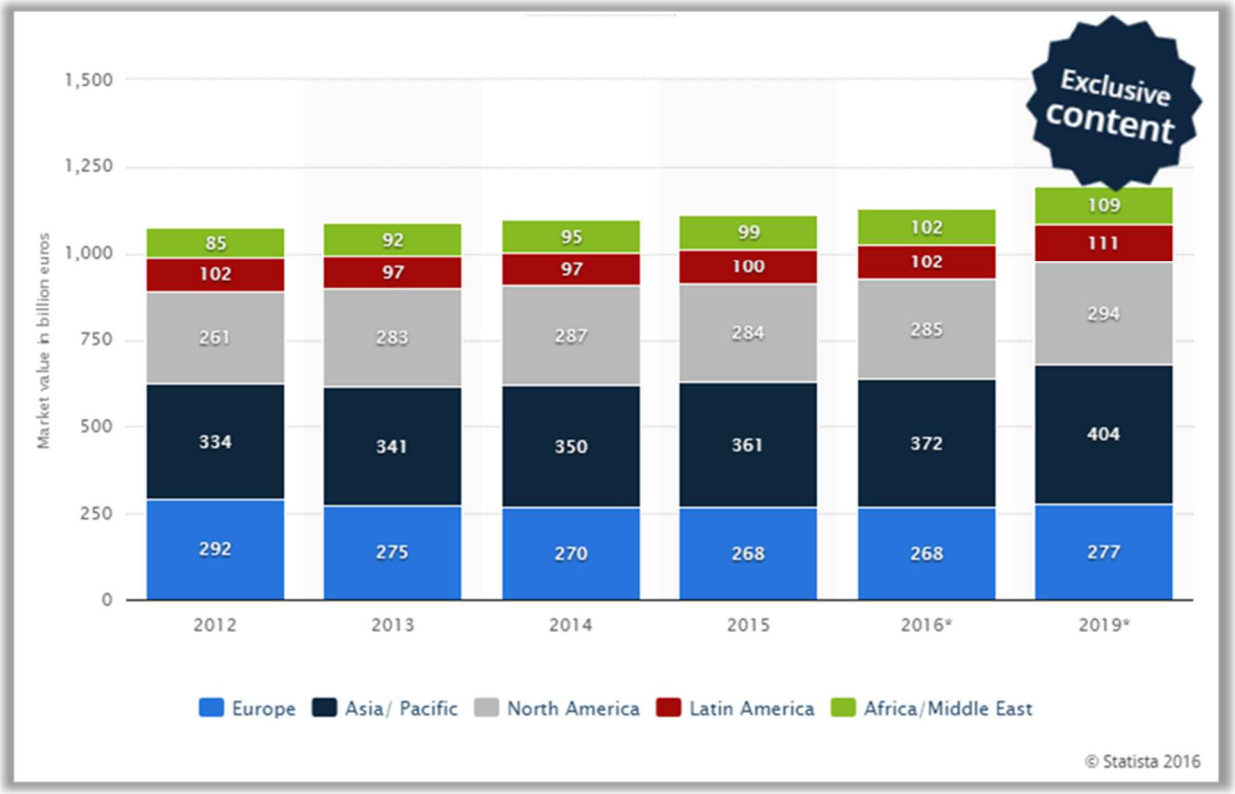
Figure 2.2 above shows that Asia has the highest number of internet users, followed by Europe, Latin America, Africa, and lastly, Oceania/Australia. The following section examines the global telecommunications market.

2.2.1 The global telecommunications market

The telecommunications industry is a very large and important sector globally, generating approximately US$1.5 trillion in revenue annually. It has continued to grow in the last two decades due to cheaper and innovative technologies, like the internet, which has successively created high demand and unmatched access to communication channels. According to the Vodafone 2014 Annual Report, as of March 2014, the industry had seven billion active mobile subscribers and over 650 million fixed-line customers, generating approximately US$960 billion in service revenue, annually. The Statistics Portal (2016:17) reports that the revenue of the telecommunications services industry in Europe was €292 billion in 2012, and Africa and Middle East revenues grew from 85 billion euros in 2012 to 99 billion euros by 2015. The global revenue is forecasted to exceed €1.2 trillion in 2018.

There has also been an increase in the demand for data services such as internet browsing on smartphones. Approximately 74% of mobile telephone users are in emerging markets, such as Africa and India, reflecting the typical combination of large populations and limited fixed line infrastructure (Vodafone Annual Report 2014:14). Figure 2.3 below depicts the growth in global communications revenue for the period 2012 to 2019.

Figure 2.3 Growth in global telecommunications revenue for the period 2012 to 2019



Source: The Statistics Portal (2016:13).

According to the Vodafone Annual Report (2014:12) and

https://www.prudential.co.za/insights/articlesreleases/is-the-sa-telecoms-sect, the telecommunications industry has continued to grow strongly. The report claims that the global mobile telephone penetration increased from 69% in 2009 to 98% in 2013. The larger percentage increase in mobile telephone users has been from emerging markets, as a result of favourable growth drivers, such as young and expanding populations, faster economic growth, and limited fixed line infrastructure. The telecommunications industry has also experienced growth in data as a result of an increase in smartphone and tablet usage, better mobile networks, and increased choice of internet content and applications. By March 2014, 28% of the telecommunications industry revenue was from data, compared to 13% in 2009.

Innovative technologies, as well as globalisation and deregulation have led to radical changes in the telecommunications industry over the past few years. Globalization has eliminated barriers, forcing monopolistic nationals to compete internationally. The progress made by many countries towards deregulation and liberalisation has significantly increased competition in the telecommunications market, and has resulted in changes in the way business is conducted in the telecommunications industry. Al- Debei and Avison (2011:17), supported by De Reuver,

Bouwman and Haaker (2013:139), claim that the above has resulted in the industry being highly competitive.

According to Migdadi (2012:29), the telecommunications industry has shifted from voice to data cellular technology, starting from Global Systems for Mobile (GSM) Communications to 3G Universal Mobile Telecommunication Systems (UMTS), and beyond. The convergences of these technologies have enabled mobile telephone users to communicate richer information at unprecedented levels of flexibility and convenience. As a result of the above, new competencies revolve around customers and content, rather than technology infrastructure.

Yan, Qian, Sharif and Tipper (2013:7), posits that the telecommunications industry structure has shifted from a monopolistic and autocratic state to a more democratic and open one, where extensive collaboration, communication and consultations are common. To align themselves with this new paradigm shift, organisations in the telecommunications industry have been forced to overhaul their businesses, and some companies have engaged in mergers, acquisitions and/or strategic alliances to sustain their businesses. The following section delves deeper into the global telecommunications outlook.

2.2.2 Global Telecommunications Outlook

BuddeComm, an independent global telecommunications research and Consultancy Company, in their report entitled "Global Telecoms - The Big Picture (2016:19) and Key Industry Statistics", state that in 2017 the telecommunications industry will continue to focus on the developments of Mobile to Mobile (M2M), Big Data Analytics, and Cloud computing. The general focus will be more on customer retention and declining revenues, while at the same time improving mobile and fixed broadband infrastructure for the future. Most emerging markets will focus mainly on mobile infrastructure, with low priced smartphones becoming a dominant trend. Mobile broadband will become an increasingly important feature in the emerging markets of the Middle East, Asia, Africa and Latin America, as the large population exerts greater demand on the existing infrastructure. Ernest and Young (EY), in their report entitled "Global telecommunications study: Navigating the Road to 2020" asserts that market conditions will remain tremendously challenging for operators, with ongoing price depression compelled by competition from Over-The-Top (OTT) suppliers and adjacent market players, such as cable companies and un-bundlers moving into mobile services *http://www.ey.com/gl/en/industries/telecommunications/ey-global-telecommunications-study-navigating-the-road-to-2020*.

Furthermore, according to Brand South Africa information gateway (2012) (*http://www.southafrica.info/business/economy/infrastructure/telecoms.htm#.V6Oofvl95dg#ixzz4GOlN2uJP)*, the telecommunications industry will develop in a number of ways. Operators will continue to pursue differentiation through network quality and scope of service portfolio, reinforced by further industry alliance and the presence of new technologies to back up data needs in the gigabyte era. However, OTTs will combatively broaden their competences, upsetting a number of industry verticals as software and interface-led innovation comes to the forefront. Regulators and policy makers will confront new challenges in enacting regulations for a progressively symbiotic digital ecosystem. Since this research is anchored on the effectiveness of project managers in the telecommunications industry in South Africa, the following discussion focuses on the telecommunications industry in South Africa.

2.3 The Telecommunications Industry in South Africa

According to the SAInfo Report (2012:24), the telecommunications industry is one of the fastest growing sectors of the economy in South Africa. It is driven by rapid growth in mobile telephony and broadband connectivity, which has a network that is 99.9% digital, comprising the latest technology in fixed line, wireless and satellite communication. The telecommunications industry in South Africa is very competitive and operates in a rapidly changing environment that is influenced by global trends.

2.3.1 Types of telecommunications

The South African telecommunications industry is made up of the following types of communications:

2.3.1.1 Fixed Telephony

According to the ICASA Report (2016:32), fixed telephone subscriptions refer to the sum of active analogue fixed-telephone lines, Voice-Over-IP (VOIP), fixed wireless local loop (WLL), Integrated Services Digital Network (ISDN) voice-channel equivalents, and fixed public payphones. The number of fixed line subscriptions reported as of the 30th of September 2015, was 3.8 million, with the vast majority consisting of analogue fixed-telephone lines. The fixed-line telephony is dominated by Telkom, which is listed on the Johannesburg Stock Exchange (JSE), and majority owned by the Department of Communications. The second fixed-line operator (Neotel Pty Ltd) was licensed in 2005 and started its operations in 2006.

2.3.1.2 Mobile Telephony

Mobile telephony is the provision of telephone service services to phones which are not fixed to a location. Mobile phones connect to cellular network base stations, whereas satellite phones connect to orbiting satellites. The two networks are interconnected to the public switched telephone network (PSTN) to allow any phone in the world to be connected (Cochetti 2014:113). According to SA Info Report (2016:22), South Africa has four licensed mobile operators: MTN, Vodacom, Cell C and Virgin Mobile. Nielsen Southern Africa, in their report entitled "Mobile Phones Dominate in South Africa", presented the following statistics regarding mobile telephone usage in South Africa, as of January 2016:

Table 2.1 Mobile telephone usage in South Africa at January 2016

South African population	54.73 million
Total mobile connections (active sim cards))	85.53 million
Total unique subscribers (people)	36.6 million
Mobile penetration (active connections to population)	128%
Estimated active smartphones in South Africa	11 million
Estimated mobile data penetration (data mobile connections)	39%
Prepaid subscriber base	84%
Postpaid (contract) subscriber base	17%

Source: http://businesstech.co.za/news/mobile/31978/

As of December 2016, there were two registered fixed line telephone operators, namely, Neotel and Telkom, and four registered mobile cellular network providers; namely, Vodacom, MTN (Mobile Telecommunications Network) , Cell C, and Virgin Mobile. A brief description of each of these Mobile Network Operators (MNOs) is presented below.

2.3.2.1 MTN (Mobile Telecommunications Network)

MTN, founded in 1994, is the largest mobile cellular communications services provider in Africa. It operates in 22 countries in Europe, the Middle East and Africa (EMEA). It offers an integrated suite of communications products and services to its customers, including traditional and mobile voice and data, digital and mobile financial services, as well as enterprise services

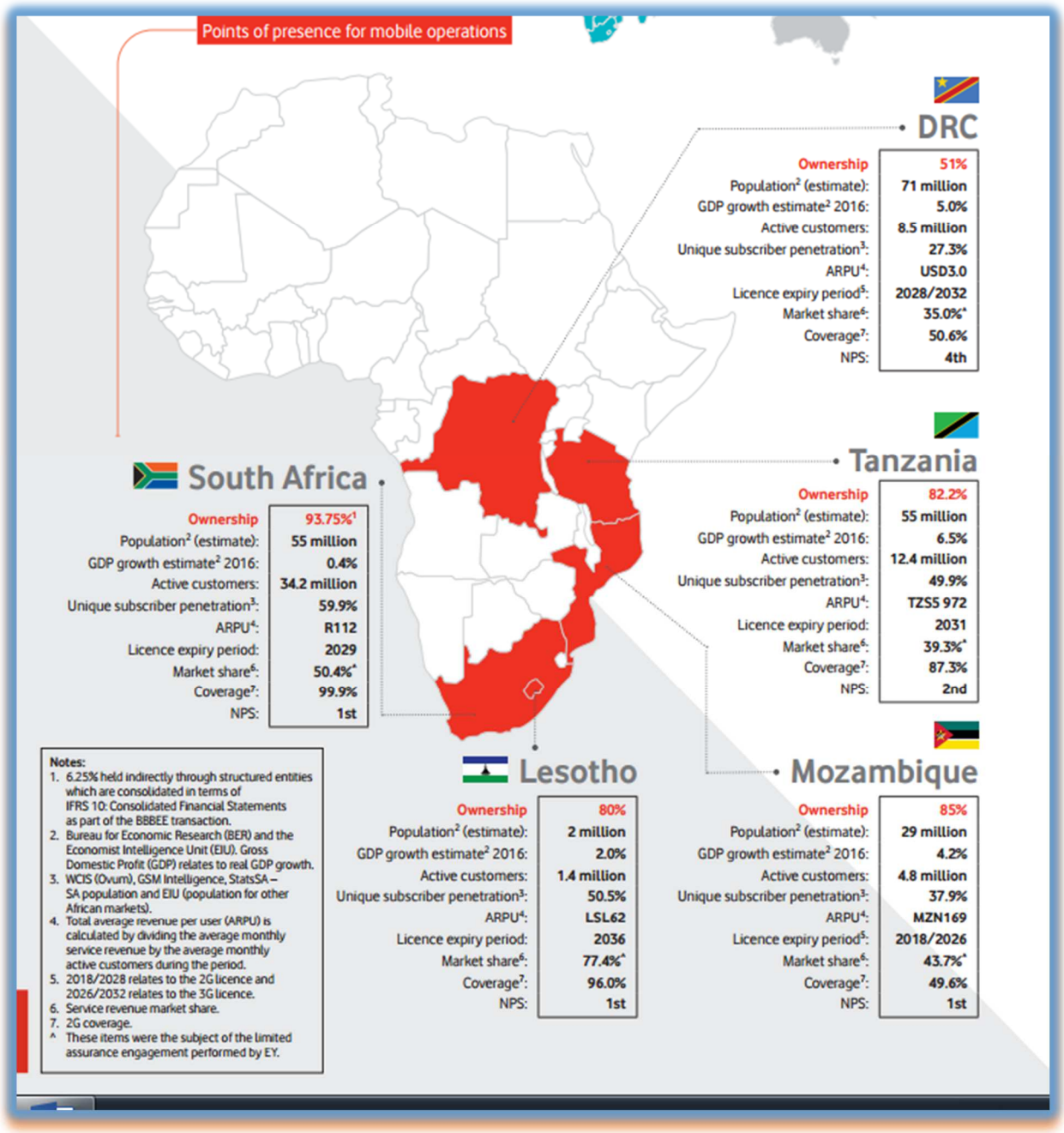
to small and medium enterprises, as well as to public sector and corporate clients. It has its headquarters in Johannesburg, South Africa. At the conclusion of its 2015 financial year, MTN had 27 000 employees. It had a gross revenue of USD 15.43 billion; a net income of USD 3.345 billion and total equity of USD12.43 billion *(www.mtn.com/mtngroup/pages/companyprofile.aspx)*. As at 30 November 2015, MTN had approximately 33.2% of the South African mobile subscriber market *(www.mtn.com/Sustainability/Documents/MTN_Group_Integrated_Report_2015.pdf)*.

2.3.2.2 The Vodacom Group

Vodacom is jointly owned by Telkom, a South African telecommunications group, and Vodafone, a British mobile phone operator, which is the majority shareholder. It was founded in 1994, and has its headquarters in Midrand, South Africa. The company provides GSM, 3G, UMTS, HSDPA, WIMAX and LTE coverage to approximately 56 million customers across Southern and Central Africa, covering Tanzania, Lesotho, the Democratic Republic of Congo (DRC) and Mozambique. By the end of 2015 Vodacom had an estimated market share of over 38.4% in South Africa.

(http://www.redknee.com/files/PDF/case_studies/Vodacom_Group_and_Redknee_case_Study_Final.pdf). Figure 2.4 below depicts Vodacom coverage in Southern Africa.

Figure 2.4 Vodacom Operations in Southern Africa



Source: Vodacom Group Financial Year Report (2015:5).

For the 2015 financial year, the Vodacom Group reported a revenue of USD5.402 billion, against an operating income of USD1.27 billion. It had a total asset base of USD4.307 billion; a total equity of USD2.643 billion. In South Africa alone, Vodacom employed 7 786 people in 2015 *http://vodacom.onlinereport.co.za/vodacom_ir_2016/downloads/Vodacom_integrated_report_2015_.pdf).*

2.3.2.3 Cell C

Cell C is 100% owned by 3C Telecommunications, which, in turn, is 60% owned by Oger Telecom South Africa, a division of Saudi Orger; 25% owned by CellSAf (the BBBEEE partner), and 15% by Lanun Securities SA (which is a subsidiary of Saudi Oger Ltd). It was founded in 2001, and has its headquarters in Randburg, South Africa. Cell C has network coverage of more than 30% of South Africa's geographic area. It has a market share of over 25%, with a customer base of over 6.9 million *(https://www.cellc.co.za/cellc/).*

In its financial year ending December 2015, Cell C reported a revenue of R13.2 billion and a net loss of R5.6 billion, with a total equity of R14.2 billion. During the same period it had over 1 500 personnel.

2.3.2.4 Virgin Mobile

Virgin Mobile, which one of the United Kingdom's largest mobile operators, entered the South African telecommunications market in 2006 in a joint venture with Cell C. Virgin Mobile South Africa operates as a Mobile Virtual Network Operator (MVNO), as it does not own any infrastructure. It operates through Cell C's infrastructure. MVNO is a telecommunications operator that provides mobile telephony services but does not have its own licensed frequency allocation of radio spectrum; nor does it have the entire network infrastructure required to offer mobile communication services (Chiumba and Akinsanmi 2010:23). Virgin Active piggybacks on Cell C's infrastructure, through a service level agreement with Cell C.

2.3.2.5 Telkom

Telkom is jointly owned by the following shareholders: the South African government (67.11%), and other shareholders, such as the Public Investment Corporation; Visio Capital Management; Acadian Asset Management; Dimensional Fund Advisors; LSV Asset Management, and the Vanguard Group *(http://mybroadband.co.za/news/business/128510-who-really-owns-telkom.html)*. Telkom had consolidated operating revenue from continuing operations of R31.7 billion and net profit of R2.889 million for the year ended 31 March 2015. As of 31 March 2015, Telkom had approximately 3.4 million fixed telephone access lines in service, (with the rest belonging to Neotel), and 964 196 ports connected via MSAN access. Services offered by Telkom include, but is not limited to, fixed-line voice, data and interconnection, data centre operations, like e-commerce hosting and storage, mobile communication which include voice, data and handset sales *(http://www.telkom.co.za/sites/aboutus/companyinfo/companyprofile/companyprofile/).*

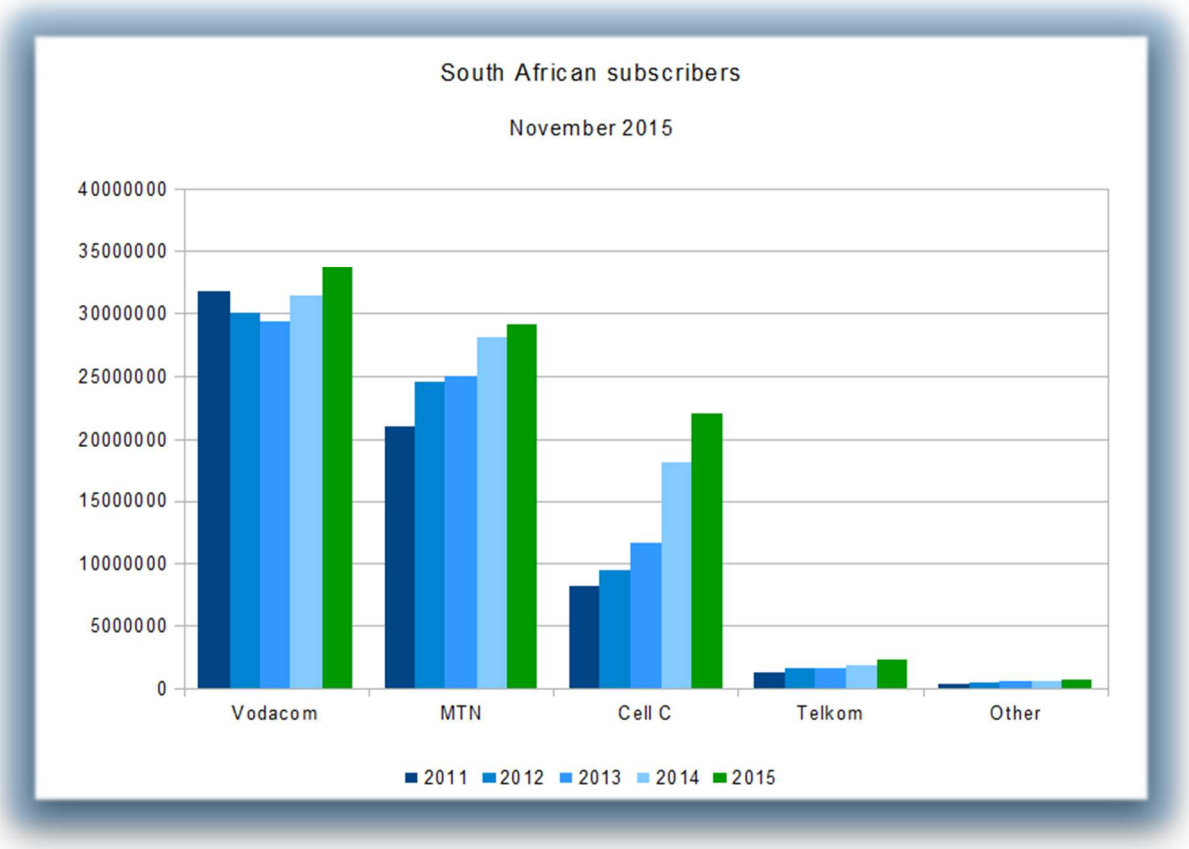
2.3.2.6 Neotel

Neotel was granted the second fixed-line operators' licence in 2006. It became the first converged communications operator offering tailored innovative solutions based on voice, internet, data services and Electronic Communication Services ECS/ECNS licenses that enabled consumers to reduce costs, increase productivity and improve efficiencies. Neotel (Pty) Ltd. is 70.49% owned by Tata Communications (a global communications and enterprise IT service provider), 10.51% owned by CommuniTel (established by Umkhonto We Sizwe Veterans Association and Telecom Namibia), and 19% owned by Nexus (a BEEE Partner representing various women and youth groups, non-governmental organisations and labour union business arms). Neotel has grown to amass 200 000 subscribers within seven years of its establishment in South Africa (*http://www.neotel.co.za/wps/portal/)*.

2.3.3 Distribution of fixed and mobile subscribers South Africa

Figure 2.5 below depicts the distribution of fixed and mobile subscribers for each of the companies in the telecommunications industry in South Africa from 2011 to November 2015.

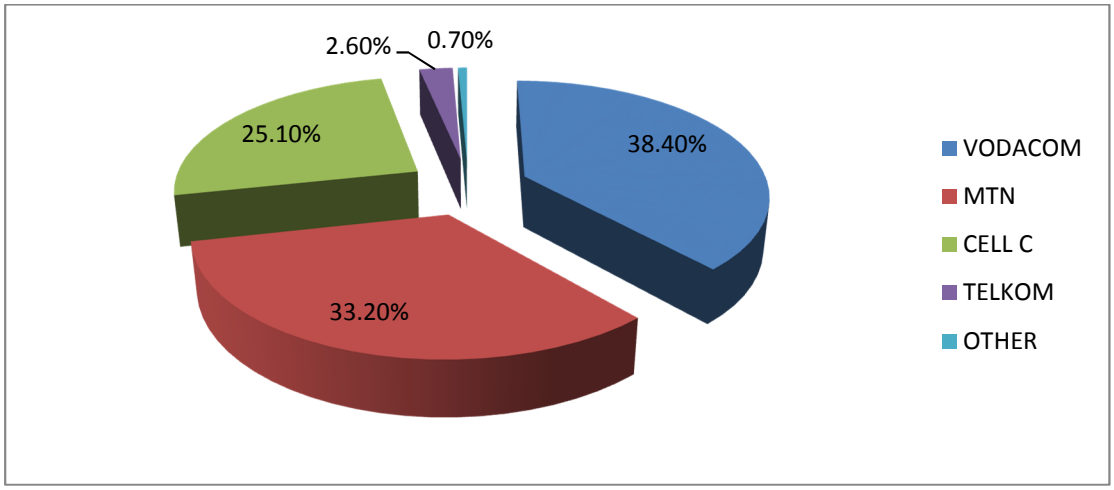
Figure 2.5 The distribution of fixed and mobile subscribers in South Africa from January 2011 to November 2015



Source: *http://mybroadband.co.za/news/cellular/146341-mobile-dominance-in-sa-vodacom-vs-mtn-vs-cell-c-vs-telkom.html*

Figure 2.5 above shows South African subscribers for both fixed and mobile telephony as of November 2015, whereas the pie chart below in Figure 2.6 illustrates the mobile subscriber market share of the telecommunications companies in South Africa. Figure 2.5 shows that Vodacom subscriber base was above 30 million in 2011; dropped to 30 million in 2012; dropped to below 30 million in 2013; rose to approximately 30.2 million in 2014, and rose again in November 2015 to approximately 30.4 million. On the other hand, MTN has experienced steady growth from approximately 20.1 million subscribers in 2011 to approximately 30.8 million subscribers in November 2015. Cell C has also experienced a steady growth during the same period (2011 to November 2015), whereas Telkom experienced a negligible growth in its subscriber base during this period.

Figure 2.6 Mobile subscriber market share of telecommunications companies in South Africa as at November 2015



Source: *http://businesstech.co.za/news/mobile/85752/sa-mobile-subscribers-vodacom-vs-mtn-vs-cell-c-vs-telkom/*

On the basis of the discussion thus far, one can conclude that the telecommunications industry plays a significant role in the South African economy and in the lives of the citizens of the country, and in the next section, this is outlined.

2.4 The importance of the telecommunications industry in South Africa

In the 21St century, the telecommunications sector has become central to a country's socio-economic development and is one of the major sectors that is relied upon to stimulate growth and transformation of the economy. As observed by Bagley (2010:6), telecommunications can increase the effectiveness of economic, commercial, and administrative activities; improve the efficiency of public and emergency services, and effectively disseminate information to a broader and remote citizenry. The lives of millions of ordinary citizens have been positively impacted by the changes brought about by advancements in the telecommunications industry.

Telecommunications in South Africa have played a principal role in the development of various sectors of the economy, such as the financial sector; the insurance industry; tourism; business services; the manufacturing industry; agriculture, and the government sector. Telecommunications aid in distribution of information to all sections of society, thereby facilitating better performance of all sectors of the economy (Sadr and Farahani 2012:74). For instance, telecommunications connectivity fosters social development, including improved education, health and increased citizen involvement in civil society matters. Telecommunication, *inter alia*, aids in enabling access to health care information by capturing

and disseminating patients data, management of health systems and the procurement of medical supplies.

In the financial services industry, telecommunications have positively impacted societies in many ways, for example, by offering easy and quick access to banking and other financial services. In South Africa, services offered by various financial institutions, like 'e-wallet' by First National Bank, 'Instant Money' by Standard Bank, and 'Cash Send' by ABSA, all rely on the telecommunications ability to send One Time Passwords (OTP). Also, e-commerce finds its applications across many end markets, including online shopping, paying bills for utilities such as power and water, and booking tickets for commuting services such as flights, trains and taxis. In addition, mobile banking permits patrons of banks and other financial bodies to access their account information, transfer funds, trade stocks and purchase financial products such as insurance (Buhalis and Hyun 2011:45).

Telecommunications impacts on societies by lowering the costs of gathering and dispersing information, and thus reducing the cost of doing business. Also, the enhancement of information processing and the application of new communication tools helps improve the turn-around time taken to make decisions, and this positively impacts on the productivity of organisations.

According to STATSSA Report, dated October 2015, entitled "Post & Telecommunications Industry 2013: Income from internet services rises by 8.6%", the total income for the post and telecommunications industry in 2013 was R276.3 billion, with telecommunications being the largest contributor, R262.2 billion or 95%, and the other R14.2 billion (or 5%) generated from postal and associated courier activities. The total number of persons employed in the post and telecommunications industry at the end of June 2013 was 107 100, 66% of whom were employed in the telecommunications industry *(www.statssa.gov.za).*

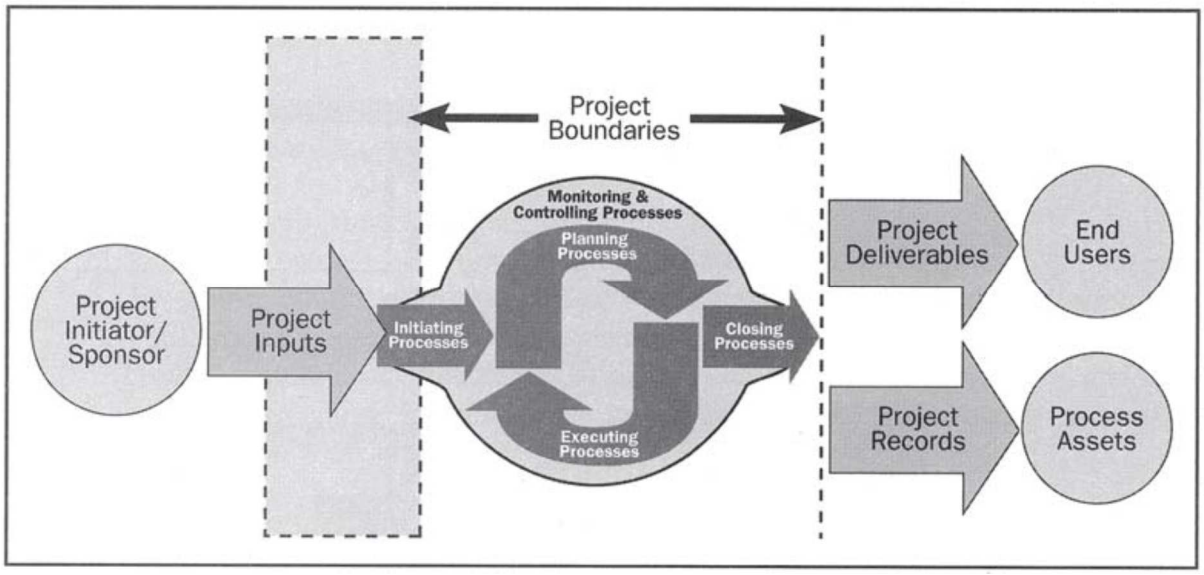
The discussion above presented an overview of the importance of the telecommunications industry in South Africa. Since this study wishes to establish the effectiveness of project managers in the telecommunications industry in South Africa, the discussion that follows examines, in detail, *inter alia*, the project management fraternity and the aspects that relate to the effectiveness of project managers, and commences with the definition of project management.

2.5 Definition of Project Management

Project management is defined by the Project Management Institute (PMI) (2004:37) as "the process of application of skills, knowledge, tools and techniques to project activities in order to meet project requirements''. Another authority in project management, Kerzner (2013:67), states that project management is the process of planning, organization, controlling and directing an organization's resources for a relatively short-term objective that has been established to complete specific goals and objectives.

According to Knapp (2010:15), project management involves the following stages: initiating, planning, execution, monitoring and controlling, and closing. Project management also espouses the body of knowledge that is characterized by ten knowledge areas, which are integration, cost, human resources, stakeholder management, scope quality, communications, and time, procurement, and risk management. Archibald and Archibald (2016:7), posits that project management entails a system which can deliver once-off undertakings on-time, within budget, and within scope, through the planning and control of variables, including resources, costs, productivity, schedules, risk and quality. Figure 2.7 below illustrates the stages in project management.

Figure 2.7 Project Management Stages



Source: Project Management Institute (2004: 38).

According to Darling and Whitty (2016:29), project management techniques have proliferated over the years, not only within the technology and engineering spheres, but they have also been

employed in areas as diverse as education, health, social services, and the arts. Below is a brief description of the evolution of project management.

2.6 Evolution of Project Management

Project management, like any other profession, has been practised for many years and has evolved with time. Scholars argue that project management has been practised as early as the 1900, although there was no formal methodology or structure observed then. According to Seymour and Hussein (2014:23), project management started as early as the 1900s, but it took some time before organisations could start applying project management tools and techniques in the running of complex projects. Shafritz, Ott and Jang (2015:29) posit that project management originated from Henri Fayol's identification of the five functions of a manager in 1949, namely, planning, organising, coordinating, controlling and directing. The Navy in the United States of America employed project management methodologies as early as the 1950s. As from 1951, several core project management tools, including Cost per Mile/Project Evaluation Review Technique (CPM/PERT); Material Requirement Planning (MRP), and many others were introduced (Azzopardi 2011:30). However, other authorities argue that project management has been practised since the Egyptian era, citing the Egyptian Pyramids as an example of project management practice.

The modern project management model started between 1900s and 1950s. This was the period where technology advancement shortened the project schedule and allowed effective resource allocation and higher mobility. Morris and Pinto (2010:48) claim that the origins of project management can be traced back to the chemical industry prior to World War Two. Telecommunication systems increased the speed of communication, and Henry Gantt used job specification as a basis to invent the Gantt chart, which is widely used as a project management tool for scheduling project tasks (Chiu 2010:48). During the 1960s and 1970s, the USA Department of Defence and other large engineering and construction companies were also applying project management principles and tools to manage their projects (Kwak 2005:38).

During the 1980s and 1990s the revolution in the information technology sector shifted from the use of mainframe computers that processed a limited number of transactions because of low capacity in memory and disk space, to multi-tasking personal computers that had high efficiency in managing and controlling complex project schedules. In the mid-1980s, the internet served the researchers and developers, and Local Area Network (LAN) and Ethernet Topology started to dominate network technologies (Leiner, Clark, Cerf, Kahn, Kleinrock,

Lynch and Wolff 2009:25). The internet changed the way organisations conducted their businesses in the mid-1990s. It provided a fast, interactive medium for doing business, and allowed organisations the project management community to become more efficient in managing various areas of projects (Allen and Peloza 2015:36). Table 2.2 below shows the evolution of project management, as from 1958.

Table 2.2 Evolution of Project Management

Period	Technology	Project Management & Technology	Project Office
1958	- Telegraph - Telephone - First computer - Automobile - Airplane - First database	-Parametric Cost Estimating - PERT/CPM - Gantt Chart - Monte Carlo Simulation - Systematic Application	- Focal point - Proximity - Traditional project office functions - Navy Special Project Office (SPO)
1959 - 1979	- IBM 7090 - Xerox copier - UNIX - Microsoft Founded	- PMI - Inventory Control -Material requirement planning	- Project Supporting Office
1980 - 1994	- Personal Computer -Wireless in-building network -First Internet browser (MOSAIC	- Matrix organization - PM Software for PC	- Project Headquarter - War Room
1995 ~ Current	- Internet	- PMBOK (PMI) - PRINCE2 (APMG)	- Virtual Project Office - Web-based Project Office

Source: Cleland (2004:96)

2.7 The Role of a Project Manager

According to the Project Management Institute (2014), the Project Manager is responsible for delivering a specific end result, within agreed quality, cost and time. Robichaud and Anantatmula (2010:49), contend that a Project Manager is responsible for developing the project scope, delivery timelines and milestones in consultation with the Project Sponsor; whereas Eweje, Muller and Turner (2012:96) argue that the role of a Project Manager is that of a principal-agent, as he/she is the agent of the owner (principal). This notion suggests that the Project Manager is the chief executive of a temporary organisation, and thus his/her role in setting objectives and motivating team members is emphasized over his/her role in planning and executing work.

The authors cited above concur that a Project Manager's role is to ensure that:

- the project is established and planned effectively;
- an appropriate project team is selected and established;
- tasks are planned and scheduled;
- the project plan is implemented, and problems are resolved, and that,
- on completion, the results are reviewed and the project team is disbanded.

According to Kwak, Park, Chung and Ghosh (2012:27), the Project Manager's role is performed through five key management stages, which are as follows:

2.7.1 Project definition and proposal

The Project Manager develops the objectives of the project from the initial requirements document and defines the acceptable tolerances of budgeted cost and time. The Project Manager then creates an initial delivery strategy and skills profile for required project team members to deliver the project. The project proposal is then confirmed by the project stakeholders and accepted or rejected by the Project Sponsor.

2.7.2 Detailed planning and scheduling

Once the proposal has been approved, the Project Manager begins to plan in detail and record each major activity on the task list that will be used as the basis for developing a comprehensive project plan. The project objectives are discussed with the key team members responsible for each major activity, and the required resources identified and agreed upon. The Project Manager then creates a project plan and a task list for each key member.

2.7.3 Managing implementation

When the actual project work begins, the Project Manager coordinates activities, monitors progress and control the three constraints, namely, quality, time and costs. During this phase the Project Manager receives and provides feedback on progress, negotiates for resources and resolves any conflicts that may threaten the success of the project.

2.7.4 Project Delivery and Closure

During this phase, the Project Manager ensures that the project team delivers the output/result or service that the project was set out to deliver. Project outputs are tested, approved and handed over to the relevant end-users or Operations Business Units. The project team is acknowledged and disbanded; third-party contractors are paid; contracts terminated, and the project is officially closed.

2.7.5 Post implementation review

This is the stage where the Project Manager checks results against quality targets from the specifications set, ensuring that all the objectives have been met within planned timelines and budgets. The Project Manager then reports the results to senior management and other stakeholders, and formally hands over the tracking of benefits from the project to the Business Change Managers or Operations Managers.

2.8 Characteristics of an Effective Project Manager

This section identifies and discusses the attributes that are required of a project manager to be effective in discharging his or her duties. Belbin (2013:47) suggest that the success of an organisation depends on the calibre of the management team, and this also applies in project management. According to Robbins, Judge, Millett and Boyle (2013:56), a project manager must exhibit technical, organisational and interpersonal skills. He/she should be a multitasker; an effective communicator; a good negotiator; a problem solver, and he/she must understand the politics and the political environment of the organisation in which he or she operates. According to Chatterjee (2014:9), the project manager must be someone who pays attention to detail, understand and appreciates risk management and possesses excellent project and process management competencies.

Haughey (2010:3) suggests that in order for a project manager to be effective, he or she should be able to define with the customer the critical factors that would contribute to the success of the project at hand. Furthermore, he/she should be a good planner; be able to motivate

subordinates, and be able to manage risks. Sampson (2007), cited by Ahsan, Ho and Khan (2013:39) posits that the skills required by a project manager are half hard and half soft skills. He further suggests that there should be a balance between the technical and leadership aspect of project management, with project managers having adequate technical knowledge in the field of the project and the environment where the project is being undertaken, and must also have adequate technical skills in Information and Communications Technology (ICT).

Ray (2014:52) asserts that managers who have technical skills in the area of the project they are managing, such as product knowledge, services, infrastructure and market trends, perform better than those without the skills because they cannot be easily misled by other functional experts who might have a hidden agenda, or make decisions with limited information. The project manager must also possess good organisational skills. He or she must be able to plan, organise, coordinate and control the running of the project to ensure its success.

Kerzner (2013:72) argues that the project manager should also be a good finance and people manager. Interpersonal skills play an important part in the effectiveness of a project manager, and the project manager should be able to cope with problems that may arise among workers. According to Macaulay (2012:48), a project manager should be a good problem-solver, who is also flexible, patient, considerate, persistent, direct, creative, and an effective communicator, and one who is able to manage stress. This view is corroborated by Nixon, Harrington and Parker (2012:21) who argue that an effective project manager needs to show concern for people in solving problems, build trust, show sympathy and involve people's emotions.

Apart from the above attributes of an effective project manager, Eweje, Turner and Müller (2012: 49) link leadership style with project management effectiveness. They argue that good leadership leads to effective project management. In this regard, Gujral (2012:17) notes that the leadership style of a manager has an impact on his or her performance, as leadership influences project success through teamwork. Jałocha, Krane, Ekambaram and Prawelska-Skrzypek (2014:25) concur with Muller, Eweje, Turner and Gujral. The authors add that subordinates and work place situations are key factors to take into account when selecting an appropriate leadership style, and that the situational leadership style is best suited for project management.

Northouse (2015:107) concludes that project managers exhibiting 'concern for people' leadership style and those with a balance between 'concern for task' and 'concern for people' leadership styles are most effective project managers. Sage, Dainty and Brookes (2014:46),

citing Pollack (2007), contend that although both technical and leadership skills are important, a project manager requires a good academic background to be an effective project manager. In support of Pollack, Di Vincenzo and Mascia (2012:10) propose that a project manager should have at least taken classes in communication, mathematics and basic skills in computers. The above mentioned authors add that project managers should at least have a bachelor's degree, although there is no need for it to be in the business or management area.

While a project manager may possess all of the characteristics discussed above, he/she needs to be ethical. Zivcakova and Wood (2015:22) argue that ethics builds trust and integrity, and that project managers must adhere to corporate governance practices when performing their duties. In Table 2.3 below, Keil, Lee and Deng (2013:40-42) summarise the characteristics of an effective project manager, as advanced by various authors.

Table 2.3 Summary of the characteristics of effective Project Managers

Requisite	**Description**	**Authors**
Ability to manage diverse teams	There might be a few teams/ groups/departments involved in a project from different companies or business units. The PM must have a good understanding of each team's responsibilities; where they overlap, and where there are gaps.	Kiel *et al.* (2013:40)
Ability to communicate at multiple levels	The ability to communicate with peers, and upstream and downstream with all stakeholders at different levels of management is fundamental.	Stevenson and Starkweather (2010:64)
Ability to involve end users	The PM should be able to sell the project to the end user. Making the end user community accept the project will minimise problems and conflicts during project execution.	Skulmoski and Hartman (2009:61)
Ability to learn/self-evaluation	PMs may improve their performances as they evaluate themselves, and learn from experience.	Steven and Starkweather (2010:64)
Ability to motivate team members	Projects are completed by people; therefore, all PMs are human resources managers who must be able to retain and motivate people involved in the	Keil *et al* (2013:41)

	project. The PM should be able to drive team members to towards the project objectives.	
Ability to understand the business problem	The chances of effectiveness increase if the PM understands the business problem before working on the technical solution.	Keil *et al* (2013:41)
Analytical skills	The ability to analyse problems and issues within different stages of projects.	Keil *et al* (2013:41)
Business skills	The PM should be able to identify factors that affect the health of the project, such as stakeholder politics and changes; cost implications, changing business factors, etc.	Keil *et al* (2013:41)
Commitment	Focused involvement in the project tasks enables the timely, accurate and proficient delivery of quality products and services.	Keil *et al* (2013:41)
Compromise	At times, the PM should be flexible and compromise to get consensus. However, this option must be used as a last resort.	Skulmoski and Hartman (2009:62)
Confidence/Realistic	The PM should at least accept things as they are and not base decisions on unlikely hopes for the future. The PM should also be certain of his or her abilities.	Keil *et al* (2013:41)
Conflict management	People on a project have different goals, objectives and perspectives and this often leads to conflicts. PM should have the ability to manage conflicts constructively.	Keil *et al* (2013:42)
Cost management	The PM should be able to forecast costs and manage the project budget. He/she should also be able to handle the project budget versus the actual costs incurred.	Keil *et al* (2013:42)

Decision making	The ability to identify and analyse different solutions to a problem. Being able to see the whole picture, analyse possible risks and impact before choosing a direction.	Rose (2013:37)
Experience	Good PMs learn from previous experience and their interactions with other professionals.	Stevenson and Starkweather (2010:65)
Good people skills	PM should be able to interact with people in all types of situations that is customers, vendors and internal management.	Keil *et al* (2013:42)
Leadership	The PM should be able to effectively lead the team towards the goals of the project.	Keil *et al* (2013:42)
Knowledge of the end product	A PM must understand the end product/result of the project he or she is managing; what the product is; how it should look like, and how it should function.	Keil *et al* (2013:42)
Organisational skills	The ability to plan, organise, coordinate and direct the activities of the project and its resources.	Keil *et al* (2013:42)

Source: Adapted from Keil *et al* (2013 :40-66)

2.9 Impact of training on a Project Manager's performance

Unlike in the 1990s, when project management was a growing field, it is almost impossible to find a contemporary organisation that does not employ project management techniques (PMI 2013). Initially, project managers came mainly from the disciplines of Information Technology and Civil Engineering, but of late, people from many different disciplines are involved in project management. As a result, some businesses find themselves in a situation where many people who are involved in or running projects are not adequately trained and lack the basic skills, knowledge and competencies. Hence, training becomes necessary (Cherian and Jacob 2013:82).

Ramazani and Jergeas (2015:42) state that effective project management training must encompass the six variables which exist on any project, namely, costs; time; scope; quality;

risk, and benefits. They also argue that good project management training should be delivered by subject matter experts who can deliver training experiences that are inspirational and rewarding. This is corroborated by Sparrow (2012:76) who posits that organizations from all business sectors need to invest in good project management training experts who are prepared to engage with their organization's strategic aims and objectives in a partnership rather than a supplier role. According to Huang and Zhang (2013:207), training has a positive impact on the performance of project managers. Adequately trained project managers are likely to perform better than those who have little or no training in the field of project management.

Taylor and Woelfer (2012:68) contend that when it comes to the execution of their duties, adequately trained project managers will always have an advantage over those without training. Training can provide many benefits to an organization, like providing a tighter control over resources and an improved level of project risk management. It can also raise the skills of the individuals, providing them with greater work satisfaction and long-term career prospects.

According to Edmonds (2010:36), a project manager is responsible for communications in the project under his or her management. For this reason the project manager acts as an intermediary among all stakeholders to ensure that the project is completed on time; is within budget, and conforms to the quality specifications. As the Project Manager is involved with the project from initiation to completion, he/she needs to be inspirational in directing and guiding the team towards the end goal, and training ensures that he/she executes his/her responsibilities with much ease (Knapp 2010:66).

Many projects are cross-functional and involve people from different business units within an organization, which can potentially be disastrous, as people are likely to be "speaking different languages". Therefore, it is important that the project leader learns a language which can be universally understood to manage the uncertainty (Keil *et al* 2013:43). According to the IPM (2013), any type of organization in any business sector can fall foul of project management failure, but if they are to avoid long-term damage, they need to address the causes, and take steps to improve the project chances of success, by providing necessary training to the project personnel, especially the Project Manager, who has to act as a conduit between different stakeholders.

2.10 Challenges encountered by Project Managers in the telecommunications industry

Several challenges impact on the ability of the project manager to execute his/her duties and responsibilities. These challenges can be classified as either internal or external, and some of

the most critical challenges confronting project managers in the telecommunications industry in South Africa are discussed hereunder.

2.10.1 Internal Challenges

Rose (2013:37), define internal challenges as those barriers that are inherent within the project's environment, and they include the following:

2.10.1.1 Product Quality Assurance

As observed by Kerzner (2013:72), one of the challenges confronted by project managers is to deliver an end-product that is of the quality acceptable to the client. In most cases this presents challenges to the project manager because the project owner representatives (sometimes also referred to as the client, if the project is being managed by a third party) have a tendency to spend a lot of their time supervising the project managers instead of focusing on defining quality standards. At times, the project manager and field engineers may not be professionally competent and unfamiliar with the local standards and environment where the project is being undertaken. This presents challenges in attaining the desired quality. In order for engineers to be as accurate as possible, professional qualifications and familiarity with the project environment and operational standards are essential. If it is not so, it may present challenges in quality to Project Managers as the project progresses (Gutiérrez 2014:8). Marle and Vidal (2016:49) also noted that another challenge faced by project managers regarding product quality is the failure by the client to clearly define the quality criterion as well as the quality measurements and metrics. This leads to substandard products/results that either require re-work or are rejected by the client, thereby rendering the project unsuccessful.

2.10.1.2 Project Cost

An effective Project Manager must deliver a project to the client within the triple-constraints of quality, costs and time (Rakos, Dhanraj, Kennedy, Fleck, Jackson and Harris 2015:44). Completing a project within budgeted costs is one of the foremost challenges that are confronted by project managers during a project's life cycle. In some situations, projects are started out with rough estimates because of the vagueness associated with vague requirements, or, at times, the project estimate is made to seem lower than it would be in reality, in order to get final project approval (Amalraj, Hernani, Ladouceur and Verma 2007:16).

Another cost challenge to a project manager is contracting of work. In an environment where there is shortage of labour and a lack of competition, project costs can escalate. The lack of a

competitive bidding atmosphere may also result in a parent company not contracting the right contractor for the project. This escalates costs and compromises standards, resulting in several re-works and scope-creeps that become costly for the company (Skulmoski and Hartman 2009:74). Hence, managing project cost poses a major challenge to project managers.

2.10.1.3 Project Scheduling

As Hwang and Ng (2013:30) assert, a prolonged approval process of a project will impact on both scheduling and resource allocation, as the targeted resources might be moved to another project. Project scheduling is performed at project inception, as part of the feasibility study, and as such, it becomes a challenge for the project manager as the subject matter experts might not yet be engaged in the project. If scheduling is not properly performed from inception by adequately qualified project planners and schedulers, Hwang and Ng (2013:30) contend that it may cause confusion about the project schedule and project implementation planning. This delays the project and the project manager has to take this into consideration. Having a clear and well-defined schedule at the onset of a project can help contain costs in the long run. Schedule challenges come from all areas of a project, including the shareholders of the company involved; the project management team, and at times, the local authority, for example, to lay the telecommunication cables will require the approval of the City Council. Stretch targets, which are over-ambitious goals that require breakthroughs to be achieved can also contribute to the project delays (Keil *et al* 2013:44).

2.10.2 External Challenges

There are also external challenges that can affect project management, which the Project Manager has no control over, and these are discussed below.

2.10.2.1 Labour

According to Knapp (2010: 37), the unavailability of labour in the area in which the project is undertaken can be a challenge to a project manager. In some cases a project may face the challenge of the non-availability of employees in terms of numbers and the requisite skills, in the area where the project is being executed. This has an impact on the scheduling of the project. It also has an impact on the overall costs related to the project. Another challenge for project managers is the subject of trade unions. Where the labour force is concerned, union or other labour agreements can be a hindrance to project management. Some unions are particular about how their members are treated; at times demanding that the labour force be hired from

particular zones only. This can limit the workforce pool and cause project schedule delays (Knapp 2010:37).

Newton (2015:12) identifies the chosen hours of work as another characteristic of labour that can make a difference to the cost and schedule of a project as some projects set their hours of work prior to the beginning of a project, and observe those hours of work strictly. Sometimes the hours of work set by the project managers and planners may be different from those set by trade unions (Newton 2015:19). Some projects may also find it difficult to appeal to workers - due to a number of reasons, such as the location of the project, cost of living in the area where the project is located, accessibility of the area, and the availability of health and recreational facilities (Van Canh and Gertz 2012:129). For example, in an isolated region, personnel may face challenges such as inflated cost of living, lack of after-work activities to take part in, fewer resources available, and inadequate infrastructure. (Amalraj *et al* 2007:19).

In the South African Telecommunication industry, in particular, software development might be outsourced to organizations located in China or India, while installation, testing and implementation is executed by a Mobile Network Operator located in South Africa. Due to the availability of skilled labour and flexible working conditions, organisations in China work a seven day shift and deliver solutions quicker, whereas in South Africa organisations work five day shifts. This presents complications in synchronizing deliverables from the development team and the implementation teams.

2.10.2.2 Weather conditions

According to Kazaz, Ulubeyli, and Tuncbilekli (2012:427), another factor that Project Managers have no control over it, is the weather. If a project is being undertaken in an area that experiences extreme weather, the weather can negatively impact the project schedule. In extreme cold and heat, workers cannot work outside for extended periods of time. Stormy weather can also affect work schedules, depending on the severity of the storms. The authors contend that project managers who are planning to work in areas known for extreme weather conditions should make provision in their schedule to accommodate for time lost due to poor weather conditions.

2.10.2.3 Opposition from the Local Community

As observed by Hurlimann and Dolnicar (2010:289), major projects can occasionally face resistance from the community where the projects are undertaken. Whether planned or not, a major project can have detrimental effects on the community. Even while the local populace is

growing by the number of employees coming from other areas to work, there is no increase in municipal tax revenue, as the labour force for the project pays municipal taxes in the communities they originate from. In the interim, these people place an additional liability on the community's facilities and services. These people are referred to as the community's "shadow residents", as they live in the community momentarily while sustaining a home base elsewhere. When this shadow populace rises, the community in question may begin to experience a housing shortage, as well as discovering that their airport and public transport facilities may be insufficient because of the rising consumer population. The health care system gets affected as well, with a substantial rise in users of the community service systems without the increase in funding.

The above consequences can combine to make a community an even less attractive place to live, which may make it difficult to attract the requisite numbers of employees with the relevant skills to complete the project on time and within budget. It can end up being a vicious cycle if nobody intervenes on behalf of the residents of the community, (Amalraj *et al* 2007:15). The community may then be forced to resist such projects because of the above experiences.

Another reason for resistance of projects by the community can be on religious grounds. An example is the case of the Medupi Power Station project in South Africa, where the local community complained that they were not consulted when Eskom built its electricity generating station. They claimed that the station was built on the graves of their relatives, and they wanted the project abandoned or remedial action taken to appease their cultural beliefs.

2.10.2.4 Lack of Authority over Project Team Personnel

Another challenge that faces project managers is that although they are responsible for meeting project objectives; for schedules; budgets, and evaluating alternatives; for weighing risks and deciding how to accept, avoid, remove, or alleviate them, and for leading the initiative to successful completion, they have no authority over other personnel that form part of the project team (Gillard 2009:22). Managers of the functional, technical, and support departments provide personnel and technical assistance to the project manager, yet retain responsibility for their tools, training, performance evaluation, and reassignment (Jacques, Garger, and Thomas 2007:6; Yazici 2009:20).

2.10.2.5 Stakeholder Interests

According to Gillard (2009: 33), a further challenge confronting project managers in the telecommunications industry in South Africa arises from the multi-dimensional environment

in which they function. At the core of day-to-day operations are the project office and the project team. The second element is the inter-organization, which might be a/an external organization/s that has/have an interest or oversight authority in the project office. And a third element is the intra-organization, which encompasses the parent organization, user community, and contractor(s) This intricate web presents a communication paradigm unmatched by any other management position: the team is often large in number and comprises a multi-pronged mix of disciplinary, inter-organizational, geographically distributed members, internally employed personnel, and subcontracted or contract staff; the project manager must cope with delicate lines of authority and power, and he/she must interact with various groups and stakeholders internal and external to the employing organization, often with contradictory interests relevant to the project at hand (Gillard 2009:34).

The above challenges have been expressed by Zielinski (2005:18), as follows: "These 'accidental' [project] managers must simultaneously satisfy the needs of often fussy clients, stick to tight cut-off dates, and marshal limited or sometimes non-existent resources to get the job done - all while shepherding, motivating and cajoling a diverse universe of personalities within the organizational intricate. They are held accountable for project results, but often have little power over personnel or resource matters, and they must find a way to get things done without ruffling too many feathers, because the next project might involve the same people."

Black (2006:19) and Sampson (2007:45) concur with Zielinski when they conclude that when team members have a twofold reporting arrangement, the project manager may find it difficult to exercise influence over the team members. Direct authority over personnel tends to rest with the functional manager, while the project manager has little authority over the project team members or their managers.

2.11 Conclusion

From a review of the relevant literature, it is evident that the telecommunications industry plays an invaluable role in society and the economy, connecting people and organisations, both locally and globally. It is also evident that competition within the telecommunications industry is intensifying, and greater pressure is exerted on organisations within the industry to reduce costs. In this regard, the effectiveness of project managers within the industry to execute multimillion dollar projects within budget and on-time, is crucial.

In the next chapter, the research methodology and design employed to conduct the empirical study is discussed.

CHAPTER 3

RESEARCH METHODOLOGY AND DESIGN

3.1 Introduction

The overall purpose of this chapter is to explain in detail the methodology that was used to carry out this research study. The chapter begins with a restatement of the key research questions that this study aimed to address. This is followed by a detailed description of the sampling procedure and data collection methods that were used. Thereafter, the reliability and validity of the measuring instruments, as well as the manner in which the questionnaire was administered are explained. The chapter concludes by explaining how data was analyzed and presented.

3.2 Key Research Questions

- What are the perceptions of project managers within the telecommunications industry in South Africa regarding the skills required for the successful execution of a project?

- What criteria should be used to evaluate the effectiveness of Project Managers within the Telecommunications industry in South Africa?

- Does training in project management enhance the ability of project managers within the telecommunications industry in South Africa to deliver a project successfully?

- What challenges are perceived to pose the greatest threat to project managers in the telecommunications industry in South Africa?

3.3 Research Design

The research design refers to the method the researcher chose to bring together different components of the research in a coherent and logical manner to ensure that the research problem is fully addressed. The research design constitutes the blue print for the collection, measurement, and analysis of data (Vogt, Gardener and Haeffele 2012: 118). The function of a research design is to ensure that evidence obtained enables the researcher to address the research problem in a logical way and as unambiguously as possible (De Vaus 2014: 182). A quantitative research design was used for this study.

According to Goodenough and Waite (2012:15) quantitative research design is the glue that holds the research project together. The quantitative approach attempts to maximize objectivity, replicability, and generalization of findings and is typically interested in prediction. It involves manipulation of numbers to make claims, provide evidence, describe phenomena, and determine relationships or causation. According to Cohen and Manion (2010:36), quantitative research design is a social approach that employs empirical methods and empirical statements. Empirical statements are expressed in numerical terms. The important part to this approach is the expectation that the researcher will set aside his or her experiences, perceptions, and biases to ensure objectivity in the conduct of study and the conclusions drawn. The quantitative approach assumes that there is a single truth that exists, independent of human perception (Gorard 2013:51). The quantitative research approach is characterized by the collection of information which can be analysed numerically, the results of which are typically presented using statistics, tables and graphs.

According to Marshall (2013:210) a quantitative research design's advantages are in its ability to provide the following;

- numeric estimates;
- opportunity for relatively uncomplicated data analysis;
- data which are verifiable;
- comparable data from different locations, and
- data which do not require analytical judgement beyond consideration of how information will be presented in the dissemination process Marshal (2013:210).

The disadvantages of the quantitative approach have been identified as:

- issues that are not included in the questionnaire, or secondary data checklist are not included in the analysis;
- the results need to be computed using Access, Excel, or any other software that can handle data analysis; which may not be always accessible in some situations;
- the larger the sample, the more time it takes to collect and analyse data;

- the quantitative research ignores a very important human element, namely, the views or feelings of respondents, that can be captured by qualitative research, and
- there is limited participation by the affected persons in the content of the questionnaires, or the direction of the information collection process, *(http://www.paulchapmanpublishing.co.uk/books/ch1.pd).*

3.4 Target Population

The term "population" refers to the members of the group being studied and the term "sample" refers to a small subgroup of those actually chosen to participate in the study (Goodenough and Waite 2012:42). The target population for this study comprised project managers within the telecommunications industry in South Africa who were registered with Project Management of South Africa (PMSA). There were over a hundred project managers practising in the five mobile and two fixed line service providers within South Africa, but not all of them were members of the Project Management of South Africa (PMSA) or Project Management Institute (PMI). The task of tracking all the project managers practising in the South African Telecommunications Industry was not only cumbersome but had a high likelihood of errors; hence, the target population for this study was derived from the membership list of PMSA. According to the information provided by the PMSA, there were 1 100 registered members as at the 11th of April 2016. As PMSA did not distinguish project managers according to the industry in which they were employed, the number of project managers in the telecommunications industry could not be accurately ascertained. However, PMSA estimated that there were approximately 100 project managers in the telecommunications industry in South Africa.

3.5 Sample Population

A sample is defined by De Vaus (2014:182) as a finite part of a statistical population whose properties are studied to gain insight about the whole population. When dealing with people, as was the case in this study, a sample can be defined as a set of respondents selected from a larger population for the purpose of a survey. The sample population of this study was made up of 80 project managers within the telecommunications industry in South Africa. The sample of 80 managers was derived by considering a target population of approximately 100, at a confidence level of 95%, and a confidence interval of 10 *(http://www.surveysystems.com/sscalc.htm).*

3.6 Sampling Process and Technique

Gorard (2013:56) notes that sampling is a process of selecting a group of people, events or behaviour with which to conduct a study, and Barnard (2012:145) confirms that in sampling, a portion that represents the whole population is selected. Sampling is closely related to generalizability of the findings. According to Henn, Weinstein and Foard (2009:62), sampling techniques can be divided into two main types: probability or representative sampling and non-probability or judgemental sampling. Probability or representative sampling is further divided into the following: systematic sampling; stratified random sampling, and cluster sampling, whereas non-probability sampling is divided into convenience sampling; quota sampling; dimensional sampling; purposive sampling, and snowball sampling. While in probability sampling every subject in the targeted population has an equal and independent chance of being selected to make up the sample, with non-probability sampling one cannot claim that a sample is representative; rather, one takes advantage of who is available at that time (Coghlan and Brydon-Miller (2014:46).

Based on the above, purposive and random sampling was employed for this study. Considering an alpha error at 5% and a confidence level of 95%, a sample size of 80 project managers was obtained given the target population of 100 PMs. The sample size was calculated by using a sample size calculator (Abbott and McKinney 2013: 54).

The sampling was purposive in that the researcher targeted only 80 project managers. Teddlie and Yu (2007:81) describe purposive sampling as a technique of sampling where the researcher deliberately chooses who to include in the study, based on their ability to provide the necessary data. The sampling was also random in the sense that all the estimated 100 registered project managers in the telecommunications industry in South Africa had an equal chance of being selected to make up the sample. The rationale for choosing this approach was that the researcher was seeking views from the project managers on the topic under investigation and could not involve all the estimated 100 registered project managers as respondents.

3.7 Data collection and the research instrument

The primary data for this study was collected via a questionnaire (See Annexure A). A questionnaire is a tool for collecting data and recording information about a particular issue of interest. It is made up of a list of questions, but also includes instructions and provides space for answers or administrative details (Brown 2001:198). Brown (2001:205) further adds that questionnaires should always have a definite purpose that is related to the objectives of the

research. According to Dörnyei (2007:90), questionnaires are commonly used to collect factual information in order to classify people and their situations; gather straightforward information relating to people's behaviour; look at the basic attitudes or opinions of a group of people relating to a particular issue, and to collect baseline information that can be tracked over time to examine changes.

The rationale for selecting a questionnaire over other data collecting instruments was its convenience to the researcher, considering that the researcher was a full-time employee. The advantages of using a questionnaire are that one can contact a large number of people at a relatively low cost. It is also easy to reach people who are across a wide geographical area or who live in remote areas. Questionnaires can also make it easier to identify the appropriate person to respond to the questionnaire (Dörnyei (2007:99). In addition to the above advantages, Goodenough and Waite (2012:44) contend that questionnaires have an advantage over other instruments in that they are highly versatile and can be used by a variety of people in different environments, at different times, targeting a variety of topics for analysis. They are also easy to construct, are convenient to work with, and provide anonymity to respondents, should they request it.

According to Dörnyei (2007:95), there are two types of questionnaires, namely, open-ended and closed-ended. Open-ended questionnaires are those that afford the respondents the opportunity to express their views, whereas closed-ended questionnaires require specific answers that are provided in the questions, like a "Yes" or a ''No" response. In this study, both open-ended and close- ended questions were employed. Feinberg, Kinnear, and Taylor (2013:57), posit that there should be an effective link between the questions asked and the information required, as the research instrument was a critical component in conducting this study. A poorly designed research instrument could negatively impact on the results and distort the overall outcome of the study. According to Fink (2013:96), structured questionnaires are efficient tools for systematically collecting data from a broad spectrum of respondents within a study area, and are efficient in that many variables can be measured without substantially increasing the time or cost.

In designing the questionnaire, the following points were taken into consideration:

- questions were not invasive and did not require confidential company data (Dörnyei 2007:105);

- questions were not leading or made the respondent feel embarrassed (Dörnyei 2007:105);
- questions were not complex so that respondents were not required to do research before answering the questions (Fink 2013:99);
- questions only required one response at a time (Dörnyei 2007:105);
- questions were clear and comprehensible (Fink 2013:99);
- the questionnaire was not too long so as to discourage the respondent from completing it, and
- the questionnaire structure and content was based on the research objectives and the literature reviewed (Fink 2013:99).

The questionnaire (refer to Annexure A) consisted of 18 close-ended questions and five open-ended questions, and comprised the following five sections:

- Section A: personal data of the respondents. The purpose of collecting this data was to ascertain the position held; reporting structure, and the experience of the respondents;

- Section B: The questions in this section of the survey instrument were designed to establish if the project management skills that the respondents possessed were adequate to enable them to successfully deliver projects in the telecommunications industry in South Africa;

- Section C: The questions in this part of the survey instrument sought to establish the criteria by respondents' organisations to evaluate the effectiveness of project managers;

- Section D: The questions in this section of the instrument survey intended to ascertain the views of the respondents regarding the impact of training on the effectiveness of project managers, and

- Section E: The questions in this part of the instrument survey sought to solicit information from the respondents regarding challenges encountered by project managers in the telecommunications industry in South Africa.

Regarding the completing of the questionnaire, respondents were given options for all the questions, whilst four questions were structured along the Likert rating scale. According to Cooper and Schindler (2013:253), a Likert scale is a summated rating scale that consists of statements that express either agreeable or a disagreeable attitude towards the objects under investigation. Such statements were posed in a manner that required the respondents to indicate their degree of agreement or disagreement, by choosing between ranges of "strongly disagree" to "strongly agree".

The self-administered questionnaires were coded into a Google form and a Weblink created and forwarded to PMSA, which in turn distributed to its members.

3.8 Data collection Procedure

The researcher sent a Web Link to Project Management South Africa (PMSA) (See Annexure B), which in turn was attached to their monthly electronic newsletter targeted at members in the telecommunications industry. A follow up was made through reminders sent by PMSA through the monthly newsletter. The completed questionnaires were e-mailed back to the PMSA Weblink provided by PMSA, which automatically redirected the responses to the researcher's private e-mail address.

3.9 Pilot Study

A pilot test was administered among five project managers with a view to examining the design and feasibility of the proposed research instrument. The results of the pilot test were used to rephrase certain questions and to eliminate some questions that were deemed to be redundant. According to Henn, Weinstein and Foard (2009:147), respondents who take part in the pilot test must be excluded from the final sample to avoid the testing effect, which could impact on internal validity; hence, the five respondents who took part in the pilot test were excluded from the final sample used of the 80 selected project managers.

3.10 Validity and reliability of the data collection instrument

Validity refers to the accuracy of an assessment tool or instrument; i.e., whether or not it measures what it is supposed to measure, and reliability refers to the extent to which assessments are consistent (McNiff 2014:37). To ensure validity, a pilot study was conducted

among five project managers and a final version of the research instrument developed, based on the results of the pilot study. This was necessary to ensure consistency, ease of understanding and question sequence appropriateness.

Reliability refers to the extent to which the data collection techniques or analysis procedures will yield consistent and accurate findings (Saunders, Lewis and Thornhill 2012:109). According to Fowler (2013:90) high reliability is obtained when the measure or instrument will give the same results if the research is repeated on a similar population. For this study, the reliability of the measuring instrument was measured by calculating the Cronbach Alpha value of the questionnaire. Cronbach's coefficient Alpha (refer to Annexure C), is a measure of internal consistence that shows how closely related a set of items are as a group.

According to Tavakol (2011:54), a reliability co-efficient lower than 0.50 is considered unacceptable; if it falls between 0.50 and 0.60, it is regarded as significant, and if it is above 0.70, it is acceptable. The aggregate co-efficient for this study was 0.597 - representing a significant level of internal reliability.

3.11 Analysis of data

According to Rubin and Bellamy (2012:68), data analysis is the art of examining raw data with the conclusions about that information. Returned questionnaires were collated and numerically referenced to facilitate the process of data capturing. Data collected through closed-ended questions were analysed by a qualified statistician, using SPSS software. Data collected through open-ended questions were analysed by using the thematic analysis method, which involves the identification of themes within data and reporting them as findings (Creswell, Hanson, Plano and Morales 2007:237). In this study, thematic analysis was deemed suitable to analyse the responses to the open-ended questions because the technique concisely organises data collected and then describes the data sets in detail.

The researcher applied both the descriptive and inferential statistical analysis in this study. Descriptive statistics was used in arranging and defining quantitative data collected through the structured questionnaire. According to Laerd Statistics (2013: 6), descriptive statistics are used to summarize groups of data using a combination of:

- graphical description (scatter diagrams, bar charts, line graphs and pie charts);
- tabulated description (percentage and frequency tables), and
- statistical explanation of the results.

The researcher also applied Spearman's rank correlation coefficient, also known as Spearman's rho, to analyse the correlations of some variables investigated. According to Black (2010), correlation is the association between two variables. If the correlation coefficient (rs-ve) is positive, it implies that the relationship is directly proportional between the variables; and a negative coefficient implies a converse relationship. If the rs-value is between 0.10 and 0.29, or between -0.10 and -0.29, the relationship between the variables is regarded as weak. If the rs-value is between 0.30 and 0.49, or between -0.30 and -0.49, it implies a moderate correlation, and a rs-value between 0.50 and 1.0, or between -0.50 and -1.0 implies a strong correlation (Gliem and Gliem 2003:116).

Chase, Kraft, Smith, Vellend and Inouye (2011:9) state that if a quantifiable variable is divided into three or more distinct groups using a descriptive variable, the researcher can assess whether these groups are significantly different using one-way analysis of variance (ANOVA). ANOVA analyses the variations within and between groups of data by comparing the means. These differences are represented by the *p*-value. If the means are significantly different between the groups, this difference will be represented by a large *p*-value, with a probability of less than 0.05. The *t*-test determines whether an observed difference in the means of two groups is sufficiently large to be attributed to a change in some variable, or if it merely could have taken place according to chance (Struwig, Struwig and Stead, 2001:161).

3. 12 Ethical considerations

The objective of ethics in a research is to ensure the protection of participants from possible harm emanating from research activities (Marshall and Rossman 2014:73). The participants were given an assurance by the researcher that high levels of confidentiality will be maintained, and they were not required to disclose their personal particulars. An introductory letter and a Letter of Information and Consent (Annexure C), was sent to PMSA stating that the study was for academic purposes only, and seeking consent to utilize the project management forum and database that they managed. PMSA published the researcher’s request to all the members in their database and assured the potential participants that their identities as well as those of their organizations will remain confidential.

3.13 Conclusion

This chapter, *inter alia*, discussed the research design, the target population and how the sample was drawn. It also explained the questionnaire structure and how it will be administered, as well as how the data will be analysed. In the next Chapter, the results emanating from the empirical study are presented, analysed and discussed.

CHAPTER 4

PRESENTATION, ANALYSIS, AND DISCUSSION OF RESULTS

4.1 Introduction

In this chapter the results of the study are presented, analyzed and discussed. The data collected through the questionnaire that was administered amongst project managers in the telecommunications industry in South Africa was analyzed using the *Statistical Package for the Social Sciences, (SPSS), Version 22 for Windows* programme. The level of significance, or "p value", was set at the 95% confidence interval.

The data obtained for this study was in both ordinal and nominal form; and descriptive and inferential tests were applied. The first section (Section A) dealt with demographic variables, like the personal data of the respondents, and the descriptive statistics was presented using bar charts, pie charts and frequency tables. Sections B, C, D and E dealt with the perceptions of Project Managers in the telecommunications industry in South Africa regarding the factors influencing the effectiveness of project managers.

4.2 Response Rate

The researcher distributed 80 questionnaires to the selected project managers, of which 42 were returned fully completed to the researcher, representing a response rate of approximately 53%. Research scholars argue that the acceptability of a response rate is dependent on the method used to send the data collecting instruments to the respondents. If the instruments were sent through mail, a response rate of 50% is considered adequate; 60% is considered good, and 70% is considered very good. If the data were collected telephonically, an 80% response rate is considered good. Where the questionnaire is sent via e-mail, 40% is considered average; 50% is considered good, and 60% and above is considered very good. For data collecting instruments sent online, 30% is considered average (Brandon, Long, Loraas, Mueller-Phillips, and Vansant 2013:17).

For this study the data collection instruments were sent online. Therefore, the response rate of 53% was considered adequate to draw meaningful inferences, since it was higher than 30%, which is considered average for data collection instruments sent online. Table 4.1 below shows other response rates which were accepted for similar studies.

Table 4.1 Response rates from similar studies

Author	Title of study	Response rate	Institute	Level and Year
K. J. Semple	Exploring the competence behaviours of the future Project Manager: Perspectives from a South African project management organization	20.6%	North West University, South Africa	Masters, 2011
B. Jónsdóttir	"You Cannot Take The Heart Out Of The Projects!" The use of project management and KPIs in social activity projects	25%	Reykjavík University, Iceland	Masters, 2015
R. Xiong	Leadership in Project Management	34.5%	Georgia Institute of Technology, Georgia	Masters, 2008

The findings of the study are presented, analysed and discussed below, in the sequence of the questions in the research instrument.

4.3 SECTION A

This section presents the demographic data of the respondents and it covers the gender, qualifications, job titles, reporting structure, and experience in project management office and in the telecommunications industry.

4.3.1 Position in the Company

Table 4.2 below shows that 62% of the respondents were Project Managers; 24% were Programme Managers; 10% were Portfolio Managers, and 4% were employed in other capacities in project management offices.

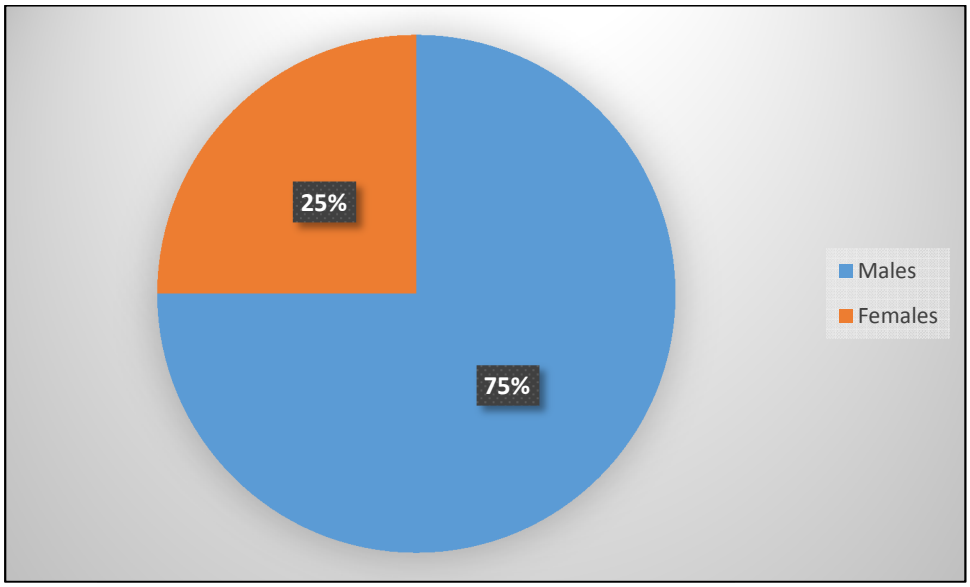
Table 4.2 Position in the Company

Job Title	Percentage
Project Manager	62 %
Programme Manager	24 %
Portfolio Manager	10 %
Other (Specify)	4%

4.3.2 Gender profile of respondents

The pie chart in Figure 4.1 shows that approximately 75% of project managers in the telecommunications industry in South Africa who were surveyed were male and 25% were female. In a similar study which was undertaken in Sample at North West University in South Africa, the proportion of male and female respondents was similar (79% and 21%, respectively), and in another study conducted among project managers in Nigeria, the gender profile of the respondents was similar -80% males and 20% females. The reasons for such gender imbalance could be attributed to the fact that the field of project management has typically been dominated by males.

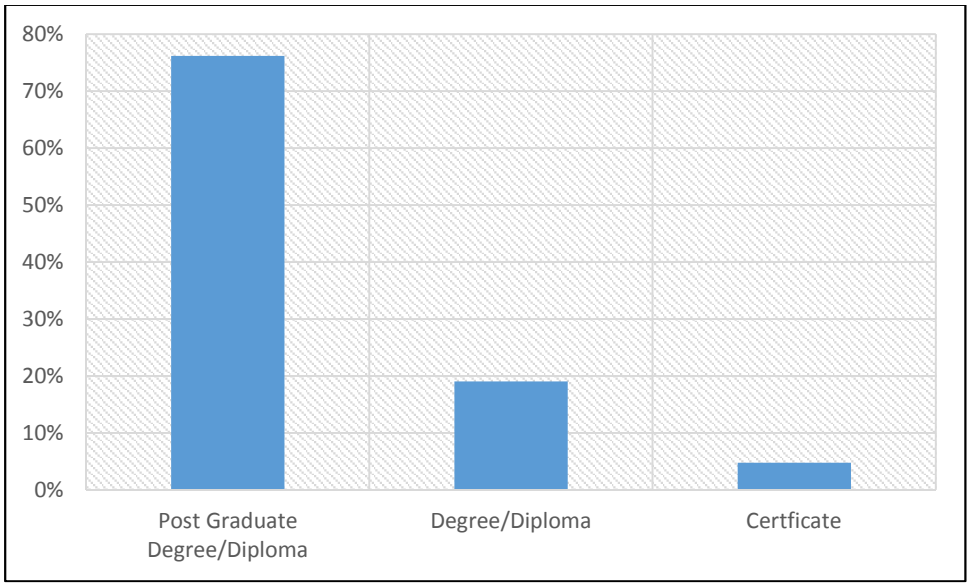
Figure 4.1 Gender profile of respondents



4.3.3 Highest Qualification of the respondents

The results shown in Figure 4.2 below reveal that 75% of the respondents had post graduate qualifications; 20% were degree or diploma holders, whereas 5% were certificate holders. From these results one can conclude that most project managers in the telecommunications industry in South Africa were adequately qualified to carry out their duties effectively.

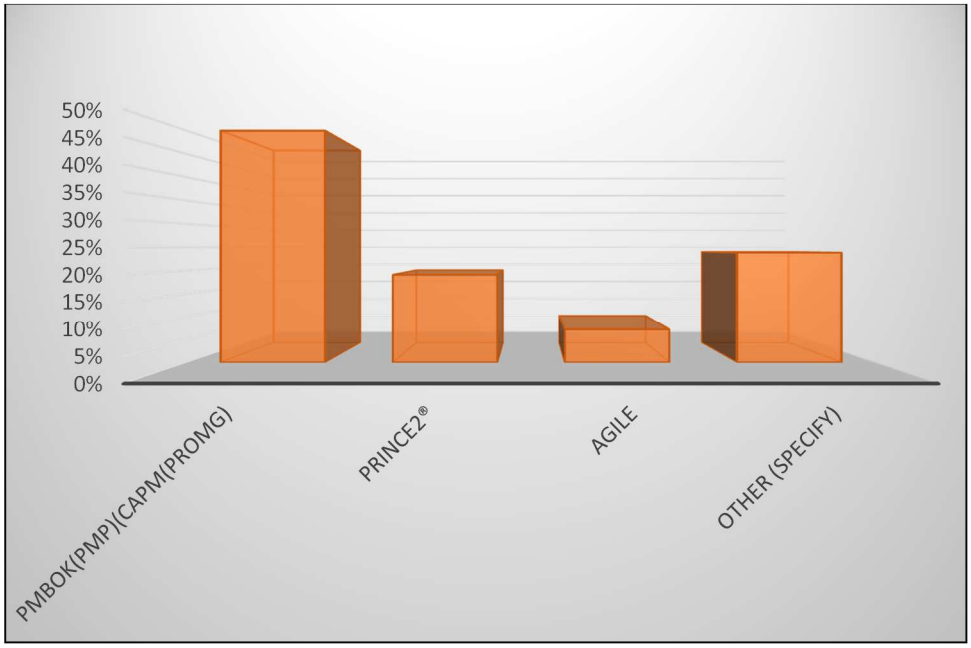
Figure 4.2 Highest academic qualification of respondents



4.3.4 Project management qualifications of the respondents

Figure 4.3 below shows that 50% of the respondents had PMBOK (PMP) (CAPM) (ProgMg) qualifications; 19% were PRINCE2® qualified; 6% had Agile qualifications, and 25% had other qualifications, which they did not mention.

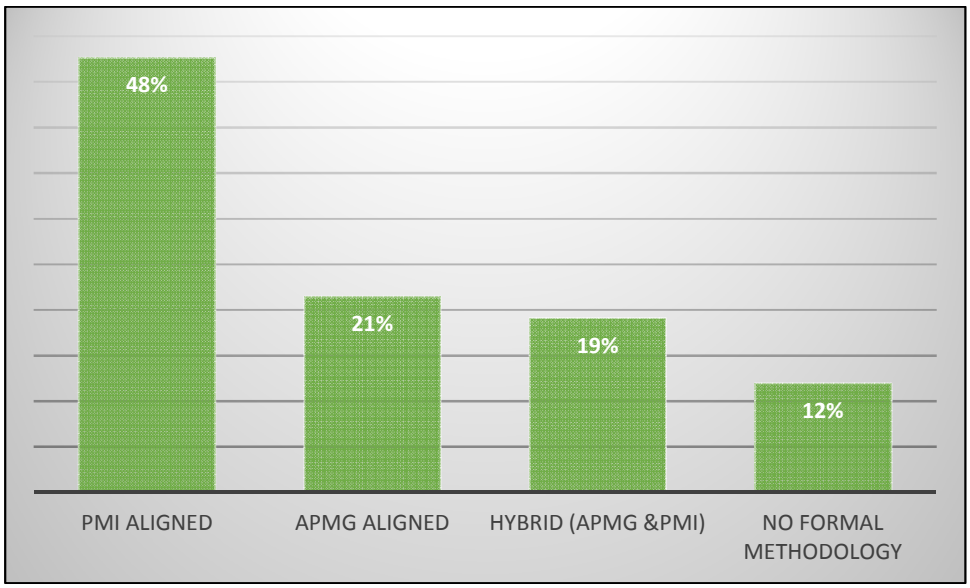
Figure 4.3 Project management qualifications of the respondents



4.3.5 Project management methodology applied

The results in Figure 4.4 show that the respondents applied different project management methodologies in their organizations. APMG Aligned methodology was applied by 21% of the respondents; 48% applied PMI Aligned methodology; 19% applied Hybrid (APMG & PMI) methodology, and 12% did not apply a formal methodology.

Figure 4.4 Project management methodology applied



From the responses reflected in Figures 4.3 and 4.4 above, it seems that organisations in the telecommunications industry in South Africa prefer PMI (PMP) (CAPM) (ProgMg) qualifications and PMI aligned methodology to other methodologies.

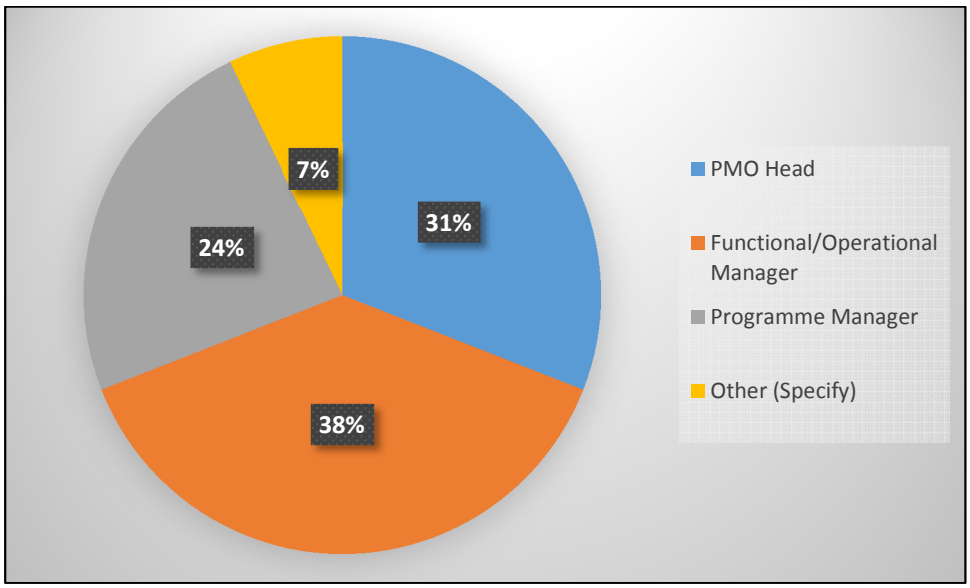
Spearman's rho (rs-value) correlation was performed to determine if there was a relationship between the qualifications of project managers and choice of project management methodology they applied in their organisations. The test result revealed that there was a strong correlation (0.837) between the qualifications of project managers and the choice of methodology they applied in executing projects. This supports the view held by Kerzner (2013:72) that most organisations seek project managers who have qualifications that support their choice of methodology used.

Analysis of Variance (NOVA) is conducted to conclude whether an observed difference in the means of more than two groups (in this case, PMI Aligned, APMG Aligned, Hybrid, No Formal Methodology) is sufficiently large enough to be attributable to a change in some variable, or it merely could have occurred by chance, and a *p*-value less than or equal to 0.05 indicates that, statistically, there is a significant difference in the responses between the groups, and a *p*-value greater than 0.05 indicates that, statistically, there is no difference in the responses of the different groups (Saunders, Lewis & Thornhill 2012:109). The analysis of variance test (ANOVA) conducted revealed that there were significant differences between the qualifications of project managers and the choice of project management methodology they applied in their organisations (p=0.032) (Table 18, Annexure D4).

4.3.6 Reporting Structure

Respondents were asked to indicate to whom they directly reported to, and the results are shown in Figure 4.5 below.

Figure 4.5 Reporting structure



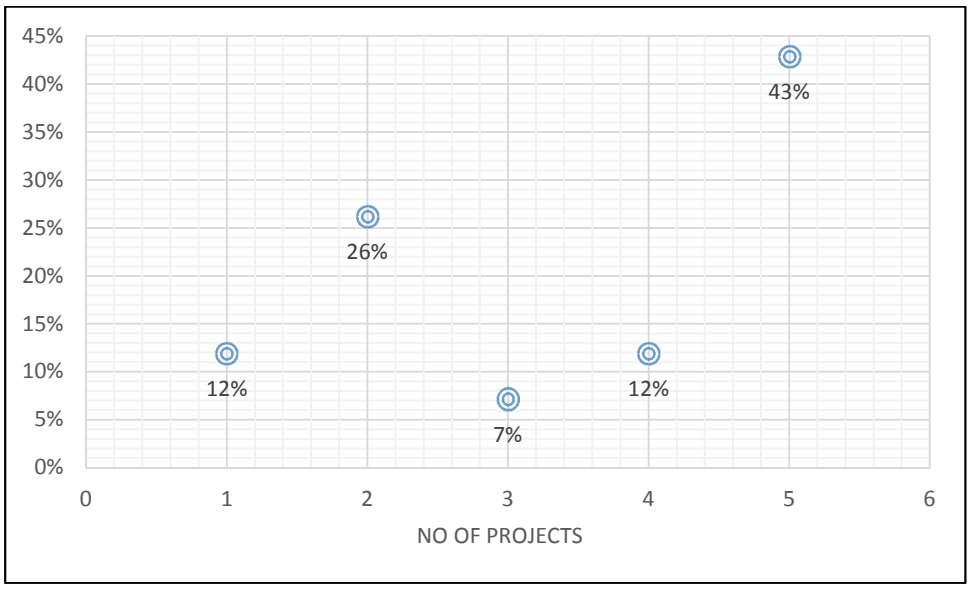
Thirty eight percent of the respondents indicated that they reported to the Functional/Operations Manager; 31% percent indicated that they reported to the PMO Head, whereas 24% of the respondents reported to the Programme Manager, and 7% of the respondents did not indicate who they reported to.

The general trend in project management is that companies with project management maturity have a proper Project management Office headed by a Project Delivery Manager/Head that will adequately support his/her efforts, leading to the successful implementation of projects. From the results reflected in Figure 4.5, it emerges that a significant proportion of project managers (38%) reported to the Functional or Operations Manager. This is an indication that most organisations from where respondents were drawn were not project management mature; hence, the low success rate in project management (approximately 39%).

4.3.7 Number of Projects managed concurrently

Respondents were asked to indicate the number of projects they handled concurrently in their organizations, and their responses are shown in Figure 4.6 below. Data presented in Figure 4.6 shows that 43% of the respondents handled up five projects at a time; 12% handled up to four projects at a time; another 12% of the respondents managed one project at a time, whereas 7% handled three projects at one time, and 26% handled up to two projects at a time.

Figure 4.6 Number of projects managed concurrently

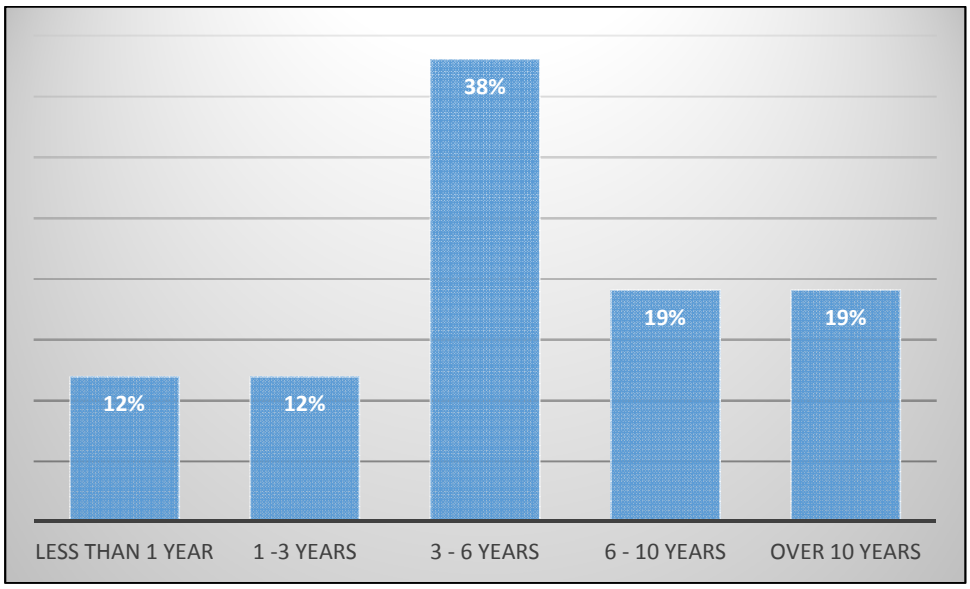


An analysis of these results indicate that a significant proportion (43%) of project managers in the South Africa telecommunications industry handle up to five projects at a time. Given the magnitude of projects in the telecommunications industry, it is contended that handling five projects simultaneously is excessive. This may be due to the fact that there are too few qualified project managers in the industry or that organisations within the telecommunications industry in South Africa do not realize the value project managers add to project management. This high workload could also account for the low success rate of projects.

4.3.8 Number of years employed in the project management office

Respondents were asked to reveal the number of years they had spent working in the project management office. The results, presented in Figure 4.7 below show that 38% of the respondents had been serving in the project management office for between 3 to 6 years; 12% had been working in the project management office for less than a year, whereas another 12% had been working in the project management office for between 1 to 3 years. Nineteen percent of the respondents had been working in the project management office for between 6 to 10 years, and the remaining 19% of the respondents had been working in the project management office for over 10 years.

Figure 4.7 Number of years in project management office

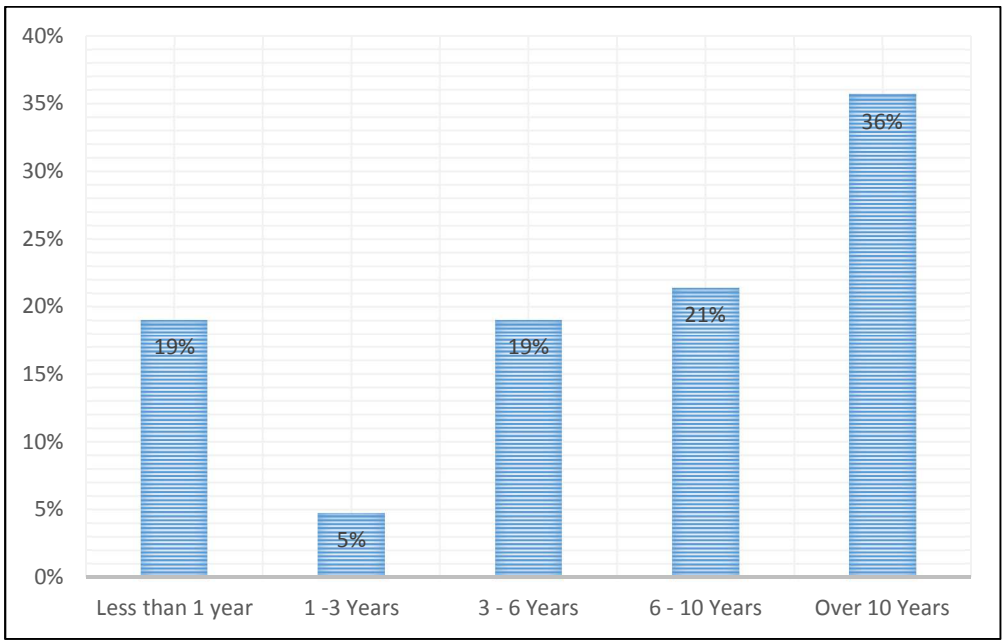


An analysis of these results reveals that a small percentage (19%) of the project managers in the South African telecommunications industry have been working as project managers for over 10 years. The remaining project managers are averaging between 3 and 6 years' experience working as project managers. This scenario may indicate that while the project management discipline has grown over the years in the South Africa telecommunications industry, the mobile network operators (MNOs) are fairly young; hence, the majority of project managers had been in the project management office for less than 6 years. Also, this might be indicative of the project management maturity level in the telecommunications industry in South Africa.

4.3.9 Number of years in the Telecommunications Industry

Figure 4.8 below shows that 36% of the respondents had been employed in the telecommunication industry for over 10 years, and 21% of the respondents indicated that they had been employed in the telecommunication industry for between 6 and 10 years. Those respondents who had served between 3 and 6 years accounted for 19%, the same percentage as those who had been employed in the telecommunication industry for less than one year, and 5% of the respondents had been working in telecommunication industry for 1 to 2 years.

Figure 4.8 Number of year in telecommunications industry



When the results in Figure 4.8 are compared with those in Figure 4.7, it appears that although there were more respondents who had been employed in the telecommunication industry for over 10 years, a larger percentage of the respondents have only been working in the project management office for between 3 and 6 years. It can, therefore, be concluded that although most of the respondents had experience in working in telecommunications industry for many years, they had not been working as project managers for a long time.

The Spearman's rho (rs-value) correlation test was performed to determine if there was a relationship between the number of years respondents had worked in the telecommunication industry and the number of years they had worked in the project management office, and the result revealed that there was a weak correlation, with a coefficient value of 0.207.

4.4 SECTION B

The questions in this section of the survey instrument were designed to establish if the project management skills that the respondents possessed were adequate to enable them to successfully deliver projects in the telecommunications industry in South Africa.

4.4.1 Requisite skills required

Respondents were asked for their opinion on whether or not project managers in the telecommunication industry in South Africa had the requisite skills to effectively carry out their duties, and their cumulative responses are shown in Figure 4.9 below.

Figure 4.9 Whether project managers in the telecommunications industry had the requisite skills to carry out their duties effectively

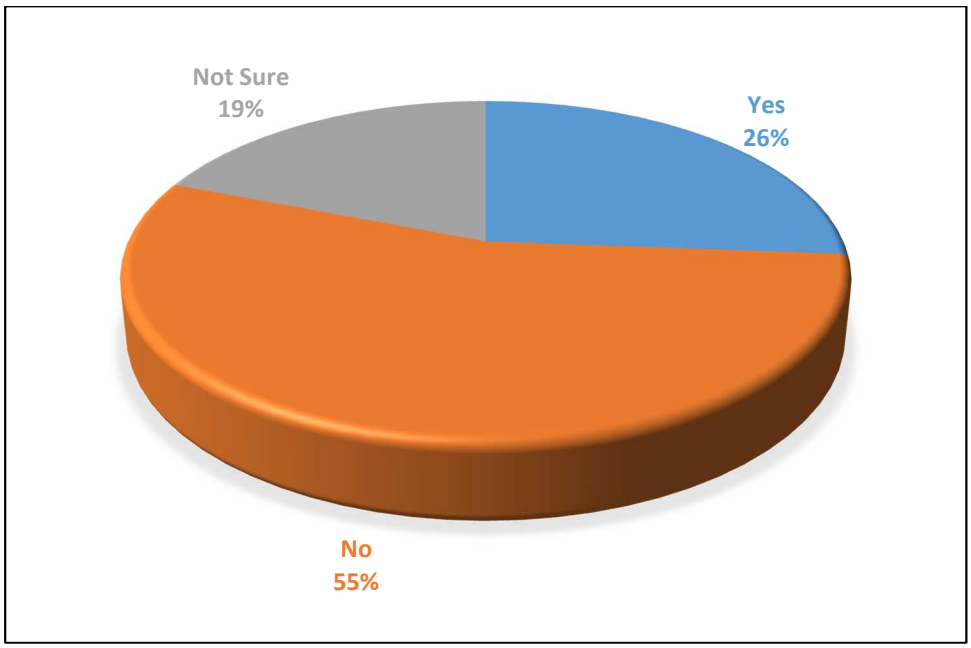


Figure 4.9 shows that the majority of the respondents (55%) felt that most project managers in the telecommunications in South Africa did not have adequate skills to effectively carry out their duties. Twenty six percent (26%) of the respondents thought that project managers in the telecommunications in South Africa had adequate skills and 19% were not sure. When further asked to motivate their responses, those who thought that project managers in the telecommunication industry in South Africa had inadequate skills cited, *inter alia*, a lack of project management qualifications among project managers, non-reliance on the organizational processes, and a lack of focus on project management principles, as reasons for their responses.

Those who thought that project managers had adequate skills contended that project managers were highly competent as they could execute projects effectively, despite the complexities of the technical environment in the telecommunication industry. In relation to the above analysis, the literature reviewed revealed that a project manager must exhibit technical, organisational and interpersonal skills. He/she should be a multitusker; an effective communicator; a good negotiator; a problem solver, and he/she must understand the politics and the political environment of the organisation in which he or she operates (Robbins, Judge, Millett and Boyle 2013:56). These authors' assertions are further echoed by Chatterjee (2014) and Haughey (2010:3) who suggest that for a project manager to be effective in carrying out his or her duties he or she must possess certain skills that are relevant to the discipline of project management.

4.4.2 Skills required by project managers

On a rating scale of 1-5, ranging from strongly disagree (1) to strongly agree (5), respondents were required to rate a series of five statements pertaining to the skills required by project managers, and their cumulative responses are reflected in Table 4.3 below.

Table 4.3 Skills required by project managers

Respondents perceptions regarding project managers' skills set	Weighting
A project managers' negotiating skills may enhance the success of a project	61%
A project manager requires technical knowledge to manage projects	55%
A project manager's style of management can either build or destroy the project team	45%
The communication skills of the project manager influences the success of a project	44%
A project manager requires people management skills to execute projects successfully	35%

Table 4.3 above reflects the weightings assigned by respondents to five skills which are deemed important for project managers in the telecommunications industry in South Africa. Negotiating skills, with a weighted score of 61%, was identified as the most important skill required by a project manager in order to successfully execute projects. Technical knowledge was identified as the second most important requirement for the successful execution of projects, as with a weighted score of 55%, whereas style of management, with a weighted score of (45%) was ranked third, and communication skills and people management skills were ranked fourth and fifth, respectively.

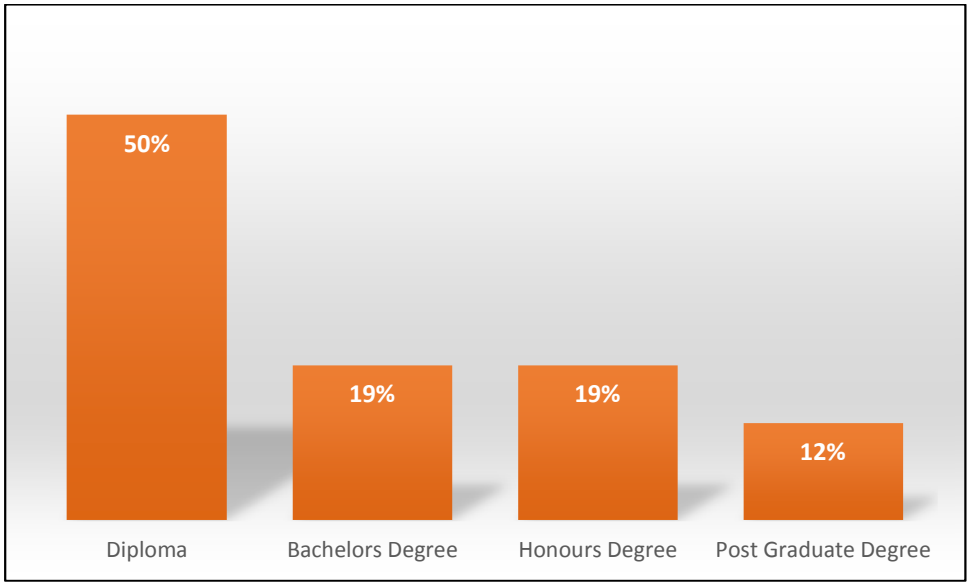
Although Stevenson and Starkweather (2010:64) argue that a project manager's ability to communicate with peers, and upstream or/and downstream with all stakeholders at different levels of management is fundamental in project management, only 44% of the respondents

perceived communication skills as being important to the success of a project.. Three of the other skills reflected in Table 4.3 above were perceived to be more important than communication skills, with two of these skills (negotiating skills and management style) being soft skills. The importance assigned by respondents to soft skills is supported by Simpson (2007), cited by Ahsan, Ho and Khan (2013:39), who contends that there should be a balance between the technical and leadership aspect of project management, with project managers having adequate technical knowledge in the field of the project and the environment where the project is being undertaken, and also adequate technical skills in Information and Communications Technology (ICT). Similar views were expressed by Robbins, Judge, Millett and Boyle (2013:58), who opined that a project manager must exhibit technical, organisational and interpersonal skills, and that he/she should be a multitasker, and an effective communicator.

4.4.3 Minimum academic qualifications for project managers in the telecommunications industry in South Africa

The respondents were asked for their opinion on what the minimum academic requirements for project managers in the telecommunications industry in South Africa should be, and their responses are presented in Figure 4.10 below. Fifty percent of the respondents felt that the minimum tertiary qualification for one to practice project management was a Diploma, while 19% of the respondents were of the view that a Bachelor's Degree was the minimum requirement. The same percentage (19%) felt that an Honours Degree should be the minimum requirement for one to practice project management, whereas 12% of the respondents were of the view that a post graduate degree should be the minimum requirement to practice as a project manager in the telecommunications industry in South Africa.

Figure 4.10 Perceptions of respondents regarding the minimum academic qualifications for project managers in the telecommunications industry in South Africa



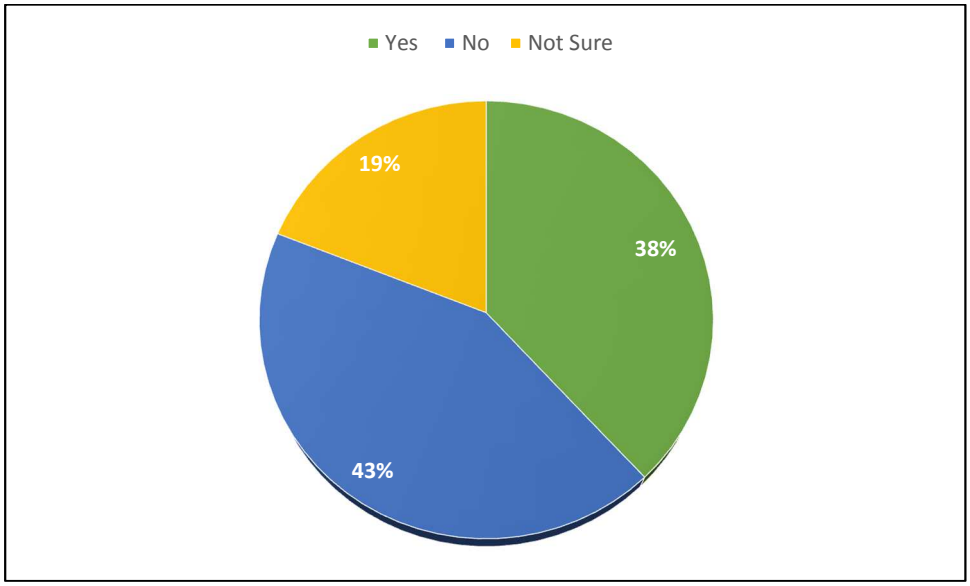
The analysis show that 50% of the respondents felt that the minimum requirement, in terms of qualifications, for one to practice as a project manager, was a diploma, contrasts with the assertion by Pollack (2007), cited by Dainty and Brookes (2014:46), that a project manager should at least have a Bachelor's degree, although there is no need for it to be in the business or management area.

A *t*- tests was conducted to determine if the gender of the respondents influenced their response to the question, "What do you think should be the minimum academic requirements for project managers in the telecommunications industry in South Africa?'' A *t*-test was conducted to conclude whether an observed difference in the means of two groups (in this case females and males) was sufficiently large to be attributable to a change in some variable, or if it merely could have occurred by chance. If the computed *p*- value is less than or equal to 0.05, then one can surmise that, statistically, there are significant differences in the responses of females and males, and vice-versa (Struwig, Struwig and Stead 2001:161). The results of the *t*-tests (Table 16, Annexure D3) performed on data emanating from the question, "What do you think should be the minimum academic requirements for project managers in the Telecommunications industry in South Africa?" revealed that, statistically, there were no noteworthy differences in the ratings assigned by females and males in respect of minimum academic requirements for project managers in the telecommunications industry in South Africa ($p = 0.214$).

4.4.4. Necessity for an IT qualification for project managers employed in the telecommunications industry in South Africa

Respondents were asked if they thought that an IT qualification was necessary for project managers in the Telecommunications industry in South Africa, and their cumulative responses are shown in Figure 4.11. Approximately 38% of the respondents thought that an IT qualification was necessary for project managers working in the telecommunication industry in South Africa, while 44% of the respondents stated that an IT qualification was not necessary, and 19% of the respondents were not sure in this regard.

Figure 4.11 Necessity for an IT qualifications for project managers in the telecommunications industry in South Africa



There were mixed views as to whether or not it was necessary for a project manager to have an IT qualification to practise as a project manager in the telecommunications industry. This is depicted by the number of respondents who were "Not Sure" (19%), and the small margin (5%) between those who stated that it was necessary to possess an IT qualification (38%), and those who stated that an IT qualification was not necessary at all (43%).

The respondents were further asked to motivate their responses. Those who were in favour of an IT qualification being a necessity for project management in the telecommunications industry argued that many projects in Telecommunications revolved around Information and Communications Technology (ICT), and the Project Manager manages a highly technical staff; hence, the necessity of an IT qualification. Those who thought that an IT qualification did not matter, believed that non-IT qualified individuals were doing well in managing projects in the telecommunications industry, and that it was more important to possess a project management

qualification. They further argued that the focus of project managers is on the project management processes, and not on the technical aspects.

A *t*-tests was conducted to determine if the gender composition of the respondents influenced their responses to the question, "Do You think an IT qualification is necessary for project managers in the Telecommunications industry in South Africa." The result revealed that statistically, there were no significant differences in the ratings assigned by females and males in respect of the necessity for an IT qualification for project managers in the telecommunications industry in South Africa ($p = 0.087$).

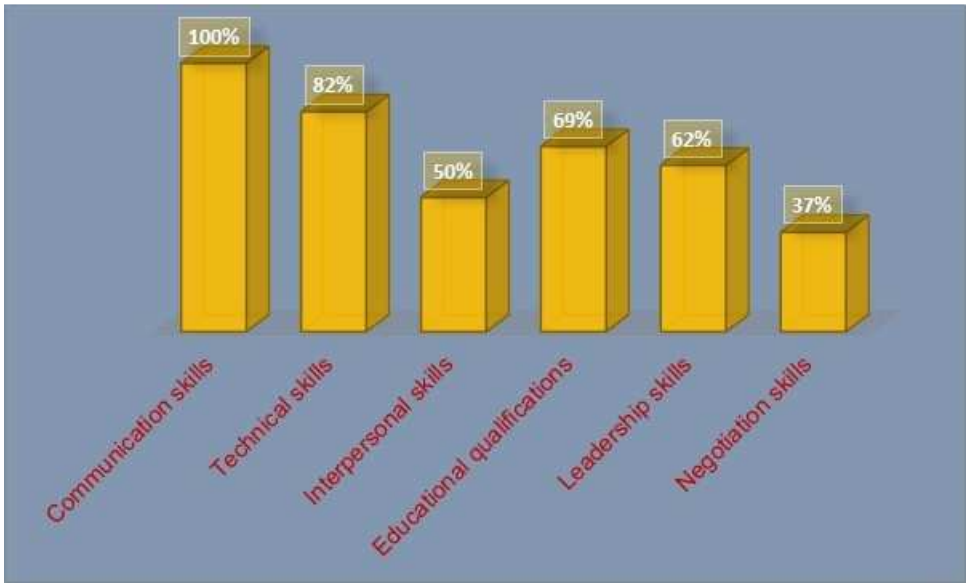
4.5 SECTION C

This section sought to establish the most frequently used criteria by the respondents' organizations to evaluate the effectiveness of project managers.

4.5.1 Criteria for evaluating the effectiveness of a project manager in the telecommunications industry in South Africa

Respondents were asked to reveal the criteria used in their organizations to evaluate a project manager's effectiveness, and their responses are shown in Figure 4.12 below. All the respondents' organizations used communication skills as the basis for evaluating the effectiveness of project managers. In addition, 82% of the respondents used technical skills; 50% used interpersonal skills; 69% used educational qualifications; 62% used leadership style, and 37% used negotiation skills as criteria for evaluating the effectiveness of a project manager.

Figure 4.12 Criteria for evaluating the effectiveness of a Project Manager in the telecommunications industry in South Africa



The findings confirm what the literature reviewed in Chapter Two revealed regarding the attributes of a project manager that may lead to successful project management. Robbins, Judge, Millett and Boyle (2013:56) claimed that a project manager must exhibit technical skills, communication skills, organisational skills, negotiation skills as well as interpersonal skills. Müller, Eweje and Turner (2012:56) identified leadership style as one of the important attributes of a successful project manager, with Gujral (2012:17) noting that the leadership style of a manager influences project success through teamwork. Educational qualifications were also identified as an important element in the success of a project manager, with Pollack (2007) in Sage, Dainty and Brookes (2014:46) noting that although both technical and leadership skills are important, a project manager requires a good academic background to be an effective project manager. Considering the above, it can be concluded that organisations in the telecommunications industry in South Africa use the recommended criteria in evaluating the effectiveness of a project manager.

4.5.2 The importance attached by respondents' organization to each of the criteria for evaluating the effectiveness of a project manager

The respondents were asked to rank, on scale 1 to 6, (with 1 being the most important, and 6 being the least important), the importance attached by their organization to each of the criteria outlined below, in evaluating the effectiveness of a project manager, and the results are reflected in Table 4.4 below. The results reveal that communication skills, with a weighted

score of 65%, was the most preferred criteria in evaluating the effectiveness of a project manager. The second most preferred criteria was technical skills, with a weighted score of 64%, whereas leadership style, with a weighted score of 60%, was ranked third. Educational skills and interpersonal skills were ranked fourth and fifth, respectively, while negotiating skills was ranked last.

Table 4.4 The importance attached by respondents' organization to each criteria used for evaluating the effectiveness of a project manager

Criterion	Weighted Score
Communication skills	65 %
Technical skills	64 %
Leadership style	60 %
Educational skills	53 %
Interpersonal skills	50 %
Negotiating skills	44 %

Respondents were further asked if they thought that there were other criteria that should be used to evaluate the effectiveness of project managers in the telecommunications industry in South Africa, and the following criteria were suggested: financial management skills; delivering projects within budget; project success rate; application of the 10 Knowledge Areas of the PMBoK; project manager's technical background; scope, time, cost and quality, and insight into how projects work practically.

The findings above indicate that organizations in the telecommunication industry in South Africa place much importance on communication skills, technical skills, leadership style, educational skills and interpersonal skills. This endorses the literature reviewed in Chapter Two pertaining to half hard and half soft skills required by a project manager. There should be a balance between the technical and leadership aspect of project management. Project managers should also possess adequate technical skills, interpersonal, and ICT skills (Simpson 2007), cited in Ahsan, Ho and Khan (2013:39). Ray (2014:53) assert that managers who have technical skills in the area of the project they are managing, such as product knowledge, services,

infrastructure and market trends, perform better than those without these skills, because they cannot be easily misled by other functional subject matter experts who might have a hidden agenda, or make decisions with limited information. Kerzner (2013:72) argues that interpersonal skills play an important part in the effectiveness of a project manager, in that the project manager should be able to cope with problems that may arise among workers.

The Pearson correlation test results (Annexure E2), revealed that there was a statistically strong positive correlation between the preferred criteria to evaluate the effectiveness of project managers in the telecommunications industry in South Africa and the skills required by project managers in order to execute their duties effectively (p = 0.82.).

4.6 SECTION D

This section discusses the findings from the empirical study pertaining to the perceived impact of training in project management on the effectiveness of project managers.

4.6.1 Opinions of project managers on the impact of project management training on the effectiveness of a project manager

Respondents were asked for their opinions on the impact of project management training on the effectiveness of a project manager. All the respondents agreed that training in project management positively contributed to the effectiveness of a project manager. When respondents were asked to reveal how the training they underwent contributed to their performance, some revealed that it enhanced their understanding of project management, and it also helped them understand what really mattered in managing projects successfully. The opinions of the respondents is supported by the literature reviewed in Chapter Two. According to Huang and Zhang (2013:207), training has a positive impact on the performance of project managers, as adequately trained project managers are likely to perform better than those who have little or no training in the field of project management. Taylor and Woelfer (2012:68) contend that when it comes to the execution of their duties, adequately trained project managers will always have an advantage over those without training. Training can provide many benefits to an organization, like providing a tighter control over resources and an improved level of project risk management. It can also raise the skills of the individuals, providing them with greater work satisfaction and long-term career prospects.

4.7 SECTION E

The questions in this section of the survey instrument sought to solicit information from the respondents regarding the challenges encountered by project managers in the telecommunications industry in South Africa.

4.7.1 Challenges encountered by project managers in the Telecommunication Industry in South Africa

As seen from Table 4.5, project managers were affected by all the challenges listed. Sixty nine percent of the respondents experienced challenges with delivering an end-product that meets the customers' quality expectations. The second most common challenge experienced by project managers was in delivering projects within budget (Cost Management), and delays in approval of projects, resulting in project overruns (Scheduling). Ineffective risk planning, implementation and mitigation strategy (Risk Management) was rated by the respondents as the fourth most common challenge on the list, with a weighting of 56%, while inadequate support from senior management (Management Support), and inadequate resource allocation and accessibility (Resource Management), were both rated as the fifth most common challenge, with a weighting of 50%. Team diversity problems (Virtual Teams) and unclear definition and communication of escalation processes (Communication Matrix) were both rated as challenges, with a similar weighting of 44%, whereas unclear definition of and communication of escalation processes (Communication Matrix) was identified as the least important challenge, with a weighting of 38%.

Table 4.5 Challenges encountered by project managers

Challenges	%	Weighted Percentage of respondents
Problems with delivering an end-product that meets the customers' quality expectations (Quality Management).	69%	
Delivering projects within budget (Cost Management).	63%	
Inadequate support from Senior Management (Management Support).	50%	
Delays in approval of projects, resulting in project overruns (Scheduling).	63%	
Team diversity problems (Virtual Teams)	44%	
Unclear definition of and communication of escalation processes (Communication Matrix).	38%	
Ambiguous and unmanageable scope definition process (Scope Management).	44%	
Inadequate resource allocation and accessibility (Resource Management).	50%	
Ineffective risk planning, implementation and mitigation strategy (Risk Management).	56%	
		20% 40% 60% 80%

The findings above are aligned with the view held by Rakos, Dhanraj, Kennedy, Fleck, Jackson and Harris (2015:44) that an effective project manager must deliver a project to the client within the triple-constraints of quality, costs and time. Completing a project within budgeted costs is one of the major challenges that are confronted by project managers throughout a project's life cycle. Hwang and Ng (2013:30) identified both scheduling and resource allocation as challenges that confront the project manager. As also observed by Kerzner (2013:72), one of the challenges faced by project managers is to deliver an end-product that is of the quality that is acceptable to the client. At times, the project manager and field engineers may not be professionally qualified and unfamiliar with the local standards and environment where the project is being undertaken, and this presents challenge in achieving the desired quality.

4.7.2 Rating of the challenges which adversely impact on the performance of project managers in the telecommunications industry in South Africa

Table 4.6 below shows that “Scope Management”, with a weighted score of 88%, was ranked as the greatest challenge confronting project managers in the telecommunications industry in South Africa. Ranked second on the list was “Quality Management”, while “Cost Management”, with a weighting of 73%, was ranked third, and was closely followed by “Risk Management” (72%). “Scheduling (66%), was ranked fifth, and “Management Support” with a weighting of 59%, and “Escalations” (57%), were ranked sixth and seventh, respectively. Team Diversity (50%) was ranked as the least important challenge impacting on the performance of project managers in the telecommunications industry in South Africa.

Table 4.6 Challenges impacting on the performance of project managers

Challenges	Weighted % (Score)
Scope Management	88 %
Quality Management	75 %
Cost Management	73 %
Risk Management	72 %
Scheduling	66 %
Management Support	59 %
Escalations	57 %

4.8 Conclusion

Data collected through the questionnaire was presented, analysed and discussed in this chapter. The cumulative responses from the respondents were presented by the use of tables, pie charts and bar graphs for clarity and ease of analysis. The analysis revealed that most project managers in the telecommunications industry in South Africa perceived negotiating skills, technical knowledge, and management style as being most important for effectively confronting the many challenges faced by them, for example, scope management, quality management, and risk management, so that projects are successfully executed.

The final chapter summarises the main findings of the study; draws conclusions; proposes recommendations for improving the effectiveness of project managers in the telecommunications industry in South Africa, and concludes with recommending some areas for future research.

CHAPTER 5

REVIEW, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this final chapter, the major findings of the study are summarized; and based on the findings, some conclusions are arrived at, and recommendations for improving the effectiveness of project managers in the telecommunications industry in South Africa are presented. The chapter concludes by outlining the limitations of the study, and by suggesting areas of future research.

5.2 Summary of the major findings of the study

A summary of the major findings of the study emanating from the literature reviewed (in Chapter 2) and the empirical study are outlined below.

From the literature reviewed for this study, the following significant issues regarding the factors that influenced the effectiveness of project managers in the telecommunications industry (in South Africa) emerged:

- the role of a project manager is to ensure that:
  - the project is established and planned effectively;
  - an appropriate project team is selected and established;
  - tasks are planned and scheduled;
  - the project plan is implemented, and problems are resolved, and that,
  - on completion, the results are reviewed and the project team is disbanded.

- an effective project manager possesses analytical skills, business skills, conflict management skills, negotiation skills, decision-making skills, people management skills, leadership skills, as well as technical, organisational and interpersonal skills;

- the skills required by a project manager are half hard and half soft skills. There should be a balance between the technical and leadership aspect of project management and adequate knowledge in the field of the project and the environment where the project is being undertaken;

- project managers must have adequate technical skills in Information and Communications Technology (ICT);

- training has a positive impact on the performance of project managers, with adequately trained project managers likely to perform better than those who have little or no training in the field of project management;

- the effectiveness of a project manager is measured by the following traits:

    - ability to manage diverse teams;
    - ability to communicate at multiple levels;
    - ability to involve end users;
    - ability to motivate team members and understand the business problem/challenge;
    - analytical skills;
    - business skills;
    - commitment skills;
    - conflict management skills;
    - cost management skills;
    - decision-making skills;
    - good people management skills, and
    - leadership and organisational skills

- project managers are confronted with the following challenges:

    - delivering projects of accepted quality
    - delivering projects within budgeted costs
    - delivering projects within schedule

From the empirical research undertaken for this study and from the analysis of results, the following findings regarding the factors that influenced the effectiveness of project managers in the telecommunications industry in South Africa emerged:

- Project managers in the telecommunications were confronted by the following challenges:
  - quality management,
  - cost management
  - inadequate support from senior management
  - delays in approval of projects, resulting in project overruns
  - team diversity problems
  - unclear definition of and communication of escalation processes
  - ambiguous and unmanageable scope definition process.

- the majority of project managers within the telecommunications industry in South Africa had either a degree or a post graduate degree,, although 50% of the respondents had a perception that the minimum requirement for one to practise as a project manager should be a diploma;

- in addition to their academic qualifications, approximately 50% of the respondents had Certified Associate of Project Management (CAPM), Project Management Professional (PMP), and/or Programme Professional Manager (PrgPM) qualifications;

- approximately 43% of the respondents in the telecommunications industry in South Africa thought that an IT qualification was not necessary for project managers working in the telecommunication industry in South Africa;

- all the respondents agreed that training in project management had a positive impact on the performance of a project manager;

- approximately half of the organisations in the telecommunication industry in South Africa apply/prefer the Project Management Institute (PMI) aligned methodology for executing projects;

- approximately 40% of project managers in the telecommunication industry in South Africa had been working in the telecommunications sector for over ten years but had only been in the project management office for less than six years;

- approximately 43% of the project managers in the telecommunications industry handled up to 5 projects at a time, and 38% reported to a Functional/Operational Manager;

- the majority of the respondents (55%) believed that most project managers in the telecommunications industry in South Africa did not have adequate skills to effectively carry out their duties;

- all respondents stated that their organizations used the following criteria in evaluating project managers: communication skills; technical skills; interpersonal skills; educational qualifications; leadership style, and negotiation skills;

- respondents stated that their organisations preferred the following criteria, in their order of importance, for evaluating the effectiveness of a project manager:
    - Communication skills (100%)
    - Technical skills (82%)
    - Educational skills (69%)
    - Leadership style (62%)
    - Interpersonal skills (50%)
    - Negotiating skills (37%)

- respondents thought that the following criteria should be used to evaluate the effectiveness of project managers in the telecommunications industry in South Africa:

    - financial management skills;
    - delivering projects within budget;
    - project success rate;
    - application of the ten Knowledge areas of the PMBoK;
    - the project manager's technical background;
    - scope, time, cost and quality, and
    - insight into how projects work practically, not theoretically.

- in executing projects all the respondents had encountered challenges related to one or more of the following: quality management, scope management, scheduling, risk

management, communication matrix management, team diversity management, resource management, cost management and getting enough support from top management, and

- in terms of impact, respondents ranked the challenges they confronted as follows:

1. Quality management
2. Cost management
3. Scheduling
4. Risk management
5. Resource management
6. Management support
7. Scope management
8. Team diversity
9. Escalations

5.3 Conclusion

Delivering projects is the prime responsibility of a project manager whose task is to balance all the elements of a project, namely, time, cost, scope, risks and stakeholders. This calls for certain characteristics, skills and attributes on the part of a project manager; *inter alia,* communication skills; technical skills; good leadership style; educational qualifications; negotiating skills and interpersonal skills. It is, therefore, paramount that organisations must ensure that project managers possess the relevant characteristics, attributes and skills to ensure the success of the projects. If this is ignored then the success rates for projects will remain low.

5.4 Recommendations

This section provides recommendations regarding the improvement of the effectiveness of a project manager in telecommunications industry in South Africa and they are outlined below:

- **Handling of multiple projects**

To effectively deliver projects in the telecommunications industry, multiple projects or initiatives that have a common goal and utilize same resources should be grouped together and managed as a programme or a portfolio by one manager. This recommendation emanates from the perceptions of respondents that managing multiple projects concurrently can compromise the quality of the delivery as the resources might be stretched to accommodate all the projects underway.

- **Adequacy of skills**

The effectiveness of a project manager is highly dependent on the various skills that can be acquired through project management training. Given the large number of respondents that have a perception that training in project management can enhance one's ability to deliver projects effectively, it is recommended that the project managers acquire the necessary skills to successfully deliver projects. For example, courses offered by international project management institutes like PMI and APMG are very informative and effective.

- **Methodology applied**

Standard project management methodologies applied by different organizations in the telecommunications industry may not be suitable for their respective environments, as such, each organization must select a project management methodology that will resonate and compliment their environment. While Prince2$^{@}$ is broadly used in the United Kingdom because it originated there; globally, the PMBoK based methodology is considered the most suitable in the telecommunications sector as it covers all the project management knowledge areas distinctively. South African organizations in the telecommunications industry seem to have adopted both methodologies extensively; however, it is highly recommended that a bespoke methodology be developed internally, using the universally accepted standard tools, so that the resultant methodology can suit the organization's peculiar needs.

- **IT qualification**

Although the literature reviewed discounts the necessity for project managers in the telecommunications industry to possess an IT qualification, a perception that is also shared by the respondents in this study, the research recommends that since the telecommunications industry is a technology based sector and is IT intensive, project managers in the telecommunications industry should possess a basic IT qualification. Furthermore, as a result of technological advancement and globalization, project managers are now required to execute projects outside their offices; hence, an IT qualification will be advantageous.

5.5 Limitations of the Study

The following limitations of the study are acknowledged:

- Not many research studies have been carried out in South Africa in the field of project management in the telecommunications industry. As a consequence, this created a gap in the academic literature that could be consulted in carrying out this study; hence, the over-reliance on industry publications.

- The respondents from this study were drawn from those project managers who were registered with PMSA, as such, project managers who were not registered with PMSA, but practicing in the telecommunications industry in South Africa, were excluded. Had they been included, the findings arising out of the empirical study could have been different.

5.6 Recommendations for future research

Below are a few suggested areas of future research which are linked to this study.

- The influence of academic and industry-specific (project management) qualifications on the success of project managers in the telecommunications industry.

- A comparative study of the success rates of project managers who handle multiple projects with those who handle a single project at a time.

- A comparative study of the factors influencing the effectiveness of project managers in the telecommunications industry versus other sectors, such as the information technology sector, and/or the mining, or construction sector.

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ANNEXURES

Annexure A: Research Questionnaire

Questionnaire (Completed sample)

Title: Factors influencing the effectiveness of project managers in the telecommunications industry in South Africa

Section A: Personal Data and Organisational Profile

Please place a tick (√) or cross (×) in the appropriate box

1. What is your position in the company?

Project Manager		Programme Manager		Portfolio Manager		Other PMO personnel	

2. Gender

Male		Female	

3. Number of years employed in the current organisation?

Less than 1		1-3 Years		3-6 Years		6-10 Years		Over 10 Years	

4. Number of years employed in the Project Management Office in current organisation?

Less than 1		1 -3 Years		3-6 Years		6-10 Years		Over 10 Years	

5. Number of years employed as a Project Manager within the telecommunications industry?

Less than 1		1 -3 Years		3-6 Years		6-10 Years		Over 10 Years	

6. What is your highest academic qualification?

Post Graduate Degree/Diploma		Degree/Diploma		Certificate		Grade 12/Std 10	

7. Which of the following project management qualifications do you possess?

Prince 2		PMBoK		Agile		Other *(specify)*……	

8. Who do you report to?

PMO Head		Functional/Operational Manager		Programme Manager	Other (Specify)……..		

9. Indicate, on average, how many projects you manage at the same time.

1	2	3	4	More than 5

10. Indicate the project management methodology applicable to your organisation.

APMG Aligned		PMI Aligned		Hybrid (APMG & PMI)		No formal Methodology	

SECTION B

11. Do you think that project managers in the telecommunications industry in South Africa have the requisite skills to carry out their duties effectively?

Yes	No	Not sure

12. Please give reasons for your response to Question 11 above.

1**3. Please indicate the extent to which you agree or disagree with each of the following statements (1: strongly disagree; 2: disagree; 3: neutral; 4: agree, and 5: strongly agree).**

13.1	The communication skills of the Project Manager influences the success of a project.	**1**	**2**	**3**	**4**	**5**
13.2	Project Managers' style of management can either build or destroy the Project Team	**1**	**2**	**3**	**4**	**5**
13.3.	Project Managers require people management skills to execute projects successfully.	**1**	**2**	**3**	**4**	**5**
13.4	Project Managers require technical knowledge to manage projects	**1**	**2**	**3**	**4**	**5**

14. What do you think should be the minimum academic requirements for project managers in the Telecommunications industry in South Africa?

Diploma	Bachelor's Degree	Honours Degree	Post graduate Degree

15. Do you think that an IT qualification is necessary for project managers working in the telecommunications industry in South Africa?

Yes	**No**	**Not sure**

16. Please motivate your response to Question 15 above.

SECTION C

17. Does your organisation use any of the criteria listed below in evaluating the effectiveness of a project manager.

	Criteria	**Yes**	**No**	**Not sure**
17.1	Communication skills			
17.2	Technical skills			
17.3	Interpersonal skills			
17.4	Educational qualifications			
17.5	Management skills (people, financial, risk, organisation)			
17.6	Leadership style			
17.7	Negotiation skills			
17.8	Project and process management competencies			

18. Rank, on a scale of 1 to 8, the importance attached **by your current employer** to each of the following criteria, in evaluating the effectiveness of a project manager, (with 1 representing most

Important, and 8 representing least important).

	Criteria	
18.1	Communication skills	
18.2	Technical skills	
18.3	Interpersonal skills	
18.4	Educational qualifications	
18.5	Management skills(people, financial, risk, organisation)	
18.6	Leadership style	
18.7	Negotiation skills	
18.8	Project and process management competencies	

19. Are there other criteria used by your current employer to evaluate the effectiveness of a project manager?

Yes	**No**	**Not sure**

20. If you answered “Yes” Question 19 above, please identify the other criteria used by your current employer to evaluate the effectiveness of a project manager.

21. Based on your experience as a project manager, in your opinion, how relevant are the criteria below for evaluating the effectiveness of a project manager? (1. not relevant; 2. relevant; 3. unsure)

	Criteria	**1**	**2**	**3**
21.1	Communication skills			
21.2	Technical skills			
21.3	Interpersonal skills			
21.4	Educational qualifications			
21.5	Management skills (people, financial, risk, organisation)			
21.6	Leadership style			
21.7	Negotiation skills			
21.8	Project and process management competencies			

22. In your opinion, are there other criteria that should be used to evaluate the effectiveness of a project manager?

Yes	**No**	**Not sure**

23. Please motivate your response to Question 22 above.

The other criteria is specified in Question 20.

24. Apart from your formal qualifications, have you undergone any project management training, and if so, please indicate whether the training was internal (in-house), or external (outside your Organization.

	Internal	External
Yes		
No		

25. If you answered “Yes” to question 24 above, has the training contributed to your effectiveness as a project manager?

Yes	No	Not sure

26. If you answered “Yes” to question 25 above, please state how the training contributed to your effectiveness as project manager?

SECTION D

27. Do you encounter any of these challenges in your organisation?

	Challenges	Yes	No	Not sure
27.1	Problems with delivering an end-product that meets the customers’ quality expectations (Quality Management)			
27.2	Delivering projects within budget (Cost Management)			
27.3	Inadequate support from senior management (Management support)			
27.4	Delays in approval of projects, resulting in project overruns (Scheduling)			
27.5	Team diversity problems (Team diversity)			
27.6	Unclear definition and communication of escalation process. (Escalations)			
27.7	Ambiguous and unmanageable scope definition process. (Scope Management)			
27.8	Inadequate resource allocation and accessibility (Resource Management)			
27.9	Ineffective Risk planning, implementation and mitigation strategy (Risk Management)			

28. On scale of 1 to 8, with 1 being the most challenging and 8 being the least challenging, please rank the challenges below, which adversely impact on your performance.

	Challenges	
28.1	Quality Management	
28.2	Cost management	
28.3	Management support	
28.4	Scheduling	
28.5	Team diversity	
28.6	Escalations	
28.7	Scope management	
28.8	Risk management	

29. Apart from the challenges identified in Question 28 above, are there other challenges that you encounter within your organisation?

Yes	**No**	**Not sure**

30. If you answered “Yes” to question 29 above, please list the challenges.

Thank you for taking the time to complete this questionnaire and for your contribution to this study. It is sincerely appreciated.

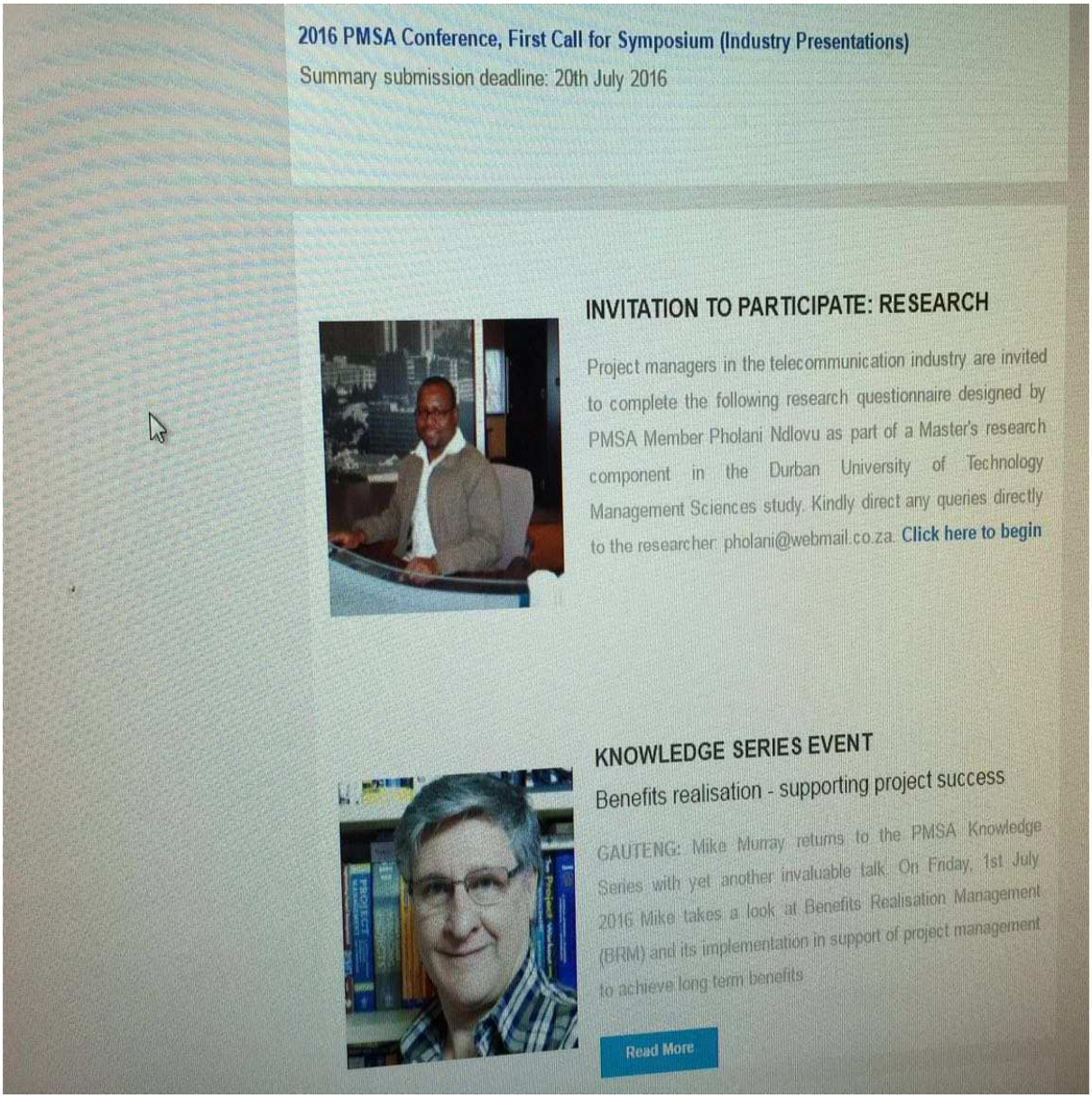
Should you wish to receive a copy of the research findings, please provide your details below?

Name *(Optional)*

E-mail address:

Annexure B: Weblink and PMSA Introduction page

The following link was given to the PMSA to customize and send it to the prospective respondents using their website, a snapshot of the PMSA web page is displayed below the link ,http://survey.sogosurvey.com/survey.aspx?k=SsVXQWQsQsPsPsP&lang=0&data=.



Annexure C: Letter of Information

PG 4a

LETTER OF INFORMATION

Title of the Research Study:
Factors influencing the effectiveness of Project Managers in the telecommunications industry in South Africa

Principal Investigator/s/researcher: Pholani Ndlovu

Brief Introduction and Purpose of the Study:
The aim of this research is to investigate the factors influencing the effectiveness of Project Managers in the telecommunications industry in South Africa.

Outline of the Procedures: Data will be collected by means of the attached structured questionnaire. As a participant in this study, you will be asked to answer a number of questions regarding the subject matter. Filling in the questionnaire should take at least 20 -30 minutes. Please kindly complete the questionnaire within 30 days from date of receipt. Please follow the instructions outlined on the first page of the questionnaire. Upon completing the questionnaire, kindly e-mail me the completed questionnaire.

Risks or Discomforts to the Participant: You are unlikely to experience any physical, psychological, or social risks. However, should you feel uncomfortable or experience any problems due to your participation in this research, you may withdraw at any time, without prejudice.

Benefits: There may be no direct benefit to you through your participation in this project. However, the outcome of this study might be of benefit to future students, yourself, your company, and both the business and academic communities. Please note that that there will be no benefits for the researcher beyond the gratification of completing the research for academic purposes.

Reason/s why the Participant May Be Withdrawn from the Study: You have the right not to participate in this study. In addition, you have the right to withdraw your participation at any time, with or without notice.

Remuneration: Your participation in this research is voluntary, as such you will not receive any reimbursements for your participation in this study.

Costs of the Study: You will not incur any direct costs, besides your time taken to complete the questionnaire.

Confidentiality: Participation in this study is confidential and the questionnaire will not compel you to identify yourself. All research material will be kept under the control of the researcher in accordance with the dictates of DUT's Institutional Research Ethics Committee (IREC) requirements.

Research-related Injury: No research–related injury is envisaged as such no compensation will be rendered in the event that an injury arises during your participation

Persons to Contact in the Event of Any Problems or Queries: Should you have any queries regarding this study and or related matters, please feel free to contact:

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Annexure D: SPSS Raw Data and Frequency Tables

Annexure D1: Raw Data

Question 1 to 5

Response	1.What is your position in the company?	2.Gender	3.What is your highest academic qualification?	4.Which of the project management qualifications do you posses?	5.Indicate the project management methodology applicable to your organisation.
1	Project Manager	Male	Post Graduate [	PRINCE2®	APMG Aligned
2	Project Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	Hybrid (APMG &
3	Project Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	No Formal Metho
4	Project Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	PMI Aligned
5	Portfolio Manager	Female	Post Graduate [	Agile	Other (Please sp
6	Project Manager	Male	Degree/Diploma	PMBOK (PMP)(CAPI	Hybrid (APMG &
7	Programme Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	PMI Aligned
8	Project Manager	Female	Post Graduate [	PRINCE2®	PMI Aligned
9	Project Manager	Male	Degree/Diploma	Other (Please specify	Other (Please sp
10	Project Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	PMI Aligned
11	Project Manager	Male	Degree/Diploma	Other (Please specify	No Formal Metho
12	Programme Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	APMG Aligned
13	Project Manager	Male	Degree/Diploma	PMBOK (PMP)(CAPI	Hybrid (APMG &
14	Project Manager	Female	Post Graduate [	Other (Please specify	No Formal Metho
15	Portfolio Manager	Female	Post Graduate [	PRINCE2®	APMG Aligned
16	Programme Manager	Male	Degree/Diploma	Other (Please specify	No Formal Metho
15	Portfolio Manager	Female	Post Graduate [	PRINCE2®	APMG Aligned
18	Project Manager	Male	Post Graduate [	PRINCE2®	APMG Aligned
19	Project Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	Hybrid (APMG &
20	Project Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	No Formal Metho
21	Project Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	PMI Aligned
22	Portfolio Manager	Female	Post Graduate [	Agile	Other (Please sp
23	Project Manager	Male	Degree/Diploma	PMBOK (PMP)(CAPI	Hybrid (APMG &
24	Programme Manager	Male	Degree/Diploma	PMBOK (PMP)(CAPI	PMI Aligned
25	Project Manager	Female	Post Graduate [	PRINCE2®	PMI Aligned
26	Project Manager	Male	Degree/Diploma	Other (Please specify	Other (Please sp
27	Project Manager	Male	Degree/Diploma	PMBOK (PMP)(CAPI	PMI Aligned
28	Project Manager	Male	Degree/Diploma	Other (Please specify	No Formal Metho
29	Programme Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	APMG Aligned
30	Project Manager	Male	Degree/Diploma	PMBOK (PMP)(CAPI	Hybrid (APMG &
31	Project Manager	Female	Post Graduate [	Other (Please specify	No Formal Metho
32	Programme Manager	Female	Post Graduate [	PRINCE2®	APMG Aligned
33	Programme Manager	Male	Post Graduate [	Other (Please specify	No Formal Metho
33	Programme Manager	Male	Post Graduate [	Other (Please specify	No Formal Metho
35	Project Manager	Male	Post Graduate [	PRINCE2®	APMG Aligned
36	Project Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	Hybrid (APMG &
37	Project Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	No Formal Metho
38	Other (Please specify):Project Engineer	Male	Post Graduate [	PMBOK (PMP)(CAPI	PMI Aligned
39	Programme Manager	Female	Post Graduate [	Agile	Other (Please sp
40	Project Manager	Male	Degree/Diploma	PMBOK (PMP)(CAPI	Hybrid (APMG &
41	Programme Manager	Male	Post Graduate [	PMBOK (PMP)(CAPI	PMI Aligned
42	Project Manager	Female	Post Graduate [	PRINCE2®	PMI Aligned

Question 6 to 11

6.Who do you report to?	7.Indicate, on average, how many projects you manage at the same time.	8.Number of years employed in the Project Management Office ?	9.Number of years employed in the Telecommunications Industry?	10.Do you think that project managers in the telecommunications industry in South Africa have requisite skills to carry out their duties effectively?	11.Please give reasons to your response to Question 10 above.
Programme M	2	1- 3 Years	6 - 10 Years	No	Most projects are s
PMO Head	More than 5	Over 10 Years	Less than 1	Yes	There are relevant c
PMO Head	2	6 - 10 Years	Over 10 Years	Not Sure	NOT ORGANIZED
Programme M	More than 5	3 - 6 Years	3 - 6 Years	No	some do not have l
Functional/O	4	3 - 6 Years	Over 10 Years	No	Reason
Programme M	More than 5	3 - 6 Years	Over 10 Years	No	The Telecom indus
Other (Please	More than 5	Over 10 Years	3 - 6 Years	No	Many of often tend
Functional/O	4	3 - 6 Years	6 - 10 Years	Yes	There are numerou
Functional/O	2	6 - 10 Years	Over 10 Years	Yes	They are highly co
Functional/O	More than 5	3 - 6 Years	3 - 6 Years	No	Most lack PM qual
Functional/O	1	Less than 1 yea	Less than 1	Not Sure	
PMO Head	3	1- 3 Years	6 - 10 Years	No	
PMO Head	More than 5		6 - 10 Years	Yes	Projects are gettin
Programme M	1	Less than 1 yea	Less than 1	No	
Functional/O	2	Over 10 Years	Over 10 Years	Not Sure	
PMO Head	More than 5	6 - 10 Years	Over 10 Years	No	Technical specialis
Functional/O	2	Over 10 Years	Over 10 Years	Not Sure	
Programme M	3	1- 3 Years	7 - 10 Years	No	Most projects are s
PMO Head	More than 6	Over 10 Years	Less than 2	Yes	There are relevant c
PMO Head	3	7 - 10 Years	Over 10 Years	Not Sure	NOT ORGANIZED
Programme M	More than 6	3 - 6 Years	3 - 6 Years	No	some do not have l
Functional/O	5	3 - 6 Years	Over 10 Years	No	Reason
Programme M	More than 5	3 - 6 Years	Over 10 Years	No	The Telecom indus
Other (Please	More than 5	Over 10 Years	4 - 6 Years	No	Many of often tend
Functional/O	0	4 - 6 Years	7 - 10 Years	Yes	There are numerou
Functional/O	-2	7 - 10 Years	Over 10 Years	Yes	They are highly co
Functional/O	More than 6	3 - 6 Years	3 - 6 Years	No	Most lack PM qual
Functional/O	5	Less than 1 yea	Less than 2	Not Sure	
PMO Head	7	1- 3 Years	6 - 10 Years	No	
PMO Head	More than 6		6 - 10 Years	Yes	Projects are gettin
Programme M	3	Less than 1 yea	Less than 2	No	
Functional/O	4	Over 10 Years	Over 10 Years	Not Sure	
PMO Head	More than 6	7 - 10 Years	Over 10 Years	No	Technical specialis
PMO Head	More than 6	7 - 10 Years	Over 10 Years	No	Technical specialis
Programme M	4	1- 3 Years	8 - 10 Years	No	Most projects are s
PMO Head	More than 7	Over 10 Years	Less than 3	Yes	There are relevant c
PMO Head	4	8 - 10 Years	Over 10 Years	Not Sure	NOT ORGANIZED
Programme M	More than 7	3 - 6 Years	3 - 6 Years	No	some do not have l
Functional/O	6	3 - 6 Years	Over 10 Years	No	Reason
Programme M	More than 5	3 - 6 Years	Over 10 Years	No	The Telecom indus
Other (Please	More than 5	Over 10 Years	5 - 6 Years	No	Many of often tend
Functional/O	-4	5 - 6 Years	8 - 10 Years	Yes	There are numerou

Question 12 to 14

12.Please indicate the extent to which you agree or disagree with each of the following statements (Rank 1: Strongly Disagree; Rank 2: Disagree; Rank 3: Neutral; Rank 4: Agree, Rank 5: Storngly Agree)					13.What do you think should be the minimum academic requirements for project managers in the telecommunications industry in South Africa?	14.Do you think that an IT qualification is necessary for Project Managers working in Telecommunications industry in South africa?
Project Managers require people management skills to execute projects successfully.	Project Managers require technical knowledge to manage projects.	Project Managers' style of management can either build or destroy the Project Team.	The communication skills of the Project Manager influences the success of a project.	Project Managers' negotiating skills may enhance the success of the project.		
5	1	3	4	2	Bachelor's Degree	Yes
3	1	2	5	4	Post Graduate Degree	Not Sure
5	4	3	2	1	Diploma	No
4	2	3	5	1	Honours Degree	No
1	2	3	4	5	Diploma	No
5	3	4	2	1	Diploma	No
5	1	2	4	3	Bachelor's Degree	Yes
5	3	4	2	1	Diploma	Yes
5	4	3	2	1	Bachelor's Degree	Yes
1	3	4	5	2	Honours Degree	No
4	1	5	3	2	Diploma	Not Sure
1	2	4	3	5	Honours Degree	Not Sure
5	4	3	2	1	Diploma	Yes
3	1	4	5	2	Post Graduate Degree	Yes
5	4	3	2	1	Diploma	No
4	5	1	2	3	Diploma	No
5	4	3	2	1	Diploma	No
5	1	3	4	2	Bachelor's Degree	Yes
3	1	2	5	4	Post Graduate Degree	Not Sure
5	4	3	2	1	Diploma	No
4	2	3	5	1	Honours Degree	No
1	2	3	4	5	Diploma	No
5	3	4	2	1	Diploma	No
5	1	2	4	3	Bachelor's Degree	Yes
5	3	4	2	1	Diploma	Yes
5	4	3	2	1	Bachelor's Degree	Yes
1	3	4	5	2	Honours Degree	No
4	1	5	3	2	Diploma	Not Sure
1	2	4	3	5	Honours Degree	Not Sure
5	4	3	2	1	Diploma	Yes
3	1	4	5	2	Post Graduate Degree	Yes
5	4	3	2	1	Diploma	No
4	5	1	2	3	Diploma	No
4	5	1	2	3	Diploma	No
5	1	3	4	2	Bachelor's Degree	Yes
3	1	2	5	4	Post Graduate Degree	Not Sure
5	4	3	2	1	Diploma	No
4	2	3	5	1	Honours Degree	No
1	2	3	4	5	Diploma	No
5	3	4	2	1	Diploma	No
5	1	2	4	3	Bachelor's Degree	Yes
5	3	4	2	1	Diploma	Yes

Question 15 to 16

15.Pleae motivate your response to Question 14 above.	16.Does your organisation use any of the listed criteria in evaluating the effectiveness of a project manager.					
	Communication skills	**Technical skills**	**Interpersonal skills**	**Educational qualifications**	**Leadership style**	**Negotiation skills**
A lot of Telecomr	Communication skills	Technical skills	Interpersonal sk	Educational qualifications	Leadership style	
Non IT individuals	Communication skills	Technical skills			Leadership style	
IT IS ABOUT TE(	Communication skills					
PM qualification i	Communication skills	Technical skills		Educational qualifications	Leadership style	
Motivate	Communication skills					
The projects run	Communication skills	Technical skills	Interpersonal sk	Educational qualifications	Leadership style	Negotiation skills
Nowadays Telec(	Communication skills	Technical skills	Interpersonal sk	Educational qualifications	Leadership style	Negotiation skills
Telecoms are toc	Communication skills	Technical skills			Leadership style	Negotiation skills
	Communication skills	Technical skills	Interpersonal sk	Educational qualifications		
There is need for	Communication skills	Technical skills	Interpersonal sk	Educational qualifications	Leadership style	Negotiation skills
	Communication skills	Technical skills		Educational qualifications	Leadership style	
	Communication skills	Technical skills				
IT Helps with the	Communication skills	Technical skills	Interpersonal sk	Educational qualifications		
	Communication skills		Interpersonal sk	Educational qualifications	Leadership style	Negotiation skills
	Communication skills	Technical skills		Educational qualifications	Leadership style	Negotiation skills
Project managers	Communication skills	Technical skills	Interpersonal sk	Educational qualifications		
	Communication skills	Technical skills		Educational qualifications	Leadership style	Negotiation skills
A lot of Telecomr	Communication skills	Technical skills	Interpersonal sk	Educational qualifications	Leadership style	
Non IT individuals	Communication skills	Technical skills			Leadership style	
IT IS ABOUT TE(	Communication skills					
PM qualification i	Communication skills	Technical skills		Educational qualifications	Leadership style	
Motivate	Communication skills					
The projects run	Communication skills	Technical skills	Interpersonal sk	Educational qualifications	Leadership style	Negotiation skills
Nowadays Telec(	Communication skills	Technical skills	Interpersonal sk	Educational qualifications	Leadership style	Negotiation skills
Telecoms are toc	Communication skills	Technical skills			Leadership style	Negotiation skills
	Communication skills	Technical skills	Interpersonal sk	Educational qualifications		
There is need for	Communication skills	Technical skills	Interpersonal sk	Educational qualifications	Leadership style	Negotiation skills
	Communication skills	Technical skills		Educational qualifications	Leadership style	
	Communication skills	Technical skills				
IT Helps with the	Communication skills	Technical skills	Interpersonal sk	Educational qualifications		
	Communication skills		Interpersonal sk	Educational qualifications	Leadership style	Negotiation skills
	Communication skills	Technical skills		Educational qualifications	Leadership style	Negotiation skills
Project managers	Communication skills	Technical skills	Interpersonal sk	Educational qualifications		
Project managers	Communication skills	Technical skills	Interpersonal sk	Educational qualifications		
A lot of Telecomr	Communication skills	Technical skills	Interpersonal sk	Educational qualifications	Leadership style	
Non IT individuals	Communication skills	Technical skills			Leadership style	
IT IS ABOUT TE(	Communication skills					
PM qualification i	Communication skills	Technical skills		Educational qualifications	Leadership style	
Motivate	Communication skills					
The projects run	Communication skills	Technical skills	Interpersonal sk	Educational qualifications	Leadership style	Negotiation skills
Nowadays Telec(	Communication skills	Technical skills	Interpersonal sk	Educational qualifications	Leadership style	Negotiation skills
Telecoms are toc	Communication skills	Technical skills			Leadership style	Negotiation skills

Question 17 to 18

17.Rank, on scale 1 to 6, the importance attached by your organisation to each of the creteria in evaluating t6he effectiveness of a project manager (with 1 representing the most important and 6 the least important)						18.In your opinion, are there other criteria that should be used to evaluate the effectiveness of a project manager working in the Telecommunications industry in South Africa? Motivate you answer.
Communication skills	Technical skills	Interpersonal skills	Educational skills	Leadership style	Negotiating skills	
6	2	4	5	3	1	Financial Management Skills
1	3	5	6	2	4	delivering within budget
1	4	6	5	2	3	NO.PROJECT MANAGEMENT I
1	2	4	3	5	6	Project Success rate,
6	5	4	3	2	1	question 18
2	1	3	4	5	6	Organisation structure can impa
6	2	5	3	1	4	Evaluation should should be bas
1	6	5	2	3	4	I think the above represents ever
1	2	3	4	5	6	Yes it is importance to have a P
1	2	5	6	3	4	Project success in terms of sco
6	1	5	4	3	2	
1	2	3	4	5	6	
5	3	4	1	2	6	NO
1	6	2	3	4	5	
6	4	3	2	1	5	No
2	3	1	4	6	5	Insight into how projects work pr
6	4	3	2	1	5	No
6	2	4	5	3	1	Financial Management Skills
1	3	5	6	2	4	delivering within budget
1	4	6	5	2	3	NO.PROJECT MANAGEMENT I
1	2	4	3	5	6	Project Success rate,
6	5	4	3	2	1	question 19
2	1	3	4	5	6	Organisation structure can impa
6	2	5	3	1	4	Evaluation should should be bas
1	6	5	2	3	4	I think the above represents ever
1	2	3	4	5	6	Yes it is importance to have a P
1	2	5	6	3	4	Project success in terms of sco
6	1	5	4	3	2	
1	2	3	4	5	6	
5	3	4	1	2	6	NO
1	6	2	3	4	5	
6	4	3	2	1	5	No
2	3	1	4	6	5	Insight into how projects work pr
2	3	1	4	6	5	Insight into how projects work pr
6	2	4	5	3	1	Financial Management Skills
1	3	5	6	2	4	delivering within budget
1	4	6	5	2	3	NO.PROJECT MANAGEMENT I
1	2	4	3	5	6	Project Success rate,
6	5	4	3	2	1	question 20
2	1	3	4	5	6	Organisation structure can impa
6	2	5	3	1	4	Evaluation should should be bas
1	6	5	2	3	4	I think the above represents ever

Question 19 to 20

19.In your opinion, does training in Project Managerment contributes to the effectiveness of a project manager?	20.If you have undergone any training in Project Management, please state how it contributed to your effectiveness as a project manager.
Yes	N/A
Yes	Made me sharper
Yes	TECHNIQUES APPLIC
Yes	It enhanced my unders
Yes	question 20
Yes	MY PMP broadend my
Yes	The PMP actually info
Yes	Improve my approach
Yes	The training gives an o
Yes	Understanding pm prir
Yes	
Yes	
Yes	
Yes	
Yes	
Yes	By understanding wha
Yes	
Yes	N/A
Yes	Made me sharper
Yes	TECHNIQUES APPLIC
Yes	It enhanced my unders
Yes	question 21
Yes	MY PMP broadend my
Yes	The PMP actually info
Yes	Improve my approach
Yes	The training gives an o
Yes	Understanding pm prir
Yes	
Yes	
Yes	
Yes	
Yes	
Yes	By understanding wha
Yes	By understanding wha
Yes	N/A
Yes	Made me sharper
Yes	TECHNIQUES APPLIC
Yes	It enhanced my unders
Yes	question 22
Yes	MY PMP broadend my
Yes	The PMP actually info
Yes	Improve my approach

Question 21

21.Do you encounter any of these challanges in your organisation?

Problems with delivering an end-product that meets the customers' quality expectations (Quality Management).	Delivering projects within budget (Cost Management).	Inadequate support from Senior Management (Management Support).	Delays in approval of projects, resulting in project overruns (Scheduling).	Team diversity problems (Virtual Teams)	Unclear definition of and communication of escalation processes (Communication Matrix).	Ambiguous and unmanageable scope definition process (Scope Management).	Inadequate resource allocation and accessibility (Resource Management).	Ineffective risk planning, implementation and mitigation strategy (Risk Management).
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva	Team diversity		Ambiguous and un		Ineffective risk pl
Problems with delivering a								
				Team diversity				Ineffective risk pl
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva		Unclear definition of a	Ambiguous and un		Ineffective risk pl
Problems with delivering a								
Problems with delivering a		Inadequate suppc	Delays in approva	Team diversity	Unclear definition of a		Inadequate resou	
	Delivering project:		Delays in approva		Unclear definition of a	Ambiguous and un	Inadequate resou	Ineffective risk pl
Problems with delivering a	Delivering project:		Delays in approva	Team diversity				
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva		Unclear definition of a	Ambiguous and un	Inadequate resou	Ineffective risk pl
Problems with delivering a	Delivering project:		Delays in approva			Ambiguous and un	Inadequate resou	Ineffective risk pl
			Delays in approva		Unclear definition of a		Inadequate resou	Ineffective risk pl
Problems with delivering a		Inadequate suppc						
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva	Team diversity	Unclear definition of a	Ambiguous and un	Inadequate resou	Ineffective risk pl
	Delivering project:			Team diversity			Inadequate resou	
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva	Team diversity		Ambiguous and un	Inadequate resou	
	Delivering project:	Inadequate suppc						Ineffective risk pl
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva	Team diversity		Ambiguous and un	Inadequate resou	
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva	Team diversity		Ambiguous and un		Ineffective risk pl
Problems with delivering a								
				Team diversity				Ineffective risk pl
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva		Unclear definition of a	Ambiguous and un		Ineffective risk pl
Problems with delivering a								
Problems with delivering a		Inadequate suppc	Delays in approva	Team diversity	Unclear definition of a		Inadequate resou	
	Delivering project:		Delays in approva		Unclear definition of a	Ambiguous and un	Inadequate resou	Ineffective risk pl
Problems with delivering a	Delivering project:		Delays in approva	Team diversity				
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva		Unclear definition of a	Ambiguous and un	Inadequate resou	Ineffective risk pl
Problems with delivering a	Delivering project:		Delays in approva			Ambiguous and un	Inadequate resou	Ineffective risk pl
			Delays in approva		Unclear definition of a		Inadequate resou	Ineffective risk pl
Problems with delivering a		Inadequate suppc						
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva	Team diversity	Unclear definition of a	Ambiguous and un	Inadequate resou	Ineffective risk pl
	Delivering project:			Team diversity			Inadequate resou	
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva	Team diversity		Ambiguous and un	Inadequate resou	
	Delivering project:	Inadequate suppc						Ineffective risk pl
	Delivering project:	Inadequate suppc						Ineffective risk pl
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva	Team diversity		Ambiguous and un		Ineffective risk pl
Problems with delivering a								
				Team diversity				Ineffective risk pl
Problems with delivering a	Delivering project:	Inadequate suppc	Delays in approva		Unclear definition of a	Ambiguous and un		Ineffective risk pl
Problems with delivering a								
Problems with delivering a		Inadequate suppc	Delays in approva	Team diversity	Unclear definition of a		Inadequate resou	
	Delivering project:		Delays in approva		Unclear definition of a	Ambiguous and un	Inadequate resou	Ineffective risk pl
Problems with delivering a	Delivering project:		Delays in approva	Team diversity				

Question 22 and 23

22.In a scale of 1 to 8, with Ramk 1 being the most challanging and Rank 8 being the least challanging, pleas								23.Apart from the challanges indentified above in Question 22, are there other challenges that you encount in
Quality Management	Cost Management	Management Support	Scheduling	Team Diversity	Escalations	Scope Management	Risk Managment	
1	4	5	7	6	8	2	3	No
5	6	7	3	8	4	2	1	NONE
4	2	5	3	8	7	1	6	N/a
1	2	3	4	5	6	7	8	question 23
4	2	8	3	6	5	1	7	
5	6	7	2	8	1	3	4	Capability and
2	5	3	6	8	7	1	4	None
8	7	6	5	4	3	2	1	
4	2	5	3	7	8	1	6	Customer buy
1	2	3	7	5	8	6	4	
8	7	6	5	4	3	2	1	
5	7	6	4	1	2	8	3	No
4	1	5	8	3	7	6	2	
1	7	6	5	4	3	2	8	
7	2	1	4	8	6	3	5	
1	7	6	5	4	3	2	8	
	4	5	7	6	8	2	3	No
5								
4	6	7	3	8	4	2	1	NONE
1	2	5	3	8	7	1	6	N/a
4	2	3	4	5	6	7	8	question 24
5	2	8	3	6	5	1	7	
2	6	7	2	8	1	3	4	Capability and
8	5	3	6	8	7	1	4	None
4	7	6	5	4	3	2	1	
1	2	5	3	7	8	1	6	Customer buy
8	2	3	7	5	8	6	4	
5	7	6	5	4	3	2	1	
4	7	6	4	1	2	8	3	No
1	1	5	8	3	7	6	2	
7	7	6	5	4	3	2	8	
1	2	1	4	8	6	3	5	
1	2	1	4	8	6	3	5	
5	4	5		6	8	2	3	No
4			3					
1	6	7	3	8	4	2	1	NONE
4	2	5	4	8	7	1	6	N/a
5	2	3	3	5	6	7	8	question 25
2	2	8	2	6	5	1	7	
8	6	7	6	8	1	3	4	Capability and
4	5	3	5	8	7	1	4	None

Annexure D2: Frequency Tables

Table 1

AV1: Gender profile of respondents

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Females	10	12.5	24	24.0
	Males	32	40	76.2	100.0
	Total	42	52.5	100.0	
Missing	System	38	47.5		
Total		80	100.0		

Table 2

AV2: Highest academic qualification of respondents

Highest academic qualification					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Post graduate Degree/Diploma	32	40	76.2	76.2
	Degree/Diploma	8	10	19.04	95.24
	Certificate	2	2.5	4.76	100
	Total	42	52.5	100.0	
Missing	System	38	47.5		
Total		80	100.0		

Table 3

AV3: Project management qualifications of the respondents

Project management qualifications					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	PMBoK (PMP, CAPM or ProMg)	21	26.3	50	50
	PRINCE2®	8	10	19.04	69.04
	Agile	3	3.75	7.14	76.18
	Other	10	12.5	23.8	100
	Total	42	52.5	100.0	
Missing	System	38	47.5		
Total		80	100.0		

Table 4

AV4: Project management methodology applied by the respondents' companies

Project management methodology applied					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	PMI Aligned	20	25	47.62	47.62
	APMG Aligned	9	11.3	21.43	69.05
	Hybrid (AMPG & PMI)	8	10	19.04	88.09
	No formal methodology	5	6.25	11.9	100
	Total	42	52.5	100.0	
Missing	System	38	47.5		
Total		80	100.0		

Table 5

AV5: Reporting structure

Reporting structure					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	PMO Head	13	16.25	30.95	30.95
	Functional/Operational Manager	16	20	38.1	69.05
	Programme Manager	10	12.5	23.81	92.86
	Other	3	3.75	7.14	100
	Total	42	52.5	100.0	
Missing	System	38	47.5		
Total		80	100.0		

Table 6

AV6: Number of projects managed concurrently

Number of projects managed concurrently					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	6.25	11.9	11.9
	2	11	13.75	26.19	38.09
	3	3	3.75	7.14	45.23
	4	5	6.75	11.9	57.13
	More than 5	18	22.5	42.9	100
	Total	42	52.5	100.0	
Missing	System	38	47.5		
Total		80	100.0		

Table 7

AV7: Number of projects managed concurrently

Number of years in the Project Management Office (PMO)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 year	5	6.25	11.9	11.9
	1 – 3 years	5	6.25	11.9	23.8
	3 – 6 years	16	20	38.1	61.9
	6 – 10 years	8	10	19.05	80.95
	More than 10 years	8	10	19.05	100
	Total	42	52.5	100.0	
Missing	System	38	47.5		
Total		80	100.0		

Table 8

AV8: Number of projects managed concurrently

Number of years in the telecommunications industry					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 year	8	10	19.05	19.05
	1 – 3 years	2	2.5	4.76	23.8
	3 – 6 years	8	10	19.04	42.85
	6 – 10 years	9	11.25	21.43	64.28
	More than 10 years	15	18.75	35.7	100
	Total	42	52.5	100.0	
Missing	System	38	47.5		
Total		80	100.0		

Table 9

BV9: Whether Project managers in telecommunications have requisites skills?

Whether Project managers in telecommunications have requisites skills					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	11	13.75	26.19	26.19
	No	23	28.75	54.76	80.95
	Not sure	8	10	19.04	100
	Total	42	52.5	100.0	
Missing	System	38	47.5		
Total		80	100.0		

Table 10

BV10: Perception on minimum academic requirement for PMs In Telecoms in South Africa

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	21	26.25	50	50
	Bachelor's Degree	8	10	19.04	69.04
	Honors Degree	8	10	19.04	88.08
	Post Graduate Degree	5	6.25	11.9	100
	Total	42	52.5	100.0	
Missing	System	38	47.5		
Total		80	100.0		

Table 11

BV11: Necessity of IT Qualification for PMs in Telecommunications industry in South Africa?

Necessity of IT Qualification for PMs in Telecommunications industry in South Africa					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	16	20	38.1	38.1
	No	18	22.5	42.86	80.96
	Not sure	8	10	19.04	100
	Total	42	52.5	100.0	
Missing	System	38	47.5		
Total		80	100.0		

Table 12

AV1 Gender * BV10: Perception on minimum academic requirement for PMs in Telecoms in South Africa (cross – tabulation)

		BV10: Please indicate your perception regarding minimum academic requirement for PMs In the telecommunications industry in South Africa				Total
		Diploma	Bachelor's Degree	Honors Degree	Post Graduate Degree	
AV1 : Gender	Females	38%	14%	14%	9%	76%
	Males	19	5%	5%	3%	24%
Total		50%	19%	19%	12%	100.0%

Table 13

AV1 Gender * BV11: Necessity of IT Qualification for PMs in Telecommunications industry in South Africa? (Cross – tabulation)

		BV11: Please indicate if you think IT qualification is necessary for Project managers in telecommunications industry in South Africa?			Total
		Yes	No	Not sure	
AV1 : Gender of the Resondents	Females	29%	33%	14%	76%
	Males	9%	10%	5%	24%
Total		38%	43%	19%	100.0%

Table 14

AV3: Project management qualifications of the respondents * AV4: Project management methodology applied by the respondents' companies

		AV3: Project management qualifications of the respondents				Total
		PMBoK	Prince2@	Agile	Other	
AV4: Project management methodology applied by the respondents' companies	PMI Aligned	24%	9.1%	3%	11.3%	48%
	APMG Aligned	11%	4%	2%	5.1%	21%
	Hybrid	10%	3.6%	1%	4.5%	19%
	No Formal Methodology	6%	2.3%	1%	2.8%	12%
Total		50%	19%	7%	24%	100.0%

Annexure D3: T-Test

Table 15

	t-test
	Sig (2-tailed)
AVI	
Equal variances assumed	**0.50**
Equal variances not assumed	**0.53**
AV2	
Equal variances assumed	**0.56**
Equal variances not assumed	**0.58**
AV3	
Equal variances assumed	**0.29**
Equal variances not assumed	**0.30**
AV4	
Equal variances assumed	**0.23**
Equal variances not assumed	**0.24**
AV5	
Equal variances assumed	**0.16**
Equal variances not assumed	**0.18**
AV6	
Equal variances assumed	**0.24**
Equal variances not assumed	**0.25**
AV7	
Equal variances assumed	**0.12**
Equal variances not assumed	**0.13**
AV8	
Equal variances assumed	**0.13**
Equal variances not assumed	**0.14**
BV9	
Equal variances assumed	**0.27**
Equal variances not assumed	**0.29**
BV10	
Equal variances assumed	**0.34**
Equal variances not assumed	**0.38**

BV11	
Equal variances assumed	**0.13**
Equal variances not assumed	**0.15**

Table 16

T-Tests for cross tabulation

	t-test
	Sig (2-tailed)
AV1*BV10	
Equal variances not assumed	**0.214**
AV1*BV11	
Equal variances not assumed	**0.087**
AV3*AV4	
Equal variances not assumed	**0.238**

Annexure D4: ANOVA Tests

Table 17

	Sum of Means	*F*	*P-Value*	*F-Crit*
AV1				
Between groups	26.25	0.654	0.504	18.5
Within groups	50.01			
Total	76.35			
AV2				
Between groups	17.5	0.41	0.56	7.7
Within groups	33.33			
Total	50.83			
AV3				
Between groups	13.138	1.35	0.29	5.99
Within groups	24.995			
Total	38.132			
AV4				
Between groups	13.14	1.81	0.23	5.60
Within groups	25.00			
Total	38.14			
AV5				
Between groups	13.13	2.52	0.16	5.60
Within groups	25.00			
Total	38.14			
AV6				
Between groups	10.60	1.62	0.24	5.32
Within groups	20.00			
Total	30.60			

AV7				
Between groups	10.50	3.07	0.12	5.32
Within groups	20.00			
Total	30.50			
AV8				
Between groups	10.50	2.93	0.13	5.32
Within groups	19.996			
Total	30.496			
BV9				
Between groups	17.5	1.65	0.27	7.71
Within groups	33.33			
Total	50.83			
BV10				
Between groups	13.13	1.53	0.26	5.60
Within groups	25.00			
Total	38.12			
BV11				
Between groups	17.5	3.71	0.13	7.71
Within groups	33.33			
Total	50.83			

Table 18

ANOVA Test for cross tabulation

	ANOVA Test		
	F	**P-Value**	**F Critical**
AV1*BV10 Equal variances not assumed	**2.055**	**0.202**	**5.987**
AV1*BV11 Equal variances not assumed	**8.398**	**0.044**	**7.709**
AV3*AV4 Equal variances not assumed	**4.090**	**0.032**	**3.490**

Annexure E: Correlations Calculations Using Formula

Annexure E1: Formula and Sample data

CORREL function syntax has the following arguments (argument: A value that provides information to an action, an event, a method, a property, a function, or a procedure.):

- Array1 Required. A cell range of values.
- Array2 Required. A second cell range of values.

Remarks

- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If Array1 and Array2 have a different number of data points, CORREL returns the #N/A error value.
- If either Array1 or Array2 is empty, or if s (the standard deviation) of their values equals zero, CORREL returns the #DIV/0! error value.
- The equation for the correlation coefficient is:

$$r = \frac{\sum_i (x_i - \overline{x})(y_i - \overline{y})}{\sqrt{\sum_i (x_i - \overline{x})^2} \sqrt{\sum_i (y_i - \overline{y})^2}}$$

Where x and y are the sample means AVERAGE(array1) and AVERAGE(array2).

Annexure E2: Computed Correlations

Calculation extracts from Excel for the Co-relationships

Correlationship between Creteria used for evaluating the effectiveness of Project Managers in telecommunications industry in South Africa and,														
Perception on minimum academic requirement for PMs In Telecoms in South Africa Perception on minimum academic requirement for PMs In Telecoms in South Africa														
	Criteria for effectvin ess	**Academi c Percepti on**												
	79	21												
	13	8												
	8	8												
	11	5												
Coeeficient	0.977065	***which shows a very strong positive relationship***												
Correlationship between Number of Years in the Telecom Industry and Number of years in the PMO														
	No of Yrs in Teleco	**No of Yrs in the PMO**												
	8	5												
	2	5												
	8	16												
	9	8												
	15	8												
Coefficient	0.206791	***which shows a weak positive relationship***												
Correlationship between Project Management Qualifications AND Project Management Methodology applied by Telco inductry in South Africa														
	PM Qaulifica tions	PM Method ologies												
	21	20												
	8	9												
	3	8												
	10	5												
Coefficient	**0.836743**	***which shows a strong positive relationship***												
Correlationship between requisites skills and necessity of IT qualification for PMs in Telecomms in SA														
	Requisit e Skills	IT Qualific ations												
	11	16												
	23	18												
	8	8												
Coeffient	**0.785714**	***which shows a strong positive relationship***												

Correlation between the criteria used to evaluate the project mangers effectiveness and the skillse required by project managers							
	Criteria used to evaulate the PMs	Skills required by project managers					
	100	61					
	82	55					
	50	45					
	69	44					
	62	35					
	37						
Pearson's Corelation	**0.82**						