LEADERSHIP SKILLS, STAKEHOLDER MANAGEMENT, PROJECT SCOPE AND EXECUTION OF FIBRE OPTIC INFRASTRUCTURE IN NAIROBI COUNTY, KENYA

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DECLARATION

This Thesis is my original work and has not been presented for award in any other University

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DEDICATION

I wish to dedicate to my parents, Mr. and Mrs. Akhwaba for raising, and giving me material and psychological support that has enabled me to reach where I am in social and academic life.

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The research would not have been complete without the respondents who contributed their valuable input in completing survey questionnaire used in this study. Failure to mention every one of them by name does not, in any way, imply less credit. With different forms of assistance from the persons mentioned, I have done my best to clear this report of errors and omissions. However, I take sole responsibility for any faults that may have remained.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADC	Adaptive Dispersion Compensator
AK	Access Kenya
BPON	Broadband Passive Optical Network
CAK	Communication Authority of Kenya
CCTV	Closed Circuit Television
CTC	Concurrent technology Corporation
EASSy	East African Submarine System
EDGE	Enhanced Data for Global Evolution
EFOI	Execution of fibre optic infrastructure
EU	European Union
FOA	Fibre Optic Association
FTTP	Fibre to the Premises
GoK	Government of Kenya
GP	Government policy
GPON	Gigabit Passive Optical Network
GPRS	General Packed Radio Service
GSM	Global System for Mobile communications
ICT	Information, Communication and Technology
ICTA	Information, Communication and Technology Authority
ILRI	International livestock Research Institute
JTL	Jamii Telecom
LFA	Logical Framework Approach
LTK	Liquid telecom, formerly KDN
KPC	Kenya Pipeline Corporation
KPLC	Kenya Power and Lighting Company
LTE	Long Term Evolution
NEPAD	New Partnership for Africa's Development
NOFBI	National Optic Fibre Backbone
NVIVO	A qualitative data analysis computer software package
PBT	Planned Behavior Theory
PCCW	Pacific Century Cyber Works
PMBOK	Project Management Body of Knowledge

PMIS	Project Management Information System
Prince 2	Projects IN Controlled Environment
SAFE	Scaled Agile Framework
SEACOM	Sea Submarine Communication limited
SPSS	Statistical Package for Social Sciences
STAP	Short-Term Action Plan
STATA	Statistical Analysis Package
TEAMS	The East African Marine System
TTN	Technology Transfer Network
UAE	United Arab Emirates
USAID	United states agency for international aid
VSAT	Very Small Aperture Terminal
WBS	Work Breakdown Structures
WTL	Wananchi Telecom

ABSTRACT

Telecommunication and internet service enterprise have drastically evolved in the last 10 years across the globe. With demand for huge amounts of data and increased voice traffic, optical fibre is globally preferred technology for transmission of high-speed broadband. Nonetheless, fibre optic infrastructure involves construction challenges and therefore, continues to fail for several reasons including ineffective leadership, poor stakeholder management, and unclear scope definition. The main purpose of this study was to investigate the influence of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure in Nairobi County in Kenya. The study was guided by five objectives, namely, to determine how leadership skills influence execution of fibre optic infrastructure, assess the extent to which stakeholder management influences execution of fibre optic infrastructure, examine how project scope influences execution of fibre optic infrastructure, establish how leadership skills and stakeholder management jointly influence execution of fibre optic infrastructure and to examine how project scope moderates the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure. The study was grounded on leadership skills theory, stakeholder theory, logical framework theory and systems theory. The study adopted the pragmatism paradigm, with a cross-sectional survey design. Census was used to select 187 respondents from a target population of 187 functional members of staff in mobile telecommunication and internet service companies. A questionnaire was used to collect quantitative data while qualitative data was collected using interview guide. Prior to data collection, pilot testing of research instruments was done through content-related method and Cronbach's Alpha technique. Qualitative data was analyzed through content analysis while quantitative data was analyzed using descriptive and inferential statistics. To ensure validity of statistical investigation, tests of statistical assumptions were done prior to data analysis. The study used summary statistics to analyze descriptive data. Inferential statistical analysis was also performed using Pearson's Product Moment correlation analysis, simple linear regression analysis, and multiple regression analysis. All five null hypotheses tests in the study were rejected. With R^2=0.451, β=0.626, t=11.825, p=0.001<0.05, in the first test, H_0**1** was rejected and conclusion made that leadership skills have a significant positive influence on execution of fibre optic infrastructure. Similarly, H_0**2** was rejected and conclusion made that stakeholder management has significant influence on execution of fibre optic infrastructure with R^2=0.466, β=0.600, t=12.247, p=0.001<0.05. In the third test, with R^2=0.366, β=0.544, t=9.982, p=0.001< 0.05, H_0**3** was rejected and conclusion made that project scope has significant influence on execution of fibre optic infrastructure. In the fourth test, H_0**4** was rejected and conclusion made that leadership skills and stakeholder management, acting together, have significant influence on execution of fibre optic infrastructure, with R^2=0.574; β=0.379, t=6.476, p=0.001<0.05 for leadership skills and β=0.385, t=6.989, p=0.001<0.05 for stakeholder management. In the fifth and final test, the coefficient of determination (R^2) increased by 3.9% on addition of interaction term in the model, therefore, H_0**5** was also rejected and conclusion made that project scope has significant and positive moderating influence on combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure. Hence, it was recommended that the Government through ICT authority should formulate policies to guide and regulate execution of fibre optic infrastructure, develop right of way, review building code to allow for fibre optic services in new buildings and establish a centrally coordinated authority for issuance of permits and related services. Also, companies should develop coaching, mentoring and training programs to improve leadership skills of project leaders, involve key stakeholders throughout projects life cycle and develop conflict management strategies to ensure sustainability of projects. It was also suggested that research should be conducted on other factors that may influence execution of fibre optic infrastructure. Similar studies should also be conducted in other counties in Kenya.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Changes are necessary in businesses (Schwalbe, 2010). These changes bring about information and communication development at this time of increased awareness and urgent need to improve. Establishments that maximize the use of new technologies find themselves involved with complex and costly projects to execute in order to meet organizational requirements (Akintelu, Olaposi and Ogunberu, 2016). It is, therefore, imperative for such organizations to embrace project management methodology to plan and execute projects, which meet stakeholders' expectations and ensure expected outcomes meet objectives of the organizations.

Project management as a discipline focuses on planning as well as management of complex arrays of activities that deliver a project such as fibre optic infrastructure (Morris, 1994). Sometimes things don't go as planned in projects which may lead to conflicts among stakeholders. It is, therefore, important to have project leaders who can manage tasks and people (Qing and Dekker, 2014). Some of the leadership skills include; planning, conflict resolution, delegation, communication, problem solving, decision making, coaching and team building (Awan, Ahmed and Zulqarnain, 2015). Leadership skills help project managers in empowering teams and other stakeholders, listing down of stakeholders, assessing their interests in the project, influencing and selling the project, shaping expectations, and affirming successful execution of the projects (Qing and Dekker, 2014). Therefore, in order to accurately define vision of a project, scope and stakeholders, it is important to involve a competent project manager with right leadership skills in the project.

Similarly, stakeholder management is essential for project organization (Vinten 2000). Belief of stakeholders in the life of a project ensures effective and efficient delivery (Cleland, 1995). Fibre optic network as infrastructure provides universal communication services and as such, their execution is widespread, involve several stakeholders and challenging construction situations (Huawei, 2016). Huawei (2016) also opined that in fibre optic infrastructure, Governments, Operators, Constructors and equipment Vendors are the main stakeholders that take major responsibilities. Hence, the need to strike a balance to ensure that fibre optic infrastructure has right response from stakeholders and is important to policy makers.

However, with multiple stakeholders, successful execution of fibre optic infrastructure is a challenge (Ilavarasan and Srinivasan, 2014). The inability of project players to address fears of stakeholders in projects also result in myriad project disappointments the world over (Bourne and Walker, 2005).

Due to the evolution of telecommunication and internet service enterprise, customers and business enterprises with smart devices consume huge amounts of data and increased voice traffic. Further, this has made operators in telecommunication and internet service enterprise extend operations and amend cost plans to increase their business footprints (Ernst and Young, 2015). Therefore, one of the innovations to beat this new development in telecommunication industry is the emergence of fibre optic telecommunication network.

Across the globe, optical fibre is the preferred technology for transmission of high-speed broadband to end users (Beardsley, Enriquez, Guvendi and Sandoval, 2011) and, therefore, a major building block in telecommunication infrastructure (Ezeh, Ogbuehi, Eleke and Diala, 2013; Massa, 2013). Torlak (2013) defines optic fibre as flexible, long, transparent thin strands of glass or plastic about a diameter, slightly thinner than human hair. Optical cables are organized packs of fibres used in transmission of light/digital signals over a wide geographical spectrum. Light signal from fibre optic cables do not cause interference among other fibre cables in same channel. Optical fibre is therefore, suited for transmission of digital information, useful in computer and telecommunication networks (Sankara, 2014; Massa, 2013).

Nevertheless, fibre optic network involves construction challenges far beyond those associated with traditional construction projects on a contained and easily controlled site (Crocker, 2012). Crocker (2012) also noted that fibre optic construction involves huge risks from weather as well as in safety and land access. Similarly, Deloitte (2016) noted that logistics in procurement, staff mobilization, equipment and materials transport to sites also present significant challenges in fibre optic network. Furthermore, fibre construction happen in communities for short periods and, therefore, a complex program of proactive community engagement with operators, constructors, government agencies, environment groups and property owners is an essential part of meeting schedules and budget (Huawei, 2016).

Theory of Leadership skills is the first theory that informed this study. Focus was directed at the skills theory by Katz (1974). Skills theory suggests what leaders can successfully achieve. It proposes that knowledge, skills, and abilities are required for an effective leader. Katz

(1974) noted that the foundation of leadership is anchored on technical skills, human skills, and conceptual skills. As applied in the current study, human and conceptual skills relate to the independent variable, leadership skills, whose indicators are visionary, problem solving, decision-making, team building, communication, planning, coaching, training and delegation.

Stakeholder theory also informed this study. It was founded and published by Ian Mitroff in 1983 in San Francisco, United States (Patton, 2008). The theory reveals and guides how managers function and does not largely address theorists in management and economists. Patton (2008) also noted that stakeholder theory aids managers to identify, analyze, and understand stakeholders in an organization and purposefully manage them. As applied in this study, stakeholder theory relates to the independent variable, stakeholder management whose indicators are stakeholder list with areas of interest, stakeholder analysis, and dynamics of stakeholders in the project life cycle, stakeholders' reaction to project decisions and stakeholder's engagement through the project life cycle.

The logical framework theory uses top down, waterfall approach to plan project activities where planners define project goal, use the goal to develop expected outputs of project, identify activities required to achieve objectives and resources or inputs required to perform activities (Drucker, 2007). This is the third theory that informed this study and relates to project scope, which is the moderating variable in the current study. Project scope indicators in the study include management plan, work breakdown structure, statement of scope, acceptance criteria, change criteria and management of actual changes.

Systems theory is the fourth theory in this study. The theory originated from biological sciences, founded by Ludwig von Bertalanffy 1901-1972 (Bertalanffy, 1973). Bertalanffy (1973) founded the general systems theory by focusing on essential interdependency of science characteristics, studied autonomously. The organization in this study, fibre optic infrastructure, is a system having cohesive portions that need to be coordinated for successful execution (Chikere and Nwoka, 2015). As applied in this study, systems theory relates to the dependent variable, execution of fibre optic infrastructure, and it holds that construction projects like fibre optic infrastructure are about systems that require one part of the system to complete before another one kicks off.

In Malaysia, it was shown that leadership skills of a project manager positively contribute to success of projects and that acquisition of such skills is through training and learning (Zakaria, Mohamed, Ahzahar and Hashim 2015). Likewise, findings of Ahmed, Tahir and

Noor (2013) in Pakistan revealed that project managers with essential qualities, leadership competencies and management skills ensure effective accomplishment of business and project results. Similarly, Archer, Verster and Zulch (2010) in South Africa sought to describe the importance of people and leadership skills in construction industry and concluded that leadership is an important skill; therefore, project managers should continually develop as leaders and constantly improve their skills.

In a study on demonstrating the aspect of stakeholders in project scope and execution in United Arab Emirates, Saad (2011) observed that for successful delivery of a project, stakeholders within the organization authorizing the project must be involved and managed very closely at every stage when defining the project scope. In Canada, Bourne (2006) postulated that a fundamental component of ensuring that a project is successful involves taking a proactive approach in managing what the stakeholders expect in a project. Additionally, expectations and perceptions of stakeholders strongly influence project success and lack of stakeholder involvement leads to failure of most projects (Chinyio and Akintoye, 2013). Moreover, conflict among stakeholders negatively affects performance of construction projects (Akintoye, Hardcastle, Beck, Chinyio, and Asenova 2003). As such, stakeholder involvement in project planning phase enables project managers to overcome challenges that could be encountered during project development life cycle such as execution phase.

Mega construction projects in Africa represent a strategic option towards attaining sustainable development objectives (Ahmed and Othman, 2013). Characterization of these projects is by need for a clear explanation of scope based on managerial capabilities, competent human resources, technical skills, expertise power, excessive cost of investment, and timeliness of the projects. On the contrary, most of mega construction projects in African countries lack some of the requirements needed in implementation, which eventually hinder them from being implemented, thereby obstructing project development (Ahmed and Othman, 2013). In an investigative study in Kisumu county, Kenya, Kenneth (2014) showed that most of the respondents did not have a grip of project scope management. The study concluded that most projects experienced scope creep and implementation was still going on long after their stated completion time (Kenneth, 2014).

In another study in Kenya, Moenga and Moronge (2016) showed that stakeholder participation is a significant factor in utilization of ICT infrastructure. In addition, the study

revealed that capacity of human resource, implementation plan and policies in place have a positive relationship with utilization of communication infrastructure. In a similar study in Kenya, using descriptive survey design, Owino, Keraro and Wanjiku (2015) showed that policies have a significant influence on the performance of information, communication and technology projects. The study also showed that management practices of human resource, innovations and systems adopted, positively contribute to the effective utilization of infrastructure projects. However, these studies did not factor in the aspect of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure and the interaction of variables.

The tussle to provide access broadband by providers is taking shape in Kenya, with firms like Access Kenya, Liquid Telecom, Telkom Kenya, Wananchi Telecom, Safaricom, and Jamii Telecom leading in national and metro fibre optic networks (Gathara, 2012). Deloitte (2016), in the report on Kenya's economic outlook, indicated that mobile phone penetration rose from 79% in 2013/2014 financial year to 86% in 2014/2015 financial year. Similarly, internet subscriptions rose from 14 million in 2013/2014 financial year to 24.9 million in 2014/2015 financial year as the speed of data transfer rose by 67% in the same period.

There was also improvement in internet connection in the country by 25% within three years, with fibre optics accounting for close to 95% of all ground internet connections (Deloitte, 2016). Due to the importance of optical fibre, it is essential to ensure effective, efficient and sustainable execution of fibre optic infrastructure. Therefore, the current study sought to determine the influence of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure in Nairobi County, Kenya.

1.2 Statement of the Problem

Across the globe, optical fibre is the ideal technology for transmission of high-speed broadband to end users (Beardsley *et al*., 2011) and, therefore, it is a core backbone in the telecommunication infrastructure (Ezeh *et al*., 2013; Massa, 2013). Optical fibre is increasingly being used mainly in networks as backhaul and last mile connectivity to support both fixed and wireless broadband (Deloitte, 2016). Fibre optic infrastructure is thus intended to improve connectivity, fasten communication and better delivery of government services to citizens across the world.

Fibre optic infrastructure involves construction challenges far beyond those associated with traditional construction projects on a contained and easily controlled site (Crocker, 2012).

Crocker (2012) also noted that fibre construction involve huge risks from weather as well as in safety and land access. Logistics in procurement, mobilizing staff and transporting equipment and materials to sites also present significant challenges (Deloitte, 2016). Furthermore, fibre construction happens in communities for short periods and therefore a complex program of proactive community engagement with other key stakeholders is an essential part of meeting schedules and budgets (Huawei, 2016).

Construction of fibre optic infrastructure is thus costly and time consuming. This is because it requires a massive construction effort to build down every major and minor street to offer service as well as from the curb to each user's home or business (Vaseli, Hashemian, Bayat, Gay, Williams and Melzer, 2017). This threatens to shorten the life of streets and increasingly disrupt traffic and access to local businesses. The above challenges have also been noted by several researchers in Europe, US, Malaysia and other parts of the globe (Stockman and Zhao, 2014; Bakhshi and Windsor, 2015; Nawi, Rahman and Ibrahim, 2012).

Fibre optic infrastructure, therefore, involves a complex stakeholder management framework across a wide range of groups requiring constant engagement to provide management oversight through formal reporting, audit and assurance mechanism to ensure successful execution (Crocker, 2012). Despite advanced project management methodologies, many projects including fibre optic infrastructure in Kenya and indeed across the world continue to fail, delivered beyond projected timelines, budget and scope due to several reasons including ineffective leadership, poor stakeholder management, and unclear scope definition.

The need for leadership skills to guarantee effective leadership, stakeholder management and clear scope definition is acceptable among professionals in project planning and management. Studies in areas of leadership skills, stakeholder management and project scope definition notwithstanding, the extent to which leadership skills, stakeholder management and project scope influence execution of fibre optic infrastructure is not clear. The issue is that projects remain unsuccessful because of ineffective leadership, poor stakeholder management and unclearly defined project scope.

However, studies across the globe reveal that leadership skills, stakeholder management and project scope are key to successful execution of projects (Zakaria *et al.*, 2015; Ahmed *et al.*, 2013; Archer, Verster and Zulch, 2010; Saad, 2011; Ahmed and Othman, 2013; Kenneth, 2014). The studies also showed that the main reasons behind failure of projects is inadequate leadership skills of project leaders, poor management of stakeholders and unclear scope

definition. These studies focused on building, water and other construction projects but none considered fibre optic infrastructure. Though leadership skills, stakeholder management and execution of projects have been examined in the literature, the moderating role of project scope is less empirically documented. Therefore, this study sought to address the problem, influence of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure in Nairobi County, Kenya.

1.3 Purpose of the Study

The main purpose of this study was to investigate the influence of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure in Nairobi County, Kenya.

1.4 Objectives of the Study

The study was guided by the following objectives:

1. To determine how leadership skills influence execution of fibre optic infrastructure
2. To assess the extent to which stakeholder management influences execution of fibre optic infrastructure
3. To examine how project scope influences execution of fibre optic infrastructure
4. To establish how leadership skills and stakeholder management jointly influence execution of fibre optic infrastructure
5. To examine how project scope moderates the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure

1.5 Research Questions

The study sought to answer the following research questions:

1. How do leadership skills influence execution of fibre optic infrastructure?
2. To what extent does stakeholder management influence execution of fibre optic infrastructure?
3. How does project scope influence execution of fibre optic infrastructure?
4. In which way do leadership skills and stakeholder management jointly influence execution of fibre optic infrastructure?
5. How does project scope moderate the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure?

1.6 Research Hypotheses

The following null hypotheses were also formulated from research objectives and conceptual framework:

$H_0$1: Leadership skills do not have significant influence on execution of fibre optic infrastructure

$H_0$2: Stakeholder management does not have significant influence on execution of fibre optic infrastructure

$H_0$3: Project scope does not have significant influence on execution of fibre optic infrastructure

$H_0$4: Leadership skills and stakeholder management, acting together, do not have significant influence on execution of fibre optic infrastructure

$H_0$5: There is no significant moderating influence of project scope on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure

1.7 Significance of the Study

The results of this study will benefit professionals in project management as they will help to complete fibre optic infrastructure on time and within budget. The study findings will also be useful to telecommunication industry players because the study illustrates how the county implements fibre optic infrastructure, their performance, service delivery and challenges experienced this far. The study findings will, additionally, form a guideline for project planning and implementation that helps organizations to get on track and deliver more successful fibre optic infrastructure. Finally, the study findings will be valuable to academicians, policy makers and other researchers as they add onto the current literature in project management, telecommunication industry and fibre optic infrastructure. These benefits, coupled with the fact that the research adds to the existing body of knowledge on the role of leadership skills, stakeholder management and project scope on execution of projects and project management in general, makes the study useful to the corporate ecosystem and society in general.

1.8 Basic Assumptions of the Study

It was assumed that organizations under study use leadership skills approach in execution of fibre optic infrastructure, proper stakeholder management and project scope. Additionally, an assumption that respondents would willingly give correct information during data collection

and that project managers who had overseen execution of most fibre optic infrastructure would still be serving in their respective organizations formed the basis for the study. Finally, the study assumed that existing records were accurate, collected data would form a normal distribution and fairly represent the target population of organizations that undertake fibre optic infrastructure in Nairobi County, Kenya.

1.9 Delimitations of the Study

The research was carried out in Nairobi County, Kenya. Nairobi covers a total area of 696.1 km^2 of which 299.6 km^2 is arable land. It is the political, industrial and commercial capital of Kenya. To the North and West, Nairobi borders Kiambu County. It borders Machakos to the East and Kajiado to the South and lies at an altitude of about 1,798 metres above sea level. Administratively, Nairobi has 9 sub-counties, namely, Kasarani, Starehe, Embakasi, Kamukunji, Njiru, Makadara, Westlands, Dagoretti, and Langata. The County also has 135 sub-locations, 64 locations and 27 divisions (Nairobi City County, 2013). Nairobi had 3,134,265 people as of the 2009 housing and population census. The County Government projected that the population would rise to 4,247,770 by 2017 (Republic of Kenya, 2013).

The study only focused on fibre optic infrastructure in telecommunication and Internet service provision industry and excluded utility companies that own and construct fibre optic infrastructure. The study was delimited to telecommunication and Internet service companies with their headquarters in Nairobi County, namely, Safaricom PLC, Telkom Ltd, Access Kenya, Jamii Telecom, Liquid Telecom, Wananchi Group, ICTA, and CAK and only respondents engaged in fibre optic infrastructure. It was delimited to Nairobi County because majority of telecommunication as well as internet service companies have their headquarters in Nairobi and the County has an elaborate road, railway and fibre optic network, thus providing head start for first hand access to data and information for the study. To solicit varied responses in the research, a large target population was required and therefore, questionnaire, interview guide and document review guide were ideal data collection instruments for the study. Therefore, instruments of data collection also delimited the research. Appendix X shows distribution of fibre optic network in Nairobi County, Kenya.

1.10 Limitations of the Study

The study anticipated lack of cooperation and suspicion especially in organizations where execution of fibre optic infrastructure may not have satisfactorily been delivered and where respondents could be tempted to provide false information to cover up for perceived self-

inadequacies during execution of the projects. Secondly, some organizations could hold back information for fear of arming their competitors. The study was carried out in Nairobi County alone, even though execution of fibre optic infrastructure is done throughout the country, especially in urban areas. Therefore, generalization of the study findings beyond the area of study is challenging.

In mitigating the limitations, the researcher strove to win confidence of respondents by making adequate self-introduction and personal administration of research instruments as much as possible. The researcher also clearly indicated to respondents that the research was purely academic, and that its findings would be used for academic purposes. To cement this, the researcher made commitment to confidential treatment of information from respondents to allay fears of victimization by employers because of their responses.

1.11 Definition of Significant Terms used in the Study

Execution of Fibre Optic Infrastructure	Effective implementation of fibre optic infrastructure determined by completion within time, budget, quality standards, realization of benefits, committed project teams and closed out with lesson learnt, handover documentation shared and kept for future reference
Leadership Skills	Ability of leaders in project management to influence attitudes, behaviors and values of project team and other stakeholders in the management of fibre optic infrastructure in a competent manner. The skills include being visionary, team building, communication, planning, delegation, making of key decisions, problem solving, coaching and training
Project	Fibre optic infrastructure
Project Scope	Project scope in the context of this study involves planning, defining deliverables, verifying and controlling fibre optic infrastructure work that includes management plan, statement of scope, work breakdown structure, acceptance criteria, change criteria and management of actual changes in fibre optic infrastructure

Stakeholder Management	The process of identification, analysis, planning and execution designed to manage and engage with stakeholders through fibre optic infrastructure life cycle

1.12 Organization of the Study

This study report is presented in five chapters. Chapter one is the introduction of the study and includes Background of the study, Statement of the problem, Purpose of the study, Objectives of the study, Research hypotheses as well as Significance of the study. It also includes Basic assumptions of the study, Delimitations of the study, Limitations of the study, Definitions of significant terms used in the study and Organization of the study.

In Chapter Two is the literature review of the study. It includes Introduction, Concept and socio-economic benefits of fibre optic infrastructure, Execution of fibre optic infrastructure, Leadership skills and execution of fibre optic infrastructure, Stakeholder management and execution of fibre optic infrastructure. In addition, it has Project scope and execution of fibre optic infrastructure, Theoretical framework, Conceptual framework and Chapter summary.

Chapter Three presents research methodology. It consists of Research paradigm, Target population, Sample Size, Research instruments, Data collection procedure, Data analysis techniques, Operationalization of study variables and Ethical considerations of the study.

Chapter Four deals with Data analysis, Presentation, Interpretation and Discussions of the study. It begins with an introduction and presents results and discussions in thematic areas consisting of Questionnaire return rate, Demographic information, Basic tests for statistical assumptions, Execution of fibre optic infrastructure, Leadership skills and execution of fibre optic infrastructure, Stakeholder management and execution of fibre optic infrastructure and Project scope and execution of fibre optic infrastructure. Other thematic areas in this chapter where results and discussions are presented include Leadership skills, stakeholder management and execution of fibre optic infrastructure, and Leadership skills, stakeholder management, project scope and execution of fibre optic infrastructure.

Chapter Five is the final chapter of this study. It has thematic areas consisting of Summary of the findings, Conclusions, Contribution of the study to Knowledge in Project Management, Recommendations and Suggestions for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, literature is reviewed on the concept and socio-economic benefits of fibre optic infrastructure, execution of fibre optic infrastructure, leadership skills and execution of fibre optic infrastructure, stakeholder management and execution of fibre optic infrastructure, and project scope and execution of fibre optic infrastructure. This chapter also discusses theories upon which the study was anchored; leadership skills, stakeholder, and logical framework theories and systems theory. The review of literature in the chapter is based on the relationships between key variables in line with research objectives. The key reason for review of literature was to enhance identification of gaps in previous studies, which this study proceeded to address.

2.2 Concept and Socio-Economical Benefits of Fibre Optic Infrastructure

Optic fibres are thin and long strands of glass about a diameter of human hair, arranged systematically in a bundle known as optical cable and it is used in the transmission of digital signals over a wide geographical spectrum (Torlak, 2013). The achievement of fibre optic infrastructure is through data transmission system that facilitates the dissemination of information through fibre optic cable. Similarly, Massa (2013) contends that electromagnetic spectrum consists of quite visible infrared light which is transmitted by fibre and other wavelengths such as amplitude modulation and frequency modulation used to transmit signals for radio and television and therefore, only a minute part of electromagnetic spectrum is seen and perceived as light waves by human eyes.

According to Fibre optic association best practices, fibre optic cable plant project management life cycle phases include design, installation, and testing. The main activity during fibre optic cable plant project planning is design (Massa, 2013). The fibre optic plant design includes identification of a process, developing a communication link, establishment of requirements and development of equipment. It also includes components' requirements, choosing the connecting route, obtaining authorization permits, developing plant component's requirements, coordinating facilities and personnel, developing installation documents and guidelines to help in inspection of the work done. Further, it involves development of an assessment and restoration plan, an installation schedule and drawing fibre optic installation contract including project requirements (Sankara, 2014).

According to Fornefield, Delauney and Elixmann (2008), there has been an increase in the likelihood of worldwide web, making it possible to incorporate internet into wider business processes and services, which in turn increases access to multimedia content to many consumers due to the development of fibre broadband infrastructure. There exist socio-economic benefits of fibre optic infrastructure in developed, sub Saharan Africa, regional and local contexts. For instance, internet use in learning has been taking place in social communities in the European countries (Fibre Optic Association, 2011). In United States, fibre connected to the premise or the home, as it is commonly known as lately deployed by Verizon FiOS and Google Fibre, are capable of reaching speeds of 500mbps and 1gbps respectively (Berenguer, Nölle, Molle, Raman, Napoli, Schubert and Fischer, 2016; Reese and Anderson, 2014; Khanna, Spinnler, Calabro, De Man and Hanik, 2016).

There has also been a rapid growth of undersea fibre-optic cables in Africa due to growth in the internet, traffic jams in global data, high-speed accessibility of internet, use of electronic mail and transfer of data. Other factors that have led to rapid deployment of fibre include acquiring information online, the use of virtual private networks, high interest in transmission of videos, programming of videos and increasing rates in the application of business video. It also includes new ways of financing businesses and its operations, voice over internet protocol, playing of games, use of mobile phones and third generation mobile technology. For example, African retail carriers can get access to equal and open access to inexpensive bandwidth through Sea submarine communication limited cable provided in Sub-Saharan Africa (Msangawale, Otaigo and Koloseni, 2011).

In East Africa, it was expected that by 2015, broadband penetration would reach 81% of all households. Furthermore, the very high-speed digital subscriber line (VDSL), infrastructure of Eastern Africa Submarine Cable System was expected to improve significantly before the year 2020 (Msangawale, Otaigo and Koloseni, 2011). Countries in East Africa including Tanzania, Uganda and Kenya jointly installed along their coastal regions a state of art telecommunications optical fibre network of high capacity, which aimed to connect East Africa region to the global banking network. This high-speed internet was crucial in driving the growth of economy through enabling businesses to attract investment opportunities and help impact lives of the people in the region. In Tanzania, for instance, high-speed internet led to improved connectivity through improved regional integration and provided innovation platform thus benefiting businesses, government services like online registrations and support

services, which in turn led to improved number of online users (African Development Bank, 2017).

Kenya has the most advanced ICT infrastructure services in East Africa. It has four undersea cables, namely; Sea Submarine Communication Limited, East Africa Submarine System, Lower Indian Ocean Networks 2 and The East African Marine System. The undersea cables have resulted in reduction of bandwidth costs compared to its land locked neighbours like Rwanda as noted by Rubadiri (as cited in Fageha and Aibinu, 2013). Kenya also will have two data centers in the upcoming satellite cities of Konza and Tatu that will be major Information and Communication Technology parks which, when completed, would be expected to differentiate Kenya as an Information and Communication Technology eco-system hub (Akamanzi, Deutscher, Guerich, Lobelle and Ombaka, 2016). According to Africa Development Bank (2017), the internet traffic in Kenya increased from four thousand megabytes per second in 2007 to seven hundred and eighty-eight thousand megabytes, and internet users from about a million in 2007 to about twenty-three million in 2015 because of advanced ICT infrastructure services. This called for a robust and secure infrastructure like fibre optic infrastructure capable of delivering such capacities.

2.3 Execution of Fibre Optic Infrastructure

Project execution involves processes that are necessary to complete management plan defined work, entailing coordination of resources and people as well as integrating performance activities according to specifications (Project Management Institute, 2013). Accordingly, fibre optic cable execution phase revolves around infrastructure implementation activities. Implementation phase consists of activities such as preparation for installations, actual installations and closure of installations (Republic of Kenya, 2011).

Pre-installation process involves choosing a contractor or supplier and discussing/signing a contract. It also involves handing over sets of plans to the supplier, reviewing components with him/her and conducting procurements (Project Management Institute, 2013; Mirza, Zohreh, & Mujde, 2013). Further, ordering components, scheduling time and place of delivery, stocking, inspecting and securing of the material, route surveys accompanied by the contractor and marking special requirements and reviewing contract together with the contractor and involving contractor schedule preparation are some of the pre-installation activities. Other pre-installation activities include establishment of safety policies with contractors and posting rules on the jobsites, educating and updating installers on procedures

to be followed while installing new equipment, operating and informing the contractor and all stakeholders involved about the date installation will start (Project Management Institute, 2013; Republic of Kenya, 2012).

The installation process involves controlling all the activities and ensuring that workers comply with requirements at each stage, reviewing the process and progress daily, giving reports on test data results and deficiencies to stakeholders involved (Wakefield, 2008). After installation process, activities include conducting final examination of workmanship, setting up and testing the communication systems and reviewing test data on cable plant (Sale, Mustafa, & Osman, 2015; Project Management Institute, 2013; Project in Controlled Environment 2, 2009).

Therefore, effective project execution leads to project success. Successful project implementation is determined by establishing whether the project was accomplished to the required level or whether the project in place was meant for a particular purpose (Project Management Institute, 2013). According to Stout (2012), project success includes consideration of the time it took to accomplish a project, budget for the project, specifications, whether the customers were satisfied, and maintaining the existing social structure and values within the organization.

The fibre optic closing process marks the project's completion and success. This process focuses on updating the restoration plan and project documentation with test results and modifications which occurred during execution. The main processes that are executed during fibre optic cable plant project closing phase consists of closing process group, updating and completing documentation, updating and completing snag list, storing snag list, documenting lessons learned and archiving a project that is relevant as well as closing out of the procurement system (Sankara, 2014).

The development of Long-Haul fibre optic Infrastructure enhanced the link among providers and reduced significantly shared risks through improved path performance. Some of the major long-haul projects executed include specifications and plans development, fibre optic network deployment and wireless network implementation in the United States (Fornefield, Delauney and Elixmann, 2008). In the year 2005, the Regional Council of Ostrobothnia in Finland started using a broadband approach to enable one Gbit/s connections among families in a span of 5 years. About 450 households were activated, which led to the establishment of the first Internet service provider and all the schools and other buildings were also connected

by the municipality. Today, 80% of the homes in municipality of Kristinestad have fibre connection. About 20% of households are yet to be connected and the difference in relation to asymmetric digital subscriber line is that anyone can buy 100 megabytes internet connections at a monthly cost of about 22 euros (Fornefield, Delauney and Elixmann, 2008).

In sub-Saharan countries for instance South Africa, Digi Bridge Telco heavily contributed in reducing the digital divide and helped the government entities in deploying state of the art telecommunications infrastructure. In East Africa and particularly Tanzania, there was successful utilization of Sea Submarine communication limited fibre cable where access to the use of internet is mainly by satellites (Msangawale, Otaigo and Koloseni 2011). Waema and Ndung'u (2012) presented some of major fibre optic projects in Kenya as Altech Kenya Data network metro and backbone fibre networks, Telkom Kenya Metro Fibre, Access Kenya Nairobi fibre network, National Optic Fibre backbone, and Kengen fibre infrastructure. Others are Kengen Ngong fibre infrastructure, Chartis Kenya fibre infrastructure for Caption Digital Kenya limited, Safaricom fibre rollout and Jacaranda-Gardens fibre infrastructure by Huawei, Kenya Power and Lighting Company fibre optic links and Kenyatta University campus fibre optic network (Waema and Ndung'u, 2012).

There is documentation of empirical studies on execution of fibre optic infrastructure. For instance, in United States, Kraus and Quiroga (2010) showed that inclusion of comparatively small size of conduits could lead to noticeable reductions in shared risk causing delays in execution of fibre optic infrastructure. The study adopted use of fibre maps provided by internet service providers and key cable service providers in coming up with a geographical map of long-haul United States of America fibre-optic infrastructure. Kraus and Quiroga (2010) relied on data sources that were underutilized previously, derived from public records of the Federal Government, as well as the municipal agencies to make an improvement in fidelity of the maps. Besides being limited to the United States, the study was limited to secondary data and hence did not make use of primary data.

Msangawale, Otaigo and Koloseni (2011) identified and examined possible theoretical issues towards successful utilization of Sea Submarine communication limited fibre cable in Tanzanian environment. The issues identified were unavailability of national fibre backbone network and backhaul connectivity, low affordability of internet connectivity; poor infrastructure system to operate and connect to SEACOM as well as poor internet

accessibility. However, they did not show the role played by leadership skills, stakeholder management and project scope in the execution of fibre optic infrastructure.

An analytic research by Jere and Biru (2015) came up with solutions through data collection, analysis and ethical considerations to assess the level of internet development and internet governance in Africa. In literature review, the paper compared fibre optic infrastructure in Republic of Kenya, South Africa and Zambia by analyzing unification of fibre infrastructure. The findings showed that destruction of network was a regular cause of fibre cuts from construction companies that failed to comply with by-laws and procedures of municipality because of Non-Unified backbone infrastructure.

The study concluded that a flexible regulatory structure should be established in agreement with current market pressure to attract investment opportunities in telecommunication and ICT industry in general (Jere and Biru, 2015). The study only identified social challenges mostly on non-compliance with legal framework during implementation of fibre optic projects but did not deal with management challenges. In addition, the study restricted itself to critical review of literature and hence did not make use of primary data. Lastly, the study did not show the influence of leadership skills, stakeholder management, and project scope on execution of fibre optic infrastructure, which is the focus of the current study.

2.4 Leadership Skills and Execution of Fibre Optic Infrastructure

Leadership is the capacity to influence others positively, give them moral support to contribute towards the organization to enhance success and effective operations (Petty, 2014). Leadership can also be described as the ability to influence people to get desired results, which acts as a guide to their character, setting of their vision and direction they want to take and the processes they follow to achieve their goals (Awan, Ahmed and Zulqarnain, 2015). Leadership skills vary and skills that may produce good results in a certain circumstance may be unsuitable in another circumstance (Eikenberry, 2016).

Studies showed that communication, education, and training were essential characteristics for successful leadership in construction industry (Petty, 2014; Eikenberry, 2016; Awan, Ahmed and Zulqarnain, 2015). Therefore, leadership is essential in good project management and has a great influence on the overall project process. Further studies also suggested that in a demanding market situation, focus should be on proper leadership, knowledge on how to run the project and use of skills to ensure the project is accomplished, implying that for successful project implementation, emphasis on the organization and human aspect is

necessary (Berg and Karlsen, 2015; Dainty, Cheng and Moore, 2005). The dimensions of leadership skills for this study were visionary capability, team building, communication, delegation, planning, decision-making, problem solving, coaching, and training.

In America, Archer, Verster and Zulch (2010), established that managers should address the issue of poor leadership and ineffective people skills as it leads to problems, losses, as well as insufficiency and inadequacy in the industry. Similarly, Kouzes and Posner (2012) showed in their study that leadership skills are essential in good project management and have a greater influence on the overall project process. A questionnaire was used for data collection from forty-five clients, consultants, and contractors in the Free State. Data was analyzed through excel spreadsheets and findings presented in tables and figures (Archer, Verster and Zulch, 2010). This study could have included interviews and document review guide to get more data on the study. Besides being conducted in a developed country, the study restricted itself to projects dealing with construction in general and not specific to fibre optic infrastructure in terms of objectives, goals as well as regulation.

Further study in United Kingdom by Khamaksorn (2016) revealed that planning and scheduling are significant skills in project management. The study also showed that in the construction process, decision making skills, problem solving skills, and delegation skills are essential. In that study, a manager in charge of a project was an important person accountable for the project success. Project manager in charge of a construction project should, therefore, possesses skills related to management and the technical aspect of the project. The study was based on the secondary qualitative approach. Data was collected from three textbooks and eight journal articles. This study was entirely informed by secondary data and primary data was not collected yet primary data is important in supplementing secondary sources in research. The focus of the study was on knowledge and skills in the construction industry. However, it did not address knowledge and management skills in fibre optic infrastructure projects which is the focus of the current study.

In Asia, Sayrani and Ataolahi (2015) examined the influence of transformational stewardship on performance of projects. The study population was about 100 people. A questionnaire was adopted in the collection of data and data analysis was done by use of structural equation modeling. The study established that relationship between transformational stewardship and projects' performance was significant. However, transformational leadership is only one aspect of leadership in an organization and hence the study did not cover other aspects of

leadership and leadership skills. Similarly, a study by Junwei, Guangdong and Hongtao (2017) showed that transformational and transactional leadership had significant influence on sharing of information and performance improvement in projects. The study suggested that project managers should inspire a higher stimulation of knowledge, behavior and social capital to improve performance innovation in the project organizations in construction industry.

In Malaysia, research findings showed that leadership was very important in construction projects, management and industry development. Therefore, reliable leaders and followers are significant in construction industry in developing countries. The reliable leadership concept appears to consist of positive elements and seems unrealistic. However, it is the most suitable concept for construction industries in countries that are still developing (Ofori and Toor, 2012). Further study in Malaysia showed that development of personal attributes, skills, and knowledge of managers in building industry raises their image and profile (Ishak, 2018).

According to Hauschildt, Gesche and Medcof (2000), fifty percent of the problems in implementing and accomplishing a project were caused by technical components of a project. In addition, fifty percent of problems were resulted from organizational aspects and style of leadership, with teamwork having a higher percent of human aspect linked to leadership. Neuhauser (2012) observed that managers had to manage technical aspects of the project that included planning, working schedules, preparing budgets, carrying out statistical analysis and monitoring of the whole project within the organization as well as providing leadership in a way that gives motivation to employees to complete the project successfully. Zadeh *et al.* (2016) concurs that technical competency in leadership is important for successful project outcomes.

Xiong (2014) addressed the role of a leader in construction projects. There was information collection to bring out leadership factors, surveys, interviews and presentation of internal management strategies and leadership philosophy as well as styles within the company. The results of the study showed that it is easy to promote a team member who demonstrates leadership skills, implying that project team members need leadership skills in order to achieve intended project objectives and goals.

Quality leadership influences the entire project process and it is key to individual career enhancement. In addition, it is more significant in the booming construction market and especially towards global project teams. Though Xiong (2014) findings are related to the

current study, which sought to determine how leadership skills influence execution of fibre optic infrastructure but focusing on Nairobi County, Kenya. Additionally, Xiong (2014) carried out his study in Thailand, a country with different legal framework and infrastructure governance from that of Kenya.

Khan, Long and Iqbal (2014) explored the importance of leadership competency in project success. The study concluded that for a project to succeed, leadership competency was necessary for positive impact on the project. However, besides being limited to Malaysia, the study only used secondary data and hence did not obtain opinions and views from other stakeholders in the sector.

A leader should communicate well to be able to pass information in a proper manner and this makes communication skills a basic requirement. A leader should also have ability to listen, understand, persuade and motivate team members (Fageha and Aibinu, 2014; Steyn, 2014). Therefore, to achieve project goals, project managers should possess good communication skills. A leader with communication skills can pass information, resolve conflicts and interact with employees comfortably (Steyn, 2014). Campbell (2015) established that communication in the organization should be vertical (up and down flow), horizontal and diagonal with stakeholders. Campbell (2015) did not relate project managers' communication skills to execution of projects.

Delegation is very important in an organization and when delegating, leaders should look at the skills of the employees and experience for them to give an employee a responsibility which is manageable for successful implementation of a project. Delegation involves giving other people the authority to take responsibility and be accountable for the results (Haley, 2017). An exploratory study by Law and Martin (2016) revealed that in management, employees in the higher authority delegate their responsibility to the people in the lower ranks and they monitor the work to make sure that it is done well. Therefore, delegation is an important principle in an organization but needs to be monitored for good results (Law and Martin, 2016). The study focused on a functional organization and did not relate delegation as a leadership skill vital in in execution of projects. However, a study in Norway and United Kingdom by Klakegg, Williams, Magnussen and Glasspool (2014) established that it was important that all levels in an organization are governed well and these ranged from the board level, down to the project level. This study restricted itself to developed countries, Norway

and the United Kingdom, and hence its results cannot be generalized to execution of fibre optic infrastructure in Kenya.

A leader should come up with road maps with the aim of successfully completing a construction process (Zakaria *et al*., 2015). It is also necessary to work together with other people in the same profession, as this helps to accomplish the project on time (Sears, Sears, Clough, Rounds, and Segner, 2015). To manage projects effectively, a project manager needs to be highly qualified. Planning skills are for planning activities to ensure completion within the deadline. A manager in charge of a project executes its plan by ordering activity implementation that results into deliverables. Sears *et al.* (2015) directly related the influence of leadership skills and stakeholder management to execution of fibre optic infrastructure. The study investigated the influence of leadership skills and stakeholder's management on construction projects. However, construction projects in general differ from fibre optic infrastructure projects in terms of scope and objectives that they seek to achieve.

Like all other projects, fibre optic infrastructure projects conform to the rules of project management, carefully planned and organized to ensure accomplishment within a specific timeline (Fibre Optic Association, 2011). Therefore, the construction of fibre infrastructure projects also need proper management and involvement of stakeholders in the implementation process and its accomplishment. Therefore, they also require a competent manager and a qualified leader who can perform his duties effectively (Xiong, 2014).

Competency skills enrichment as tools in leadership show value in project management achieved and nurtured through training and application by supervisors. Coaching done informally is a strong strategy for developing employee's talents and getting them to perform their roles at their best level within the organization. Enhancing competency skills involves providing employees with tools, knowledge and skills they require to nurture their skills to perform well. The work of a coach is majorly supervisory and not to do the work on behalf of the team (Von, Nonaka, Rechsteiner, 2014). In addition, leaders can nurture employee's skill through training (Haley, 2017).

In Australia, it was established that interpersonal influence has a positive and significant association with performance of projects in terms of timely delivery (Sunindijo, 2015). Additionally, it was showed that sincerity, emotional intelligence, interpersonal skills and budgeting influence performance of projects in terms of cost. Similarly, Sunindijo (2015) showed that quality performance of a project is influenced by transformational leadership,

visioning capability, interpersonal skills, emotional intelligence, interpersonal influence, apparent sincerity, and quality management, and document and contract administration. Research data was collected from 107 project managers by use of a questionnaire. Sunindijo (2015) was general in his study and focused on general skills of a project manager required to improve performance of a project. However, the current study was specific and addressed how leadership skills in project planning and management influence execution of fibre optic infrastructural projects.

In the state of Canada, Carey, Philippon and Cummings (2013) found out that effective coaching strategies could enhance professional growth between the management and their employees. The study used synthetic model to identify common elements of reported effectiveness of coaching framework and it entailed establishing of good relationships among the staff, problem identification, problem solving, setting of goals as well as transformation spurred by acting promptly. However, the study was limited to only one aspect of leadership, namely, coaching, and hence did not show how other aspects influence project success. In South Africa, studies show that a trusted project manager motivates employees to work together and communicates successfully. Furthermore, employees need to share information to realize project objectives. Therefore, allowing employees to own their work and share vision enhances formal flow of information in all directions, thereby enabling the manager to attain more from them as a result enhancing effective communication (Zulch, 2014).

According to the findings of Otim and Alinaitwe (2009), poor management strategies as well as poor planning of projects affects performance of the projects. However, the study failed to show the type of research method that it adopted. A study by Rukundo (2011) in Uganda focused on assessing the effect of competence, leadership and negation of road project performance and established that sixty seven percent of the respondents had not attended training to enhance their leadership skills. The study concluded that failure of road projects in Uganda was mainly due to incompetence of human resource, incompetence of the leaders and poor negotiation skills, which led to unrealistic schedules, plans and budgets right from the initiation of those projects. This, therefore, means that for successful completion of the projects, there is need for adequate competency skills among project managers.

In Kenya, it was concluded that characteristics of a manager affect project success, these characteristics can be obtained through continual learning and training (Njau and Ogolla, 2017). This implies that managers should come up with programs to train their employees to

acquaint them with leadership skills, which are important in ensuring successful completion of projects. Using a descriptive survey research with a sample of 60 participants selected from a population of 200 by use of stratified random sampling and primary data collected by directly administering questionnaire to the participants, Njau and Ogolla (2017) showed that training employees empowers them with skills for improvement of their leadership, actualize their plans of effectively managing changes in scope and involving key stakeholders in initial phases of a project early ensuring adequate scope verification process. Although the sample size was appropriate, the study could have incorporated other methods of data collection to get a variety of data. The study was also delimited to the use of work breakdown structure in determining project scope performance at Kenya National Youth Service and did not address how leadership skills influence execution of projects.

Odoyo (2013) in his study adopted descriptive research design, with questionnaire and interview guide as data collection instruments. A sample of 238 participants was selected from a population of 311 using stratified sampling. It was established that natural calamities such as floods delay effective implementation of projects since project managers spend more time on controlling and coordinating daily activities related to disaster mitigation. This study also agreed that poor leadership can lead to stalling of project. It was thus deduced that technical skills of team members affect implementation of a project since skills are important in execution responsibilities of a project team. The current study incorporates interview guide, document review guide and questionnaires to get a variety of data on how leadership skills influence execution of fibre optic infrastructure.

Gwaya, Masu and Oyawa (2014), in their study in Kenya, focused on construction projects in general. Their study showed that there are limited methods in project management that can be used in monitoring and controlling of integrative elements required in managing teams and challenges in the organizations for successful project outcomes. However, Gwaya, Masu and Oyawa (2014) did not assess the role leadership skills play in the context of fibre optic projects but they were quite general focusing on construction projects. The current study was more specific and determined how leadership skills influence execution of fibre optic infrastructure in Nairobi County, Kenya.

2.5 Stakeholder Management and Execution of Fibre Optic Infrastructure

There are different definitions of the term stakeholder in today's academic literature. According to Charre, Zarour and Bendjena (2012), a stakeholder refers to a group or an

individual directly affected or influenced by planning and implementation of the company goals. Project Management Institute (2013) postulated that a stakeholder is anyone or an entity that influence, influenced or touched by a judgment, action, or result of a development. In fibre construction context, stakeholders are parties that are influenced by the installation of fibre optic projects from the beginning until its closure (Aapaoja, Haapasalo and Soderstrom, 2013).

Stakeholder management is the exercise of ascertaining and passing information well to those groups or people with an influence on the project's outcome. Project success is influenced by its ability to show reinforcement and supervision by its stakeholders. Therefore, when stakeholders are satisfied, they help in improving progress and importance of the project and eventually help in contributing to its success (Kennon, Howden and Hartley, 2009). Pressure from parties not within the project team could have a great influence on a project. Consequently, it is vital to have effective communication both internally and externally to relevant stakeholders for successful project implementation (Fageha and Aibinu, 2013). The overall aim of stakeholder theory is to help leaders to identify, analyze, and understand stakeholders and manage them effectively (Patton, 2008). Stakeholder list with areas of interest, stakeholder analysis, dynamics of stakeholders in project life cycle, stakeholder reaction to project decisions and stakeholder engagement in a project were therefore, the components of stakeholder management for this study.

In America, initiatives to plan and conserve the environment are developed well, with important stakeholders identified and diverse viewpoints put into consideration before final meeting of the stakeholders. Including stakeholders was vital for both pragmatic and democratic reasons (Vogler, Macey and Sigouin, 2017). Therefore, Stakeholders should be encouraged to take part because consideration of diverse perspectives can lead to better decisions that can fit in the local context. Carrying out analysis of the stakeholder was an important tool in helping to develop strategies that could help in conserving the environment and identifying representative stakeholders, their likely positions and potential mitigation strategies (Vogler, Macey and Sigouin, 2017).

Similarly, in Brazil, Leonardo and Antonio (2013) established that management of stakeholders in a project should be based on a plan. Therefore, what has been planned should be followed by the managers involved. The plan should be adjusted where necessary during the project implementation, implying that a plan is important as it allows a smoother running

and supervision of projects involving more than one project manager (Leonardo and Antonio, 2013). Nyamasege and Mburu (2015) noted that some projects terminate prematurely due to ineffective stakeholder management and involvement in planning and execution processes, inadequate skills and empowerment of communities involved and poor monitoring and evaluation framework.

Stakeholder identification determines project stakeholders, their groupings and sub groupings (Bourne, 2015). Identifying stakeholders early enough is very important for significant trans-disciplinary investigation into the supervision of that resource. This helps the manager in charge to identify project characteristics necessary for the stakeholder. Managers would benefit from project team with adequate data regarding both the project and stakeholders when they perfectly understand individual stakeholders. Characteristics of stakeholders could include stakeholders' interests and stakes, involvement bases and origin of power (Hurni and Wiesmann, 2014). The study showed how a project manager can identify necessary stakeholder characteristics but did not relate stakeholders' identification as a component of stakeholder management to the execution of projects which this study was designed to address.

In a study in Central Romania on Land Use Policy, Nieto, Milcu, Leventon, Mikulcak and Fischer (2016) found out that identification of stakeholders should be rightful to sensitivities and changes among the companies' stakeholders. The research adopted a descriptive design and data collected from 100 respondents using structured questionnaires. It was noted that the initial stage of identifying stakeholders is crucial and creates a situation that makes the company and stakeholder feel equal in power and authority. Nieto *et al*. (2016) did not relate directly the influence of stakeholder identification to execution of projects.

Stakeholder analysis involves identification, assessment of stakeholder interests and the extent to which stakeholders influence project delivery (Kariungi, 2014). It gives deep understanding and perceptions that exist in a project environment and its stakeholders (Grimble and Wellard, 1997). It is significant for managers or accountable specialists to analyze the influence, concerns, and needs of stakeholders. If the demands are not properly analyzed and addressed, disagreements can arise and consequently interfere with project execution (Li, Ng and Skitmore, 2012).

Yang, Shen, Bourne, Ho and Xue (2014) established that stakeholder legitimacy attribute was imprecise and hence difficult to operationalize and made them to prefer proximity that was

much practical and implementable. The analysis and mapping level of stakeholder's contribution was done in stakeholder circular diagram where the project team weighed the attributes. The assessment of stakeholders' level of influence about relative weights and the attributes putting into consideration the damping effect established to counteract effect of extreme setting and allowances. This study did not relate the stakeholder analysis to project execution. It only focused on the attribute of legitimacy and its operationalization.

In view of dynamics, construction stakeholders may have varied interests, and this may change during the time of dealing with the project. On the other hand, local landowners were after ensuring that what they value was not interfered with by the project and the environmentalists were focused to safeguard the environment from pollution or causing damage to it (Chinyio and Akintoye, 2013). In addition, the media influence the way people perceive the projects; and others who are interested; including individuals whose connection is quite clear, but whose support may be beneficial in ensuring project success (Leung and Olomolaiye, 2010).

According to Nash, Chinyio, Gameson and Suresh (2010), interest of stakeholders can change as the project progresses as it depends on stakeholders' ability to influence and the power they hold in the project. The adjustments can take place any time in the process of developing the project. Adoption of necessary strategies is important to avoid surprises that may hinder progress of the project. It was therefore important to understand stakeholders' attributes for proper identification of appropriate strategy for engaging them (Nash *et al*., 2010). Because project process is dynamic and long, stakeholders use varied approaches in different stages to ensure their interests are put into consideration and therefore different strategies are used to engage stakeholders depending on the prevailing situations. Adopting appropriate strategy enables the project to succeed (Chinyio and Akintoye, 2013). For instance, communication can either be by using letters/flyers, project website or even meetings/workshops to obtain their views on the project.

Mirza, Zohreh and Mujde (2013) observed that the project scope is a major source of cost increase as it adds complexity and elements that were not seen earlier. Other challenges were to do with labour shortages and poor communication. Specifically, stakeholders should comprehend the project scope. However, stakeholder management in fibre optic infrastructure was lacking in the study. Therefore, the current study assessed the influence of dynamism as an aspect of stakeholders' management on the execution of fibre optic

infrastructural projects in Nairobi County, Kenya. Similarly, Liu and Wilkinson (2014) considered dynamic aspects of stakeholders, as the characteristics could vary within stakeholders' relationships. Furthermore, Liu and Wilkinson (2014) noted that it was relevant in the context of public private partnership projects because they are long-term, complex and have the potential of shifting responsibilities over a duration of time. Liu and Wilkinson (2014) did not investigate the extent to which stakeholder management influences execution of fibre optic infrastructure that was the focus of the current study.

Stakeholder engagement is the interacting practice with project stakeholders who are likely to influence overall implementation of the project, thus it is important in project management. According to transdisciplinary research, understanding the stakeholder perspective do not exclude opportunistic political factions among varying governments in the stakeholder engagement in infrastructural projects (Bracken, Bulkeley and Whitman 2014). Findings by Bracken, Bulkeley and Whitman (2014) indicated that engaging more stakeholders creates more opportunity to involve those who could oppose, thereby increasing chances for success. They also observed that some conflicts may arise when few levels of stakeholders are involved, and alignment of political issues agreed upon among different groups of stakeholders.

Aaltonen and Sivonen (2014) identified response strategies such as compromising, dismissal, influence, avoidance and adaptation. The authors indicated that proactive influence strategies, which comprises of active dialogue process and involvement of stakeholders in early phases lead to a reduction in opposing opinions of the stakeholders. The current study examined how stakeholder engagement as a component of stakeholder management influences execution of fibre optic infrastructural projects in Nairobi County in Kenya.

Okorie, Nwakanma and Mary (2013) indicated that all Nigerian hinterland can be linked with the main objective of increasing business, investment in the area as well as ensuring basic needs are met. Construction of kilometers of new optic fibre cables has been implemented through Wire Nigeria Programme (Okorie, Nwakanma and Mary, 2013). This project dealt with Nigerian government's role in promoting internet connectivity in the country to improve its economic productivity. However, it does not show the significance of stakeholder engagement and their level of involvement in projects.

The links existing between leadership skills, stakeholder management and execution of fibre optic infrastructure have been studied and documented. For instance, Eikenberry (2016)

studied project skills of a manager and showed that stakeholders' participation in the definition of scope ensures successful execution of projects including fibre optic infrastructure. Kariungi (2014), in his study, found out that the ability to formulate project scope determines success of a project. The findings of the study also showed that assistance and supervision of stakeholders is important since their satisfaction is key to improvement and relevance of projects which eventually translates into success. Bourne (2015), in his study in Australia, opined that the relationship between stakeholder management and leadership skills in project planning and management is tied to the fact that stakeholder identification is carried out at the scope definition stage.

Fageha and Aibinu (2016) in Saudi Arabia studied the effect of decision-making model on the definition of project scope among project leaders. Questions, partly structured, were used in the collection of data. The process was categorized into three stages. The first stage involved identification of key stakeholders who had interest in public building projects. The second stage involved identification of scope elements that are the project scope inputs. Lastly, the Analytical Hierarchy Process was used in identification and prioritization of responses from several stakeholders in the scope definition with a total of 46 participants.

Fageha and Aibinu (2013) had earlier suggested that managers should come up with a well-defined project that reflects wishes of the stakeholders and benefits that may accrue from their contributions, bearing in mind the main aim of the project. Therefore, all stakeholders in a project should be given enough opportunities to give opinions and views to enable inclusion of all elements in the project scope definition. The study was based on a wide coverage of projects in public building projects in Europe and hence its findings cannot be generalized. Fageha and Aibinu (2013) also examined the interactions and relationships among different definitions of project elements. The study did not focus on the relationship between stakeholder engagement and execution of projects.

Phase two and three adopted a case study research design to explain project scope and demonstrated reality of development procedure. In the end, the achievement was an evaluation framework used to measure the definition of the completeness of a scope in government buildings located in Saudi Arabia. This model prioritized the importance of stakeholders' involvement in each stage of project development and project managers used this information in decision making, reducing inefficiencies and reducing waste of time, while at the same time evaluating the completeness of a scope. Nonetheless, the study did not

consider how stakeholder management contributed to successful execution of projects like fibre optic infrastructure.

Stakeholders can also be affected by implementation of fibre projects from start to the end (Aapaoja, Haapasalo and Söderström, 2013). It also involves explaining clearly, the expectation of the stakeholders and the deliverables which they are seeking to obtain (Aibinu, Ofori and Ling, 2011). Leonardo and Antonio (2013) in studied the effect of not identifying stakeholders in early phases of a project. The findings indicated that failure in identification of stakeholders at the earlier stages of a project could lead to request of new requirements leading to delays in delivery of project goals and time overrun. In a situation where stakeholders are not informed early enough, Leonardo and Antonio (2013) showed that it may lead to conflicts resulting in project completion delays. The negative impacts in projects are because of poor stakeholders' involvement and management.

Further, a study by Machado, Ciuffo, Marques, Salmito and Stanton (2014) showed that the execution of new experimental facilities in Brazil, including their integration with European facilities, provides infrastructure for education and research. This allowed researchers to examine and compare with innovative procedures, skills and methodologies for the future internet. The study demonstrated the role of fibre projects in enhancing future internet for researchers and academia by linking Brazil with European Union countries. The study did not bring out the influence of stakeholder management in execution of fibre optic infrastructure.

In Rwanda, Kobusingye, Mungatu and Mulyungi (2017) findings showed that stakeholders' involvement in project initiation, planning, implementation, and review contribute to positive project outcome. It was noted that not all stakeholders were involved in the project in the earlier stages, which led to delay in the project completion. This study utilized an explanatory descriptive survey design and the target population comprised of stakeholders in the wash project in Rwanda. The study sample was 409 respondents. Semi-structured questionnaire, interviews and observations were utilized in the collection of primary data. However, the actual study population of the study was not indicated and hence the appropriateness of the sample size could not be assessed. This study focused on influence of stakeholders in Water project in Rwanda. However, it did not address the influence of stakeholders in execution of fibre optic projects, which the current study addressed.

In Uganda, Bashir (2010) established that stakeholders' involvement influences performance of poverty eradication projects, the ethical climate of a project and commitment of the

beneficiaries to the project. Nonetheless, Bashir (2010) failed to address how stakeholder management influences execution of fibre optic infrastructure, which was the focus of the current study. Nangoli, Namiyingo, Kabagambe, Namono, Jaaza and Ngoma (2016) studied health projects in Uganda and showed that stakeholder participation among Non-governmental organizations (NGO) health projects was still low and had a negative influence on project sustainability. The study was guided by quantitative research design and, questionnaires were used in the collection of data from eighty-six health projects run by 110 NGOs in Uganda. The study relied on questionnaires as a tool to collect data, which could not give a variety of data. The current study incorporated questionnaire, interviews and document review guide to get more data.

Koskei (2015) carried out his study in Kenya and established that stakeholders' involvement in curriculum development was minimal, and as a result, execution of new curriculum innovations had faced challenges as the key implementers did not take ownership of the process and so were not committed towards its execution. In addition, it also led to key stakeholders having a negative attitude towards the new curriculum, which negatively affected its execution. The study focused on influence of stakeholders on implementation of a new curriculum, the current study focused on influence of stakeholders on the execution of fibre optic infrastructure in Nairobi County, Kenya. A study by Wamugu and Ogollah (2017) concluded that participation in initiation, planning and implementation positively influenced performance of CDF projects' in Mathira East Constituency, Kenya. They also showed that the influence of stakeholders on CDF projects tend to diminish as the project progresses. Therefore, involvement of stakeholders ought to start in early stages of initiating a project.

In Kenya, Chepkoech and Waiganjo (2015) indicated that the association between project planning, stakeholder management, competence of project team and performance of projects is strong and positive. A descriptive survey design was used. Quantitative as well as qualitative techniques were used in collecting data and analyzing it. The data collection instrument comprised closed ended and open-ended questions. Chepkoech and Waiganjo (2015) further revealed that stakeholders were largely involved, and that implementation was rigorous.

Studies reviewed have shown that stakeholders' involvement significantly influence project execution but the findings of Mburu (2017) in Kenya have differed with the other studies as he observed that stakeholders' participation in project implementation had no significant

influence on sustainability of CDF projects. The study target population was 254 respondents with a sample of 105 participants. The study was guided by descriptive research design, with a structured questionnaire for collection of primary data from 75 respondents. Multiple linear regression analyzed retrieved data to establish the influence of stakeholders' engagement on sustainability of CDF projects. However, the study was restricted to CDF projects, and it did not address execution of fibre optic infrastructure.

Likewise, Kipkoech and Kwambai (2018), in their study in the University of Eldoret, Kenya, established that the relationship between stakeholder engagement and organizational effectiveness was positive and significant in the University of Eldoret. The study also showed that Stakeholders within the University were actively engaged in implementation of programs and projects' decision-making process. Stakeholder engagement is thus an integral part of decision-making in cross-functional teams in a project organization leading to increased productivity.

On the contrary, conventional stakeholder-participation models do not have capacity to address limitations resulting from their application in projects thus unreliable for successful execution (Kadurenge, Nyonje and Ndunge, 2017). Osedo (2017), in his study in Kenya, established that the effect of stakeholder relationships on effective execution of county construction projects is weak and statistically insignificant, though staff competency has a significant influence on effective execution of the projects. The study also showed that management support has positive influence on effective implementation of county projects. It was also revealed that project planning tools and techniques influence effective execution projects counties. Osedo (2017) focused on the effect of stakeholder relationship on effective implementation of county projects. However, the study did not address how stakeholder management influences execution of fibre optic infrastructure, a knowledge gap that the current study sought to bridge.

Githua and Wanyoike (2015), in his study in Njoro Sub-County, Kenya, examined how vandalism, illicit brew and stakeholder participation influence performance of community water projects. The researchers were guided by a descriptive survey research, with primary data collection from a sample of 91 participants through a structured questionnaire. The findings showed that the relationship between stakeholders' participation and performance of water projects in a community is positive and significant. Githua and Wanyoike (2015) did not consider the overall stakeholder management for community water projects but only

considered stakeholder participation which is a component of stakeholder management. The current study focused on assessing the extent to which stakeholder management influences execution of fibre optic infrastructure.

2.6 Project Scope and Execution of Fibre Optic Infrastructure

Scope of a project is the parameter of coverage of an undertaking, be it an eco-region programme, with the aim of conserving priority areas, initiative to combat emerging threat, or action to project species (Weijde, 2008). Weijde (2008) also postulated that clear definition of scope leads to timely completion of a given project, with savings in cost, and within specified quality standards. Karl (2014) noted that during the process of managing the project, definition of project scope is a pre-planning stage that requires substantial amount of resources as well as time for coming up with concreate decisions about investment requirements. The effort is the most effective approach that increases the probability of success and significantly decreases the risks that may increase during the process of project execution (Karl, 2014).

Olawale and Sun (2010), in their study, in United States, showed that the following top five factors, namely; changes in design, inaccurate estimation of project duration, risks and uncertainties, complexity of project tasks and non-performance of sub-contractors impede cost and time control in construction projects. They also showed that the correlation between impeding factors and controls of cost and time was positive and significant. It was concluded that practitioners in construction industry should consider changes in design as the main factor that hinder control of costs and duration in projects.

In Taiwan, to avoid rework and promote effective scope control, Hans (2013) indicated, in his study, that verification of scope is important. It was also noted that scope verification ensure that customers get what they requested for from the project team. Scope verification also assists project managers to ensure verification of product against scope and user requirements, and scope against user requirements thus minimizing project scope changes. A deliverable-oriented work breakdown structure is thus a scope verification tool that project managers can use to resolve scope verification challenges (Hans, 2013).

In Sweden, Berbec (2014) findings demonstrated that project definition, management of scope as well as requirement management were the main frameworks which organizations need to consider in ensuring successful implementation of projects. The processes ensure that there is alignment between project scope and business strategy, therefore, the study

recommended that managers and other key stakeholders in a project should focus on clear and complete project definition, scope and requirements management.

According to Karl (2014), project managers can set expectations among the stakeholders in a project if there is a well-defined scope. Definition of scope helps project managers in the assessment of resources required in ensuring successful implementation of a project and in setting realistic commitments. The scope of a project is one of the most crucial elements enabling project managers to have a detailed understanding of a project as it aids them to plan and allocate resources of a project. However, project scope can change as project development evolves due to emergence of unexpected circumstances. Management as well as controlling of the project scope play a key role in ensuring projects are completed successfully as they significantly affect project cost, schedule and competency of project managers, risk and other subordinate staff.

Scope definition involves identifying key components of a project such as deliverables and specifications, accurate time estimation, accurate estimation of resource requirements and project cost, project components' supervision and measurement of performance (Newton, 2015; Project Management Institute, 2013; Prince, 2009). There should be an agreement between project scope and manager demands of a better understanding of requirements to be included in the scope. The manager in charge of a project should ensure that delivery is not made beyond the scope, as this is a common source of delays, overspending and uncontrolled adjustment (Thomas and Fernandez, 2008).

According to Knapp (2011), the main contributing factor to project failure is poor project scope definition among the project managers. It is therefore, prudent to ensure definition of project scope at the earliest stage of project development cycle. The study also established that project scope should be given much attention during the process of project development and management. Furthermore, the findings indicated that time could be compromised but project scope was uncompromised since it was much concerned with the needs and wants of the customers.

Scope control involves factors that influence scope changes, identification of occurrence of scope change, helping in ensuring changes are beneficial to project objectives and taking care when the actual changes occur (Newton, 2015; Project Management Institute, 2013; Project In Controlled Environment 2, 2009). Project scope sometimes requires adjustment to cope with dynamic environment of the project. Changes in the environment include fluctuations of

the resources, change in the programme, project cost and changes in the requirements of the client. Changes in the scope may not be bad especially when identified early, tackled fast, and impact of change on the project activities agreed upon by stakeholders. Nevertheless, changes in project environment that were not controlled resulted into an issue quite fast. It was therefore critical to establish a mechanism for controlling change in the scope for a project to succeed (Newton, 2015).

Hao, Shen, Neelamkavil and Thomas (2008), in their study in Chile, indicated that changes in projects are inevitable. Therefore, when implementing a project, many decisions are made, and, in most cases, they are not based on facts. Change was common in all construction projects, though the projects differed in their sizes, complexities, and their scope. Thus, in construction industry, change management is a major challenge. The effort to manage change orders impose massive work load on the management of projects. Changes can lead to failure of a project as a result of delays in completion, visible defects in the project product and cost overruns. Changes in a project can also cause serious ethical problems and disputes in the building and construction industry.

Project scope is considered as part of planning in projects that establishes and documents specific goals, features, functions, deliverables, tasks, deadlines and costs of the project (Levy and Globerson, 1997). It is specific to work required in the accomplishment of project goals (Fageha and Aibinu, 2016). According to Fibre Optic Association (2011), scope for communications cabling or fibre optics may be part of a larger building project document based on a standardized master format. Current study adopted a scope definition by Martinsuo and Lehtonen (2015) which provides that project scope involves breaking down of major project deliverables in scope statement into smaller and workable components, breakdown of the work structure, and identification of required resources and milestones that gives a whole project perspective including acceptance criteria, change control criteria and management of actual changes in the scope.

Studies have been done on project scope and its impact on project execution in different contextual and conceptual spheres. For instance, De Andrade, Albuquerque, Frota and da Silva Filho (2015) in Brazilian public sector concluded that project scope gives a clear direction of any project and implementers found it easy to plan and execute projects according to the set deadlines. The study used descriptive design, targeting participants in management level through a well-structured questionnaire, review of periodicals, manuals

and policies, and studied one approach to the management of IT projects applied in the Brazilian public sector.

In Taiwan, Ker and Yang (2013) targeted heads of departments and students. The study found out that inadequate appreciation of project scope because of poor management system of incentives that encourage the benefits from the project normally leads to failure of many projects. The study concluded that project scope gives clear direction of any project and implementers find it easy to plan and execute projects according to the set timelines. However, the study was limited on Taiwan and did not show how project scope moderates the joint influence of stakeholder management and leadership skills on execution of projects.

Studies in Brazil and Taiwan (Andrade *et al.*, 2015; Ker and Yang, 2013) revealed that project scope gives a clear direction of any project and therefore, implementers found it easy to plan and execute projects within set constraints. This implied that any poorly defined project scope could lead to failure of a project. However, different projects have different objectives and requirements in terms of financial resources and human resource. The studies focused on IT, management framework projects, and not fibre optic infrastructure.

Planning of project scope entails development of a scope statement from business case and project charter documents (Project Management Institute, 2013). To ensure that all recommended adjustments, changes and corrective actions are supervised through a validated change control criterion, a project manager should carry out planning and documentation within scope management plan. Scope statement as a project foundation, enhances scope planning procedure which lists processes that determine project scope definition, verification and control (Schwalbe, 2010).

To accomplish scope management planning, several activities are conducted, namely, carrying out planning workshops, research on experiences in similar completed projects and establishing a plan for the scope (Newton, 2015). Management plan for the project scope is, therefore, the product of planning process that the project team use in documenting project scope decisions. It acts as stakeholders' guide on the management and controlling of scope in the lifecycle of a project. It is thus part of the project plan, though it may also be a standalone supplementary plan if required for specific project needs (Project Management Institute, 2013; Project in controlled environment 2, 2009).

In Florida, United States, Ahmed and Azhar (2014) showed that, whether a delay was justifiable or not, a contractor was not eligible for extra time of working on the project or a change in project cost without comprehending the contract context. Delays connected to codes were categorized as the most serious, followed by delays connected to the designs, construction, financial and economic, management and administrative and acts of God that occur when the scope is not controlled properly. Excusable and compensable is the most common delay at 48 percent, followed by non-excusable delays at 44 percent and non-compensable excusable delays at 8 percent. In most cases, once the contractor has been given the authority, the type of delay was unjustifiable. The type of delay was unjustifiable and compensable when the responsibility belonged to the consultant, owner or the government (Ahmed and Azhar, 2014).

The consultants oversaw the design process together with the project owner thus their contribution to delays related to designs. Delays related to code were attributed to the government. Economic issues and poor project management strategies lead to delays in payments, though their effect on the project completion was not same as delays caused by design, construction and code related issues (Ahmed and Azhar, 2014). Ahmed and Azhar (2014) limited their study to building projects in the Florida region, Collection of data was through survey and consideration was on construction projects in general. In addition, having been limited to the United States, the research findings may not be generalized for Kenya. The current study examined how project scope influences execution of fibre optic infrastructure focusing to Nairobi County, Kenya.

Kawana (2016), in his study in Namibian Kavango region, used a mixed research method design and gathered data using a questionnaire targeting project managers and locals. The finding showed that projects failed because leaders do not visit and discuss with locals on previous project experiences to develop strategies and plans in streamlining current projects. Kawana (2016) further argued that scope planning is critical and needed not to be sidelined in any project's success. This was in line with Sankara (2014) who found out that there was need for the development of a project plan outlining a comprehensive explanation of the project and product created by the project initiator to describe the performed work or the services provided by a contractor. The plan entails description of tasks, direct methods to be used and defines the period of performance, which contains design and performance requirements. Nonetheless, the dependent variable in the study by Kawana (2016) was

creation of jobs in the Namibian Kavango region, which was different from execution of fibre optic infrastructure.

Mayer, Figueredo, Jensenm, Kelly, Green and Federico (2014) in Africa, covering twenty-four sub-Saharan countries, and using a newly developed spatial methodology in their study, established that a good scope planning should be clear, complete, and logical enough for it to be well understood. They further argued that the scope should be clear and not ambiguous, precise to cover what was required, who was to cover it, the time it was to take to finish and how successful completion was to be done. The study, however, did not show the moderating role of project scope on the influence of stakeholder management and leadership skills on execution of fibre optic infrastructure.

Fibre Optic Association (2011) stresses that a well-planned scope can be more successful than any other part of the contracting process during execution of fibre optic projects. The Fibre Optic Association (2011) also suggested that in scope planning, seven parts of a fibre project scope to be considered were background-general description of the project; relevant comments of the development of the project; references where all applicable documents or other types of records/standards are kept; requirements including schedules; project description and progress/compliance; how the customer will judge the progress/completion of the project; and the compliance to requirements of the statement of work.

Scope verification involves confirmation and the ultimate acceptance of project work by the customer (Newton, 2015). It involves taking measurements, carrying out examination and testing deliverables of the project to ensure compliance with requirements that have been agreed upon and coming up with a plan that ensures it is complete, documented and in agreement with the stakeholders' expectations (Project management institute, 2013). The main aim of scope verification is therefore to plan on how project deliverables will be accepted. The project team needs to put into account all the procedures that have been accepted as listed within scope plan and ensure that all deliverables are accepted, documented and signed off by relevant stakeholders (Project in controlled environment 2, 2009).

There is empirical argument on how leadership skills, stakeholder management and project scope relate to project execution. Martinsuo and Lehtonen (2015) contended that for the execution of fibre optic infrastructure to be successful there is need to create project deliverables and the specifics required to complete the project objectives and that this required leadership skills and sound stakeholder management. Although strategic skills are a

crucial asset for the completion of any project, the concept is hard to define and apply in a very broad approach (Fageha and Aibinu, 2013). Strategic skills possession offers greatest influence in shaping and transforming stakeholders to participate in the implementation of the project by undertaking roles as listed in the project scope (Kariungi, 2014). Kariungi further notes that through strategic skills those who are in positions of power manifest their authority and satisfactorily discharge their duties in the execution process.

Furthermore, Schwalbe (2010) indicated that for stakeholders to be able to act on the information about the project there is need for a well-defined project plan which leaders respond to and make decisions for better project outcomes. The level of project execution may be high when the stakeholders involved in project follow procedures that are laid down and are able to question the best practices that promote project execution and take responsibility in case of misuse of the allocated and entrusted resources for any undertaken project (Kariungi, 2014). Rajani and Shobha (2012) in India also revealed that WBS provides foundation for planning, management of risks, budgeting, resource allocation and scheduling thus contributing to the success of a project.

Zuofa and Ochieng (2014), in their study in Nigeria, used focus group discussions to collect qualitative data from a team of eight project managers. The data was systematically recorded and analyzed using NVIVO technique. Zuofa and Ochieng showed that the association between development, successful project implementation and societal well-being requiring proper verification is unambiguous. Zuofa and Ochieng (2014), also established that project failure was because of contingent factors but the key ones were corruption and poor competency skills among the project managers.

The findings were synthesized in action points that consisted of the need of management mechanism that incorporates strategies that support successful completion of project objectives, with punitive measures against stakeholders engaging in corruption (Zuofa and Ochieng, 2014). The study used only focus group discussion to collect data and this method alone could not have obtained comprehensive data. The data was all qualitative and was analyzed using NVIVO. Besides being limited to Nigeria, the study used qualitative data and hence did not test hypotheses. The current study collected both quantitative and qualitative data and tested hypothesis to examine how project scope influences execution of fibre optic infrastructure in Nairobi County, Kenya.

Banda and Pretorius (2016) were concerned with determining the effect of definition of scope in public building construction projects developed by agencies in the state of Malawi. The study found out that the project scope definition significantly influences the performance of infrastructure projects in Malawi. Projects that had well-defined scope exhibited good performance compared to those with poorly defined scope. This research further established that projects managers had to make critical decisions during the process before changing the scope of the project. Even though the project managed to meet its objectives, there were instances it was clear to the project managers that achieving the set objectives was impossible without making several changes. Various changes in the activities of a project are done if they will achieve project objectives.

The findings by Banda and Pretorius (2016) also revealed that changes in project activities affect cost, time and quality of a project. They further, showed that change in project scope without changing cost of the project or timeframe increased the chances of not completing the project within the stipulated frame, emergence of new project activities and led to shortage of resources since the resources were already budgeted for at the earlier stages of project development. The study focused on determining the relationship between scope definitions and projects in building industry executed by contractors in Malawi. The study was limited to public building projects and did not address how project scope influence execution of fibre optic infrastructural projects, research gaps the current study addressed.

Nibyiza, Shukla, and Ndabaga (2012), in their study in Rwanda-Akazi Kanoze, used descriptive survey research and Census, with questionnaire and interview guide as data collection instruments. Primary data was collected from thirty members of staff, working in the department of project management and operationalization through interviews and administration of questionnaires while secondary data was obtained through review of published academic materials. The study established that during the process of project management there is a time project manager makes decisions to change the project scope in order to meet objectives of the project. This study showed that any slight change in project activity provoked the change in project cost, time and quality. The study was delimited to Rwanda, hence cannot be generalized for Kenya. Additionally, the moderating influence of project scope on the joint influence of leadership and stakeholder management on execution of fibre optic infrastructure was missing in the study. The current study examines how project scope moderates the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure in Nairobi County, Kenya.

Mukhwana (2013), on his part, investigated the determinants of implementation of tele-health projects in Kenya. Telemedicine projects sought to reduce load on valuable resources by making better accessibility to medical care for people who receive low quality health care, no matter their location. The study concluded that human resources effectively deployed and utilized in the tele-health projects required training and practice on what the tele-health equipment could do and what procedures were suitable. Therefore, the organization should invest in human resource skills in both size and level of technical sophistication. The study, however, was delimited to Safaricom, Nokia Kenya and Orange Limited tele-health projects, with a focus on technology, planning, human resource skills and project funding for tele-health projects in Kenya.

Further, Charles and Mohamed (2015) in Kenya through extensive review of literature established a similar trend in literature supporting the importance of scope verification as a successful factor in project execution. They recommended a thorough scrutiny of the implemented projects to ensure the procedures set are well followed and acceptable for all the stakeholders as outlined in the initial plan. They further argued that strict adherence to acceptable procedures develops confidence among the stakeholders resulting in better execution.

The reviewed studies did not address how project scope influences execution of fibre optic infrastructure. However, the current study focused on telecommunication and internet service companies in Nairobi County examining how the project scope influences execution of fibre optic infrastructure and how project scope moderates the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure.

2.7 Theoretical Framework

Theory of Leadership Skills, Stakeholder Theory, and Logical Framework Theory and Systems Theory were used to guide the current study. Leadership skills theory was the first theory that informed the current study. The study focused on skills theory by Katz (1974). Skills suggest what leaders can achieve. The skills theory states that, for a leader to perform effectively, he needs to equip himself with skills, knowledge, and abilities. The theory asserts that learned skills, a developed style, and acquired knowledge, are the real solutions to leadership performance. Wolinski (2010) believed in skills theory, and he noted that significant effort, and resources should be allocated to training of leaders and their

development. Katz (1974) suggested that effective leadership encompasses conceptual, human and technical skills.

On a construction project like fibre optic infrastructure, there are various entities required for their technical skills. The installation and testing of optic fibre needs technical skills specific to the task that involves high level of repetition. The soft skills of a project manager to influence direction of a project and effort can be addressed by human skills. Conceptual skills empower the project manager to see the broad picture of fibre optic infrastructure and be able to plan and optimize execution process.

Leaders possessing human skills appear to be more empathic and sensitive to what motivates followers, which helps in creating an atmosphere of trust, when deciding on what to do to ensure the achievement of specific organizational goals (Katz, 1974). Conceptual skills help a leader in thinking through ideas that play a role in forming an organization as well as its vision for future understanding and expression of economic principles that underlie organizations effectiveness and ability to transform written and verbal ideas (Northouse, 2010). Studies have used a skill model like that of Kartz (1974) comprising strategic, interpersonal, business and cognitive skills (Mumford, Campion and Morgeson, 2007) and established that interpersonal and cognitive skills are necessary at lower levels of management, but at higher level all the four leadership skills were necessary. Critics of skills theory like Burkus (2010) believe that it is weak in its predictive value, failing to give an explanation on how an individual's competencies can lead to effective leadership.

Leadership skills are, therefore, necessary for success of projects while management is broadly applied to position of the leader. The current study determined how leadership skills influence execution of fibre optic infrastructure focusing on Nairobi County in Kenya. The skills theory by Katz (1974) relates to application of leadership skills in effective execution of fibre optic infrastructure.

Stakeholder theory also informed the current study as it reflects and gives direction on how the project manager works. The theory was originally detailed by Ian Mitroff in a book published in 1983. It aims at helping and empowering managers to have the ability to identify, analyze, and recognize stakeholders in a project or any organizational undertaking and purposefully manage them (Patton, 2008). This pushes the management of an organization to articulate their way of doing business, specifically, what type of relationship

they need to establish with stakeholders in order to provide effective and efficient service delivery to customers (Freeman 1994).

The success of any firm is dependent on how best managers deal with key stakeholders and others that can influence achievement of the main objective (Freeman and Phillips, 2002). Stakeholder models that entail all legitimately interested in participation in an organization benefits are realized (Patton, 2008. Mitchell, Agle, and Sonnenfeld (1999) notes that activation of stakeholder power is by conditions exhibited in stakeholder attributes of urgency and legitimacy. Powerful and important stakeholders in a project are thus located where urgency, power and legitimacy intersect (Freeman and Phillips, 2002).

The stakeholder theory is useful in organizations with dispersed powers, especially public and complex organizations such as mobile telecommunication and internet service companies (Beach, 2009). The studies also show that with fibre optic infrastructure provision by mobile telecommunication and internet service companies, stakeholder theory explains the focus on communities in the surrounding environment and the association between the companies and communities (Jongbloed, Enders and Salerno, 2008). Stakeholders' identification in Mobile Telecommunication and Internet service provision industry is part of strategic management process. The process involves identifying groups that are suitable to organizational management as the first step; then determining participation and significance of each stakeholder group; assessing how to meet the needs and expectations of each group effectively; and modifying corporate policies and rank priorities in accordance with stakeholder interests (Freeman, 1984; Polonsky, 1995).

However, Burrows (1999) and Jongbloed *et al*. (2008) asserts that there are still only rare research literature references on empirical definitions and classifications on the importance of stakeholder management in Mobile telecommunication and Internet service industry. The stakeholder theory therefore emphasizes significance of relationship between stakeholder management and execution of fibre optic infrastructure. Stakeholder management with resulting benefit realizations tend to influence project success. Hence, the current research assessed how stakeholder management influences execution of fibre optic infrastructure.

The third theory that informed this study was The Logical Framework Theory, which is a model commonly used by large international assistance organizations to plan and manage development projects. The Logical Framework theory was developed in 1969 for USAID. The tool was developed using ideas from Peter Drucker's Management by Objectives model

(Drucker, 2007). This framework uses a top down, waterfall approach for planning project activities where planners begin by defining the objective of the project, develop the expected outputs of the project from the objective, identify activities required to achieve the objectives, and, finally, resources or inputs required to perform the activities.

According to Bullen (2016), Logical Framework Theory describes how programs produce results and help someone to think critically. It has close links to change theory, even though, change theory reveals the real picture of the world that is big and messy, with possible direction to change, including the reason one thinks it leads to change. The Logical Framework thus zooms in a specific direction creating neat and orderly program or project structure. Bullen (2016) observed that this makes it easier for the project team as well as donors to monitor the process of execution and implementation of projects.

Nyamasege and Mburu (2015) using the Logical Framework theory suggested that in order to understand risk management practices of water projects in Kitui County, the researcher should examine the extent to which stakeholders use a structured and systematic process of managing projects. The framework suggests that for stakeholders to manage their projects effectively, they must decompose them into basic activities in order to identify inputs required to implement the projects (Karogo and Orodho, 2014). Therefore, a good understanding of inputs enabled stakeholders to identify potential risks in the projects. However, Bakewell and Garbutt (2005) felt that although logical framework is universal, the systematic idea of cause and effect has reservations and equated it to a push button situation as if development or delivery of projects can be realized upon pushing the button.

Logical Framework fits into definition of project scope which is the moderating variable in the current study. According to Drucker (2007) the framework uses a top down, waterfall approach for planning project activities where planners begin by defining the goal of the project, then use the goal to develop expected outputs of the project, identify activities required to achieve objectives, and finally resources or inputs required to perform activities. On the other hand, project scope involves the determination and documentation of a list of specific goals of the project, deliverables, tasks, costs and deadlines of the project (Gotto, 2013). Through leadership skills of a project manager, Eikenberry (2016) noted that stakeholders managed to participate in scope definition for successful execution of projects including fibre optic infrastructure. The current study, therefore, exmined how of project scope influences execution of fibre optic infrastructure and how project scope moderates the

joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure in Nairobi County, Kenya.

The fourth theory applied was the Systems Theory. Ludwig von Bertalanffy (Von, 1973) founded system theory from his focus on fundamental interdependency that exists in many aspects of science, studied independently. The theory postulates that ways in which parts of a complex system or process links together and their impact on effectiveness of total system or process can be comprehended, analyzed and improved. It demonstrates the thinking about complex processes and focuses on association between parts of an entity or system and does not reduce a system into its components (Walker, 2009). According to Flood and Jackson (1991), a system is a complex and intertwined component that demonstrate synergy whereby the whole is better than combination of the individual components making up the whole system.

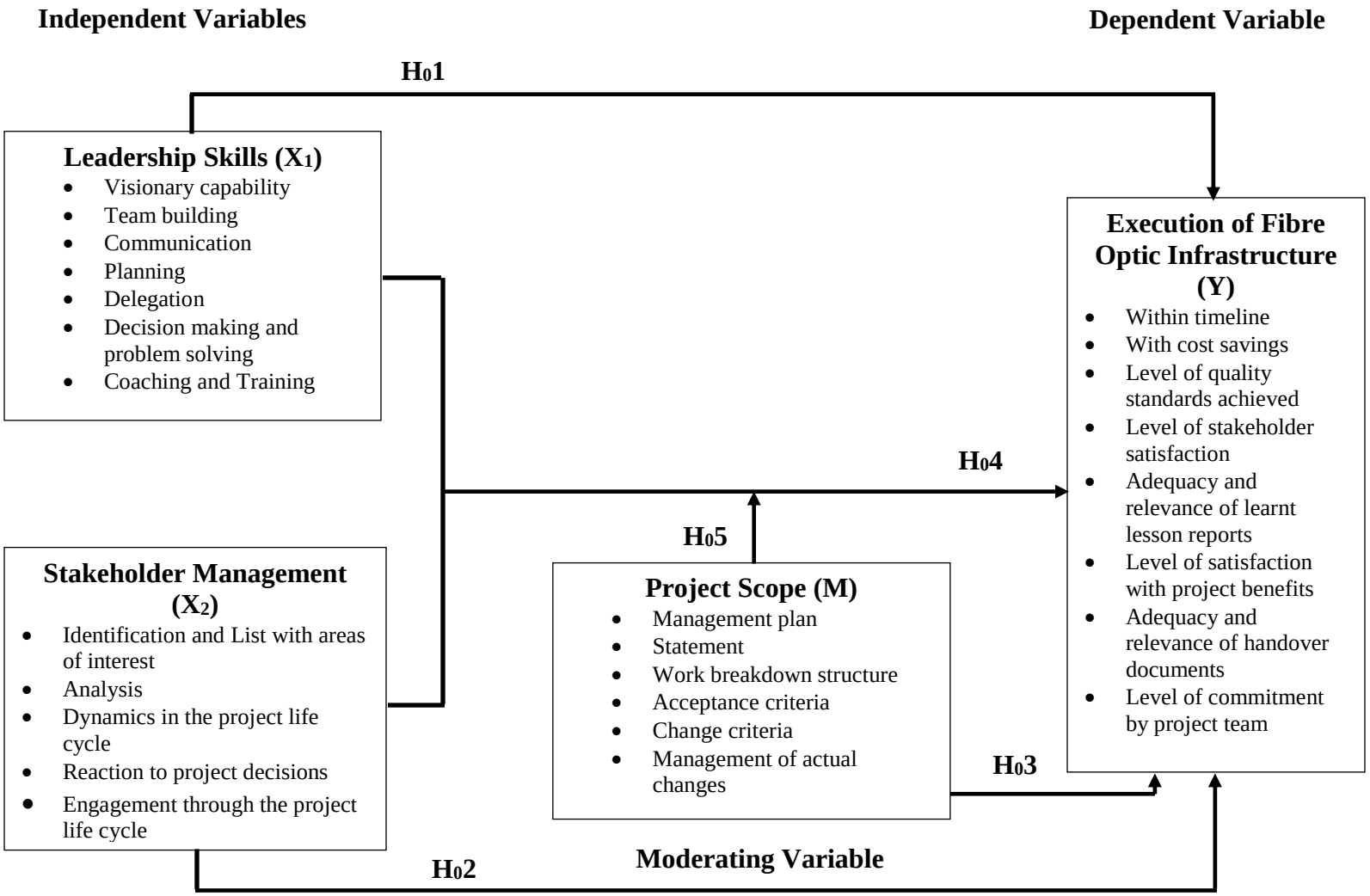
For the purpose of this study, a system consists of different autonomous components working in collaboration to achieve a goal. The components act jointly together to achieve specific objectives in a competitive environment. For instance, an organization, in this case, fibre optic infrastructure, has independent departments with different team members who have different competencies and qualifications working together with the sole aim of ensuring successful implementation or realizing the vision of the organization. The organization in the current study, fibre optic infrastructure is, therefore, a system with cohesive but independent departments which coordinate for success in implementation (Chikere and Nwoka, 2015).

McShane and Von Glinow (2003) noted that as firms grow, they develop complex subsystems whose coordination become important in order to transform inputs into usable outputs. Thus, subsystems depend on each other and any minor occurrence can lead to unintended consequences in the firm. Mullins (2005) findings showed that any activity in one department in an organization affects all other organizations' department. The current study, therefore, investigated the influence of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure in Nairobi County, Kenya.

2.8 Conceptual Framework

The purpose of the conceptual framework in this study is to define study variables and indicators measured in each variable (Creswell, 2013). Figure 1 presents the conceptual framework of this study showing the influence of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure.

Figure 2.1: Conceptual Framework showing relationships between the Study Variables



Source: Perceived by the Researcher

The conceptual framework displays conceptualized interactions of all variables in this study. It shows that the degree to which individual independent or dependent variables are realized depend on the extent to which their corresponding indicators are expressed. The independent variables, namely; leadership skills (X_1) and stakeholder management (X_2) interact with the dependent variable, namely, execution of fibre optic infrastructure (Y) on the right-hand side of the diagram. Interactions are at two levels. Individual independent variables interaction with the dependent variable represented by hypothesis **$H_0$1** and **$H_0$2** and combined independent variables influence on dependent variable represented by hypothesis **$H_0$4**. The combined influence is however, moderated by project scope (M) that either enhances or reduces the influence of leadership skills and stakeholder management on execution of fibre optic infrastructure, depending on the degree of project scope defined, represented by **$H_0$5**. In addition, there is project scope interaction with dependent variable, execution of fibre optic infrastructure, represented by **$H_0$3**.

Table 2. 1: Summary of Knowledge Gaps

Variables	Author and Date	Focus of the study	Methodology	Findings	Gaps in knowledge	Focus of current study
Leadership skills	Xiong (2014)	Importance and role of leadership in project management in Georgia, USA	Information gathering, Surveys and interviews	Any person who displays leadership skill is given promotion more easily. Good leadership is paramount to career pursuits of individual. It also influences the process of a project and its teams	Did not present the relationship between leadership skills and execution of projects	The study focuses on how leadership skills influence execution of fibre optic infrastructure
	Khan, Long and Iqbal (2014)	Researched on the association between leaders' competency skills and performance of projects in India	Data collected from construction database and analyzed	Leadership competency among project leaders has a positive impact on project success	Did not present relationship between variables. Data collected from a database. The study focused on construction projects in general in India and not fibre optic	The study focuses on fibre optic infrastructure in Nairobi County, Kenya. Empirical data collected from professionals in internet and Telecommunications industry using interviews and Questionnaire. The analysis of the data was by content analysis, descriptive and inferential statistics.
	Gwaya, Masu and Oyawa, (2014)	Relationship between voluntary leadership and construction performance in the Republic of Kenya	Examined whether servant-leadership application affected project performance. A survey was done on 500 members	There are numerous methods adopted in management of project to track and control competency skills of staffs to manage stress, maintain effective communication, establish harmonious relationships, and amicably solve disagreements and give moral support to project team for successful project results	Research questions that were used in establishing the association between servant leadership and project outcomes in construction industry in Kenya. Study did not determine the interrelationship between leadership skills, project scope, stakeholder management and execution of projects	Current study examined the extent to which project leadership skills influence execution of fibre optic infrastructure projects in Nairobi County. Instead of using a research question, the null hypothesis guiding this section is that Leadership skills do not have a significant influence on execution of fibre optic infrastructure. It was a descriptive cross-sectional survey covering mobile telecommunication and internet service companies in Nairobi County

Stakeholder management	Mirza, Zohreh and Mujde (2013)	Significance of Project Scope in Project Success	Analysis of Mega Projects along with other transportation projects in Boston, United States	Concluded that stakeholders must comprehend project scope throughout project life cycle	Context of stakeholder management in fibre optic infrastructure missing	The current study considers identification as a component of stakeholder management and its influence on execution of fibre optic infrastructure in Nairobi County, Kenya.
	Fageha and Aibinu, (2013)	Project Scope Definition management in the improvement of stakeholder participation and enhancement of outcome of the Project	Quantitative, Qualitative approach and Case study	There is need for the managers to develop a project in a way that reflects stakeholder's expectations, the importance of their views bearing in mind the purpose of the project. Consider views of stakeholders to ensure all elements of the project scope definition are given necessary attention	This study was based on a wide coverage of the projects, that is, public building projects in Europe and not Fibre optic projects that current study focusses on	The study considered a wide coverage of projects in public building projects in Europe. The current study examines stakeholder analysis as a component of stakeholder management and their influence on execution of fibre optic infrastructure in Nairobi County, Kenya.
	Okorie, Nwakanma and Mary (2013)	Sustaining expansion of Broadband Infrastructure through Universal Service Provision Fund	Documentation reviews, Discussion with experts	All hinterland can be linked with expectation that it would increase commerce, trade and communication in the area	However, it does not show importance of the stakeholder dynamics in a project and level of involvement of stakeholders	Therefore, the current study fills this gap by empirically emphasizing the need to consider stakeholder dynamics and stakeholder level of involvement as components of stakeholder management and how they influence execution of fibre optic infrastructure
	Githua and Wanyoike (2015**)**	Determinants of the performance of community Water Projects in Njoro-Sub County	Descriptive design. Data collection by use of structured questionnaire. Sample of 91. Data analysis by descriptive and inferential analyses	The participation of stakeholders has positively and significantly influence performance of community water projects in Njoro-sub-county	The study considered water projects but not fibre optic infrastructure which the current research focusses on	Therefore, as a bridge to this gap, research objective in the current study is to assess the extent to which stakeholder management influences execution of fibre optic infrastructure in Nairobi County, Kenya

Project scope	Ahmed and Azhar (2014)	Construction delays in Florida Construction Industry	Data was collected using literature review and questionnaire survey	The most critical delays sources are construction permits authorization, order changes, drawing changes, documents that are not complete, inspections, specifications changes, development stage decisions, shop drawings authorization, development of design and changes in laws governing the project	This study was limited to construction projects in the Florida region. Data, gathered through literature review and questionnaire survey.	Ahmed and Azhar (2014) was carried out in Kenya and focused on fibre optic infrastructure in Nairobi County. Other than questionnaire, the study used Interviews to collect data and not only focused on delays and their causes in project management but also examined the delays in terms of execution of fibre optic infrastructure.
	Zuofa and Ochieng (2014)	Failure of a project and way forward for the development of a solution	It was focus group discussion, Qualitative research. Data analyzed by software NVIVO.	The emerging key issues suggested that projects failed because of corruption and lack of professionalism in Nigeria	Focused on social issues as cause of project failure but failed to consider technical issues. The data was all qualitative, collected using focus group discussions and analyzed using NVIVO	The current study loops in technical factors with scope management plan as a component of Project Scope. The study adopts both quantitative and qualitative methods of data collection. Quantitative data was analyzed by descriptive and inferential statistics using SPSS while qualitative data was analyzed using content analysis
	Nibyiza, Shukla, & Ndabaga, (2015)	Change management in project scope for ensuring the success of projects in Akazi Kanoze	The population was 30 employees, Census sampling technique adopted, Data collected by use of interviews, questionnaires and content analysis	At times those carrying out project implementation are forced to make changes on the project scope to attain their goals. These changes lead to a change in the cost of the project, quality, and time it took to accomplish the project.	Did not focus on fibre projects, but analyzed the changes in scope as a tool for enhancing success of the project	The current research evaluates the role of Project Scope in the execution of fibre optic infrastructure projects in Nairobi County of Kenya

	Mukhwana, (2013)	Challenges Facing Implementation of Tele-health Projects, in Kenya	This study was guided by descriptive research design	Mukhwana, (2013) concluded that human resources effectively deployed and utilized in the tele-health projects. Therefore, organizations should invest in human resource skills in both size and level of technical sophistication.	The study was limited to Safaricom, Nokia Kenya and Orange Limited tele-health. Only focused on technology, planning, human resource skills and project funding	The current study deals with tele-communications companies and internet service providers in Nairobi County. Specifically, it focused on the Project Scope and how it influences execution of fibre optic infrastructure
Leadership skills and stakeholder management	Machado *et al.* (2014)	Infrastructure building for Experimentation between Europe and Brazil in the enhancement of Future Internet Research Collaboration	Documentation reviews and Experimentation	The study found out that adequate infrastructural resources for researching and educating give researchers a chance to do evaluation and develop innovative procedures and strategies for utilization in the future internet.	Has been used to demonstrate the role of fibre projects in enhancing future internet for researchers and academia by linking Brazil with EU countries	The current study was used to demonstrate adherence to the purpose of leadership skills by involving and managing stakeholders in the execution of fibre optic infrastructure in Nairobi County, Kenya
	Fageha and Aibinu, (2016)	Identification of how involvement of stakeholders enhances the completeness of the definition of a project scope in Saudi Arabia	Data was collected through interviews from a sample of 46 respondents	In the end, a framework for use in evaluation and measurement of scope definition for public construction projects in Saudi Arabia was developed based on stakeholders' input according to weights achieved	Kenya context of the role of leadership skills and stakeholders in project scope definition	This study focusses on the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure in Nairobi County
Leadership skills, stakeholder management and Project scope	Kawana, (2016)	The role of leadership in water technology innovations in enhancing job creation in Kavango East region in Namibia	Used a mixed research method design and gathering data using a questionnaire targeting project managers and locals	Projects fail because leadership does not visit and discuss with locals on previous project experiences and develop strategies and plans to streamline the current projects and argued that scope planning is critical and cannot be sidelined in project success	Study focused on the role of leadership and technology innovation concentrating on water-based technology in the Namibia context	Current research considers the influence of leadership skills among other variables such as project scope, stakeholder management and execution of fibre optic infrastructure. The context of the study is also in Kenya's fibre optic sector.

	Charles & Mohamed (2015)	Efficacy of monitoring and evaluation function in achieving project success in Kenya	Extensive review of literature	Supported the importance of leadership as a successful factor in project execution	The focus was not on how project scope, stakeholder management and leadership skills work together to achieve execution of fibre optic infrastructure	The current study applied interrelationship model in conceptualizing the influence of leadership, stakeholder management and project scope on execution of fibre optic infrastructure
	Ker and Yang (2013)	The relationship between total project scope and total project control in Taiwan	The study used descriptive design	Lack of appreciation of project scope because of poor management system of incentive that encourages the benefits from the project normally leads to failure of many projects	The study was delimited to Taiwan and did not show the moderating influence of project scope on the joint influence of leadership skills and stakeholder management on execution of projects	The current study was conducted in Kenya and sought to establish the moderating influence of project scope on the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure

2.9 Chapter Summary

A review of literature on aspects of the study concerning the influence of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure was presented in this chapter. The literature review is summarized below.

In United States, Sears *et al.* (2015) directly linked successful implementation of projects to the joint influence of leadership skills and stakeholder's management. Sankara (2014) postulated that execution of projects including fibre optic infrastructure requires project leaders to have relevant leadership skills to be able to define and manage key stakeholders. Similarly, Eikenberry (2016) opined that skills of a manager in projects ensures stakeholders take part in the process of scope definition for successful execution of projects including fibre optic infrastructure. In Iran, Sayrani and Ataolahi (2015), while investigating the effect of transformational leadership on success of results of the listed companies showed that transformational leadership increases staff motivation, which in turn leads to an increase in commitment and productivity and hence success of projects. Another study in Australia by Fageha and Aibinu (2014) showed that communication skills are required for leaders in managing projects to achieve project goals.

In Malaysia, it was revealed that while a leader should come up with plans of successfully completing a project, it was necessary to work together with other stakeholders to accomplish the project on time (Zakaria *et al*., 2015). Additionally, Zakaria *et al.* (2015) noted that stakeholders' interests and influence on a project may change during execution and skilled leaders must demonstrate ability to manage the change to achieve project success. Findings of Ahmed *et al.* (2013) in Pakistan showed that project managers with essential qualities, leadership competencies and management skills ensure effective accomplishment of business and project results. The main challenges facing execution of projects include poor teamwork due to lack of empowerment and delegation of authority (Hauschildt *et al*., 2000; Neuhauser, 2012; Law and Martin, 2016).

In South Africa, Steyn (2014) showed that a leader with communication skills can pass information, resolve conflicts and interact with employees comfortably, which in turn influences execution of projects. Archer, Verster and Zulch (2010) sought to describe the importance of people and leadership skills in construction industry and concluded that leadership is an important skill and project managers should continually develop as leaders and constantly improve their skills. In Namibia, it was found out that most projects fail

because leaders do not visit and discuss with stakeholders on previous project experiences when developing strategies and plans to streamline new projects (Kawana, 2016).

To guarantee project sustainability, Kobusingye, Mungatu and Mulyungi (2017) in their study in Rwanda, revealed that sustainability of a project can be achieved by involving key stakeholders in all the project phases. Bashir (2010) in Uganda, argued that stakeholder identification and analysis is the first step to the management of identifying and resolving conflicts in a project. In Kenya, Kariungi (2014) showed that the ability to formulate project scope determines the success of a project, the assistance and supervision of the stakeholders since their satisfaction is key to improvement and relevance of the project, which eventually translates to its success. In another study in Kenya, Moenga and Moronge (2016) showed that stakeholder participation is a significant factor in utilization of ICT infrastructure.

Though literature on leadership skills, stakeholder management, and project scope and project success has been examined in this chapter, the interaction between the variables and the moderating role of project scope are less empirically presented. The current study, therefore, bridges this knowledge gap by investigating the influence of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents methodology adopted to carry out this research. The chapter begins with introduction and then explains the research paradigm and design. It then proceeds to present target population, sample size, and research instruments, data collection procedure, data analysis techniques, and operationalization of the study variables. Ethical considerations that guided the conduct of the research are also discussed in the last section of the study.

3.2 Research Paradigm

This study was guided by the pragmatic paradigm. A paradigm in research is a set of beliefs and viewpoints shared among scientists on understanding and addressing research problems (Kuhn, 1962). Characteristics of research paradigms include ontology, epistemology and methodology. Ontology and Epistemology create a universal sense of how to view knowledge and how researchers see themselves relative to the knowledge and methodological approaches used to realize the knowledge (Bryman, 2012). Understanding of philosophical assumptions, therefore, improves quality of research and can help bring out creativeness of the researcher.

Pragmatists believe in the renegotiation of reality. Discussing, expounding, and consequently problem-solving becomes the best method to use (Wambugu, Kyalo, Mbii and Nyonje, 2015). They also believe that establishment of knowledge can be through seeking an understanding of the world by developing subjective meanings from researcher's own experiences and those of his subjects on the situation under study and not only through computation of objective reality.

In addition, Pragmatists believe that since the world is not an absolute unity, its complete understanding demands use of different ways of gathering and analyzing data (Wambugu *et al*., 2015). This calls for use of several methods, techniques and procedures in generating information used to unravel situations. Pragmatism is therefore the philosophy that informed the researcher to seek to understand association between variables under study by undertaking objective measurement and developing meaning to opinion and experiences of telecommunication and internet service providers in Kenya on the relationships of study variables as expressed in the questionnaire, interview schedules and document review guides.

3.2.1 Research Design

In this study, a cross-sectional survey design was used for data collection on Mobile telecommunications and Internet service companies in Nairobi County to investigate how leadership skills, stakeholder management and project scope influence execution of fibre optic infrastructure in the County. Bryman (2012) noted that a cross-sectional survey design involves data collection on more than one case from people similar in some characteristics but different in an important interest factor such as income level, or geographic location. In this study, the researcher used a cross sectional survey design to assess how leadership skills, stakeholder management and project scope influence execution of fibre optic infrastructure and to determine the nature of relationship between leadership skills, stakeholder management, project scope and execution of fibre optic infrastructure in Nairobi County.

Quantitative and qualitative data in the study was collected across mobile telecommunication and internet service providing companies at a specific time to determine the association between leadership skills, stakeholder management, project scope and execution of fibre optic infrastructure. Studies have exemplified cross-sectional survey design for producing consistent results (Owino, 2013; Kariuki, 2015; Owiti, 2015; Wanyoike and Kiarie, 2016). It was thus, the most appropriate design for this study.

3.3 Target Population

The population of interest for this study covered functional members of staff in fibre optic infrastructure departments of Mobile telecommunication and Internet service provider companies in Kenya that own and deploy fibre optic infrastructure, with their headquarters located in Nairobi. The functional staff in infrastructure departments were preferred because they are responsible for planning, implementation and operation of fibre optic infrastructure. They were therefore considered knowledgeable and in a better position to provide answers to questions on their perception and experience of service in the companies. This position is supported by Navarro (as cited in Owino, 2013). Yurdusev (2013) defines target population as the entire set of units or people under investigation by a researcher

Kenya has two mobile telecommunication providers, namely, Telkom Ltd and Safaricom Ltd, and four internet service providers, namely, Liquid Telecom, Jamii Telecom, Access Kenya and Wananchi Group that own, deploy, lease and operate fibre optic infrastructure in the country, mainly in urban areas (Gathara, 2012). The target population of the current study was 187 functional members of staff in fibre optic infrastructure departments of the two

mobile telecommunication providers, four internet service providers and two policy making and regulating authorities. The functional staff were distributed as follows: Telkom Ltd – 25, Safaricom PLC – 45, Liquid Telecom – 30, Jamii Telecom – 25, Access Kenya – 30, Wananchi Group – 30, ICT Authority – 1 and Communication Authority – 1. The distribution of the target population of the study is illustrated in Table 3.1.

Table 3. 1: Target Population

Organization	Service offered	Target Population
ICT Authority	Policy	1
CAK	Regulatory	1
Telkom Ltd	Mobile Telecommunication	25
Safaricom PLC	Mobile Telecommunication	45
Liquid Telecom	Internet	30
Jamii Telecom	Internet	25
Access Kenya	Internet	30
Wananchi Group	Internet	30
Total		**187**

3.4 Sample Size

A sample is a section of the target area of interest selected by a researcher to represent an entire population (Creswell, 2012). The size of the sample in this study was small and, therefore, the study adopted Census as a sampling technique. Census is a systematic procedure used to acquire and record information about units of a given population (Bryman, 2012). Therefore, the study focused on all 187 respondents targeted. In case of ICTA and CAK, the study selected executives purposively for the interview.

3.5 Research Instruments

This study used qualitative and quantitative data with document review guide, questionnaire and interview guide as data collection instruments. Instruments were structured according to the study objectives. Pilot testing, validity of instruments and reliability of instruments are also discussed in this section.

3.5.1 Document Review Guide

The document review guide was used to obtain secondary data. Secondary data brought together information from desk research on fibre optic infrastructure statistics and projects in general, information on policies and assessment of documents published by telecommunication companies, agencies of government and other internet governance stakeholders in Kenya. Survey reports, annual reports and quarterly statistical reports from

CAK and Ministry of Information and Communication, case studies and analysis of project manuals, proposals, implementation plans, budget and strategic plans of organizations in relation to fibre optic infrastructure also formed part of secondary data.

3.5.2 Questionnaire

The Primary research data from functional members of staff in Fibre optic infrastructure departments was collected using a questionnaire. The questionnaire had five sections, namely, background information, leadership skills, stakeholder management, project scope and execution of fibre optic infrastructure. Also, the questionnaire had 5 point grouped Likert scale and Visual analogue scale. The Likert scale had 5 signifying strongly agree, 4 signifying agree, 3 signifying neutral, 2 signifying disagree, and 1 signifying strongly disagree. The interpretation of arithmetic mean in questions on Likert scale shows that strongly disagree is between 1 and 1.5, disagree is between 1.5 and 2.5, neutral is between 2.5 and 3.5, agree is between 3.5 and 4.5, and strongly agree is between 4.5 and 5.0 (Vonglao, 2017). Statements in each of the sections of research instruments adopted an affirmative approach. The instruments' measurement scales were ordinal, nominal and interval. The Visual analogue scale measured the opinion ratings on an interval scale ranging from 10 (highest rating) to 0 (lowest rating) (Dexter and Chestnut, 1995).

3.5.3 Interview Guide

An interview schedule was conducted by telephone and face to face conversation initiated by the researcher to collect data from heads of department of target organizations and executives at ICT Authority and CAK responsible for policy and industry regulation. This was done to obtain additional in-depth information about fibre-optic infrastructure.

3.5.4 Pilot Testing

The pilot study was conducted on one organization, Huawei that did not own fibre optic infrastructure but was contracted to deploy fibre optic infrastructure by service providers. The researcher administered 19 questionnaires to respondents involved in deployment of fibre optic infrastructure, in line with Mugenda (2008) who postulated that 10% of a study sample is adequate for a pilot study. In addition, Huawei being a private establishment, it was easily accessible, and respondents were cooperative and readily available once prior arrangements were made and hence practicality of testing research instruments. Pilot research is a preliminary study carried out to assess practicability, time required to carry out the study,

study cost, study risks and statistical variability. It helped in planning appropriate study sample and adjusting study design before the actual study (Teijlingen and Hundley, 2001).

3.5.5 Validity of Instruments

Validity is the appropriateness, meaningfulness, correctness and practicality of conclusions a researcher makes (Fraenkel and Wallen, 2009). The study applied two types of validity tests to the research instruments. First, a pilot study with 19 questionnaires administered to Huawei Project Managers tested the face validity of study instruments. The managers were requested to fill the questionnaire for the purpose of research and highlight unclear questions. The questionnaire was then adjusted and administered to two scholars in the University and their feedback used to adjust and correct vague questions to enhance the instrument adopted for the study.

Internal construct validity was the second validity test. It is also known as measurement validity and it refers to how a measuring tool accurately measures what it is supposed to measure (Bryman, 2012). Therefore, measurement validity relates to reliability and for this study, key variables were subjected to a reliability test, for measurement validity. Use of situational and job-related questions in the study ensured predictive validity of Interview and Document review guides. The researcher also executed interviews and document reviews using highly structured questions to ensure predictive validity.

3.5.6 Reliability of Instruments

The degree to which an evaluation tool gives consistent and steady results is the reliability of the evaluation tool (Kothari, 2004). Reliability of data that examines internal consistency and average correlation in this study, was determined using Cronbach's alpha coefficient with values ranging from 0 to 1. This measure of internal consistency is also said to determine scale reliability (Winer, Brown and Michels, 2011). If the alpha coefficient value is high, then consistency exists among the items. An acceptable alpha coefficient should be 0.7 or more while alpha (α) value of less than 0.7 is questionable (Patton, 1990). The results of Cronbach's Alpha reliability test in this study are as illustrated in Table 3.2.

Table 3. 2: Cronbach's Alpha for Pilot Survey

Construct	Cronbach's Alpha	No of items
Leadership skills	0.812	10
Stakeholder management	0.909	10
Project scope	0.828	10
Execution of fibre optic infrastructure	0.870	10

From the results in Table 3.2, leadership skills had an Alpha value of 0.844, Stakeholder management had a value of 0.898, Project scope had a value of 0.828, and Execution of fibre optic infrastructure had a value of 0.870. The results on reliability indicated that Cronbach reliability alpha for the variables (independent variables, moderating variable, intervening variable and dependent variable) was greater than 0.7 and hence there was no need to change measures and indicators in the questions.

3.6 Data Collection Procedure

Several procedures were followed to ensure smooth collection of data. The researcher obtained an introduction letter from Nairobi University. Thereafter, the researcher sought approval of study undertaking from National Council for Science and Technology, who issued authorization letter and research permit. In addition, the researcher sought permission and acceptance by top management and responsible departments that deal with fibre optic infrastructure deployment and operations in the target organizations. Primary data was collected through administration of the questionnaire to the respondents, with the help of three research assistants.

The researcher oversaw data collection exercise, made spot checks to ensure conformity to standards and guidelines. The collection of data from 179 participants was done through a closed questionnaire. Interview guides were used for collection of data from eight key informants. The questionnaire was forwarded to respondents who were allowed ample time to respond. However, during the period, follow-ups on phone and impromptu visits were conducted so that respondents could complete the questionnaire in good time. The researcher collected qualitative data by telephone and face-to-face interview with executive staff at ICTA, CAK at the Agencies' offices and heads of departments in target organizations.

The researcher fully briefed research assistants on data collection procedure and ethical considerations. Collection of research data took about 4 months using questionnaire, interview schedules and document reviews. There was an initial 2 months of pilot data collection and analysis. Pilot study was necessary for streamlining and projecting the future of the study, ensuring that instruments of the study are valid and reliable. Data for the final study analysis excluded data collected during pilot survey. The entire study was expected to be completed within 18 months. However, additional 2 months was required for data cleaning and statistical analysis once data collection was complete. Final report was then compiled upon completion of data analysis.

3.7 Data Analysis Techniques

Analysis of data was carried out in three steps, namely; data preparation, data analysis and reporting of results. Mixed methods of data analysis were adopted incorporating descriptive, inferential and content analysis. The instruments were assembled, sorted and prepared for analysis after completion of data collection. Descriptive and inferential statistics were used to analyze quantitative data. The results were presented in tables and arranged according to research objectives. A summary of research objectives, hypotheses, analytical methods and interpretation of results are as illustrated in Table 3.3.

Descriptive analysis was used to express study variables and profiles of respondents using arithmetic mean measure of central tendency and standard deviation measure of dispersion and frequency tables used to present background information of the participants. Two types of inferential statistics were also used in the study. First, Pearson's Product Moment correlation coefficient "r" was used to determine the strength of the relationship between independent and dependent variables. Simple linear regression analysis equation, $Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$ was used to determine hypotheses **$H_0$1, $H_0$2** and **$H_0$3**. Multiple linear regression equation, $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon_0$, was used to determine **$H_0$4** while multiple linear regression equation, $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 M + \beta_4 X_1 M + \beta_5 X_2 M + \varepsilon_0$, was used to determine **$H_0$5** (Owen and Jones, 1994).

Qualitative data was analyzed using content analysis, which Bryman (2012) defines as an approach to document analysis and writings whose purpose is to quantify content in logical and repeatable prearranged categories. Reduction of data, data display and conclusions' drawing are the main phases of analysis of qualitative data. Field notes were therefore, summarized into briefs and summary sheets. Interim case summary sheets were drawn, and sequential analysis undertaken to provide deeper insight on leadership skills, stakeholder management, project scope, and their influence on execution of fibre optic infrastructure and emerging themes put together on aggregate basis for systematic analysis of the data. In mixed research studies, results from quantitative and qualitative analysis may be explained individually. The current research combined qualitative and quantitative data and jointly interpreted them at that stage as supported by Bryman (2012).

Table 3. 3: Research Objectives, Hypotheses, Analytical Methods and Data Interpretation

Objectives of the study	Research Hypotheses	Statistical test	Analytical Method	Interpretation
1) Determine how leadership skills influence the execution of fibre optic infrastructure	**$H_0$1:** Leadership skills do not have significant influence on the execution of fibre optic infrastructure	Simple regression	$Y= \beta_0 + \beta_1X_1 + \varepsilon$; Where, X_1 – Leadership skills; Y - Project Execution	Coefficient is significant if related ρ-value ≤ 0.05. If ρ-value associated with β_1 is ≤ 0.05, then **$H_0$1** is rejected and the relationship between X_1 and Y is considered significant at 95% confidence level
2) Assess the extent to which stakeholder management influences the execution of fibre optic infrastructure	**$H_0$2:** Stakeholder management does not have significant influence the execution of fibre optic infrastructure	Simple regression	$Y= \beta_0 + \beta_2X_2 + \varepsilon$; Where; X_2 – Stakeholder management	Coefficient is significant if related ρ-value ≤ 0.05. If ρ-value associated with β_2 is ≤ 0.05, then **$H_0$2** is rejected and the relationship between X_2 and Y is considered significant at 95% Confidence level
3) Examine how project scope influence the execution of fibre optic infrastructure	**$H_0$3:** Project scope does not have significant influence on the execution of fibre optic infrastructure	Simple regression	$Y= \beta_0 + \beta_3M + \varepsilon$; Where; M – Project scope	Coefficient is significant if related ρ-value ≤ 0.05. If ρ-value associated with $\beta_{3\ is} \leq 0.05$, then **$H_0$3** is rejected and the relationship between M and Y is considered significant at 95% confidence level
4) Establish how leadership skills and stakeholder management jointly influence the execution of fibre optic infrastructure	**$H_0$4:** Leadership skills and stakeholder management, acting together, do not have significant influence on the execution of fibre optic infrastructure	Multiple regression	Step 1; Unrestricted model $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \varepsilon$; - 1 Step 2: $\beta_1 = 0$; $\beta_2 = 0$, restricted model is $Y = \beta_0 + \varepsilon_0$; - 2	Coefficient is significant if ρ-value associated β_1 or β_2 or both ≤ 0.05 but ≠ 0 Coefficient is significant if ρ-value associated with $\beta_1 \leq 0.05$ but ≠ 0. If $\beta_1 \neq 0$, then **$H_0$4** is rejected and there is significant joint influence of X_1 and X_2 on Y.
5) Examine how project scope moderates the joint influence of leadership and stakeholder management on the execution of fibre optic infrastructure	**$H_0$5:** There is no significant moderating influence of project scope on combined influence of leadership skills and stakeholder management on the execution of fibre optic infrastructure	Multiple regression	The interaction equation is as follows: $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3M + \beta_4X_1M + \beta_5X_2M + \varepsilon_0$; Where, M – Leadership Skills Omitted group calculated by replacing 0 for M and X_2 $Y = \beta_0 + \beta_1X_1 + \varepsilon_0$ When $X_2 = 1$: $Y = (\beta_0+ \beta_2) + (\beta_1 + \beta_4) X_1 + \varepsilon_0$ When M = 1: $Y = (\beta_0 + \beta_3) + (\beta_1 + \beta_5) X_1 + \varepsilon_0$	The difference between slope of omitted group and X_2, is indicated by β_4, and difference between slope for the omitted group and M, is signified by β_5. A joint test whether slopes for the 3 groups vary from one another is done by concurrently testing $\beta_4 = 0$ and $\beta_5 = 0$. Slopes for groups symbolized by X_2 and M, are equated by testing variance between β_4 and β_5. If β_4 or β_5 are significant ≠ 0 indicated evidence of moderation suggesting that M moderates joint influence of X_1 and X_2 on Y, then **$H_0$5** was rejected

3.8 Operationalization of the Study Variables

The scope-based model for project planning measured the study variables. The model has three basic components, namely; scope, action, monitoring and evaluation plans. In this model, the scope was used as a reference for development of the action, monitoring and evaluation plans. Project Management Institute (2013) validated the use of scope-based planning (SKOPOS).

In this study, there were two main independent variables namely, leadership skills and stakeholder management. Leadership skills were characterized by visionary capacity, team building, communication, delegation, planning, problem solving, decision-making, coaching and training, while stakeholder management consisted of stakeholder list with areas of interest, stakeholder analysis, dynamics of stakeholders in the lifecycle of a project, stakeholder's reaction to project decisions and stakeholder's engagement through the project life cycle.

Project scope was defined by management plan, statement of scope, WBS, acceptance criteria, change control procedure and management of actual changes. The dependent variable was execution of fibre optic infrastructure, and its indicators comprised execution within timeline, with cost savings, level of quality standards achieved, level of stakeholder satisfaction, adequacy and relevance of learnt lesson reports, level of satisfaction with project benefits, adequacy and relevance of handover documents, and level of commitment by project team. Table 3.4 presents comprehensive operationalization of research variables.

Table 3. 4: Operationalization of the Study Variables

Variable	Indicator	Measurement	Data Collection Tools	Scale	Data Analysis tools
Leadership skills	• Visionary • Team building • Communication • Delegation • Planning • Decision making and Problem solving • Coaching and Training	• Visionary leadership • Team motivation • Level of communication • Availability and clarity of plans • Level of delegated authority • Accuracy and completeness of decisions • Adequacy of coaching and training programs	• Questionnaire • Interview schedules • Document reviews	Nominal, Ordinal and Interval	Descriptive analysis Correlation analysis Regression analysis Content analysis
Stakeholder Management	• Identification and list with areas of interest • Analysis • Dynamics • Reaction to project decisions • Stakeholder Engagement	• Availability and accuracy of stakeholder list with areas of interest • Level and degree of stakeholder analysis • Extent of Stakeholder Dynamics • Degree of reaction to project decisions • Extent of Stakeholder Engagement in the project	• Questionnaire • Interview schedules • Document reviews	Nominal, Ordinal and Interval	Descriptive analysis Correlation analysis Regression analysis Content analysis
Project Scope	• Management plan • Statement • WBS • Acceptance criteria • Change control procedure • Management of actual changes	• Effectiveness of scope planning • Level of scope definition • Availability and accuracy of scope verification criteria • Availability and commitment to scope change procedure	• Questionnaire • Interview schedules • Document reviews	Nominal, Ordinal and Interval	Descriptive analysis Correlation analysis Regression analysis Content analysis
Execution of fibre optic infrastructure	• Time • Cost • Quality • Stakeholder satisfaction • Learnt lesson • Benefits • Handover • Commitment	• Within timeline • With cost savings • Level of quality standards achieved • Level of stakeholder satisfaction • Adequacy and relevance of learnt lesson reports • Level of satisfaction with project benefits • Adequacy and relevance of handover documents Level of commitment by project team	• Questionnaire • Interview schedules • Document reviews	Nominal, Ordinal and Interval	Descriptive analysis Content analysis
Background Information	Profile of the respondents	Profile of the respondents	• Questionnaire	Nominal, Ordinal	Frequency Tables

3.9 Ethical Considerations

Ethics in research requires a researcher to have integrity. Winer, Brown and Michels (2011) outlined the aim of ethics in research as ensuring no one is negatively affected from activities carried out during research. Hulley, Cummings, Browner, Grady and Newman (2007) indicated that it is the role of the researcher to ensure research instruments are non-invasive and information gathered is solely for academic purposes. Before distribution of research instruments in this study, the researcher sought permission from management of target telecommunication and internet service organizations. Participation of respondents was made voluntary and the respondents were given leeway in withdrawing their participation any time if they felt so during data collection. The researcher ensured respondents provided informed consent, were not affected negatively, and that there was no invasion of privacy. A participant information sheet was made part of the questionnaire in order to enlighten respondents of their rights and highlight the study purpose as being exclusively academic.

The study was presented to participants frankly to avoid suspicion. There was an introductory letter issued by the University of Nairobi and an approval for undertaking the study comprising authorization letter and a permit to carry out the research issued by the National Council for Science and Technology. These measures ensured that participants had adequate understanding of what the research was about. Utmost care was also taken to uphold confidentiality and anonymity of the respondents. The researcher ensured confidentiality and anonymity by safeguarding specific details that could be used to identify the participants without changing the meaning of participants' words in anyway, using pseudonyms in transcripts, storing interview instruments and participant details separately and advising respondents not to indicate their names on the data collection instruments.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSIONS

4.1 Introduction

This chapter covers data analysis, presentation, interpretation and discussion of findings relating to research objectives. The chapter discusses questionnaires return rate, demographic information, basic tests for statistical assumptions, execution of fibre optic infrastructure, relationship between leadership skills and execution of fibre optic infrastructure, stakeholder management and execution of fibre optic infrastructure as well as project scope and execution of fibre optic infrastructure. Also, presented in the chapter are leadership skills, stakeholder management and execution of fibre optic infrastructure as well as leadership skills, stakeholder management, project scope and execution of fibre optic infrastructure.

4.2 Questionnaires Return Rate

The census for the study consisted of 187 fibre optic infrastructure departments' functional staff in mobile telecommunication and internet service providers in Nairobi County and 8 key informants. Out of 187 questionnaires, which were distributed during the study, 172 were completed and returned to the researcher. In addition, six interviews were carried out. Therefore, the response rate was 92%. According to Bryman and Cramer (2012), a 50% response rate is satisfactory for data analysis and making inferences about a population. Thus, the response rate (92%) was acceptable for data analysis, inferences and reporting.

4.3 Demographic Information

This section presents demographic characteristics of respondents in the study, namely, their gender, length of service in respective organizations, the organizations they were working for, level of education, and the category of their organizations.

4.3.1 Gender of the Respondents

This study examined whether the respondents' two genders were normally distributed. As part of the background information, the participants were requested to specify their gender. The findings are shown in Table 4.1.

Table 4. 1: Gender of the Respondents

Gender	Frequency	Percent
Male	124	72.1
Female	48	27.9
Total	**172**	**100.0**

In Table 4.1, the findings show that 72.1% of the respondents were male while 27.9% were female. This implied that most of functional staff in fibre optic infrastructure departments in mobile telecommunication and internet service companies in Kenya were male. Thus, fibre optic infrastructure execution in Kenya is male dominated. The companies should therefore work towards bridging the gender gap in execution of fibre optic infrastructure in order to comply with the Kenya constitutional requirement of gender balance in all employment sectors in the country.

4.3.2 Respondents' Length of Service in the Organizations

The participants in the study were requested to indicate the length of service in their organizations. The results are as depicted in Table 4.2.

Table 4. 2: Respondents' Length of service in the Organizations

Duration of service in the organization (Year/s)	Frequency	Percent
1 years	30	17.4
2 years	20	11.6
3 years	34	19.8
4 and above	88	51.2
Total	**172**	**100.0**

In Table 4.2, the results show that 51.2% of functional staff had stayed in their respective institutions for more than four years, 19.8% had stayed for a period of three years, 17.4% had stayed for a period of one year and 11.6% had stayed for a period of two years. These findings suggested that most of the functional staff in mobile telecommunication and internet service companies had stayed in their respective companies for more than four years. Therefore, most of the respondents in this study had worked in their organizations long enough and hence had the required information on leadership skills, stakeholder management, project scope and execution of fibre optic infrastructure in their organizations.

4.3.3 Respondents' Current Place of Work

The main organizations that own and deal with fibre optic infrastructure in Kenya include Telkom Ltd, Safaricom PLC, Liquid Telecom, Jamii Telecom, Access Kenya and Wananchi Group. The study therefore sought to determine the distribution of population in these companies. The participants were therefore asked to indicate their current place of work. The findings are as shown in Table 4.3.

Table 4. 3: Respondents' Current Place of Work

Current place of work	Frequency	Percent
Safaricom	44	25.6
Wananchi Telecom	29	16.7
Access Kenya	28	16.4
Jamii Telecom	25	14.5
Telkom	24	14.0
Liquid Telecom	22	12.8
Total	**172**	**100.0**

According to the findings in Table 4.3, 25.6% of the respondents were working in Safaricom PLC, 16.7% were working in Wananchi Telecom, 16.4% were working in Access Kenya, 14.5% were working in Jamii Telecom, 14% were working in Telkom Ltd and 12.8% were working in Liquid Telecom. This implies that Safaricom PLC had the highest proportion of functional staff in fibre optic infrastructure department, among mobile telecommunication and internet service companies in Nairobi County.

4.3.4 Highest Education Level of the Respondents

The participants were requested to indicate their highest education level. A participant's education level was important in this study as it relates to ability to respond to questions in the research instrument. The options that were provided included diploma, bachelors, masters and PhD. The results are presented in Table 4.4.

Table 4. 4: Respondents' Highest Education Level

Highest level of education	Frequency	Percent
Diploma	28	16.3
Bachelors	116	67.4
Masters	24	14.0
PhD	4	2.3
Total	**172**	**100.0**

In Table 4.4, the findings show that 67.4% of the functional staff had bachelor's degrees, 16.4% had diplomas and 14.0% had master's degrees. In addition, 2.3% of the participants indicated that they had PhD degrees. The results showed that most of the functional staff in mobile telecommunication and internet service companies in Nairobi County had bachelor's degrees. It can therefore, be assumed that the respondents had basic knowledge on leadership skills, stakeholder management, project scope and execution of fibre optic infrastructure in their organizations and could provide accurate information as respondents in the study.

4.3.5 Service Category

The companies that deal with mobile telecommunication in Kenya are Telkom Ltd and Safaricom Ltd while those that deal with internet service provision include Liquid Telecom, Jamii Telecom, Access Kenya and Wananchi Group. Therefore, the participants were requested to indicate the service categories in their organizations. The results are as presented in Table 4.5.

Table 4. 5: Service Category

Service category	Frequency	Percent
Mobile Telecommunication	68	39.5
Internet Service Provider	104	60.5
Total	**172**	**100.0**

In Table 4.5, the results show that 60.5% of the firms deal with provision of internet services while 39.5% indicated that their companies deal with provision of mobile telecommunication services. This implied that most of the companies studied provide internet service. This might be because four of the firms studied, namely, Liquid Telecom, Jamii Telecom, Access Kenya and Wananchi Group deal with internet service provision while only two, Telkom and Safaricom Ltd deal with mobile telecommunication.

4.4 Basic Tests for Statistical Assumptions

Linear regression has five key assumptions, which include normal distribution, no autocorrelation, low or no multicollinearity, homoscedasticity and linear relationship. In case any of the assumptions of regression is violated, then confidence intervals and other scientific understandings from a regression model may be inefficient, biased or even misleading. Reliability test, control of type I and II errors, and analysis of likert type and visual analogue scales data are also discussed in this section.

4.4.1 Tests of Normality

The assumption of linear regression is that variable data is from a normal population. Data that is not normally distributed can distort relationships between variables. Normality of data can be determined using Kolmogorov-Smirnov test and Shapiro-Wilk test. For samples that are below 50, Shapiro Wilk Test is more appropriate, even though it can handle as large as 2,000 samples (Bhattacherjee, 2012). Additionally, Shapiro-Wilk is a specific normality test, whereas Kolmogorov-Smirnov is general and hence less powerful. The null hypothesis in Shapiro–Wilk states that the variables have no normal distribution of data. David (2012) postulates that for variables to have normally distributed data, p-value must be more than the

significance level of p=0.05. The study therefore, used Shapiro–Wilk to examine the normality of data. The findings are illustrated in Table 4.6.

Table 4. 6: Shapiro-Wilk Test

Variables	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Leadership skills	0.175	172	0.101	0.921	172	0.098
Stakeholder management	0.183	172	0.103	0.930	172	0.141
Project scope	0.266	172	0.113	0.836	172	0.231
Execution of fibre optic infrastructure	0.167	172	0.084	0.927	172	0.120

According to the findings in Table 4.6, leadership skills (p=0.098), stakeholder management (p=0.141), project scope (p=0.231), and execution of fibre optic infrastructure (p=0.120) exhibited normal distribution of data, since p-values for the variables were greater than the significance level of p=0.05.

4.4.2 Autocorrelation Test

Autocorrelation in regression residual can be detected using Durbin–Watson statistical test, which assumes values ranging from 0 to 4. In this test statistic, the rule of the thumb is that values between 1.5 and 2.5 ($1.5 < d < 2.5$) show no autocorrelation in the data analyzed (Cooper and Schindler, 2006). Autocorrelation in this study was tested by use of Durbin–Watson. The results are presented in Table 4.7.

Table 4. 7: Durbin–Watson Statistic

Model	Durbin-Watson
1	1.850

The findings in Table 4.7 show that Durbin–Watson statistic value was 1.850. The value lies between 1.5 and 2.5, indicating that the data analyzed had no autocorrelation.

4.4.3 Multicollinearity Test

The statistical concept which shows the probability that two or more independent variables in a multiple regression model are highly correlated is multicollinearity (Creswell, 2014). Standard errors of coefficients increase if correlation among independent variables are strong. This is thus an undesirable event. According to Russell (2013), Variance Inflation Factor (VIF) of more than 10 demands further investigation of the data. VIF was used to measure the presence of multicollinearity, in this study. The findings are illustrated in Table 4.8.

Table 4. 8: Collinearity Statistics

Variables	Tolerance (1/VIF)	VIF
Leadership skills	0.559	1.788
Stakeholder management	0.456	2.195
Project scope	0.575	1.740

In Table 4.8, the findings show that Leadership skills had a VIF of 1.788, stakeholder management had a VIF of 2.195, and project scope had VIF of 1.740. This indicates that the independent variables were not highly correlated among themselves since all the values were below 3. There was no multicollinearity in the data analyzed, hence the findings of multiple linear regression analysis were not misleading.

4.4.4 Heteroscedasticity and Homoscedasticity Test

Homoscedasticity violations make it difficult to evaluate forecast errors' standard deviation, which usually result in confidence intervals that are too narrow or too wide (Bryman and Cramer, 2012). In this study, Heteroscedasticity was tested by conducting the Breusch-Pagan/Cook-Weisberg. The null hypothesis was that the errors of variances are equal the alternative hypothesis was that the errors of variances are a multiple function of one or more variables. According to Bryman and Cramer (2012), homoscedasticity is usually evident when p-value is greater than the significance level of p=0.05. The findings of the test are as presented in Table 4.9.

Table 4. 9: Breusch-Pagan / Cook-Weisberg Test for Heteroscedasticity

Ho: Constant variance	
Chi2 (1)	6.67
Prob>chi2	0.098

According to the findings in Table 4.9, p=0.098 was greater than the significance level of p=0.05, which shows that the data analyzed had no heteroscedasticity.

4.4.5 Linearity Test

The linearity assumption in this study was tested with scatter plots. Linear relationship is one of the assumptions of regression analysis. A linear association exists when the values of independent variable and dependent variable resemble a straight line that is either a positive slope or a negative slope (Bryman and Cramer, 2012). From the results, leadership skills and execution of fibre optic infrastructure had a positive linear relationship. This showed that execution of fibre optic infrastructure improved with employment of the right leadership skills. The results also revealed that leadership skills explained 45.1% of variance in execution of fibre optic infrastructure (See Appendix XI, A).

In addition, stakeholder management and execution of fibre optic infrastructure had a positive linear relationship. This implied that execution of fibre optic infrastructure increased with the increase in stakeholder management. The results further showed that stakeholder management explained 46.9% of variance in execution of fibre optic infrastructure (See Appendix XI, B)

Project scope and execution of fibre optic infrastructure also had a positive linear relationship. These findings inferred that execution of fibre optic infrastructure increased with the increase in improvement of project scope. Furthermore, the results showed that project scope explained 37% of variance in execution of fibre optic infrastructure (See Appendix XI, C).

4.4.6 Reliability Test

According to Kothari (2004), Cronbach's Alpha values of 0.6 - 0.7 indicates acceptable reliability. Similarly, values of 0.8 or higher indicates good reliability (Kothari, 2004; Patton, 1990). The reliability of questionnaire in this study was ensured by measuring its internal consistency by use of Cronbach's alpha coefficient. The findings are as illustrated in Table 4.10.

Table 4. 10: Cronbach's Alpha for Actual Survey

Variables	Cronbach's Alpha	No. of items
Leadership skills	0.920	10
Stakeholder management	0.955	10
Project scope	0.942	10
Execution of fibre optic infrastructure	0.761	10
Average	**0.806**	**10**

In Table 4.10, the findings show that average Cronbach's Alpha coefficient for the variables had 0.806 value. In addition, the results showed that leadership skills had a value of 0.920, stakeholder management had a value of 0.955, project scope had a value of 0.942, and execution of fibre optic infrastructure had a value of 0.761. The findings on reliability showed that Cronbach reliability value for the variables was greater than 0.7. This implied that reliability level was acceptable.

The current study used interview and document review guides to collect qualitative data. The credibility of qualitative data collected was ensured by use of triangulation of methods. Method triangulation involves checking consistency of findings by use of different data collection methods (Bryman, 2012). The study combined self-reported data and observations

to help in balancing out measurement bias, telephone and face to face interviews to control sampling bias, and short and longer engagements where participants had more time to give considered responses to control procedural bias. The qualitative data was thus more reliable since it was collected by more than one method and from the perspective of more than one source taking advantage to offset the weakness of one method with the strength of the other method.

4.4.7 Control of Type I Error and Type II Error

For validity of statistical findings, a researcher ensures Type I and Type II errors, which may result in wrong interpretation of results are controlled. When a true null hypothesis is rejected, Type I errors do occur. Similarly, when a researcher fails to reject a false null hypothesis, type II errors occur (Bryman, 2012). To minimize Type I errors in this study, 95% confidence interval was used as demonstrated by Bryman (2012), which means the standard variate was 1.96 and alpha value (significance level) was p=0.05. In addition, Type II errors were dealt with by taking a census of 179 respondents. The use of many respondents to address type II errors was recommended by Bhattacherjee (2012).

4.4.8 Analysis of Likert-Scale Data

The questionnaire, which was the main data collection instrument in this study had six sections. Section one of the questionnaire comprised of demographic characteristics that used nominal scale. The rest of the five sections comprised a five-point likert scale items with 1 signifying strongly disagree, 2 signifying disagree, 3 signifying neutral, 4 signifying agree, and 5 signifying strongly agree. Hasson and Arnetz (2005) indicated that supporting statements in a Likert scale are easily understood and utilized by the respondents, researcher, process of coding and interpreting the results. Each of the five Likert questions had ten (10) items. The number was limited to increase response rate. According to Sivo (2006), long characterization of questionnaire results in low validity and quality of the responses. The interpretation of arithmetic mean in Likert questions shows that strongly disagree is between 1 and 1.5, disagree is between 1.5 and 2.5, neutral is between 2.5 and 3.5, agree is between 3.5 and 4.5, and strongly agree is between 4.5 and 5.0 (Vonglao, 2017)

4.4.9 Analysis of Visual Analogue Scale Data

One of the limitations of a Likert scale is that words used in development of statements may affect responses and not even be enough in the description of subjective complex and continuous phenomenon. In addition, this selection of number of statements may also be an

issue because too many statements lead to difficulties in the selection and too few statements may not provide enough sensitivity forcing respondents to choose answers that fail to represent their true intent. Moreover, the average score of a multi-item Likert Scale question results in diverse rating combinations and hence may lead to a researcher making wrong conclusions (Hasson and Arnetz, 2005). Therefore, Visual Analogue Scale was the most preferable in conducting inferential statistics as they are already in a continuous form and do not involve a combination of statements.

Wewers and Lowe (1990) postulated that Visual Analogue Scale measures data in subjective experiences and it enables expression of opinion-based information on an interval scale, which then enables analysis of such information by use of powerful statistical tools. It also measures a characteristic or attitude ranging across a continuum of values that are difficult to measure directly (Wewers and Lowe, 1990). Operationally, Visual Analogue Scale encompasses a 10 or 11 points line attached on each end with words describing opposing statements with maximum and minimum extremes of the dimension measured (Dexter and Chestnut, 1995). In this study, the Visual Analogue Scale ranged from 0 to 10 and were intended to rate the extent of leadership skills application, performance of the companies in stakeholder management, performance of the companies in developing project scope, government support in execution of fibre optic infrastructure and performance of the companies in execution of fibre optic infrastructure.

4.5 Execution of Fibre Optic Infrastructure

Execution of fibre Optic Infrastructure was identified as the dependent variable in this study and measured in terms of completion within timeline, cost savings, level of quality standards achieved, and level of stakeholder satisfaction, adequacy and relevance of learnt lesson reports, level of satisfaction with project benefits, adequacy and relevance of handover documents and level of commitment by the project team.

4.5.1 Description of Execution of Fibre Optic Infrastructure from Likert Scale Data

The respondents were requested to rate the level of agreement with several statements on execution of fibre optic infrastructure in the respective organizations on a likert scale. The results are shown in Table 4.11.

Table 4. 11: Execution of Fibre Optic Infrastructure Likert Scale Data

Statements	1	2	3	4	5	Mean	Std. Dev.
My company always achieves timely connection of fibre optic infrastructure	1.2	11.6	25.6	46.5	15.1	3.627	0.918
My company always achieves cost savings in fibre optic infrastructure	1.2	5.7	25.6	51.2	16.3	3.755	0.836
My company does not always achieve acceptable quality standards in execution of fibre optic infrastructure	25.6	37.2	18.6	12.8	5.8	2.360	1.163
My company does not always achieve stakeholder's satisfaction	25.6	37.2	18.6	16.3	2.3	2.325	1.096
My company does not always undertake post project reviews to learn lessons for future	32.6	27.9	16.3	20.9	2.3	2.325	1.198
My company always undertakes to assess delivery of benefit as defined in benefit realization plan	4.7	2.2	25.6	41.9	25.6	3.814	0.997
My company always asks to sign off the project deliverables as a sign of successful closure	4.7	4.6	11.6	40.7	38.4	4.034	1.053
My company always ensures that all parties involved in fibre optic projects are and remain committed to project execution	1.2	3.4	14.0	48.8	32.6	4.081	0.840
Where there is any lack of project team commitment in my company, it is clearly recognized and dealt with	1.2	7.0	20.8	38.4	32.6	3.941	0.959
Project leadership in my company maintains commitment and has the skills and resources to inspire commitment from others	1.2	5.8	14.0	48.8	30.2	4.011	0.885
Composite Mean and Standard Deviation						**3.4273**	**0.9945**

In Table 4.11, the functional staff in fibre optic infrastructure departments agreed that their firms always ensured that all parties involved in fibre optic infrastructure remained committed to project execution (M=4.081, SD=0.840). In addition, they agreed that companies always asked all parties to sign off project deliverables as a sign of successful closure (M=4.034, SD=1.053). They also agreed that project leadership in their companies

had maintained commitment and had the skills and resources to inspire commitment from others (M=4.011, SD=0.885).

Moreover, functional staff agreed that where there was lack of project team commitment in their companies, it was clearly recognized and dealt with (M=3.941, SD=0.959). The functional staff also agreed that their companies always assessed delivery of benefit as defined in benefit realization plan (M=3.814, SD=0.997). The functional staff agreed that their companies always achieved cost saving in fibre optic infrastructure (M=3.755, SD=0.836).

Furthermore, functional staff agreed that their companies always achieved timely connection of fibre optic infrastructure (M=3.627, SD=0.918). However, the functional staff disagreed with the statement indicating that their companies do not always achieve acceptable quality standards in the execution of fibre optic infrastructure (M=2.360, SD=1.163). Moreover, they disagreed with the statement indicating, that their companies do not always undertake post project reviews to learn lessons for the future (M=2.325, SD=1.198).

In summary, the results showed that the surveyed companies rated execution of fibre optic infrastructure in terms of completion within timeline, cost savings, level of quality standards achieved, and level of stakeholder satisfaction, adequacy and relevance of learnt lesson reports, level of satisfaction with project benefits, adequacy and relevance of handover documents and level of commitment by the project team (M=3.4273, SD=0.9945) implying that execution of fibre optic infrastructure is successful in mobile telecommunication and internet service companies.

The key informants also rated execution of fibre optic infrastructure in their companies as good and stated that indicators of effective execution of fibre optic infrastructure include timely delivery and quality of fibre optic projects. They also indicated that execution of fibre optic infrastructure encompassed confirmation of closure documents, confirmation of business case and benefit realization plan, lesson learned and resources management plan. This theme was captured by one quote from a respondent as stated in K06.

> *The firms always ensured that all parties involved in fibre optic projects remain committed to project execution. The importance of project team and stakeholder's commitment to the execution of a project is very important as it helps in ensuring delivery on time and reduces cost* (K06).

4.5.2 Description of Execution of Fibre Optic Infrastructure from Visual Analogue Scale Data

The respondents were requested to rate the performance of their companies in execution of fibre optic infrastructure on a scale of 0 to 10, where 0 represented least performance and 10 represented best performance. The findings are illustrated in Table 4.12.

Table 4. 12: Execution of fibre optic infrastructure Visual Analogue Scale Data

Score	Frequency	Percent
2.00	2	1.2
3.00	4	2.3
4.00	6	3.5
5.00	10	5.8
6.00	24	14.0
7.00	30	17.4
8.00	38	22.1
9.00	38	22.1
10.00	20	11.6
Total	**172**	**100.0**

According to the findings in Table 4.12, 22.1% of respondents gave performance of their companies in execution of fibre optic infrastructure a score of 8, followed by 9 (22.1%), 7 (17.4%), 6 (14%), 10 (11.6%), 5 (5.8%), 4 (3.5%), 3 (2.3%) and 2 (1.2%). The results showed that the performance of mobile telecommunication and internet service companies in execution of fibre optic infrastructure were rated 8 and above on visual analogue scale by 55.8% of respondents implying that the performance of execution of fibre optic infrastructure is good and successful in mobile telecommunication and internet service industry.

Effective execution of Fibre Optic Infrastructure plays an important role in ensuring success of a project measured in terms of timely delivery, cost savings, and satisfaction of customers. The research findings showed that the companies always ensured that all parties involved in fibre optic projects remain committed to project execution. However, where there was lack of project team commitment in the companies, it was clearly recognized and dealt with. These findings agree with those of Wakefield (2008), who showed in his study that project team and stakeholders' commitment to the execution of a project is important. In addition, the current study revealed that project leadership had maintained commitment and had skills and resources to inspire commitment from others. These findings agree with the assertion by Eikenberry (2016), that project leadership should show commitment to a project as well as inspire and motivate their followers.

The study findings also showed that mobile telecommunication and internet service companies always achieved cost saving in fibre optic infrastructure. These findings are in line with the argument by Stout (2012) that the criterion for judging project success include completion within the budget. Additionally, the findings showed that the companies always achieved timely connection of fibre optic infrastructure. These findings agree with those of Mirza, *et al*. (2013), who demonstrated in his study that one of the main measures of project execution success is completion within schedule.

The study findings also indicated that the companies always assessed delivery of benefit as defined in benefit realization plan. The findings agree with those of Stout (2012) who showed that customer satisfaction and realization of project benefits is one of the measures of project success. However, the study revealed that mobile telecommunication and internet service providing companies do not always achieve acceptable quality standards in execution of fibre optic infrastructure, thereby contradicting the assertion by Eikenberry (2016) that quality is an important indicator of successful execution of projects.

Furthermore, the study findings showed that the companies always ask stakeholders to sign off the project deliverables as a sign of successful closure. These findings concur with the argument by Sankara (2014) that project closure is a vital component in project planning and management. However, the companies do not always undertake post project reviews to learn lessons for the future. This is contrary to Sankara (2014) who emphasized the importance of undertaking project reviews to learn lessons for implementation in future projects.

4.6 Leadership Skills and Execution of Fibre Optic Infrastructure

The first research objective was to determine how leadership skills influence execution of fibre optic infrastructure. Leadership skills considered in this study include visionary capacity, team building, communication, planning, delegation, decision making, and problem solving, coaching and training.

4.6.1 Description of Leadership Skills from Likert Scale Data

The functional staff in fibre optic infrastructure departments of the two mobile telecommunication and four internet service companies were requested to rate the level of agreement with several statements on leadership skills in the organizations. The findings are as shown in Table 4.13.

Table 4. 13: Leadership Skills from Likert Scale Data

Statements	1	2	3	4	5	Mean	Std. Deviation
The company has visionary leadership with right set of leadership skills that ensures effective stakeholders management, correction and complete scope is defined and documented	2.3	3.5	15.1	44.2	34.9	4.058	0.922
My company has motivated teams that go an extra mile to deliver projects in time	1.2	7.0	22.1	30.2	39.5	4.000	1.002
My company ensures project team members are involved throughout the project	1.2	5.8	18.6	36.0	38.4	4.046	0.953
Project leaders in my company use communication to let the teams know and appreciate good performance as well as when the performance is not satisfactory	2.3	9.3	18.6	40.7	29.1	3.848	1.020
Project leaders in my company frequently plan milestones to support project teams measure work progress	3.5	10.5	22.1	41.8	22.1	3.686	1.040
Project leaders understand the job and know resources and skills relevant to the project	1.2	7.0	8.0	51.2	32.6	4.069	0.889
Project team members are empowered to make decisions and have a certain level of delegated authority and responsibility	0.0	5.8	19.8	43.0	31.4	4.000	0.865
In my company project leaders are empowered to make decisions and are ready to justify reasons behind the decisions to anyone without fear or favor.	4.7	12.8	25.6	38.3	18.6	3.534	1.078
Project leaders' coach and train other project team members	2.3	9.3	15.1	50.0	23.3	3.825	0.969
Training is available in my company to equip project team members with relevant skills	8.1	16.3	23.3	26.7	25.6	3.453	1.258
Composite Mean and Standard Deviation						**3.8519**	**0.9996**

In Table 4.13, findings showed that the functional staff agreed that project leaders understood the job and knew resources and skills that were relevant to the organizations' projects (M=4.069, SD=0.889). They also agreed that their companies had visionary leadership with

the right set of leadership skills that ensured effective stakeholder management and correction, as well as completion of defined and documented scope (M=4.058, SD=0.922).

The respondents further agreed that their companies ensured project team members were involved throughout the project life cycle (M=4.046, SD=0.953). The functional staff agreed that their firms had motivated teams to go an extra mile to deliver projects in time (M=4.000, SD=1.002). They also agreed that project teams are empowered to make and implement decisions and have a certain level of delegated authority and responsibility (M=4.000, SD=0.865). Moreover, the functional staff agreed that project leaders in their firms communicated to each other to let the teams know and appreciate good performance as well as when performance is not satisfactory (M=3.848, SD=1.020).

The functional staff also agreed that project leaders coached and trained other project team members (M=3.825, SD=0.969). They further agreed that project leaders of their companies, frequently planned milestones to help project teams feel that they were making progress (M=3.686, SD=1.040). Furthermore, the functional staff agreed that project leaders of their companies were empowered to make decisions and were ready to justify the decisions they made to anyone without fear or favor (M=3.534, SD=1.078). However, the employees were neutral on the statement indicating that training was available in their companies to equip project team members with relevant skills (M=3.453, SD=1.258).

Overall, surveyed companies agreed that project leaders in the companies had appropriate leadership skills (M=3.8519, SD=0.9996). The results imply that leadership skills such as visionary capacity, team building, communication, planning, delegation, decision making, and problem solving, coaching and training are essential in execution of fibre optic infrastructure since project leaders with the right leadership skills can define project goals and effectively manage stakeholders and project activities. This guarantees effective, efficient and sustainable execution of fibre optic infrastructure.

4.6.2 Description of Leadership Skills from Visual Analogue Scale Data

The participants were requested to rate how leadership skills had been applied in their companies in steering company projects towards their intended goals, using a scale of 0 to 10, where 0 represented least application and 10 represented most application. The findings are as shown in Table 4.14.

Table 4. 14: Leadership skills from Visual Analogue Scale

Score	Frequency	Percent
2.00	4	2.3
3.00	8	4.7
4.00	4	2.3
5.00	14	8.1
6.00	18	10.5
7.00	34	19.8
8.00	48	27.9
9.00	22	12.8
10.00	20	11.6
Total	**172**	**100.0**

In Table 4.14, the findings show that 27.9% of the participants gave application of leadership skills in steering company projects towards their intended goals a rating of 8, followed by 7 (19.8%), 9 (12.8%), 10 (11.6%), 6 (10.5%) 5 (8.1%), 3 (4.7%), 4 (2.3%) and 2 (2.3%). These findings indicated that the performance of the two mobile telecommunication and four internet service companies in application of leadership skills in steering company projects towards their intended goals were rated 8 and above on the visual analogue scale by 52.32% of respondents. The results imply that leadership skills are important in ensuring successful execution of fibre optic infrastructure.

The key informants indicated that leadership skills of project managers influence execution of fibre optic infrastructure. In addition, they specified that leadership skills required for effective execution of fibre optic infrastructure include skills in people, projects and financial management. The key informants also showed that the companies in mobile and internet service industry had no leadership framework and philosophy. They also indicated that leadership skills play a major role in project performance. This theme was captured by one quote from a respondent stated in K01.

> *Leadership skills are important in ensuring effective stakeholders management in the execution of projects and project leaders in our companies frequently plan milestones to help project team feel they are making progress. In addition, project leaders are empowered to say no and are ready to justify the reasons behind the decision, no matter how senior or important the person may be* (K01).

4.6.3 Correlation Analysis of Leadership Skills and Execution of Fibre Optic Infrastructure

Analysis of correlation was used to examine direction and strength of the linear relationship between leadership skills and execution of fibre optic infrastructure. The results are as illustrated in Table 4.15.

Table 4. 15: Correlation Coefficients for Leadership Skills and Execution of Fibre Optic Infrastructure

Variables		Execution of fibre optic infrastructure	Leadership skills
Execution of fibre optic infrastructure	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	172	
Leadership skills	Pearson Correlation	0.672	1
	Sig. (2-tailed)	0.000	
	N	172	172

In Table 4.15, the findings show that there is a positive linear association between leadership skills and execution of fibre optic infrastructure in Nairobi County in Kenya ($r=0.672$, $p<0.001<0.05$). This implies that correlation between leadership skills and execution of fibre optic infrastructure is positive and strong.

4.6.4 Regression Analysis of Leadership Skills and Execution of Fibre Optic Infrastructure

Simple linear regression analysis was used to determine how leadership skills influence the execution of fibre optic infrastructure. The hypotheses stated that:

$H_0$1: Leadership skills do not have significant influence on the execution of fibre optic infrastructure

$H_1$1: Leadership skills have significant influence on the execution of fibre optic infrastructure

Summary of the model of the influence of leadership skills on execution of fibre optic infrastructure is illustrated in Table 4.16

Table 4. 16: Model Summary for Leadership Skills

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.672	0.451	0.448	1.34320

The coefficient of determination (R^2) shows variation in dependent variable that can be explained by the predictor variable (Bryman, 2012). The coefficient of determination in Table

4.16 for the influence of leadership skills on execution of fibre optic infrastructure was R^2=0.451. This shows that 45.1% of the variance in execution of fibre optic infrastructure is explained by leadership skills. Variance analysis in regression is used to assess goodness of fit of the model for the data analyzed (Bryman, 2012). Table 4.17 shows variance analysis for the influence of leadership skills on execution of fibre optic infrastructure.

Table 4. 17: ANOVA for Leadership Skills

Model		Sums of Squares	Df	Mean Square	F	Sig.
1	Regression	252.288	1	252.288	139.835	0.000[b]
	Residual	306.712	170	1.804		
	Total	559.000	171			

The F-calculated (139.835) in Table 4.17 was greater than the F-critical (3.94) and the p-value (p< 0.001) was less than the significance level (p=0.05), indicating that the model was a good fit for the data analyzed. This indicates that the model may be used to predict the influence of leadership skills on execution of fibre optic infrastructure. Table 4.18 shows coefficients of regression for the influence of leadership skills on execution of fibre optic infrastructure.

Table 4. 18: Coefficients for Leadership Skills and Execution of Fibre Optic Infrastructure

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		β	Std. Error	Beta (β)		
1	(Constant)	2.965	0.397		7.469	0.000
	Leadership skills	0.626	0.053	0.672	11.825	0.000

The model of regression for the hypothesis was as shown below:

$$Y=2.965+ 0.626X_1,$$

Where: Y - Execution of fibre optic infrastructure

X_1 - Leadership skills

The results indicated that leadership skills positively and significantly influence execution of fibre optic infrastructure, as shown by a regression coefficient of β=0.626 (t=11.825, p<0.001<0.05) in Table 4.18. The p-value (p< 0.001) was less than the significance level (p=0.05) and hence, null hypothesis (**$H_0$1**) was rejected and the alternative (**$H_1$1**) accepted that leadership skills have significant influence on execution of fibre optic infrastructure. This meant that leadership skills have a positive and significant influence on execution of fibre optic infrastructure.

In any organization, leadership skills are important in influencing members of staff positively and giving them moral support for contribution to effectiveness and organizational success. The results of this study indicated that leadership skills have a positive and significant influence on execution of fibre optic infrastructure. These findings agree with those of Kouzes and Posner (2012) who showed in their study that leadership skills are essential in good project management and have a greater impact on the overall process of a project.

This study established that project leaders understood the job and knew resources and skills that were relevant to the organizations' projects. In addition, visionary leadership with the right set of leadership skills ensured effective stakeholder management and correction as well as definition and documentation of complete scope. These findings agree with the argument by Sears *et al.* (2015) that leadership skills are important in ensuring effective stakeholders management in the execution of projects.

The study findings also showed that project leaders in their companies frequently planned milestones to support project team's measure work progress. In addition, project leaders were empowered to make decisions and could justify reasons behind the decisions without fear or favor. However, training was moderately available in mobile telecommunication and internet service providing companies to equip project team members with relevant skills, contrary to the assertion by Zakaria *et al*. (2015) that managers should come up with programs to train their employees continually to acquaint them with leadership skills, which are important in ensuring successful completion of projects.

The study findings also showed that companies ensured project team members were involved throughout their projects. These findings agree with the assertion by Law and Martin (2016) that project team members should be involved in the lifespan of a project in order to develop ownership and commitment to the project. The study further revealed that motivated teams went an extra mile to deliver projects in time. These findings are in line with the argument by Sayrani and Ataolahi (2015) that employee motivation is one of the components of transformation leadership which increases staff motivation which, in turn, leads to an increase in commitment and productivity and hence project success.

The research findings indicated that project leaders in mobile telecommunication and internet service companies communicated to each other to let the teams know and appreciate good performance as well as when performance is not satisfactory. These findings concur with

those of Campbell (2015) who showed that communication in an organization should be vertical, horizontal and diagonal with different stakeholders including the employees.

The study findings showed that project team members in the target companies were empowered to make decisions and had a certain level of delegated authority and responsibility. These findings agree with the argument by Law and Martin (2016) that delegation was an important principle in an organization but required monitoring for good results. The findings are also in agreement with the argument by Neuhauser (2012) that poor performance of projects was often because of managers who had to manage the technical part of the project that included making plans, working schedules, preparing budgets, carrying out statistical analysis and monitoring of the whole project instead of delegating some functions to other team members.

The study revealed that project leaders coached and trained other project team members. These findings agree with those of Von, Nonaka and Rechsteiner (2014) who postulated that coaching involves equipping employees with tools, knowledge, and skills they require to nurture their skills to perform well. The also support the assertion by Rukundo (2011) that most organizations were neglecting training of staff and leaders thereby causing poor performance of projects and that lack of training and incompetence of leaders and employees and poor negotiation skills led to unrealistic schedules, plans and budgets right from initiation of those projects.

4.7 Stakeholder Management and Execution of Fibre Optic Infrastructure

The second research objective was to assess the extent to which stakeholder management influences execution of fibre optic infrastructure. The indicators of stakeholder management included stakeholder list with areas of interest, stakeholder analysis, and dynamics of stakeholders in the project life cycle, stakeholders' reaction to project decisions and stakeholders' engagement through the project life cycle.

4.7.1 Description of Stakeholder Management from Likert Scale Data

The functional staff in fibre optic infrastructure departments in mobile telecommunication and internet service companies were requested to rate the level of agreement with several statements on stakeholder management in the organizations. The findings are as shown in Table 4.19.

Table 4. 19: Stakeholder Management Likert Scale Data

Statements	1	2	3	4	5	Mean	Std. Deviation
In my company stakeholders are carefully identified and listed	4.7	8.1	19.8	39.5	27.9	3.779	1.085
We identify and understand stakeholder areas of interest	3.5	7.0	30.2	33.7	25.6	3.709	1.035
In my company, we determine and assess the power, urgency, legitimacy and proximity of stakeholders	4.7	5.8	30.2	38.4	20.9	3.651	1.023
We approximately classify stakeholders according to their interest level, power, legitimacy, urgency and proximity	2.3	14.0	31.4	36.0	16.3	3.500	1.000
We identify and classify possible conflicts and coalitions among stakeholders	4.7	12.8	26.7	40.7	15.1	3.488	1.045
We effectively resolve conflicts among stakeholders	4.7	8.1	29.1	38.4	19.7	3.604	1.040
In my company, we manage stakeholders' interest change, relationships among stakeholders' attributes, influence and how project decisions affect stakeholders	3.5	4.7	32.6	40.7	18.5	3.662	0.950
We predict stakeholders' reaction before implementation of project decisions	3.5	10.5	26.7	37.2	22.1	3.639	1.047
In my company we involve relevant stakeholders when initiating a project to enhance the mission of the project and whenever necessary in decision making throughout project life cycle	3.5	8.1	24.4	39.6	24.4	3.732	1.030
We communicate properly and frequently, instituting feedback mechanism to promote positive relationship with stakeholders	4.7	10.5	17.4	34.8	32.6	3.802	1.142
Composite Mean and Standard Deviation						**3.656**	**1.039**

The study findings in Table 4.19 show that functional staff agreed that they communicated properly and frequently, instituting feedback mechanism to promote positive relationship with stakeholders (M=3.802, SD=1.142). They also agreed that there was careful identification and listing of stakeholders (M=3.779, SD=1.085). The functional staff further agreed that their companies involved relevant stakeholders when initiating a project to

enhance the mission of the project and whenever necessary, in decision-making throughout project life cycle (M=3.732, SD=1.103). They also agreed that their companies identify and understand stakeholders' areas of interest (M=3.709, SD=1.035). In addition, the functional staff agreed that they manage stakeholders' change in interest, relationships among stakeholders' attributes, influence and how project decisions affect stakeholders (M=3.662, SD=0.950).

Furthermore, the functional staff agreed that in their companies, they determined and assessed stakeholders' attributes (M=3.651, SD=1.023). Moreover, the functional staff agreed that they predicted likely reactions of stakeholders when implementing project decisions (M=3.639, SD=1.047). The functional staff also agreed that their companies effectively resolved conflict among stakeholders (M=3.604, SD=1.040). The functional staff further agreed that they carried out appropriate classification of stakeholders according to their attributes, namely; level of interest, power, urgency, legitimacy, and proximity (M=3.500, SD=1.000). However, functional staff were neutral on the identification and classification of coalitions and conflict among key stakeholders in a project (M=3.488, SD=1.045).

Overall, the companies surveyed agreed on the importance of stakeholder management (M=3.656 SD=1.039). The study results imply that stakeholder management is important in the execution of fibre optic infrastructure. Poor stakeholder management can lead to conflict in project execution, uncontrolled changes in scope and reworks resulting into fibre optic infrastructure being executed and delivered beyond projected timelines, budget, scope and acceptable quality standards.

4.7.2 Description of Stakeholder Management from Visual Analogue Scale Data

The respondents were asked to score the performance of the companies in stakeholder management using a scale of 0 to 10, where 0 represented least performance and 10 represented best performance. Table 4.20 shows the findings.

Table 4. 20: Stakeholder Management Visual Analogue Scale Data

Score	Frequency	Percent
2.00	6	3.5
3.00	4	2.3
4.00	4	2.3
5.00	28	16.3
6.00	30	17.4
7.00	12	7.0
8.00	38	22.1
9.00	30	17.4
10.00	20	11.6
Total	**172**	**100.0**

In Table 4.20, the findings show that most of the respondents gave performance of their companies in stakeholder management a rating of 8.00 (22.1%), followed by 9.00 (17.4%), 6.00 (17.4%), 5.00 (16.3%), 10.00 (11.6%), 7.00 (7.0%), 2.00 (3.5%), 3.00 (2.3%) and 4.00 (2.3%). These results indicate that the performance of mobile telecommunication and internet service providers in stakeholder management were rated as 8 and above on Visual Analogue Scale by 51.1% of respondents. The findings showed that the performance of stakeholder management in surveyed companies is good. This indicates that stakeholder management is important and contributes positively towards effective, efficient and sustainable execution of fibre optic infrastructure.

The key informants indicated that stakeholders in fibre optic infrastructure include government, ICT operators, users and the public. This theme was captured by one quotation from a respondent stated in K02.

> *In fibre construction, stakeholders are the parties that influence or are influenced by installation of fibre optic infrastructure from the beginning until its closure. These include users of the services, the government as well as ICT operators* (K02).

They also indicated that management of stakeholders contributes to effective execution of fibre optic infrastructure. In addition, the key informants reported that their organizations had stakeholder management plan, stakeholders register, and communication plan and stakeholder engagement matrix. This theme was captured by one quotation from a respondent stated in K03.

> *Our company manages change of stakeholders' interest and influences relationship among stakeholders' attributes and how project decisions affect stakeholders. The interest of stakeholders can change as the project progresses and these adjustments*

can take place any time in the process of developing the project and hence the importance of leadership skills in managing the change (K03).

4.7.3 Correlation Analysis of Stakeholder Management and Execution of Fibre Optic Infrastructure

Analysis of correlation was used to quantify the direction and strength of the linear association between stakeholder management and execution of fibre optic infrastructure. The results are illustrated in Table 4.21.

Table 4. 21: Correlation Coefficients for Stakeholder Management and Execution of Fibre Optic Infrastructure

Variables		Execution of fibre optic infrastructure	Stakeholder management
Execution of fibre optic infrastructure	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	172	
Stakeholder management	Pearson Correlation	0.685	1
	Sig. (2-tailed)	0.000	
	N	172	172

In Table 4.21, results indicate that there is a strong and positive linear association between stakeholder management and execution of fibre optic infrastructure in Nairobi County, Kenya ($r=0.685$, $p<0.001<0.05$). This shows that there is a strong and positive correlation between stakeholder management and execution of fibre optic infrastructure.

4.7.4 Regression Analysis of Stakeholder Management and Execution of Fibre Optic Infrastructure

Simple linear regression analysis was used to determine the influence of stakeholder management on execution of fibre optic infrastructure. The hypotheses stated that:

$H_0$2: Stakeholder management does not have significant influence on the execution of fibre optic infrastructure

$H_1$2: Stakeholder management has significant influence on the execution of fibre optic infrastructure

The model summary of the extent to which stakeholder management influences execution of fibre optic infrastructure is shown in Table 4.22.

Table 4. 22: Model Summary for Stakeholder Management

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.685[a]	0.469	0.466	1.32174

The coefficient of determination was R^2=0.469 as shown in Table 4.22. This indicates that stakeholder management explains 46.9% of the variance in execution of fibre optic infrastructure among mobile telecommunication and internet service companies in Nairobi County, Kenya. Table 4.23 shows analysis of variance for the extent to which stakeholder management influences execution of fibre optic infrastructure.

Table 4. 23: ANOVA for Stakeholder Management

Model		Sums of Squares	df	Mean Square	F	Sig.
1	Regression	262.010	1	262.010	149.978	0.000[b]
	Residual	296.990	170	1.747		
	Total	559.000	171			

The F-calculated (149.978) in Table 4.23 is greater than F-critical (3.94) and the p-value of (p< 0.001) is less than the significant level of (p=0.05), which means that the model is a good fit for the data analyzed. Thus, the model may be used in predicting the extent to which stakeholder management influences execution of fibre optic infrastructure among mobile telecommunication and internet service companies in Nairobi County, Kenya. The regression coefficients of the extent to which stakeholder management influences execution of fibre optic infrastructure are illustrated in Table 4.24.

Table 4. 24: Coefficients for Stakeholder Management and Execution of Fibre Optic Infrastructure

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		β	Std. Error	Beta (β)		
1	(Constant)	3.254	0.361		9.013	0.000
	Stakeholder management	0.600	0.049	0.685	12.247	0.000

The model of regression for the hypothesis was as below:

$$Y=3.254+ 0.600X_2$$

Where: Y – Execution of fibre optic infrastructure

X_2 – Stakeholder Management

The results indicated that stakeholder management has a significant and positive influence on execution of fibre optic infrastructure as shown by a regression coefficient of β=0.600 (t=12.247, p<0.001<0.05) in Table 4.24. The p-value of (p<0.001) was less than the significance level of (p=0.05). Therefore, null hypothesis (**$H_0$2**) was rejected and the

alternative (**$H_1 2$**) accepted indicating that Stakeholder management has a significant and positive influence on execution of fibre optic infrastructure.

Stakeholder theory highlights the importance of identifying, analyzing, and understanding stakeholders and managing them effectively. In fibre optic construction context, stakeholders are the parties that influence or are influenced by installation of fibre optic infrastructure from the beginning until its closure. Stakeholder management encompasses involvement, information sharing and consultation of groups or people with an influence on the project's outcome and the extent to which it is done may well influence project success. In this study, the components of stakeholder management included stakeholder list with areas of interest, stakeholder analysis, and dynamics of stakeholders in project life cycle, stakeholder reaction to project decisions and stakeholder engagement through the life cycle of a project.

The study findings showed that stakeholder management has a significant influence on execution of fibre optic infrastructure. These findings concur with those of Chepkoech and Waiganjo (2016) that stakeholder management significantly influence performance of projects. The study also revealed that mobile telecommunication and internet service providing companies communicate properly and frequently, thereby instituting feedback mechanism to promote positive relationship with the stakeholders. These findings also agree with those of Fageha and Aibinu (2013) who, in their study, showed that it is important to have effective communication both internally and externally with relevant stakeholders for successful project implementation.

The study findings also showed that stakeholders were carefully identified and listed and mobile telecommunication and internet service providing companies identified and sought to understand stakeholders' areas of interest. These findings are validated by assertion of Nieto *et al.* (2016) that first steps in stakeholder management should be identification and listing of stakeholders and their interests in the project. In addition, the findings are in line with those of Bourne (2015) who showed in his study that identifying stakeholders early enough was very important for significant trans-disciplinary investigation into the supervision of that resource. In addition, the study revealed that mobile telecommunication and internet service providing companies involve relevant stakeholders when initiating a project to enhance the mission of the project and, whenever necessary, in decision-making throughout project life cycle. These findings further concur with the argument by Kobusingye, Mungatu and

Mulyungi (2017) that key stakeholders should actively be consulted and involved in project development when defining project scope and throughout life cycle of a project.

Stakeholder analysis involves identifying, assessing interests of stakeholders and the degree to which interests of the stakeholders affect delivery of the project. The findings of this study showed that the companies manage stakeholders' change in interest, relationships among stakeholders' attributes, influence and how project decisions affect stakeholders. These findings agree with the argument by Nash *et al.* (2010) that interest of stakeholders in project do change as the project evolves and these adjustments can take place any time in the process of developing the project and hence the importance of leadership skills in managing the change.

Furthermore, the study findings showed that mobile telecommunication and internet service companies determined and assessed attributes of stakeholders. In addition, the study findings showed that the companies carried out appropriate classification of stakeholders in accordance to their attributes, namely; level of interest, urgency, power, proximity and legitimacy. These findings are in line with those of Yang *et al.* (2014) who, in their study, showed that stakeholder legitimacy attribute was unclear and hard to put in operation, and that made them to prefer proximity, which was easier to explain and put into practice.

Moreover, the findings of the study showed that mobile telecommunication and internet service providing companies predicted stakeholders' likely reactions for implementing project decisions. These findings agree with those of Leonardo and Antonio (2013) that identification of stakeholders at earlier stages of a project reduced possible problems especially those related to late request for new requirements that end up delaying delivery of the project goals in a timely manner. The study findings also showed that the companies identified and classified possible conflicts and coalitions among stakeholders only to a moderate extent, thereby contradicting the assertion by Bashir (2010) that stakeholder identification and analysis is the first step to the management of identifying and resolving conflicts in a project and that likely issues should be actively identified and classified at this stage.

4.8 Project Scope and Execution of Fibre Optic Infrastructure

The third research objective was to examine how project scope influences execution of fibre optic infrastructure. In this study, the constructs of project scope included management plan,

statement of scope, WBS, acceptance criteria, change criteria, and management of actual changes.

4.8.1 Description of Project Scope from Likert Scale Data

The functional staff in fibre optic infrastructure departments in mobile telecommunication and internet service companies were requested to rate the level of agreement with various statements on project scope in the organizations. The results are shown in Table 4.25.

Table 4. 25: Project Scope Likert Scale Data

Statements	1	2	3	4	5	Mean	Std. Deviation
In my company, we prepare scope management plan before fibre project execution	0.0	4.7	5.8	38.3	51.2	3.907	0.997
We conduct planning workshops and prepare detailed scope statement	4.7	8.1	16.3	40.7	30.2	3.825	1.066
We research previous project experiences when developing scope in my company	2.3	7.0	18.6	37.2	34.9	4.011	1.005
In my company we define scope in initial stages of fibre projects	1.2	8.1	9.3	41.9	39.5	4.232	0.793
We document project milestones and deliverables	3.5	3.5	11.6	43.0	38.4	4.058	1.090
We estimate resource requirements before project execution	0.0	4.7	9.3	44.2	41.8	4.360	1.013
My company has defined scope verification process	4.7	1.2	15.1	41.9	37.1	3.837	0.955
In my company we detail project work acceptance criteria and get support from key stakeholders before embarking on the project	4.7	3.5	23.3	33.7	34.9	3.953	0.997
We have scope change control procedure in my company	2.3	7.0	25.6	36.0	29.	4.104	1.066
We identify factors that cause scope change and when change occurs, we ensure the changes are valuable to the objectives of the project and manage them well	2.3	7.0	14.0	40.7	36.0	4.093	1.005
Composite Mean and Standard Deviation						**4.038**	**0.9987**

From the findings in Table 4.25, the functional staff in fibre optic infrastructure departments in mobile telecommunication and internet service firms agreed that their companies estimated resource requirement before project execution (M=4.360, SD=1.013). The functional staff also agreed that in their companies, they defined scope at initial stages of fibre optic infrastructure (M=4.232, SD=0.793). In addition, they agreed that in their companies they had scope-change control procedure (M=4.104, SD=1.066). The functional staff also agreed that the companies identified factors that caused scope change and when change had occurred, they ensured changes were valuable to the objectives of the project and that the changes were well managed (M=4.093, SD=1.005).

Furthermore, the functional staff agreed that they documented project milestones and deliverables (M=4.058, SD=1.090). The functional staff agreed that in their companies they detailed project-work acceptance criteria and got support from key stakeholders before embarking on a project (M=3.953, SD=0.997). Moreover, they had defined scope verification process (M=3.837, SD=0.955). The functional staff also agreed that they conducted planning workshops and prepared detailed scope statement before embarking on project execution (M=3.825, SD=1.066).

Overall, the study findings showed that companies surveyed agreed that project scope definition in execution of fibre optic infrastructure is important (M=4.038, SD=0.9987). The results imply that project scope definition in terms of management plan, statement of scope, WBS, acceptance criteria, change criteria, and management of actual changes, involving key stakeholders at every stage can significantly contribute to successful execution of fibre optic infrastructure.

4.8.2 Description of Project Scope from Visual Analogue Scale Data

The respondents were requested to rate the performance of companies in developing project scope using a scale of 0 to 10, where 0 represented least performance and 10 represented best performance. The results are shown in Table 4.26.

Table 4. 26: Project Scope Visual Analogue Scale Data

Score	Frequency	Percent
1.00	4	2.3
3.00	4	2.3
4.00	10	5.8
5.00	10	5.8
6.00	8	4.7
7.00	16	9.3
8.00	48	27.9
9.00	54	31.4
10.00	18	10.5
Total	**172**	**100.0**

In Table 4.26, the results show that most respondents (31.4%) rated the performance of their companies in developing project scope as 9.00, followed by 8.00 (27.9%), 10.00 (10.5%), 7.00 (9.3%), 4.00 (5.8%), 5.00 (5.8%), 6.00 (4.7%), 1.00 (2.3%) and 3.00 (2.3%). These findings showed that the performance of mobile telecommunication and internet service providers in developing project scope were rated as 8 and above by 69.8% of respondents. The surveyed companies rated development of project scope as good, implying that project scope development is important and contributes to effective, efficient and sustainable execution of fibre optic infrastructure.

The key informants also reported that project scope contributes to effective implementation of fibre optic infrastructure. This theme was captured by one quotation from a respondent stated in K04.

> *Understanding project scope enables project managers to have a comprehensive understanding of a project and come up with a comprehensive plan as well as allocate appropriate resources. However, changes in the project scope can occur in the process of developing a project* (K04).

In addition, key informants indicated that their companies had scope statement, risk register and scope management plan. They also indicated that project scope encompassed budgeting, designs and execution plans This theme was captured by a quotation from a respondent stated in K06.

> *Project scope involves breaking down of major project deliverables in scope statement into smaller and workable components, breakdown of the work structure, and identification of required resources and milestones that gives a whole project*

perspective including acceptance criteria, change control criteria and management of actual changes in the scope (K06).

4.8.3 Correlation Analysis of Project Scope and Execution of Fibre Optic Infrastructure

Analysis of correlation was used to quantify the direction and strength of linear association between project scope and execution of fibre optic infrastructure. The results are shown in Table 4.27.

Table 4. 27: Correlation Coefficients for Project Scope and Execution of Fibre Optic Infrastructure

Variables		Execution of fibre optic infrastructure	Project scope
Execution of fibre optic infrastructure	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	172	
Project scope	Pearson Correlation	0.608	1
	Sig. (2-tailed)	0.000	
	N	172	172

The findings in Table 4.27 show that there is a positive and strong linear association between project scope and execution of fibre optic infrastructure in Nairobi County, Kenya ($r=0.608$, $p<0.001<0.05$). This means that there is a positive and strong correlation between project scope and execution of fibre optic infrastructure in Nairobi County.

4.8.4 Regression Analysis of Project Scope and Execution of Fibre Optic Infrastructure

The study used simple linear regression analysis to examine how project scope influences execution of fibre optic infrastructure. The hypotheses stated that:

$H_0$3: Project scope does not have significant influence on execution of fibre optic infrastructure.

$H_1$3: Project scope has significant influence on execution of fibre optic infrastructure.

The model summary of the influence of project scope on execution of fibre optic infrastructure is shown in Table 4.28.

Table 4. 28: Model Summary for Project Scope

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.608	0.370	0.366	1.43985

The coefficient of determination for the influence of project scope on execution of fibre optic infrastructure was $R^2=0.370$ as shown in Table 4.28. This indicated that project scope explains 37.0% of the variance in execution of fibre optic infrastructure among mobile

telecommunication and internet service providers in Nairobi County, Kenya. Table 4.29 shows analysis of variance for the influence of project scope on execution of fibre optic infrastructure.

Table 4. 29: ANOVA for Project Scope

Model		Sums of Squares	df	Mean Square	F	Sig.
1	Regression	206.560	1	206.560	99.635	0.000[b]
	Residual	352.440	170	2.073		
	Total	559.000	171			

In Table 4.29, the F-calculated (99.635) was greater than F-critical (3.94) and p-value of ($p< 0.001$) was less than the significant level of ($p=0.05$), showing that the model was a good fit for the data analyzed. This indicated that the model could be used to predict the influence of project scope on execution of fibre optic infrastructure among mobile telecommunication and internet service companies in Nairobi County, Kenya. Coefficients' of regression for the influence of project scope on execution of fibre optic infrastructure are shown in Table 4.30.

Table 4. 30: Coefficients of Project Scope

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		β	Std. Error	Beta (β)		
1	(Constant)	3.341	0.431		7.754	0.000
	Project scope	0.544	0.054	0.608	9.982	0.000

The hypothesis regression model was as below:

$$Y=3.314+ 0.544M$$

Where: Y – Execution of fibre optic infrastructure

M – Project Scope

The results showed that project scope has a significant positive influence on the execution of fibre optic infrastructure as shown by a regression coefficient of $\beta=0.544$($t=9.982$, $p <0.001<0.05$) in Table 4.30. The p-value ($p< 0.001$) was less than the significance level of ($p=0.05$). Therefore, null hypothesis (**$H_0$3**) was rejected, and alternative (**$H_1$3**) accepted that project scope has a significant influence on execution of fibre optic infrastructure.

Thus, the study findings showed that project scope has a significant and positive influence on execution of fibre optic infrastructure. These findings agree with Weijde (2008) who stated that a properly defined scope would enable effective, efficient and sustainable completion of a project. Additionally, in this study, findings agree with those of Knapp (2011) who, in his

study, showed that failure to clearly define and manage project scope can make projects unsuccessful. The study also established that mobile telecommunication and internet service providing companies estimate resource requirement before project execution. These findings also concur with the argument by Karl (2014) that definition of scope enables project managers to effectively assess resource requirements and set realistic commitments.

Project scope enables project managers to have a comprehensive understanding of a project and come up with a comprehensive plan as well as allocate appropriate resources. However, changes in the project scope can occur in the process of developing a project. The findings of the study indicated that mobile telecommunication and internet service providing companies have scope-change control procedure. In addition, the companies identified factors that caused scope change and when changes occurred, they ensured such changes were beneficial to the project objectives. These findings are in line with the argument by Knapp (2011) that controlling and managing scope change is important in guaranteeing success of any project because scope changes lead to changes in budget, timelines, quality and risks of the entire project.

It was further discovered that the companies also defined scope at initial stages of fibre projects. These findings also concur with those of Karl (2014) who showed in his study, that a well-defined scope at the initial stage of a project sets expectations among project stakeholders. Moreover, the results showed that companies had a defined scope verification process, thus validating the assertion by Newton (2015) that scope verification involves confirmation and ultimate acceptance of project work by the customer. Scope verification consists of taking measurements, carrying out examination and testing deliverables of the project to ensure compliance with requirements that have been agreed upon, and coming up with a plan that ensures project completion, documentation and agreement with stakeholders (Newton, 2015).

In addition, the study findings showed that mobile telecommunication and internet companies documented project milestones and deliverables. These findings agree with the argument by Berbec (2014) that organizations should ensure documentation of project milestones and deliverables. The study further established that the companies had a detailed project-work acceptance criterion and received support from key stakeholders before embarking on the project. These findings are in line with those of Levy and Globerson (1997) who, in their study, demonstrated that the development of project-work acceptance criteria before

embarking on a project is essential in ensuring project success. Also, the findings concur with Martinsuo and Lehtonen (2015) who showed that project scope involves breaking down of major project deliverables in scope statement into smaller and workable components, breakdown of the work structure, and identification of required resources and milestones that gives a whole project perspective including acceptance criteria, change control criteria and management of actual changes in the scope.

Furthermore, the study findings showed that the companies conducted planning workshops and prepared detailed scope statement. This is in line with the findings by Ker and Yang (2013) that project scope gives clear direction of any project and hence an organization should conduct planning workshops to prepare a project scope. Moreover, the findings concur with the assertion by Newton (2015) that to accomplish scope management, planning activities such as workshops, research on previous experiences, establishing plans and strategies should be conducted.

4.9 Leadership Skills, Stakeholder Management and Execution of Fibre Optic Infrastructure

The fourth research objective was to establish how leadership skills and stakeholder management jointly influence execution of fibre optic infrastructure. This objective was determined by multiple linear regression analysis. The hypotheses stated that:

$H_0$4: Leadership skills and stakeholder management, acting together, do not have a significant influence on execution of fibre optic infrastructure

$H_1$4: Leadership skills and stakeholder management, acting together, have a significant influence on execution of fibre optic infrastructure

The model summary of the joint influence of stakeholder management and leadership skills on execution of fibre optic infrastructure is shown in Table 4.31.

Table 4. 31: Model Summary for Stakeholder Management and Leadership Skills and Execution of Fibre Optic Infrastructure

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.758	0.574	0.569	1.18657

The coefficient of determination for the influence of leadership skills and stakeholder management acting together on execution of fibre optic infrastructure was R^2=0.574 as shown in Table 4.31. This indicates that leadership skills and stakeholder management jointly explain 57.4% of the variance in execution of fibre optic infrastructure. Table 4.32 shows

variance analysis of the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure.

Table 4. 32: ANOVA for Leadership Skills, Stakeholder Management and Execution of Fibre Optic Infrastructure

Model		Sums of Squares	df	Mean Square	F	Sig.
1	Regression	321.057	2	160.529	114.016	0.000[b]
	Residual	237.943	169	1.408		
	Total	559.000	171			

According to the findings, the F-calculated (114.016) in Table 4.32 was greater than F-critical (3.09) and p-value of (p< 0.001) was less than significant level of (p=0.05), showing that the model was a good fit for the data analyzed. This indicated that the model could be used to predict the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure in Nairobi County, Kenya. Coefficients' of regression of the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure are shown in Table 4.33.

Table 4. 33: Coefficients for Leadership Skills, Stakeholder Management and Execution of Fibre Optic Infrastructure

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		β	Std. Error	Beta (β)		
1	(Constant)	2.027	0.375		5.397	0.000
	Leadership skills	0.379	0.059	0.407	6.476	0.000
	Stakeholder management	0.385	0.055	0.439	6.989	0.000

Multiple regression model was as follows:

$$Y=2.027+0.379X_1+ 0.385X_2$$

Where: Y – Execution of fibre optic infrastructure

X_1 – Leadership Skills

X_2 – Stakeholder Management

In Table 4.33, results show that leadership skills have a significant influence on execution of fibre optic infrastructure as shown by a regression coefficient of β=0.379(t=6.476, p<0.001<0.05). Similarly, stakeholder management has a significant influence on execution of fibre optic infrastructure as shown by a regression coefficient of β=0.385(t=6.989, p <0.001<0.05). Since the p-values (p<0.001) in both leadership skills and stakeholder management were less than the significance level of (p=0.05), null hypothesis (**H_04**) was

rejected and alternative (**$H_1$4**) accepted that leadership skills and stakeholder management, acting together, have a significant influence on execution of fibre optic infrastructure.

The construction of fibre optic infrastructure needs proper management and execution, with involvement of stakeholders in the implementation process and its completion. Therefore, construction of fibre optic infrastructure also requires a competent manager and a qualified leader who can perform his duties effectively. The study findings showed that leadership skills and stakeholder management, acting together, have a significant influence on execution of fibre optic infrastructure. The findings agree with those of Sears *et al.* (2015) who, in their study, directly linked successful implementation of projects to the joint influence of leadership skills and management of stakeholders. The findings also concur with the argument by Sankara (2014) that execution of projects including fibre optic infrastructure require project leaders to have relevant leadership skills to be able to define and manage key stakeholders. In addition, the findings also agree with the assertion by Kawana (2016) that most projects fail because leaders do not visit and discuss with stakeholders' previous project experiences when developing strategies and plans to streamline new projects.

Likewise, findings of the study validate the argument by Eikenberry (2016), that leadership skills in project management enable stakeholders to participate in the process of scope definition for successful execution of projects, including fibre optic infrastructure. Moreover, this study findings agree with those of Kariungi (2014) who, in his research, showed that the ability to formulate project scope determines success of a project, through supervision of stakeholders since their satisfaction is key to improvement and relevance of the project, which eventually translates to its success.

The study findings also agree with the argument by Steyn (2014) that a leader with communication skills can pass information, resolve conflicts and interact with employees comfortably, which in turn influences execution of projects. Similarly, the study findings agree with the assertion by Zakaria *et al*. (2015) who, in their study, revealed that while a leader should come up with plans to successfully complete a project, it was necessary to work together with other stakeholders to accomplish the project on time. In addition, stakeholders' interests and influence on a project may change during execution and skilled leaders must demonstrate ability to manage the change to achieve project success.

4.10 Leadership Skills, Stakeholder Management, Project Scope and Execution of Fibre Optic Infrastructure

The fifth research objective was to examine how project scope moderates the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure. Multiple regression analysis was used to determine how project scope moderates the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure among mobile telecommunication and internet service providers in Nairobi County. The hypotheses stated that:

$H_0$5: There is no significant moderating influence of project scope on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure

$H_1$5: There is a significant moderating influence of project scope on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure

Table 4.34 illustrates model summary of moderating influence of project scope on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure.

Table 4. 34: Model Summary for Leadership Skills, Stakeholder Management, Project Scope and Execution of Fibre Optic Infrastructure

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.773[a]	0.598	0.591	1.15614
2	0.798[b]	0.637	0.626	1.10620

In Table 4.34, the first model included leadership skills, stakeholder management and project scope and showed that the three variables could explain 59.8% of the variance in execution of fibre optic infrastructure. However, in the second model that included leadership skills, stakeholder management, project scope, leadership skills multiplied by project scope and stakeholder's management multiplied by project scope showed that these variables explain 63.7% of the variance in execution of fibre optic infrastructure. An introduction of the interaction term in the model led to an increase in the coefficient of determination (R^2) by 3.9%. Table 4.35 shows analysis of variance for the moderating influence of project scope on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure.

Table 4. 35: ANOVA for Leadership Skills, Stakeholder Management, Project Scope and Execution of Fibre Optic Infrastructure

Model		Sums of Squares	df	Mean Square	F	Sig.
1	Regression	334.440	3	111.480	83.401	0.000[b]
	Residual	224.560	168	1.337		
	Total	559.000	171			
2	Regression	355.870	5	71.174	58.164	0.000[c]
	Residual	203.130	166	1.224		
	Total	559.000	171			

From the findings in Table 4.35, F-calculated for the first model is 83.401 and for the second model it was 58.164. Since the F-calculated for both models were greater than the F-critical (2.31), it was concluded that both models were good fits for the data analyzed and hence may be used in predicting the moderating influence of project scope on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure. Table 4.36 indicates regression coefficients of moderating influence of project scope on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure.

Table 4. 36: Coefficients for Leadership Skills, Stakeholder Management, Project scope and Execution of Fibre Optic Infrastructure

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		β	Std. Error	Beta (β)		
1	(Constant)	1.576	0.393		4.015	0.000
	Leadership skills	0.326	0.060	0.350	5.476	0.000
	Stakeholder management	0.306	0.059	0.350	5.187	0.000
	Project scope	0.182	0.058	0.203	3.164	0.002
2	(Constant)	-1.808	0.892		-2.028	0.044
	Leadership skills	0.883	0.145	0.948	6.087	0.000
	Stakeholder management	0.644	0.223	0.736	2.894	0.004
	Project scope	0.360	0.205	0.403	1.760	0.080
	Leadership skills * project scope	-0.033	0.025	-0.442	-1.321	0.188
	Stakeholders management * project scope	-0.047	0.028	-0.649	-1.704	.090

In Table 4.36, the first model, by substituting the beta values as well as the constant term, emanating from the first step regression modeling is as follows:

$$Y=1.576+0.326X_1+0.306X_2+0.182M$$

Where: Y – Execution of fibre optic infrastructure

X_1 – Leadership Skills

X_2 – Stakeholder Management

M – Project Scope

The findings showed that leadership skills have a significant influence on execution of fibre optic infrastructure as the regression coefficient was $\beta=0.326(t=5.476, p<0.001<0.05)$. In addition, stakeholder management has a significant influence on the execution of fibre optic infrastructure as the regression coefficient was $\beta=0.306(t=5.187, p<0.001<0.05)$. Moreover, project scope has a significant influence on the execution of fibre optic infrastructure as the regression coefficient was $\beta=0.182(t=3.164, p<0.001<0.05)$.

In Table 4.36, the second regression model, by substituting the beta values as well as the constant term, emanating from the second step regression modeling is as below:

$$Y=-1.808+0.883X_1+0.644X_2+0.360M-0.033X_1* M-0.047X_2*M$$

Where: X_1 – Leadership skills

X_2 – Stakeholder management

M – Project scope

X_1*M – Interaction term between Leadership skills and project scope

X_2*M – Interaction term between stakeholder management and project scope

The results in the second model showed that leadership skills have a significant influence on the execution of fibre optic infrastructure as shown by a regression coefficient of $\beta=0.883(t=6.087, p<0.001<0.05)$. The results also revealed that stakeholder management has a significant influence on the execution of fibre optic infrastructure as the regression coefficient was $\beta=0.644(t=2.894, p=0.004<0.05)$. In addition, project scope has no significant influence on the execution of fibre optic infrastructure as the regression coefficient was $\beta=0.360(t=1.760, p=0.080>0.05)$.

The interaction between leadership skills and project scope has no significant influence on the execution of fibre optic infrastructure as indicated by a regression coefficient of β=-

0.033(t=-1.320, p=0.188>0.05). Also, the interaction between stakeholder's management and project scope has no significant influence on the execution of fibre optic infrastructure as indicated by a regression coefficient of β=-0.047(t=-1.704, p=0.090>0.05). From these results, null hypothesis (**$H_0$5**) was rejected and alternative (**$H_1$5**) accepted that there is a positive and significant moderating influence of project scope on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure.

The study findings showed that project scope has a significant moderating influence on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure. These findings concur with the argument by Martinsuo and Lehtonen (2015) who, in their study, showed that project scope covers work breakdown structure, stakeholder definition and understanding of the laid down government policies. However, for any execution of a project including fibre optic infrastructure to succeed, there is need for project leaders with relevant leadership skills to define key stakeholders, manage them and influence relevant policies. In addition, the results of this study agree with assertion by Kawana (2016) that project scope planning is critical in order to guarantee project success and project leaders should ensure the involvement and management of relevant stakeholders throughout project life cycle. Similarly, the study findings agree with those of Moenga and Moronge (2016) who, in their study, showed that stakeholder participation through well-planned project scope under the leadership of a competent project manager in fibre optic infrastructure, enhances successful execution.

Furthermore, results of the study agree with the findings of Kariungi (2014) who, in his study, showed that strategic leadership skills offer a great influence in shaping and transforming stakeholders to participate in implementation of a project by undertaking roles as listed in the project scope. Moreover, the study findings agree with those of Schwalbe (2010) who revealed in his study that for stakeholders to be able to act on information given to them there is need for a well-defined project scope plan to which leaders respond and make decisions based on project scope for better project outcomes.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter consists of summary of key findings, conclusions and recommendations based on objectives of the study. In summary of the findings section, results for the descriptive analyses and inferential statistical analyses are presented. The study conclusions were guided by research objectives and were informed by the findings and discussions. Based on the study findings and conclusions, recommendations were made for practice and policy. Suggestions were also made for further research.

5.2 Summary of the Research Findings

This section presents the summary of the findings of the study in thematic areas, namely, leadership skills and execution of fibre optic infrastructure; stakeholder management and execution of fibre optic infrastructure; project scope and execution of fibre optic infrastructure; leadership skills, stakeholder management and execution of fibre optic infrastructure; and leadership skills, stakeholder management, project scope and execution of fibre optic infrastructure.

5.2.1 Leadership Skills and Execution of Fibre Optic Infrastructure

The study findings showed that project leaders understood their job and knew resources and skills that were relevant to the projects of their organizations. In addition, the companies had visionary leadership with right set of leadership skills that ensured effective stakeholder management, as well as completion of defined and documented scope. The companies ensured project team members were involved throughout the project life cycle and the firms had committed and motivated teams to deliver projects in time.

The study findings also showed that project teams in the companies are empowered to make decisions and they had a certain level of delegated authority and responsibility. Moreover, project leaders in their firms communicated to each other to let the teams know and appreciate good performance as well as when performance is not satisfactory. Project leaders coached and trained other project team members and the companies frequently planned milestones to support project teams to measure work progress. Furthermore, the project leaders were empowered to make decisions and were ready to justify reasons behind the

decisions to anyone, without fear or favor. However, the study findings showed that training was not available in the companies to equip project team members with relevant skills.

Correlation analysis results showed a strong and positive linear relationship between leadership skills and execution of fibre optic infrastructure in Nairobi County, Kenya ($r=0.672$, $p<0.001<0.05$). Findings for the first hypothesis, **$H_0$1** showed the coefficient of determination to be $R^2=0.451$, which indicated that leadership skills explain 45.1% of the variance in execution of fibre optic infrastructure. In addition, the study demonstrated that leadership skills have a positive and significant influence on execution of fibre optic infrastructure ($\beta=0.626$, $t=11.825$, $p<0.001<0.05$).

5.2.2 Stakeholder Management and Execution of Fibre Optic Infrastructure

The study findings showed that functional staff in the companies communicated properly and frequently, instituting feedback mechanism to promote positive relationship with stakeholders. In addition, there was careful identification and listing of stakeholders. Further, the companies involved relevant stakeholders when initiating a project, to enhance project mission and whenever necessary, in decision-making throughout project life cycle. The study also established that the companies identify and understand stakeholders' areas of interest and the leaders manage stakeholders' change of interest, influence relationship of the attributes of the stakeholders and how project decision affect stakeholders.

The study findings established that the functional staff in the organizations determined and assessed the attributes of key stakeholders. Moreover, the functional staff predicted likely reactions of stakeholders for implementing project decisions. Companies effectively resolved conflict among stakeholders, and they had appropriately classified stakeholders according to the attributes of legitimacy, proximity, level of interest power and urgency,

The correlation findings showed a strong and positive linear association between stakeholder management and execution of fibre optic infrastructure in Nairobi County, Kenya ($r=0.685$, $p<0.001<0.05$). The coefficient of determination for the second hypothesis, **$H_0$2** was $R^2=0.469$, indicating that stakeholder management explain 46.9% of the variance in execution of fibre optic infrastructure. In addition, the results indicated that stakeholder management has a positive and significant influence on the execution of fibre optic infrastructure ($\beta=0.600$, $t=12.247$, $p<0.001<0.05$).

5.2.3 Project Scope and Execution of Fibre Optic Infrastructure

The findings of the study demonstrated that the mobile telecommunication and internet service firms estimated resource requirement before project execution. The findings also showed that the companies defined scope at initial stages of fibre optic infrastructure projects and had scope-change control procedure. The study established that the companies identified factors that cause scope change and when change had occurred, they ensured changes were valuable to the objectives of the project and that actual changes were well managed. Furthermore, the study revealed that the companies documented project milestones and deliverables. In addition, the companies detailed project-work acceptance criteria and received support from key stakeholders before embarking on a project. Moreover, the companies had a defined scope verification process, conducted planning workshops and prepared detailed scope statement before embarking on project execution.

The findings of correlation analysis showed a strong and positive linear relationship between project scope and execution of fibre optic infrastructure in Nairobi County, Kenya ($r=0.608$, $p<0.001<0.05$). The coefficient of determination for the third hypothesis, $\mathbf{H_0 3}$ was $R^2=0.370$, indicating that project scope explains 37.0% of the variance in execution of fibre optic infrastructure. The study findings also established that project scope has a positive and significant influence on the execution of fibre optic infrastructure ($\beta=0.544$, $t=9.982$, $p<0.001<0.05$).

5.2.4 Leadership Skills, Stakeholder Management and Execution of Fibre Optic Infrastructure

The study findings showed that leadership skills and stakeholder management, acting together, have a significant influence on execution of fibre optic infrastructure. The execution of projects, including fibre optic infrastructure, requires project leaders to have relevant leadership skills to enable definition and management of key stakeholders. In addition, most projects fail because leaders do not visit and discuss previous project experiences with stakeholders when developing strategies and plans to streamline new projects. Likewise, leadership skills of a project manager enable stakeholders to take part in scope definition for successful execution of projects, including fibre optic infrastructure. The ability to formulate project scope determines success of a project, the assistance and supervision of stakeholders since satisfaction of stakeholders is key to improvement and relevance of the project, which eventually translates into its success.

Findings for the fourth hypothesis, **$H_0$4** showed that the coefficient of determination was R^2=0.574, demonstrating that that leadership skills and stakeholder management, acting together, explain 57.4% of the variance in execution of fibre optic infrastructure. In addition, the study findings showed that leadership skills (β=0.379, t=6.476, p<0.001<0.05) and stakeholder management (β=0.385, t=6.989, p<0.001<0.05) jointly have significant influence on the execution of fibre optic infrastructure.

5.2.5 Leadership Skills, Stakeholder Management, Project Scope and Execution of Fibre Optic Infrastructure

The study findings demonstrated that the moderating influence of project scope on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure projects is significant. Project scope covers work breakdown structure, stakeholder definition and understanding of the laid down government policies. However, for any execution of a project to succeed, including fibre optic infrastructure, there is need for project leaders with relevant leadership skills to define key stakeholders, manage them and influence relevant policies.

The findings for the fifth hypothesis, **$H_0$5** revealed that leadership skills, stakeholder management and project scope explain 59.8% of the variance in execution of fibre optic infrastructure. Furthermore, project scope, leadership skills, and stakeholder management and interaction terms explain 63.7% of the variance in execution of fibre optic infrastructure. Introduction of an interaction term in the model led to an increase in the coefficient of determination by 3.9%. It was also established that project scope has a significant moderating influence on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure.

Table 5. 1: Summary of the Hypothesis Test Results

Research Objective	Hypothesis	Results	Decision on null hypothesis
To determine how leadership skills influence execution of fibre optic infrastructure	**$H_0$1:** Leadership skills do not have significant influence on execution of fibre optic infrastructure	β=0.626 (p<0.001)	Rejected at significance level of p=0.05
To assess the extent to which stakeholder management influences execution of fibre optic infrastructure	**$H_0$2:** Stakeholder management does not have significant influence execution of fibre optic infrastructure	β=0.600 (<0.001)	Rejected at significance level of p=0.05
To examine how project scope influences execution of fibre optic infrastructure	**$H_0$3:** Project scope does not have significant influence on execution of fibre optic infrastructure	β=0.544 (p<0.001)	Rejected at significance level of p=0.05
To establish how leadership skills and stakeholder management jointly influence execution of fibre optic infrastructure	**$H_0$4:** Leadership skills and stakeholder management, acting together, do not have significant influence on execution of fibre optic infrastructure	β_1=0.379 (p<0.001) β_2=0.385 (p<0.001)	Rejected at significance level of p=0.05
To examine how project scope moderates the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure	**$H_0$5:** There is no significant moderating influence of project scope on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure	Model 1 β_1=0.326 (p<0.001) β_2=0.306 (p<0.001) β_3=0.182 (p=0.002) Model 2 β_1=0.883 (p<0.001) β_2=0.644 (p=0.004) β_3=0.360 (p=0.080) β_4=-0.033 (p=0.188) β_5=-0.047 (p=0.090)	Rejected at significance level of p=0.05

5.3 Conclusions

The first research objective determined how leadership skills influence execution of fibre optic infrastructure. The inferential statistical tests and key informant interviews showed that leadership skills have a significant influence on execution of fibre optic infrastructure. It was

concluded that leadership skills positively and significantly influence execution of fibre optic infrastructure.

The second research objective assessed the extent to which stakeholder management influences execution of fibre optic infrastructure. It was also shown, through inferential statistical tests and key informant interviews that stakeholder management has a significant influence on execution of fibre optic infrastructure. Thus, it was concluded that stakeholder management has a significant and positive influence on execution of fibre optic infrastructure.

The third research objective examined how project scope influences execution of fibre optic infrastructure. Analyses by inferential statistics and key informant interviews showed that project scope significantly influences execution of fibre optic infrastructure. The study therefore concluded that project scope has a positive and significant influence on execution of fibre optic infrastructure.

The fourth research objective established how leadership skills and stakeholder management jointly influence execution of fibre optic infrastructure. The study findings showed that leadership skills and stakeholder management, acting together, have a significance influence on execution of fibre optic infrastructure. It was therefore concluded that leadership skills and stakeholder management have a joint positive and significant influence on execution of fibre optic infrastructure.

The fifth research objective examined how project scope moderates the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure. Statistical analyses showed that project scope has a positive moderating influence on the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure. It was thus concluded that project scope has a positive and significant moderating influence on the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure.

5.4 Contribution of the Study to Knowledge in Project Management

Table 5.2 shows contribution of the study to knowledge in project management. The research objectives and contribution to knowledge in project management are summarized in the Table.

Table 5. 2: Contribution of the Study to Knowledge in Project Management

Objective	Contribution of the study to knowledge in project management
To determine how leadership skills influence execution of fibre optic infrastructure	Results of the study revealed that leadership skills have significant and positive influence on execution of fibre optic infrastructure
To assess the extent to which stakeholder management influences execution of fibre optic infrastructure	Findings of the study showed that stakeholder management has significant and positive influence on the execution of fibre optic infrastructure
To examine how project scope influences execution of fibre optic infrastructure	The results of the study established that project scope has significant and positive influence on the execution of fibre optic infrastructure
To establish how leadership skills and stakeholder management jointly influence execution of fibre optic infrastructure	The results of the study indicated that leadership skills and stakeholder management acting together have significant influence on the execution of fibre optic infrastructure
To examine how project scope moderates the joint influence of leadership skills and stakeholder management on execution of fibre optic infrastructure	Findings of the study revealed that project scope has positive and significant moderating influence on the combined influence of leadership skills and stakeholder management on execution of fibre optic infrastructure

5.5 Recommendations

This section presents recommendations according to the five objectives of the study. The first set of recommendations is made for practitioners in project management while the second set is for policy intervention.

5.5.1 Recommendations for Practice

1. The study findings showed that leadership skills influence execution of fibre optic infrastructure. It is therefore recommended that mobile telecommunication and internet service providing companies should ensure that project leaders have skills such as visionary capacity, team building, communication, planning, delegation, decision making and problem solving, and coaching and training. Companies dealing with execution of fibre optic infrastructure should put into consideration leadership skills when recruiting project leaders. In the same way, mobile telecommunication and internet service providing companies should develop training programs to improve leadership skills of the current project leaders.

2. The study also highlighted the importance of coaching and training skills among leaders. Coaching helps to improve skills and confidence of employees in decision making. The study, therefore, recommends that mobile telecommunication and internet service providing companies should develop coaching and mentoring programs for their functional staff involved in execution of fibre optic infrastructure.

3. Furthermore, the study showed that stakeholder management in terms of identification, listing and identifying their interests influences execution of fibre optic infrastructure. It is, therefore, recommended that the companies should ensure that stakeholders are involved in all the phases of a project from inception to closure. This will help in improving acceptance by all stakeholders, which is key in ensuring efficiency, effectiveness and sustainability of fibre optic infrastructure.

4. It was noted that execution of fibre optic infrastructure involves change and stakeholders can decide to make changes in their interests, resulting in changes in project scope during implementation. The study therefore recommends that mobile telecommunication and internet service providing companies involved in execution of fibre optic infrastructure should make use of conflict management skills as well as communication skills to ensure appropriate management of change.

5.5.2 Recommendations for Policy

1. This study recommends that the Government of Kenya, through ICT authority and other agencies, should formulate policies to guide and regulate execution of fibre optic infrastructure.

2. The study also recommends the development of right of way conduits that can be used by mobile telecommunication and internet service providing companies to install fibre optic infrastructure instead of repeated ground digging that tends to shorten life of streets, disrupt traffic and access to local businesses as well as interfere with other underground infrastructure.

3. It was also noted that building code specifies and regulates, standards for design and construction of structures. They also specify and regulate installations such as fibre optic infrastructure within buildings and other related structures. The study, therefore, recommends review of building codes to allow for fibre optic services in new buildings.

4. Finally, the Government should also establish a centrally coordinated authority to facilitate uniformity of policy in such services as, time bound issuance of permits and collection of fees and charges.

5.6 Suggestions for Further Research

The recommendations below are made for further research:

1. This study did not look at how specific government policies such as ICT policy, National ICT Master Plan (2013-2017), Kenya Information, and Communications Act influence execution of fibre optic infrastructure. Therefore, further studies should be conducted to assess how specific government policies influence execution of fibre optic infrastructure in Kenya.

2. The study was also delimited to Nairobi, the Kenyan capital city county. However, fibre optic infrastructure have also been implemented in other counties in Kenya. Since different counties in the country might experience different levels of stakeholders' involvement depending on other factors such as literacy level, culture and level of development, it is recommended that similar studies should be conducted in other counties in Kenya.

3. The study findings showed that leadership skills, stakeholder management, and project scope influence 59.8% of the variance in execution of fibre optic infrastructure. It means, therefore, that these are not the only variables that influence execution of fibre optic infrastructure. It is thus recommended that further studies should be conducted on other factors that may influence execution of fibre optic infrastructure in Kenya.

4. It is also recommended that a similar study be conducted in Nairobi County that targets all contractors and vendors that supply equipment and build fibre optic infrastructure.

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APPENDICES

Appendix I: Letter of Request for Transmittal of Data

James Konya AKHWABA,
University of Nairobi,
Mobile: +254 729720542,
Email: saulokonya@yahoo.com.
Nairobi.

February 2018.

To whom it may concern

Dear Sir/Madam

Ref: Completion of Questionnaire

In partial fulfillment of the requirement of award of the degree of Doctor of Philosophy in Project Planning and Management, The University of Nairobi has cordially instructed me to collect data as part of the research thesis and complete a report for onward submission to the board of post graduate studies for examination. My research topic is, "Influence of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure in Nairobi County, Kenya."

I will therefore appreciate if you answer all questions in the attached questionnaire as it will take shortest possible time. Please note that there are no correct answers and wrong answers. Answer the questionnaire as accurately as possible by ticking the number which best describes your experience or perception and or describing situations as may be necessary. All the information collected through this exercise will be used only for academic purposes.

Your prompt response will also be highly appreciated and will hasten the data analysis and compilation of final report. In case of any clarification and or further information, please contact me, James Konya Akhwaba through my mobile number, 0729720542.

Yours faithfully,

James Konya AKHWABA.

Appendix II: Questionnaire for Functional Staff

I am a PhD student at the University of Nairobi conducting a research on Influence of Leadership Skills, Stakeholder management and Project scope on Execution of Fibre Optic Infrastructure in Nairobi County, Kenya. You have been selected as a respondent in this study. Kindly provide responses without any reservations as the study is purely for academic purposes. Your responses will also be treated with utmost confidentiality.

Part A: Background Information

Please tick (√) where applicable

1) In which of the following categories does your organization fall?
   ( ) Mobile Telecommunication ( ) Internet Service Provider
2) Gender of respondent
   ( ) Male ( ) Female
3) Current year in the organization
   ( ) Year 1 ( ) Year 2
   ( ) Year 3 ( ) Year 4 and above
4) Where do you currently work?
   ( ) Safaricom ( ) Orange Telkom
   ( ) Access Kenya ( ) Jamii Telecom
   ( ) Wananchi Telecom ( ) Liquid Telecom
5) Please indicate your highest level of Education
   ( ) Diploma ( ) Bachelors
   ( ) Masters ( ) Other

Part B: Leadership skills

a) Please tick (√) to indicate your level of agreement with the following statements on leadership skills in your organization. Scale:1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

SN	Leadership skills	1	2	3	4	5
1	The company has visionary leadership with the right set of leadership skills that ensures effective stakeholder management, correct and complete scope is defined and documented					
2	My company has motivated teams that go an extra mile to deliver projects in time					
3	My company ensures project team members are involved throughout the project					
4	Project leaders in my company use communication to let the teams know when they are performing well and not just when they are performing badly					
5	Project leaders in my company frequently plan milestones to help project team feel they are making progress					
6	Project leaders understand the job and know resources and skills relevant to the project					
7	Project team members are empowered to make decisions and have a certain level of delegated authority and responsibility					
8	In my company project leaders are empowered to make decisions and are ready to justify the reasons behind the decision to anyone no matter how senior or important the person is					
9	Project leaders' coach and train other project team members					
10	Trainings are available in my company to equip project team members with relevant skills					

b) On a scale of 0 – 10, rate extent to which the leadership skills mentioned above have been applied in steering company projects towards their intended goals where, 0 – Least application and 10 – Most application (tick - √ one)

0	1	2	3	4	5	6	7	8	9	10

Part C: Stakeholder Management

a) Please tick (√) to indicate your level of agreement with the following statements on Stakeholder Management in your organization. Use the scale:1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

SN	Stakeholder Management	1	2	3	4	5
1	In my company stakeholders are carefully Identified and listed					
2	In my company, we identify and understand stakeholder areas of interest					
3	In my company, we determine and assess the power, urgency legitimacy and proximity of stakeholders					
4	In my company, we appropriately classify stakeholders according to their attributes/characteristics (power, legitimacy, urgency, proximity, level of interest)					
5	In my company, we identify and classify possible conflicts and coalitions among stakeholders					
6	In my company, we effectively resolve conflict among stakeholders					
7	In my company, we manage change of stakeholder's interests, influence, relationship among stakeholders, stakeholder attributes and how project decisions affect stakeholders					
8	In my company, we predict stakeholders' likely reactions for implementing project decisions					
9	In my company we involve relevant stakeholders at the inception stage, to refine project mission and whenever necessary in decision making throughout project life cycle					
10	In my company, we communicate properly and frequently, instituting feedback mechanism to promote positive relationship with stakeholders					

b) On a scale of 0 – 10, rate the performance of the company in stakeholder management, where, 0 – least performance and 10 – best performance (tick - √ one)

0	1	2	3	4	5	6	7	8	9	10

Part D: Project Scope

a) Please tick (√) to indicate your level of agreement with the following statements on project scope in your organization. Use the scale: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

SN	Project Scope	1	2	3	4	5
1	In my company we prepare scope management plan before fibre project execution					
2	In my company, we conduct planning workshops and prepare detailed scope statement					
3	In my company, we research previous project experiences when developing scope in my company					
4	In my company we define scope in initial stages of fibre projects					
5	In my company, we document project milestones and deliverables					
6	In my company, we estimate resource requirements before project execution					
7	My company has a defined scope verification process					
8	In my company we detail project work acceptance criteria and get buy-in from key stakeholders before embarking on the project					
9	In my company, we have Scope change control procedure in my company					
10	In my company, we identify factors that cause scope change and when change has occurred, ensure changes are beneficial to project objectives and manage actual changes when and if they do occur					

b) On a scale of 0 – 10, rate the performance of the company in developing project scope, where, 0 – least performance and 10 – best performance (tick - √ one)

0	1	2	3	4	5	6	7	8	9	10

Part F: Execution of fibre optic infrastructure

a) Please tick (√) to indicate your level of agreement with the following statements on Execution of fibre optic infrastructure in your organization. Scale:1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

SN	Execution of fibre optic infrastructure	1	2	3	4	5
1	My company always achieves timely completion of fibre optic infrastructure					
2	My company always achieves cost savings in fibre optic infrastructure					
3	My company does not always achieve acceptable quality standards in execution of fibre optic infrastructure					
4	My company does not always achieve stakeholders' satisfaction					
5	My company does not always undertake post project reviews to learn lessons for future					
6	My company always undertakes to assess delivery of benefits as defined in benefit realization plan					
7	My company always asks to sign off the project deliverables as a sign of successful closure					
8	My company always ensures that all parties involved in fibre optic projects are and remain committed to project execution					
9	Where there is any lack of project team commitment in my company, it is clearly recognized and dealt with					
10	Project leadership in my company, has and maintains commitment and has the skills and resources to inspire commitment from others					

a) On a scale of 0 – 10, rate the performance of your company in execution of fibre optic infrastructure, where 0 – least performance and 10 – best performance (tick - √ one)

0	1	2	3	4	5	6	7	8	9	10

Appendix III: Interview Guide for Heads of Departments

Before we begin, I would like to provide some context on the project. I am a PhD student working on a thesis; influence of project scope, stakeholder management and leadership skills on execution of fibre optic infrastructure in Nairobi County, Kenya. I have scanned through textbooks, journals and other publications to identify project areas where leadership skills, project scope, and government policy have clearly been defined; stakeholders managed and involved and how these variables influence execution of projects including fibre optic infrastructure.

Section A: Demographic Information

1. What is your highest Level of Education?
2. How long have you worked in this department?
3. How long have you worked in the Telecommunication/Internet Service industry in Kenya?
4. What is the name of your company?

Section B: Specific Information

1. I would like to start the interview by asking you to describe what your department does and whether (or how) you apply project scope and stakeholder management in your project work. As you respond, I may prompt you with other questions to expound on your answers.
2. Is the performance of your company in execution of fibre optic infrastructure satisfactory?
3. What are the indicators of effective execution of fibre optic infrastructure in your company?
4. How would you rate performance of your company in execution of fibre optic infrastructure?
5. Does project manager's leadership skills influence execution of fibre optic infrastructure in your company?
6. What are the leadership skills for effective execution of fibre optic infrastructure?
7. Does stakeholder management contribute to effective execution of fibre optic infrastructure in your company?
8. How would you rate the process of stakeholder management in your company?

9. Does development of project scope contribute to effective execution of fibre optic infrastructure in your company?
10. How would you rate the process of project scope development in your company?
11. Any final comment?

Appendix IV: Interview Guide for CAK and ICTA Officials

Before we begin, I would like to provide some context on the project. I am a PhD student working on a thesis; influence of project scope, stakeholder management and leadership skills on execution of fibre optic infrastructure in Nairobi County, Kenya. I have scanned through textbooks, journals and other publications to identify project areas where leadership skills, project scope, and government policy have clearly been defined; stakeholders involved and how these variables influence execution of projects including fibre optic infrastructure.

Section A: Demographic Information

1. What is your highest Level of Education?
2. How long have you worked in the ICT industry in Kenya?

Section B: Specific Information

1. What necessitated the adoption of fibre optic infrastructure in Kenya? What is the status?
2. Who are the stakeholders in fibre optic infrastructure? What are their roles?
3. What do you view as challenges in execution of fibre optic infrastructure?
4. As the regulator, do you have a policy in place to address the challenges? How can these challenges be overcame?
5. Do you involve industry stakeholders in policy matters regarding fibre optic infrastructure? How is their contribution significant in execution of fibre optic projects?
6. Any final comment on execution of fibre optic infrastructure in Kenya?

Appendix V: Document Review Guide

Document Review Checklist				
Project Name:			**Review Date:**	
Start Date: **Expected End date:**			**Project Actual End date:**	
Reviewer:			**Organization Name:**	
Section	**Item**	**Yes**	**No**	**Comments**
Project scope	Scope management plan			
	Scope statement			
	Risk register			
Stakeholder Management	Stakeholder management plan			
	Stakeholder register			
	Stakeholder engagement matrix			
	Communication plan			
Leadership Skills	Leadership framework and philosophy			
Project Execution	Confirm closure documents			
	Confirm business case and benefit realization plan			
	Lesson learned			
	Resources management plan			

Appendix VI: Research Clearance Letter from the University

UNIVERSITY OF NAIROBI
GRADUATE SCHOOL

Telephone: 3318262
Fax Number: 243626
Telegrams:"Varsity of Nairobi"
Email: gs@uonbi.ac.ke
Our Ref: L83/97633/2015

P. O. Box 30197, 00100
NAIROBI, KENYA

January 18, 2018

Akhwaba James Konya
C/o Dean, School of Open & Distance Learning

Dear Mr. Akhwaba,

FULL ADMISSION TO POSTGRADUATE STUDIES (DOCTORATE)

Following your application for a higher degree at this University, I am pleased to inform you that the Director, Graduate School has approved your application for full registration for the degree of Doctor of Philosophy in **Project Planning** and **Management** in the School of Open and Distance Learning. He has also approved **Dr. Omondi Bowa** and **Dr. Peter Keiyoro** as the supervisors of your PhD. thesis entitled:**"Influence of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure in Nairobi County, Kenya "**. The Guidelines on Postgraduate Supervision can be accessed on our website (www.gs.uonbi.ac.ke) while the Research Notebook is available at the University Bookstore.

The degree for which you are registered will be offered by coursework, examination and thesis.

Your admission into the programme commenced on **11th December 2013** as approved by the Director, Graduate School. Also note that your registration is governed by the common regulations for the degree of Doctor of Philosophy in all Faculties/Schools/Institutes. **You will be expected to carry out supervised thesis research in your chosen area of study for a minimum period of four (4) semesters, with effect from today's date, culminating in a doctoral thesis.**

You will also be required to show evidence of 2 (two) publications or 2 (two) letters of acceptance from peer reviewed journals from your work before the oral defence.` The publications should be co-authored with the supervisors.

	KENYAN STUDENTS (KSHS)	FOREIGN STUDENTS (US$)
Tuition fees	50,000 per unit	1,400
Examination	3,000 per unit	100
Thesis Examination Fees (once)	50,000	900
Fees for subsequent years	150,000 p.a	4,000

OTHER CHARGES		
Registration	2,000 per sem	60
ID card	500 p.a	15
Activity	2,000 p.a	60
Computer facilities	6,000 p.a	160
Medical (Emergency)	5,000 p.a	130
Library	6,000 per sem	160
Caution money (refundable)	5,000 once	130

Additional Charges	
Extension of Registration period	3,000/= per annum
Extension of Correction period	1,000/= per three months
Extension of Revision period	3,000/=
Examination for Revised Thesis/Project Report	9,000/=

NOTE:

1. **All fees due should be paid before registration is effected.**
2. **Appropriate Field work fees shall be charged separately.**
3. **The above fees are subject to change without any prior notice.**
4. **Total number of units required for the programme is 7.**
5. **The guidelines for research money are as follows:**

Arts Based Research	**Kshs. 150,000/=**
Book Allowance	**Kshs. 40,000/=**

Foreign Students from outside the partner states of the Northern Corridor Integration Project (Republics of Burundi, Rwanda, Uganda and South Sudan) to add 25% on all charges.

Please note that all fees and other charges due shall be paid by **Direct Cash Deposits, EFT (Swift Code is "BARCKENX) or RTGS** transfer to **UON CESSP Collection Account No. 2032771362** at Barclays Bank of Kenya, Barclays Plaza, Nairobi, Kenya or at any Barclays Bank Branch countrywide using the Registration Number quoted above. Personal Cheques, Bankers Cheques or Institutional Cheques are **NOT acceptable**.

As the University does not provide accommodation for postgraduate students, you must make your own accommodation arrangements. We estimate that you will need over Ksh. 50,000.00 per month to cover this and other personal expenses.

You are advised that all fees and other charges may be subject to change without prior notice.

Yours Sincerely,

STEPHEN M. MULWA (MR.)
FOR: DIRECTOR, GRADUATE SCHOOL

Cc: Dean, School of Open and Distance Learning
Dr. Omondi Bowa (Supervisor) –School of Open & Distance Learning
Dr. Peter Keiyoro (Supervisor) –School of Open & Distance Learning

SMM/gwg

Appendix VII: Research Clearance Permit

THIS IS TO CERTIFY THAT:
MR. JAMES KONYA AKHWABA
of THE UNIVERSITY OF NAIROBI, 0-200
Nairobi,has been permitted to conduct
research in *Nairobi County*

on the topic: *INFLUENCE OF LEADERSHIP SKILLS, STAKEHOLDER MANAGEMENT AND PROJECT SCOPE ON EXECUTION OF FIBRE OPTIC INFRASTRUCTURE IN NAIROBI COUNTY, KENYA*

for the period ending:
26th January,2019

.....
Applicant's Signature

Permit No : NACOSTI/P/18/20855/21016
Date Of Issue : 29th January,2018
Fee Recieved :Ksh 2000

.....
Director General
National Commission for Science, Technology & Innovation

CONDITIONS

1. The License is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.

REPUBLIC OF KENYA

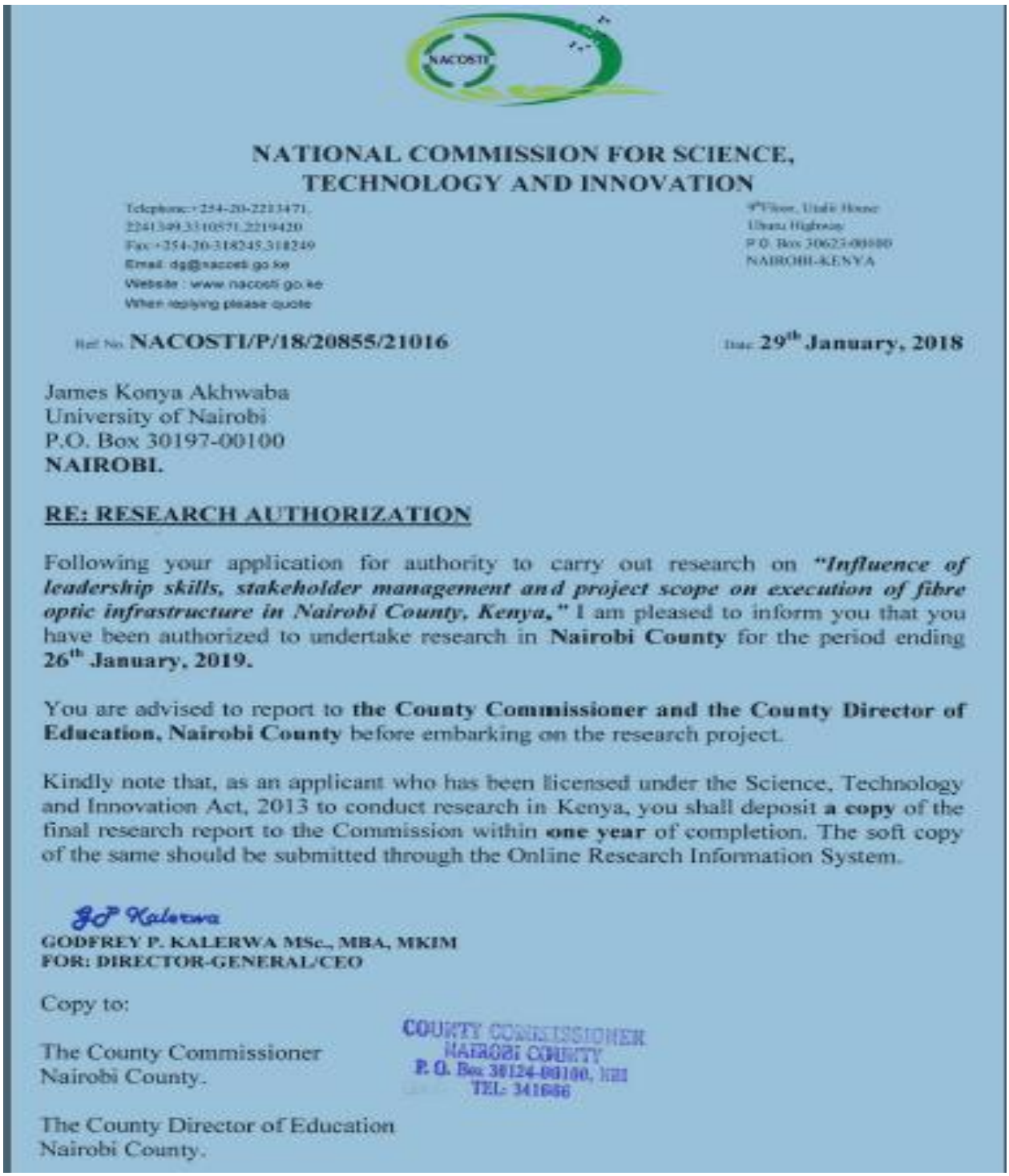
National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No.A 17284

CONDITIONS: see back page

Appendix VIII: Research Authorization Letter Issued by NACOSTI, and County Commissioner



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349,3310571,2219420
Fax: +254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

4th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref No. **NACOSTI/P/18/20855/21016**

Date **29th January, 2018**

James Konya Akhwaba
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Influence of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure in Nairobi County, Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **26th January, 2019.**

You are advised to report to **the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

GP Kalerwa

GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

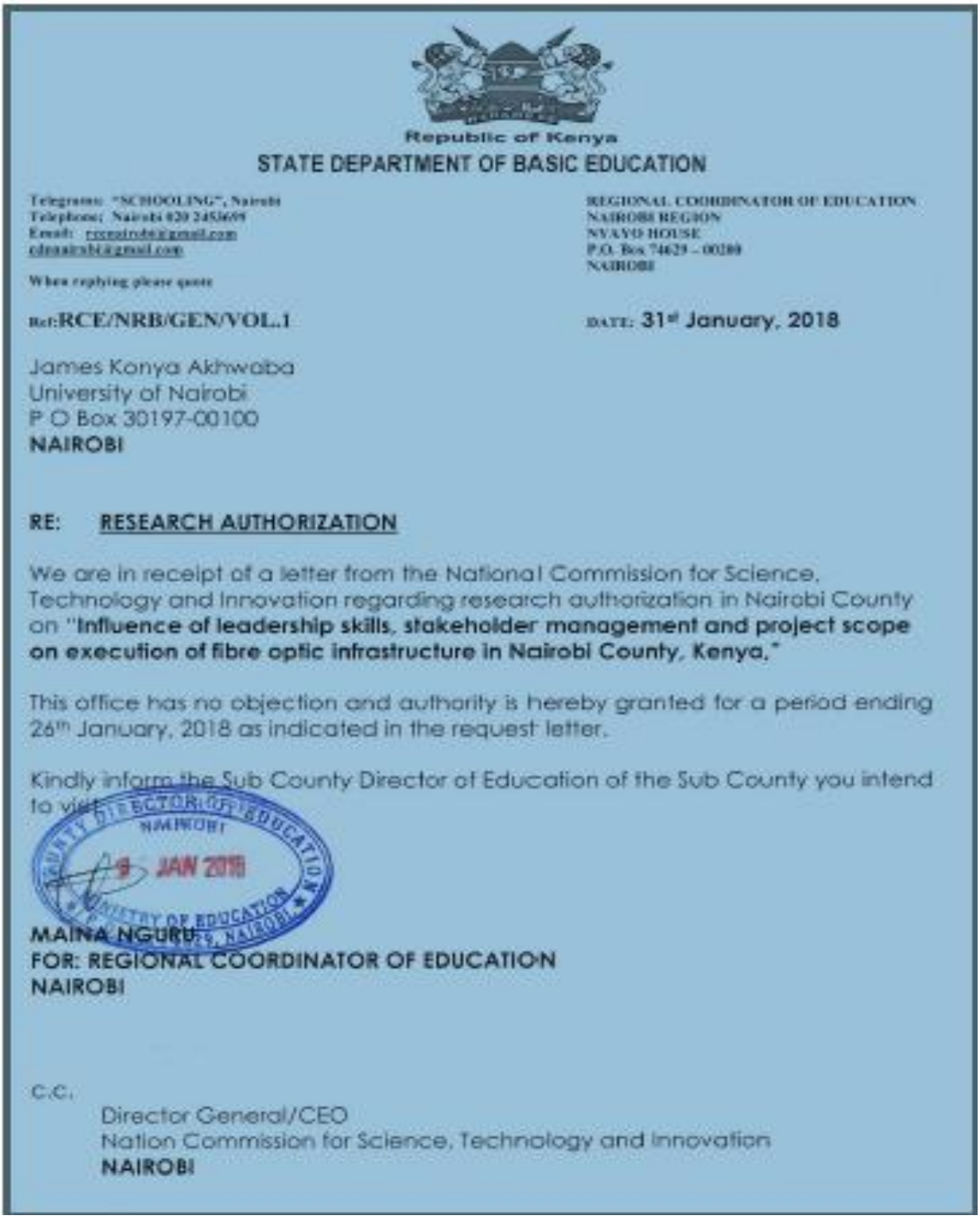
Copy to:

The County Commissioner
Nairobi County.

COUNTY COMMISSIONER
NAIROBI COUNTY
P. O. Box 30124-00100, NBI
TEL: 341666

The County Director of Education
Nairobi County.

Appendix IX: Research Authorization Letter Issued by State Department of Basic Education



Republic of Kenya

STATE DEPARTMENT OF BASIC EDUCATION

Telegrams: "SCHOOLING", Nairobi
Telephone: Nairobi 020 2453699
Email: regcoordnbi@gmail.com
dbasicnbi@gmail.com

When replying please quote

REGIONAL COORDINATOR OF EDUCATION
NAIROBI REGION
NYAYO HOUSE
P.O. Box 74629 - 00200
NAIROBI

Ref:RCE/NRB/GEN/VOL.1

DATE: 31st January, 2018

James Konya Akhwaba
University of Nairobi
P O Box 30197-00100
NAIROBI

RE: RESEARCH AUTHORIZATION

We are in receipt of a letter from the National Commission for Science, Technology and Innovation regarding research authorization in Nairobi County on "**Influence of leadership skills, stakeholder management and project scope on execution of fibre optic infrastructure in Nairobi County, Kenya.**"

This office has no objection and authority is hereby granted for a period ending 26th January, 2018 as indicated in the request letter.

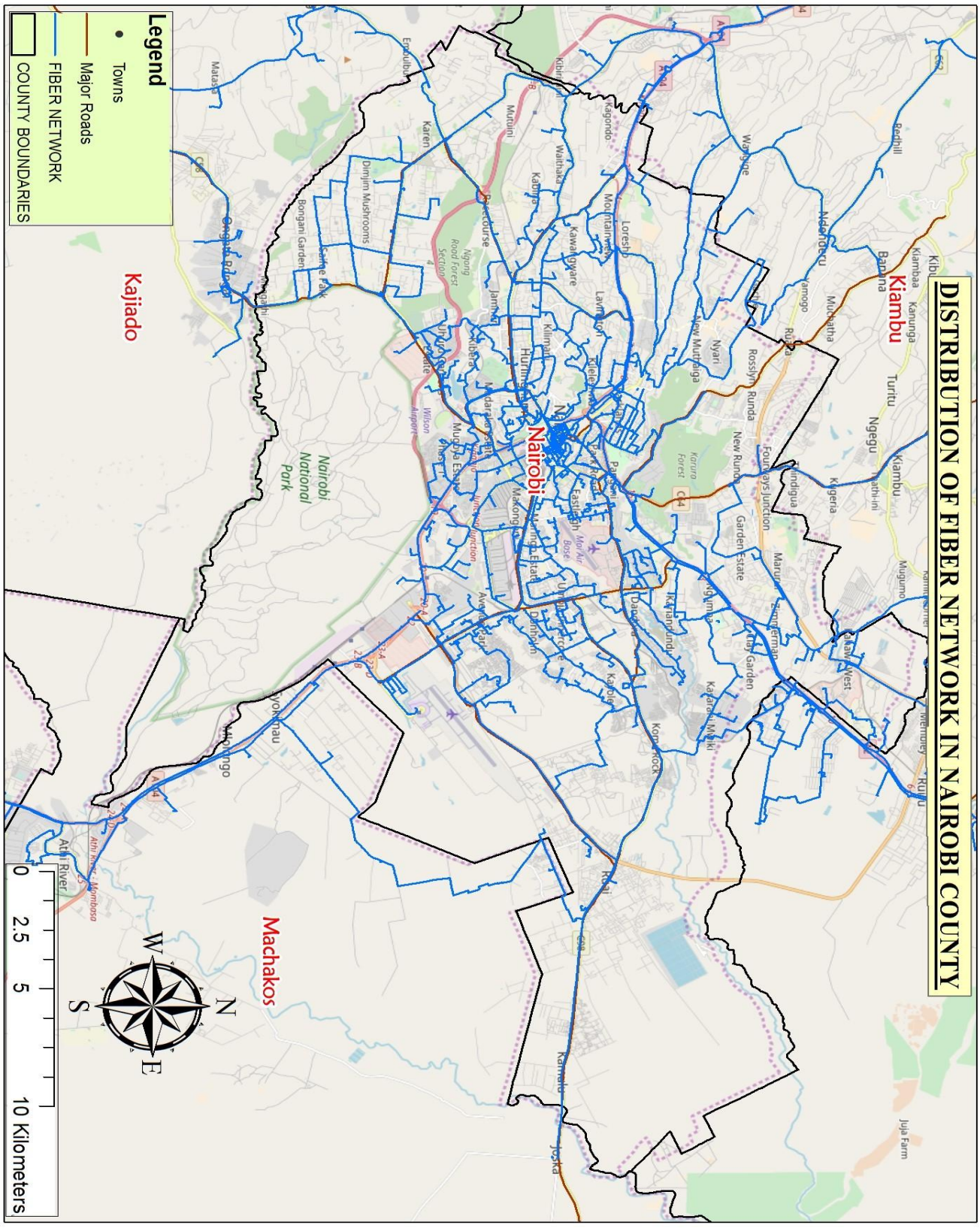
Kindly inform the Sub County Director of Education of the Sub County you intend to visit.

COUNTY DIRECTOR OF EDUCATION NAIROBI
19 JAN 2018
MINISTRY OF EDUCATION P.O. BOX 74629, NAIROBI

MAINA NGURU
FOR: REGIONAL COORDINATOR OF EDUCATION
NAIROBI

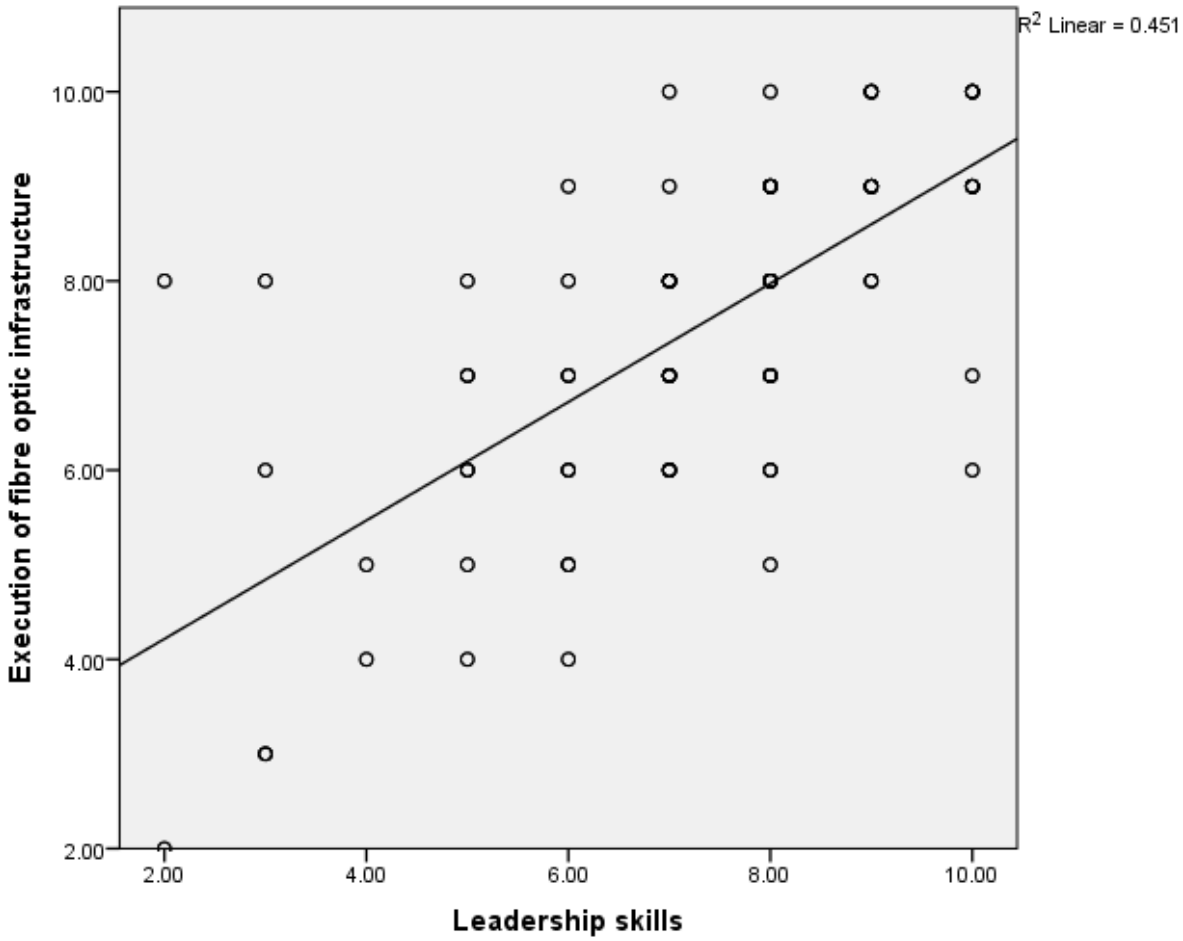
C.C.
Director General/CEO
Nation Commission for Science, Technology and Innovation
NAIROBI

Appendix X: Distribution of Fibre Networks in Nairobi County, Kenya

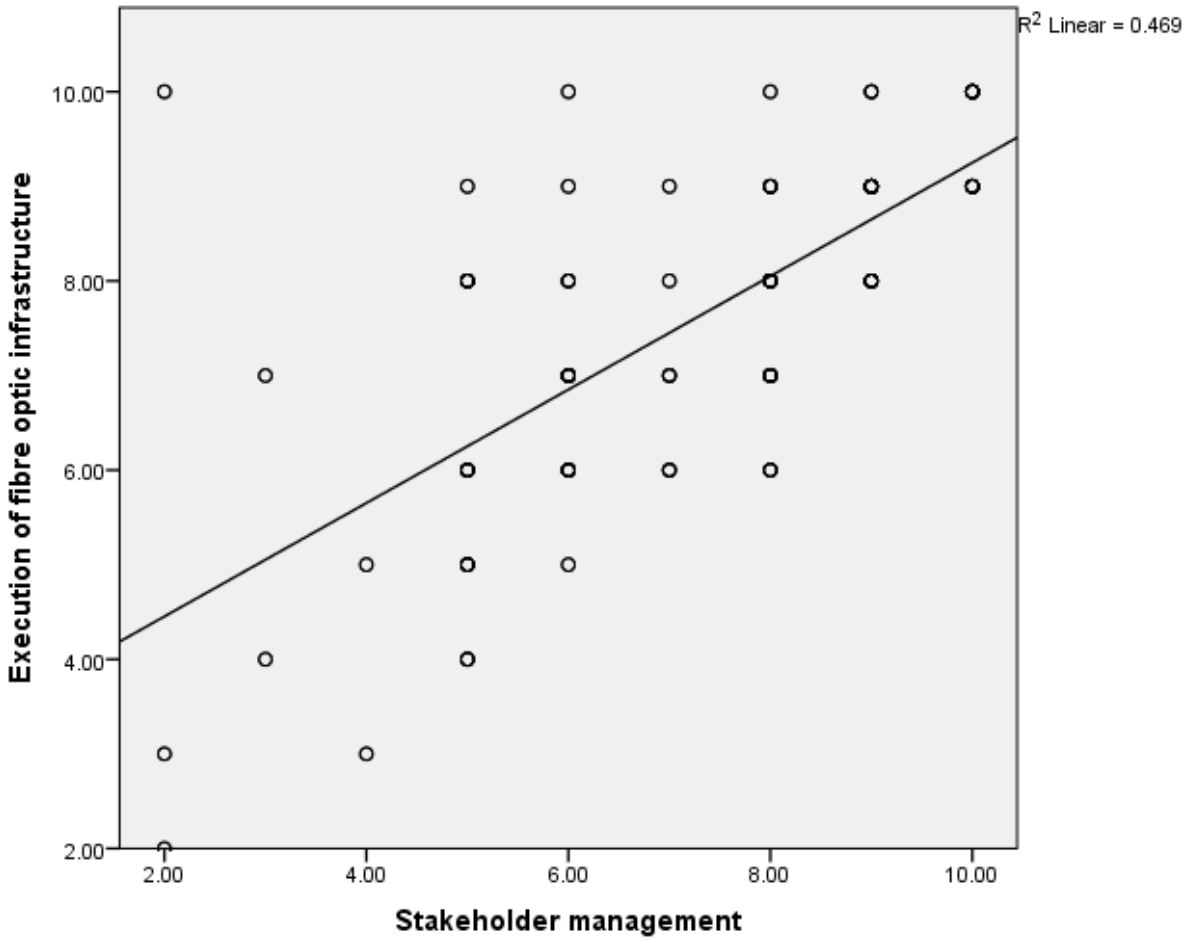


Appendix XI: Scatter Plots for Linearity Test

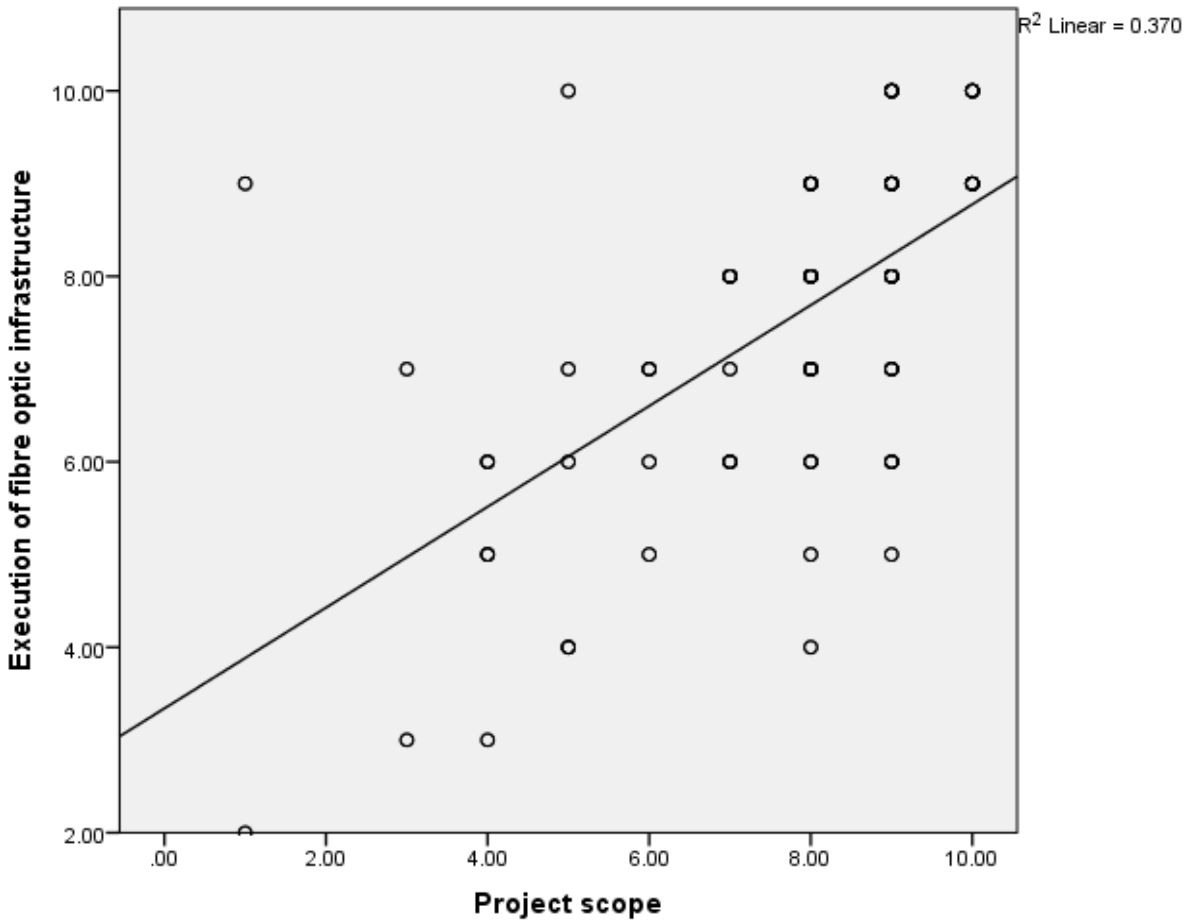
A) Scatter Plot for Leadership Skills and Execution of Fibre Optic Infrastructure



B) Scatter Plot for Stakeholder Management and Execution of Fibre Optic Infrastructure



C) Scatter Plot for Project Scope and Execution of Fibre Optic Infrastructure



Appendix XII: Reliability Statistics – Results of Pilot Test

Reliability of the research instrument

A reliability analysis is usually carried out on likert questions. An internal consistency technique was applied using Cronbach's Alpha. The alpha value ranges between 0 and 1 with reliability increasing with the increase in value. According to Kothari (2004) Cronbach's Alpha coefficient of 0.6-0.7 is a commonly accepted rule of thumb that indicates acceptable reliability and 0.8 or higher indicates good reliability. In this study, 0.7 Cronbach's Alpha was considered acceptable.

Table 1: Cronbach's Alpha

Constructs	Cronbach's Alpha	No of items
Leadership skills	0.812	10
Stakeholder management	0.909	10
Project scope	0.828	10
Government policy	0.816	10
Execution of fibre optic infrastructure	0.870	10

From the results in Table 1, leadership skills had a Cronbach's Alpha of 0.844, Stakeholder management had a Cronbach's Alpha of 0.898, Project scope had a Cronbach's Alpha of 0.828, Government policy had a Cronbach's Alpha of 0.816 and Execution of fibre optic infrastructure had a Cronbach's Alpha of 0.870.

Table 2: Leadership skills

Statements	Cronbach's Alpha if Item Deleted
The company has visionary leadership with right set of leadership skills that ensures effective stakeholder management, correct and complete scope is defined and documented	0.882
My company has motivated teams that go an extra mile to deliver projects in time	0.854
My company ensures project team members are involved throughout the project	0.748
Project leaders in my company use communication to let the teams know when they are performing well and not just when they are performing badly	0.790
Project leaders in my company frequently plan milestones to help project team feel they are making progress	0.777
Project leaders understand the job and know resources and skills relevant to the project	0.758
Project team members are empowered to make decisions and have a certain level of delegated authority and responsibility	0.767
In my company project leaders are empowered to firmly say no and are ready to justify the reasons behind the decision no matter how senior or important the person is	0.747
Project leaders' coach and train other project team members	0.786
Trainings are available in my company to equip project team members with relevant skills	0.790

The results in Table 2 show that if any of the items measuring leadership skills was to be deleted, the Cronbach's Alpha would still be above 0.7. This implies that all the items used in measuring leadership skills were reliable and appropriate.

Table 3: Stakeholder management

Statements	Cronbach's Alpha if Item Deleted
In my company stakeholders are carefully Identified and listed	.910
We identify and understand stakeholder areas of interest	.905
In my company, we determine and assess the power, urgency legitimacy and proximity of stakeholders	.895
We appropriately classify stakeholders according to their attributes/characteristics (power, legitimacy, urgency, proximity, level of interest)	.900
We identify and classify possible conflicts and coalitions among stakeholders	.896
We effectively resolve conflict among stakeholders	.909
In my company, we manage change of stakeholders' interests, influence, relationship among stakeholders, stakeholder attributes and how project decisions affect stakeholders	.895
We predict stakeholders' likely reactions for implementing project decisions	.898
In my company we involve relevant stakeholders at the inception stage, to refine project mission and whenever necessary in decision making throughout project lifecycle	.890
We communicate properly and frequently, instituting feedback mechanism to promote positive relationship with stakeholders	.898

The findings in Table 3 show that if any of the items measuring stakeholder management was to be deleted, the Cronbach's Alpha would still be above 0.7. This implies that all the items used in measuring stakeholder management were reliable and appropriate.

Table 4: Project scope

Statements	Cronbach's Alpha if Item Deleted
In my company we prepare scope management plan before fibre project execution	.766
We conduct planning workshops and prepare detailed scope statement	.818
We research previous project experiences when developing scope in my company	.850
In my company we define scope in initial stages of fibre projects	.808
We document project milestones and deliverables	.872
We estimate resource requirement before project execution	.805
My company has defined scope verification process	.764
In my company we detail project work acceptance criteria and get buy-in from key stakeholders before embarking on the project	.802
We have scope change control procedure in my company	.796
We identify factors that cause scope change and when change has occurred, ensure changes are beneficial to project objectives and manage actual changes when and if they do occur	.805

The results in Table 4 show that if any of the items measuring project scope was to be deleted, the Cronbach's Alpha would still above 0.7. This implies that all the items used in measuring project scope were reliable and appropriate.

Table 6: Execution of fibre optic infrastructure

	Cronbach's Alpha if Item Deleted
My company always achieves timely connection of fibre optic infrastructure	.882
My company always achieves cost savings in fibre optic infrastructure	.877
My company does not always achieve acceptable quality standards in execution of fibre optic infrastructure	.841
My company does not always achieve stakeholder's satisfaction	.860
My company does not always undertake post project reviews to learn lessons for future	.843
My company always undertakes to assess delivery of benefit as defined in benefit realization plan	.836
My company always asks to sign off the project deliverables as a sign of successful closure	.855
My company always ensures that all parties involved in fibre optic projects are and remain committed to project execution	.858
Where there is any lack of project team commitment in my company, it is clearly recognized and dealt with	.855
Project leadership in my company, has and maintains commitment and has the skills and resource to inspire commitment from others	.863

The results in Table 6 show that if any of the items measuring execution of fibre optic infrastructure was to be deleted, the Cronbach's Alpha would still above 0.7. This implies that all the items used in measuring fibre optic infrastructure were reliable and appropriate.

Summary

The results on reliability indicate that the Cronbach reliability alpha for the variables (independent variables, moderating variable, intervening variable and dependent variable) was greater than 0.7 and hence there was no need to change the measures and indicators in the questions.