PROJECT SCOPE MANAGEMENT AND PERFORMANCE OF PROJECTS: A CASE OF WATER AND SANITATION INFRASTRUCTURE PROJECTS IN MOMBASA AND KILIFI COUNTIES, KENYA

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DECLARATION

Declaration by Candidate:

This is my original work and has not been presented for a degree in any other university

Signature…….Date……
.

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Declaration by supervisor:

I confirm that the work in this was done by the candidate under my supervision

Signature…….Date……
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DEDICATION

I dedicate this proposal to Stephanie Banda, my son, Jasiri Wang'ondu Gitahi, and my family.

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OPERATIONAL DEFINITION OF TERMS

Performance – The outcome of a finished project is calculated against established fixed criteria. It is a measure of delivery time, budget maintenance and quality of project based on set technical specifications.

Project Scope – all the work envisioned to be carried out in a project and shares clear timelines, estimated budget and costs and expected quality of the final project.

Projects Scope management – the process of ensuring the project includes all the work required and assign responsibilities to different people, the resources and scheduling of activities.

Stakeholders – Covers the people, groupings and organizations that affect and are affected by the project and functionality of the completed project

Work breakdown structure – hierarchical structure where project tasks are broken down into smaller sections for purpose of making the project manageable

Stakeholder satisfaction – it involves measurement of the project results such that the outcomes meet the needs and expectations of stakeholders in quality of product and service delivered.

ABBREVIATION AND ACRONYMS

GRP	-	Gross Regional Product
IT	-	Information Technology
KIMAWSCO	-	Kilifi-Mariakani Water and Sewerage Company
KSH	-	Kenya Shillings
MAWASCO	-	Malindi Water and Sewerage Company
MOWASCO	-	Mombasa Water Supply and Sanitation Company
PwC	-	PricewaterhouseCoopers
W&S	-	Water and Sanitation
WASH	-	Water and Sanitation Hygiene
WBS	-	Work Breakdown Structure
WSP	-	Water Service Provider
WWDA	-	Water Works Development Agency

ABSTRACT

Kenya is a predominantly arid country with limited water sources; hence there is a greater case than ever for the importance of construction of water projects in Kenya. However, there has been a challenge in successful completion of water infrastructure projects in Kenya, particularly in Mombasa and Kilifi Counties. Mombasa and Kilifi counties were rated among the worst performers in providing its residents with potable water and adequate sanitation services. Deviation of project scope and changing the scope mid-way has led to costly delays and delays in project delivery. The specific objectives included scope planning, stakeholder engagement, scope control and work breakdown structure. The study was anchored on management and stakeholder theories and employed the descriptive research design. The study targeted 14 water projects in the 2012 -19 timeline for completion or on-going. The study respondents were senior project managers who were purposively selected to fill the semi-structured questionnaire. A pilot study was done using 9 respondents in water projects in Kwale and Taita-Taveta Counties to test for validity and reliability. Validity was confirmed by supervisor and research experts, while reliability testing was done using Cronbach Alpha coefficient and found the overall mean at 0.787 which was above the threshold set at 0.7. The response rate was 71.7%. Results showed positive associations for stakeholder engagement (r=.584; positive and moderate effects were for scope planning (r=.436) and weak associations were for work breakdown structure (r=.202). Regression coefficient results showed scope planning (β=.073, $p<0.05$), stakeholder engagement (β=.190, $p<0.05$), scope control (β=.499, $p<0.05$) and work breakdown structure (β=.553, $p<0.05$) in influencing water projects. 55.8% changes was because of scope management Scope planning communicated the mission and vision, management and reporting structure of the project, which improved its outcome. Work breakdown structure included tasks and components of the project divided into sections for easily management that influenced project outcome. Stakeholder engagement was done through proper communication and involvement in designing, financing and executing project plans for their success. Thus, the study concluded that performance in the water and sanitation projects was influenced by project scope management with practices of scope planning, scope control; work breakdown structure and stakeholder engagement. The study recommends adoption of project scope management practices for improvement in performance of the projects. There is need to formulate policies on elements like engaging all stakeholders, planning and control projects for their success. Future research can be done on other water projects in different areas and residual effect that was outside the scope of this study.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Projects are planned works that are aimed at attaining a certain goal. The projects can be small, medium or large and aim at serving a specific role (Kerzner, 2017).They are regarded as temporary as they are created to execute specific work and close down upon completion of the work they were chartered to deliver. Furthermore, projects can also be viewed as activities that are done within the definite start and end points. The project performance rating is based on a scheduled time, cost and quality (Nicholas & Steyn, 2017). The Project Management Body of Knowledge Guide (PMBOK) 6th edition states that project management is the effort deployed, the skills and techniques expended in tackling actions of the project in a quest to attain the project set objectives (PMI, 2017). While Radujković and Sjekavica (2017) on success of projects based on project management, avers that project management is about making plans, executing the plans by motivating the project team members, the control, monitoring and evaluating, for purposes of attaining the project goals under defined time, cost/budget lines, quality and satisfaction levels.

Projects are said to be successful when undertaken within the stated timelines and costs and to specification. Kerzner (2017) affirmed the above assertion by pointing out that a project that is deemed a success is one that is on schedule, within the stated budget and covers all project specified details. The PMBOK supports this and opines that common project management performance metrics include costs, scope, timelines, and quality. This is shared when defining the project (PMI, 2017). Many project managers consider the above three elements as key requirements in measuring the success or failure of a project. The optimization of these three key features works to deliver projects of high quality. Ahmadabadi and Heravi (2019) supported this and offered that the project scope,

costs and timelines are interlinked and affect project performance and quality of deliverables.

These criteria as reported by Rugenyi (2015) can be graphically represented by the well-known triple constraints project triangle as shown in Figure 1.1 developed by Lester (2006) sharing that projects should meet the fundamental criteria of being completed and handed over in time, stick to the set budget lines for their costs and expenses and quality of the deliverables as per project scope specification.

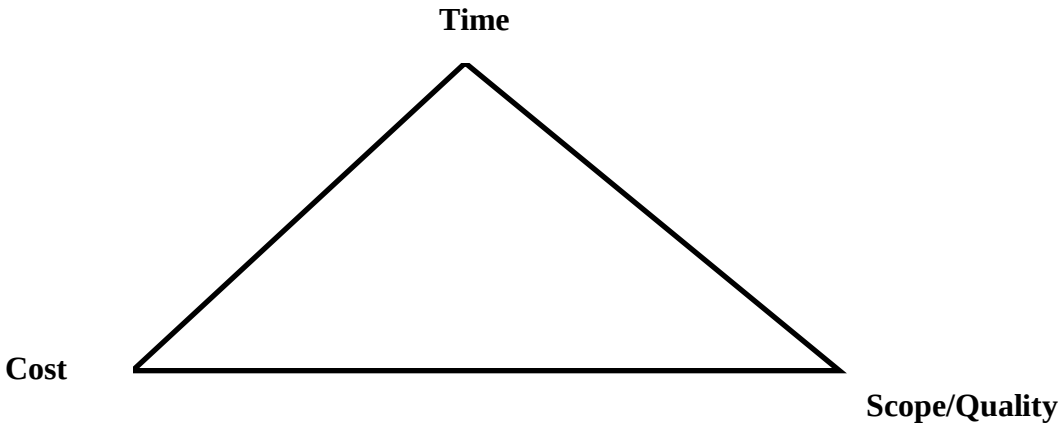

Figure 1. 1: Triple constraints project triangle

Source: Lester (2006)

When it comes to project scope management, Hilali, Charoenngam and Barman (2019) share that it is a critical success factor since the scope is a proper and detailed understanding of the breadth and width of all the work and the expected deliverables of a project right from the beginning of the project, to project closure. It involves all the work and effort put into a project to gain results in terms of quality products and service as per the demanded functions and project characteristics. The seamless management of all the relevant activities set down to achieve the set project objectives is what is referred to as project scope management (Nyakoyo & Odhiambo, 2020). Without a sound

understanding of the project scope by managers and team members, right from the beginning, successful completion of the project cannot be the achieved or become a norm. Akhwaba (2020) noted that little effort has been made to understand project scope management, yet it holds sway to the success of projects, and that project delays have been attributed to changes in the scope of the project.

In the regional scene, there are many projects that face challenges in expense overruns and delays in delivery timelines, and this can be addressed through proper project scope management. In Somaliland, Fashina, Abdilahi and Fakunle (2020) on the challenges in implementation of project scope management, sharing that miscommunication, scope creep, unrealistic time scope of projects and technical uncertainties led to failure of many of the telecommunication projects. In Kenya, Ngure (2019) shared that the adoption of project scope management by liquefied petroleum gas firms in Kenya, led to successful project implementation. The Africa Construction Cost Trends Report highlighted that in Kenya, the main reason for projects being abandoned and their failures is solely on overruns both cost and time. It is reported that at least 48% of all projects experience costs and expenses overrun and 87% register time overruns.

These challenges in attaining success of projects, in terms of costs and timeliness calls for re-looking at project scope and project scope management. Therefore, this study explored how project scope management influences performance of water projects in the Kenyan coastal area.

1.1.1 Performance of Projects

Monitoring project performance is important for attainment of project objectives. Nicholas and Steyn (2017) shared that the successful projects are measured using indicators such as timeliness, keeping to budget and quality finished project. For achievement of successful projects, Onubi, Yusof and Hasan (2020) maintained that there is need for involving all stakeholders, flow of information, enough resources and acquiring staffs with expertise skills and knowledge. Project performance is also based on

the functionality and the main reasons for undertaking that project which could be cutting costs, higher service delivering, improved quality of the final project and public benefits (Kerzner, 2017). Performance of projects can also be measured using financial elements like keeping to the budget specification, effective use of project resources and high investment returns.

In this study, performance of the water projects will be measured in terms of timely delivery of the project; which means that the project design approvals, project scope delivery and each project phase implementation must adhere to the timelines, such that the finished project can also be delivered on time (Ngure, 2019). Performance will also be measured in terms of keeping to the budget set, which brings to fore that these water projects are funded by World Bank, other developmental partners, and the Government of Kenya and if expenses are overrun, there is a likelihood that the projects will stall or be completely abandoned.

1.1.2 Project Scope Management

The process of scope management as defined by the PMBOK include 6 steps, namely: scope planning, requirements collection, scope definition, creation of work breakdown structures (WBS), scope validation and scope control. An analysis of these steps can be summed up into three key processes, namely: - scope planning, stakeholder engagement, and scope control (PMI, 2018). This study will explore in depth the concept of project scope management through the angle of scope planning, stakeholder engagement, scope control and work breakdown structure. Scope planning is the initial phase of scope management and it details how the project scope is defined, its validation, its controls and gives direction and guidance during the implementation phase. According to Akhwaba (2020) scope planning will clearly show the project charter that shows the mission, vision and values that the project team members will apply in an effort of delivering successful projects. It also shares the plan for scope management through conveying the project structure, reporting system and allocation of project tasks. In scope planning, Hilali, *et al.* (2019) further reveals that it shows how the overall project tasks will be broken down and

divided into departments, phases and assigned to different project teams. Up-front plans rely heavily on accessing information and seeking expertise opinions to correctly set the scope and its management in projects.

The second element of project scope management is stakeholder engagement. The stakeholders can either lead to failure or success of the project since they take part in defining the project scope or approve any changes in the scope plans, due to the influence they hold as the financiers, beneficiaries and implementers of the project plans (Nyakoyo & Odhiambo, 2020). To get high performing projects, Erkul, Yitmen and Celik (2019) noted that there was need to align the stakeholders' needs and expectations into the project scope and ensure project managers are keen to implement them. Stakeholders can lend support to success of project if there are clear communication lines where they can share their views and knowledge. For accountability and transparency of projects, the stakeholders should take part in monitoring, evaluating and controlling the project implementation process. Stakeholder engagement, involvement and participation in the different phases and sections of the projects can lead towards successful projects.

Work breakdown structure is also an aspect under project scope management; and it involves breaking down the project tasks into smaller portions for easy management and making the tasks approachable. It is also a tool used by project managers to integrate the scope, the costs and work schedule such that the project plans are aligned to owner expectations and influencing of project performance (Kholbaev, 2020). The work breakdown structure (WBS) can be in the form of deliverable-based that focus on the relationship of project deliverables including products and services and the scope covering the work to be done and WBS can also be in the form of phase-based such that the project is divided into phases or stages and under each stage there are deliverables that need to be met (Matu, Kyalo, Mbugua & Mulwa, 2020). WBS is viewed in levels, the top level that shares the project tittle and final deliverables, the control account having project phases and deliverables; work packages covering the grouping of tasks and responsibility assigning and activities that deliver the outcomes. The sole reason for

employing work breakdown structure is to using any form of the three WBS to make the project manageable.

This study explored more on scope planning, stakeholder engagement, scope control and work breakdown structure as the elements under project scope management. These elements were investigated to see how they influenced the success of water and sanitation projects.

1.1.3 Water and Sanitation Infrastructure Projects in Mombasa and Kilifi Counties

Water is a source of life and needed for sanitation and hygiene and negative challenges in health and food insecurity matters. Sustainable Development Goals (SDG-6) specifically addresses the water and sanitation crisis faced globally predominantly in developing countries. The UN (2020), reported that the efforts and progress has been made to enhance the rate at which people can access clean water for drinking and other needs; but still billions of rural dwellers cannot access water and yet it is a basic need. In Kenya, only 63% of the population can access water and 31% access sanitation facilities.

The WASREB report noted that there was a decline of 11% from 54%-43% of water coverage, such that some 100,000 people could not be provided with water. It was worrying for the Mombasa County Government inability to serve its 1.1 Million people and hence need for changing that trend (Water Services Regulatory Board –WASREB, 2018 report). Critical water shortages in Mombasa raised fears about Kenya's second largest city running out of water, as it has no water sources within its jurisdiction (World Bank, 2019). Mombasa's neighboring county of Kilifi was also observed as having challenges in its water sector. The Kilifi County was reported as being the biggest loser in terms of performance decline amongst other water utilities in Kenya and reported that the water services utility company in Kilifi had declined in credit worthiness and could not even be ranked while other counties like Muranga had noticeably improved (WASREB, 2019). The interventions have not helped improve access to water and sanitation in the two counties and hence the need for the research project.

1.2 Problem Statement

Completion of projects has had a big challenge due to delays in completion dates, unsatisfactory quality and going over the stipulated budget. The water projects in Mombasa and Kilifi have recorded poor performance and inability to keep to the scope agreed upon by the project managers and stakeholders. Deviating from the project scope, according to Gunduz and Yahya (2018) creates these problems of increment in costs and delays. Hence, the need to assess how project scope management affects performance outcomes.

The present study is inspired by the prevalent failure in projects as elucidated in the foregone discussion and the lack of congruence on the role of scope management on the performance of projects and the paucity of literature on project scope management's direct influence on project performance. Involving key players in understanding a project right from the beginning is a critical success factor. Such an approach encourages and motivates team members as they relate and own the project. The current study focused on scope planning, stakeholder engagement and scope control and their effects on project performance.

1.3 Objectives of the Study

1.3.1 General Objective

This study aimed at investigating the effect of scope management on performance of water and sanitation projects in Mombasa and Kilifi Counties, Kenya.

1.3.2 Specific Objectives

1. To assess the effect of scope planning on performance of water and sanitation projects in Mombasa and Kilifi Counties, Kenya
1. To determine the influence of stakeholder engagement on performance of water and sanitation projects in Mombasa and Kilifi Counties, Kenya

2. To determine the effect of scope control on performance of water and sanitation projects in Mombasa and Kilifi Counties, Kenya
3. To determine the effect of work break-down on performance of water and sanitation projects in Mombasa and Kilifi Counties, Kenya

1.4 Research Question

1. How does scope planning affect performance of water and sanitation projects in Mombasa and Kilifi Counties, Kenya?
2. How does stakeholder engagement affect performance of water and sanitation projects in Mombasa and Kilifi Counties, Kenya
3. How does scope control affect performance of water and sanitation projects in Mombasa and Kilifi Counties, Kenya
4. How does work break-down affect performance of water and sanitation projects in Mombasa and Kilifi Counties, Kenya

1.5 Significance of the Study influence

This study will be of immense benefits to several stakeholders involved in water and sanitation projects in Kenya. It is expected to inform project stakeholders in policy formulation as regards to scope management requirements in water and sanitation project implementation. The study is also significant in that it addresses the gap in scholarly studies in scope management in project implementation in the water and sanitation sector and will provide credible references to researchers in the field of scope management. The study will also demonstrate the importance of scope management to water and sanitation project stakeholders and the impact it has on the projects perceived performance in Kenya.

1.6 Scope of the Study

The scope of this study is limited to project scope management among water and sanitation projects in Mombasa and Kilifi Counties, Kenya. The elements of project scope management included scope planning, stakeholder engagement, scope control and work breakdown structure and their influence on water project performance. The study area was Mombasa and Kilifi County and its water projects since there is shortage of clean water in the areas. The study collected data from completed and on-going water and sanitation projects within the Mombasa and Kilifi Counties. The data collection was carried out in the month of April –May 2022.

1.7 Limitations of the Study

The findings of this study have to be seen in light of some limitations. The main limitation of this study was the paucity of literature on scope management in the water and sanitation projects in Kenya for purposes of reviewing literature and generating a better understanding of the current state of scope management in the sector. This was overcome by method of data collection by perusal of project documents to fill gaps on the limited published data.

The method of data collection was limitation to this study since the data was collected using questionnaires which may suffer from biases such as attribution and exaggeration. This was done by avoiding leading and ambiguous questions in the questionnaires and proper preparation of the questionnaires subdivided into subsections based on the study objectives.

Access to data is another potential limitation to this study since project owners may not want to disclose failures. This can be mitigated through statements provided an introductory letter from the university in assuring the project owners that data collected was used for the sole purpose of the research and also providing anonymity in filling the questionnaires. The findings of this study were also limited in generalizing by the sample

bias as the entire population is within Mombasa and Kilifi counties and level of scope management use may vary with the rest of the country.

The findings of this study may also be limited in generalizing due to the limited scope of the study as it's only focus was on water and sanitation projects undertaken in, Mombasa and Kilifi Counties in Kenya which reduces the population from which the samples will be drawn from. This limitation was overcome by suggestions within the study to have other studies carried out within other sectors and regions of the country.

1.8 Organization of the Study

This research project is organized into five chapters. Chapter one is introduction, chapter two is literature review, chapter three is research methodology, chapter four is research findings and discussions, and finally chapter five which is summary, conclusions, recommendations and suggestions for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed literature related to the subject under review in a systematic and critical manner by identifying, locating and analyzing studies that have been done on similar study areas to this study. The chapter discussed the theories, empirical literature, its summaries and gaps and the conceptual framework.

2.2 Theoretical Framework

In the study of project scope management and performance of projects, the study was guided by the Management Theory as proposed by Henri Fayol and the stakeholder theory as proposed by Ian Mitroff. This is discussed in the subsequent sections:

2.2.1 Stakeholder Theory

A stakeholder is anyone who has an interest in or is affected by a project, business or organization. Stakeholder theory perceives organizations that emphasize the linkages and relations occurring in the organization and its community, suppliers, employees, financiers and other elements. The theory operates on the norm that an organization should be able to create value and benefits to all stakeholders linked to the organization. The theory was initially conceptualized by Ian Mitroff (1983) in his book "*Stakeholders of the Organizational Mind*" (Blackburn, 2019). McDonald (n.d.), avers that the theory was popularized in 1984, by R. Edward Freeman when he the theory is about addressing the morals and values that are applicable during the management of organizations in the book "*Strategic Management: A Stakeholder Approach*". In essence the stakeholder expanded eco-system includes all persons that are interested in the organization and all those who are influenced and affected by the firm. They include the staffs, environmentalists, suppliers and vendors, agencies and consumers. The true success of

any organization, is its ability in meeting needs and wants of all stakeholders (McDonald, n.d.). This stakeholder theory operates in a manner to address ethical concerns of individuals and businesses, the values and morals of the various stakeholders attached to a project or program. The theory seeks for ways to strengthen the relationship that stakeholders have with organizations and addressing challenges that are faced throughout the project lifecycle (Blackburn, 2019).

The theory has been criticized and critics suggest that getting a complete list of all stakeholders for any organization is a difficult task and there is no universal agreement on the definition of the term (Blackburn, 2019). The theory is relevant to the current study since it offers insight into the importance of stakeholder engagement in any undertaking for successful completion of projects or success of an organization. The stakeholders are engaged in scope planning, scope control and breaking down the tasks and work for ease in managing projects resulting to high performance.

2.3 Empirical Review

2.3.1 Scope Planning and Performance of Projects

Planning can be defined definitive actions and activities that are thought of and executed in a systematic manner to achieve the expected goal and agenda. In the context of project scope management, scope planning can be seen as the process of seeking and obtaining a consent from main parties on what will be seen and defined as the project scope of work. In business, planning is considered one of the key activities of management and it is often said that the manager without a plan becomes a victim of circumstances. According to Parke, Weinhardt, Brodsky, Tangirala and DeVoe (2018) the process of planning in any organization is to provide information to the top leadership of the firm that is key in making effective and informative decisions. The planning process also enables leaders and managers to allocate resources to all parts of the organization so as to attain the organizational goals and objectives. Planning for the scope of work ensures productivity is maximized and there is no resource losses and wastages in any section of the project.

The PMBOK guide describes scope planning is the measures of which the scope of the project is defined, executed, validated and controlled and it plays a key role in sharing the guiding line on management of the project scope (PMI, 2017).

In the study on development of project scope for small industrial construction projects, Collins, Parrish and Gibson Jr. (2017) share that defining the project scope is important to guide the assessment process. Front-end planning or scope planning is very impactful in construction projects, but many times small projects ignore its development and it negatively impacts the project success. In the current study, consideration was on the use of front-end planning tool when the projects are small –through application of PDRI-SIP –The project definition rating index for small industrial projects. There were 41 elements ideal for SIPs. Data collected and analyzed from the 50 completed SIPs reveal that projects with scope definition showed high performance in terms of improved cost management and delivery of the project on schedule. The findings also show that comparison of SIPs with front-end plans and those that do not have is in cost, quality and delivery timelines for the completed project. Small and large industrial projects should plan for their project execution for success of their projects.

Project scope planning is about having a definition of project tasks that once properly implemented lead to successful delivering on the project goals. It is part of the project management process that defines boundaries and deliverables. When the project planning stage has errors there are high chances for the project to fail; while quality project plans give projects a big chance for its success (PMI, 2017). In their study Ajmal, Khan and Al-Yafei (2019) investigated on the factors behind the project scope. The purpose of the study was to gain the perspective of different stakeholders on factors that led to poor project scope and project scope creep. The researchers collected data through interviews from different projects in United Arab Emirates (UAE) and results show that communication was one of the key success factors for project scope. Many of the stakeholder groups show that communication was paramount for project scope creep and it led to high success rate for the projects in UAE.

The project scope document includes such elements as the main project goals, description of the deliverables and outcomes, breaking down of the project tasks and assigning individuals different responsibilities and authorizes and how best to plan for changes in the operating environment. The study by Bingham and Gibson (2017) on project scope definition as based by the project definition rating index and noted that project scope planning is a critical aspect in project management as it helps the project managers uncover project unknowns and variations and hence better plan for handling them. In infrastructure projects use of scope planning helps to identify risks and formulate measures to mitigate against these risks and make adjustments in the overall project plans and execution timelines. The research got data from 26 completed and in-process projects and the project definition rating index (PDRI) scores was an indication of level of scope definition in the projects and its project performance. The findings also reveal that well defined scores and early understanding of the elements of the scope definition led to highly performing infrastructure projects.

Yang, Yu and Zhu (2020) in their study on project planning, offered that planning is widely agreed as being an important contributor to project success and that a general consensus is that inefficiencies during the planning and analyzing of projects lead to its failure. At the same time, spending too much time planning is a sign of poor project performance and similarly poor execution could erode the gains of good planning. Newer schools of thought in the agile management field propose a more evolutionary approach to management and less initial planning. Under agile method, it is assumed that up-front planning is valuable. Their argument is that if too much time and budget of a project is spent on planning and analysis such activities increase project costs and timelines without providing a corresponding benefit. Agile management main focus is in informally-based collaborations, coordination and learning elements as opposed to up-front planning and control measures. Therefore, there seems to exist some incongruency in establishing the benefit of extensive planning at the onset of a project from the old school of management and the newer school of agile management.

2.3.2 Stakeholder Engagement and Performance of Projects

Project stakeholders include organizations that are linked and associated to the project and it also includes different categories of persons such as clients, investors, employees and general population and many others. The stakeholders are directly or indirectly participate in the project and they are affected by the on-goings and proceedings in the project. The stakeholders also have influence on the outcome of the project (Amadi, Carrillo & Tuuli, 2018). In Ghana, Tengan and Aigbavboa (2017) assessed the engagement of stakeholders and their participation in M&E in the construction projects. The construction sector is valuable but very complex, thus it requires the engagement and participation of stakeholders in M&E for its transparency that will lead to learning and improving performance in the sector. The researchers collected data through interview, questionnaire and desk review of books and journals and findings show a high level of stakeholder engagement in the construction projects but stakeholder participation in monitoring and evaluation was poor. The study concluded that poor stakeholder participation in M&E led to lapses in the procurement process, failure of projects, delay in delivery timelines of projects, corruption, dissatisfied clients and project managers and team not conforming to standards set for the construction sector.

The PMBOK guide defines stakeholder engagement as activities that are undertaken to identify people, units and firms that influence or they are influenced by the project and analyze their expectations that will shape the management strategies. Engaging the stakeholders will guide the decision making and execution of plans in the projects (PMI, 2017). Project performance and its success largely rely on interactions of all project stakeholders (Lückmann & Färber, 2016). It is therefore important to understand how and in what roles can stakeholders' participate in the project and as such lead it to high performances and its success.

Maina and Kimutai (2018) conducted a study on stakeholder management and project performance. The performance of projects is measured in terms of cost, quality and time and to attain this, the study focus was on elements of stakeholder management that

covers, stakeholder needs, communication, management of conflicts and stakeholder participation. The researcher collected data from the six open air market projects within Nyeri County where the project managers filled the questionnaires. After analysis, the findings showed that stakeholder management positively and significantly affected the performance of these projects. stakeholder participation had the strongest effect to performance of the open air market projects, followed by stakeholders' need, conflict management and lastly communication. It is important to engage all stakeholders of any project so as to enhance not only its performance but also transparency and prudent use of the limited resources.

Karimi, Mulwa and Kyalo (2020) noted that high performance in projects depend on understanding and managing the expectations of the stakeholders. But the researchers also noted that in some cases stakeholder involvement derails project progress and leads to unwarranted delays. In the study on stakeholder involvement and how it influences the project performance by Njogu (2016), a case of National Environmental Management Authority (NEMA), The study considered stakeholder involvement in areas of identifying, planning, executing and conducting M&E of projects. The findings shared revealed that stakeholder involvement significantly affected the performance of the project. Involvement of stakeholders helped in cutting carbon emission, cutting down operational costs, enhanced efficiency in the project and increased customer satisfaction with the projects.

Magassouba, Tambi, Alkhlaifat and Abdullah (2019) carried out a study on what influence did stakeholder involvement have on performance of development projects in Guinea. The researchers noted that stakeholder involvement was a critical component to project implementation and project performance. The research paper noted the reforms initiated by the Administration and Control of Major Projects and Public Procurement (ACMPPP) in 2014 to encourage different stakeholders to come and work together so as to improve project performance. The stakeholders include the national government, World Bank, African Development Bank and others; the stakeholder involvement led to higher developmental project performance.

2.3.3 Work Breakdown Structure and Performance of Projects

Work breakdown structure concentrates on separation of the project components in an effort to ensure that the project plans are implemented efficiently and deliverables are met. It also involves hierarchical breakdown of the structure such that the scope of work is easily managed and there is integration of cost, time and resources. The WBS structure clearly outlines what is to be done, using which resources and timelines to attain the project deliverables. According to Al-Kasasbeh, Abudayyeh and Liu (2020) who investigated on use of work breakdown structure based framework in building management, realizing that asset inventory is an important aspect of building asset management. This is based in using conditional assessment and deterioration prediction in managing the assets. There is a need for classification systems for effective building asset management. The researchers adopted the unified classification system for asset inventory and the study was a case study of educational building. It was revealed that employment of unified work breakdown –based framework effectively helped in classification of assets and inventories hence guiding the decision making in asset management across the project life cycle.

In assessing quality planning for high-rise building architectural works, Rianty, Latief and Riantini (2018) developed the risk-based standardized work breakdown structure. The article revealed that work breakdown structure (WBS) is about breaking down the project activities into smaller components for ease of its management. Each project is unique but when looking at building projects, in most instances the activities can be standardized and help project managers to forecast and have a sound project management system. For quality performance, project managers must have an approach that considers and controls all risks, enact an efficient project management processes and supervise the implementation. The focus of the study was to develop a risk-based work breakdown structure for delivery of high quality building architectural works. The study results showed that a standardized work breakdown structure consists of primary levels and complementary levels and also covers the dominant risk variables that have resulted in quality performance for the building architectural works.

Siami-Irdemoosa, Dindarloo and Sharifzadeh (2015) conducted a study on work breakdown structure (WBS) and its development for underground construction. The researchers noted that use of work breakdown structure is a key aspect for the success in project planning and its management. It was also noted that many of the published studies have shown tools and methodologies that have developed WBS for projects but they are limited to construction sectors such as construction of apartment buildings and manufacturing of boiler. There are limited studies that have developed WBS with methodologies for general projects and as such can be customized to handle complex underground construction projects. This study has come up with the hierarchical neural networks as a new methodology for developing WBS for complex underground projects. The researchers found out that use of hierarchical neural networks for WBS development has been adopted in tunnel cases and revealed that the methodology is adapted to real projects and has developed WBS with comparative activities to those formulated by the project planning team. The study concludes that use of such modeling methodologies have significantly affected the capacity and improved WBS for complex underground projects. The hierarchical neural networks for WBS development led to improved underground project tasks with elements such as planning for workloads, estimating costs and budgeting and scheduling and planning all project activities.

Burghate (2018) study was on work breakdown structure and how it is able to simplify the project management aspect. The work breakdown structure (WBS) is an excellent tool for managing projects and the central point for effectively planning, executing, controlling, monitoring and reporting for projects. The researcher revealed that under work breakdown structure, all the project tasks are identified, estimated, budgeted for, scheduled and executive to get project deliverables. The project managers are responsible for development of the WBS which is done with the help of other project leaders and team members. The study found out that the main reason for formulating the WBS is to break down the entire project work into smaller, separate tasks that is assigned to different groups in a logical manner. Through use of WBS, the project managers are able to keep track of the project scope, project costs and expenses and project timelines and its schedule. The study concluded that WBS is an effective project management and

planning tool for successful project execution. The WBS is ideal for keep track of cost, time, schedule and project scope and its quality

2.4 Summary and Research Gaps

The current chapter dwelt on the literature review on scope managing and influence it has on the performance of projects. The review discussed the components of scope control that influence performance of projects such as scope planning, stakeholder engagement and scope control. The literature review exposed gaps and discrepancies in the literature on the effect the above-named factors have on the effective scope management and its impact on project performance. A summary of the research gaps identified are as shown in this table

Table 2. 1: Summary and Research Gaps

Author(s)	Title of the Study	Findings of the Study	Research Gap	Focus of the Current Study
Al-Kasasbeh, et al. (2020)	Use of work breakdown structure based framework in building asset management	The employment of unified work breakdown –based framework effectively helped in classification of assets and inventories	Conceptual gaps were created since work breakdown structure was linked to managing building assets with no mention of performance of projects	This study linked work breakdown structure to performance of projects
Ajmal, et al. (2019)	The factors behind the project scope	The study results show that communication was one of the key success factors for project scope	Project scope was not linked to performance of projects and it was done in UAE, thus creating conceptual and contextual gaps	Scope planning was correlated to project performance in the Kenyan background
Magassouba, *et al.* (2019)	The influence of stakeholder involvement on performance of development projects in Guinea	The stakeholder involvement led to higher developmental project performance.	The study creates contextual gaps as it was done in Guinea and solely focuses on developmental projects	The current study focused on stakeholder engagement and water projects performance
Al-Rubaiei, et al. (2018)	Review of project scope management through various perspectives	The findings showed strong association between the variables.	Conceptual gaps are created since the study does not directly link project scope management to project performance	The study exposed how scope control affects project performance

Collins, et al. (2017)	The development of project scope for small industrial construction projects	The findings show that projects with scope definition showed high performance in terms of improved cost management and delivery of the project on schedule.	Project scope planning was not correlated to project performance which create a conceptual gap	This study concentrated on scope planning and performance of projects
Tengan and Aigbavboa (2017)	Stakeholder engagement and stakeholder participation in M&E in the construction projects	The findings show a high level of stakeholder engagement in the construction projects and stakeholder participation in M&E of the projects was poor	The study creates contextual gaps since it was done in Ghana and its construction sector	This study was done in the Kenyan background and focus is on stakeholder engagement and project performance
Njogu (2016)	The influence of stakeholder involvement and performance of projects	Findings revealed that stakeholder involvement significantly affected the performance	The study was a case study of NEMA and created methodological gaps since findings may not apply to other organizations or sectors	The study exposed how stakeholder engagement affected performance of water projects in Kilifi and Mombasa
Siami-Irdemoosa, et al. (2015)	Work breakdown structure (WBS development for underground construction	The findings show that use of hierarchical neural networks for WBS development led for application of WBS in tunnel and real projects	Conceptual gaps are such that focus was on development of work breakdown structure for underground construction and project performance was not considered	The present study assessed how WBS development affects project performance

2.5 Conceptual Framework

This is a pictorial that shows the interconnections between study variables. In this case, it showed how elements of project scope management are interlinked with project performance and each variable is attached with the key indicators. This is shown in Figure 2.1

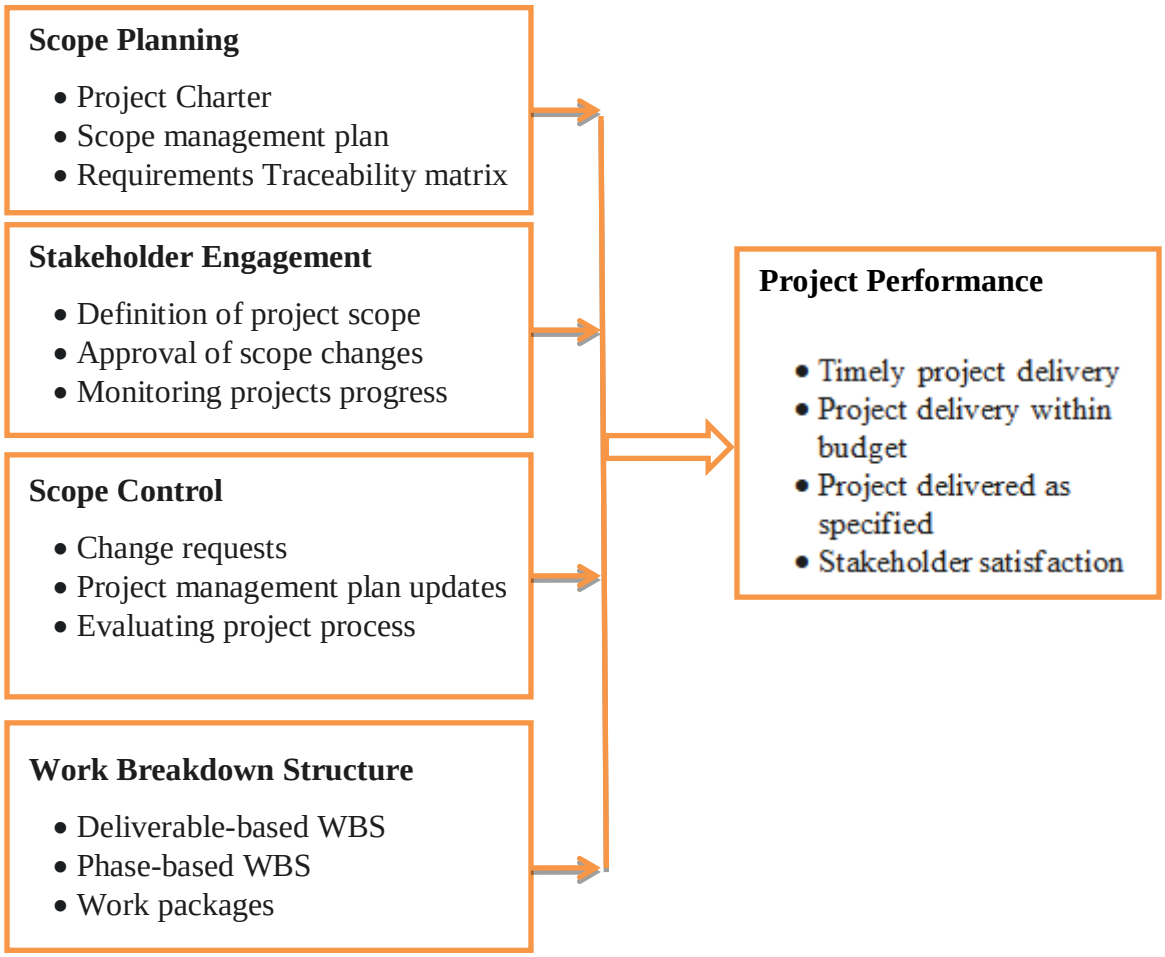

Figure 2. 1: Conceptual Framework

Source: Researcher (2021).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the description of the procedures that the researcher employed when handling the research exercise. The chapter covers different sections including research design, population, sampling methods and sample size. It also covers sections dealing with data, type, collection and analysis method.

3.2 Research Design

A research design shows the step-by-step process that the research will take to be able to answer the research question. It is the blueprint that guides the research when undertaking the research exercise. The descriptive research design concerned itself with the phenomenon and its present status as based on the existing environmental conditions of the variable (Aggarwal & Ranganathan, 2019). In this study, descriptive research design responded to the what, when, where and how of the water and sanitation projects in Mombasa and Kilifi and their performances as influenced by project scope management.

3.3 Target Population

The population consisted of 14 projects done by Coast Water Works Development Agency (CWWDA) in Kilifi and Mombasa counties. This is because it is the organ charged with the responsibility of undertaking water and sanitation services infrastructure projects in Mombasa and Kilifi County. The researcher targeted only those projects in the 2012-2019 period and records showed there are only 14 water projects. The respondents include managers, technical staff, environmental and executive officers; and for each project, Resident Engineer/Project director, 1 project Engineer (Consultant), and 1 project Manager (Contractor) such that 3 people per project were selected to participate in this study. The target population included 46 people as indicated in Table 3.1.

Table 3. 1: Target Population

S/N	Project Name	Target respondents
1	Marere Pipeline Replacement	3
2	Malindi WSP Reticulation Improvement	3
3	Kilifi WSP Reticulation Improvement project	3
4	KIDDP_Mariakani Kaloleni Water supply Improvement project	3
5	Malindi Informal settlement Lot 2: Kibokoni.	3
6	Malindi Informal settlement Lot 1: Kisumu Ndogo.	3
7	Rehabilitation / Extension of Mombasa Water Supply Works – Lot 2	3
8	Rehabilitation / Extension of Mombasa Water Supply Works – Lot 1	3
9	Extension of Water and Sanitation Services to Informal Settlements In Mombasa Lot 2-Matopeni, Shauri Yako, Kisumu Ndogo and Maweni	3
10	Mombasa West Mainland Sewerage Rehabilitation	3
11	Mombasa West Mainland Sewerage Rehabilitation	3
12	Drilling and Equipment of the three (3) Replacement Boreholes in Baricho Wellfield	3
13	Baricho Immediate Works with the following Lots: Augmentation of the Baricho Well field & Electromechanical Work.	3
14	Immediate Baricho Works Expansion & New Pipelines to Kilifi & Gongoni (Lot 3)	3
15	Chief Executive officer, CWWDA	1
16	Technical Services Manager	1
17	Projects Engineer, CWWDA	1
18	Social and Environmental officer	1
Total		**46**

Source: CWWDA (2021)

3.4 Sampling Technique and Sample Size

They are the methods employed in research in selecting a sample from the entire population of elements, such that a small portion is selected for easy collection of data (Taherdoost, 2017). For this study, purposive sampling was employed in selecting 14 projects that are on-going or have been completed in the last 8 years, and purposely selecting project engineers, project supervisors, project consultants and project managers

who are project team members who had the information that answered the research question.

All the targeted population made it into the final list of the sample size, since the population was small. Adoption of census sampling saw that all the 46 project team members were included in the final sample list. According to Mujere (2016) census sampling is ideal as there is no generalization of findings since all targeted elements are included in the study.

Table 3. 2: Sample Size

Description	Target Population	Sample Size
Project Engineers	14	14
Project Consultants	14	14
Project Managers	14	14
Chief Executive officer, CWWDA	1	1
Technical Services Manager -CWWDA	1	1
Projects Engineer, CWWDA	1	1
Social and Environmental officer -CWWDA	1	1
Total	**46**	**46**

Source: Researcher (2021).

3.5 Data Collection Instrument

The data collection was done through the use questionnaire and review of project documents. The questionnaire was structured and had open and close-ended questions that were administered to the respondents during the data collection exercise. According to Gupta and Bashir (2018) questionnaires are a cheap method of collecting large amounts of data. The questionnaire was developed to align with the research topic and contents of the questions were as per the specific study variables. The instrument was arranged in sections, starting with bio-data of the respondents and the second part having the four independent variables and the last part was on the independent variable. The statement used the five-point Likert rating scale that guided the responses of the study participants.

The researcher also reviewed available project data to check on the project planning process, stakeholder engagement processes and scope control methods employed throughout the project life cycle.

3.6 Data Collection Procedure

The researcher first obtained an introductory letter and got a permit from the NACOSTI and got permission from the Ministry of Water and Sanitation & Irrigation; and thereafter started collecting data. The researched sought permission from the management of the water projects, got signed consent forms from the participants and ensure that confidentiality of the data is maintained. The researcher also assured the respondents of secrecy of the identities and the data is for the research and academic purposes only (Gupta & Bashir, 2018).

The questionnaire was developed with care such that it did not have questions that embarrassed and harmed the respondents. It was self-administered and the researcher did the dropping of the instrument and picked them later, such that participants were given 1-weekto fill the instrument before collection in readiness for data analysis. Using ‘drop and pick later’ method improved the response rate of the study and it gave the participants sufficient time to answer the research questions without interference of their workday.

3.7 Pilot Testing

The researcher conducted a pilot test using 9 project managers in Kwale and Taita-Taveta County in the Mzima II, Mwache Dam and Mwache dam treatment plant projects. The 9 respondents accounted for 10% of the target population and were used to check for validity and reliability of the instrument that was used to collect data and respond to the research questions. The project managers and supervisors were team members from the completed and on-going projects in CWWDA Water and Sanitation projects. The project managers who took place in the pilot testing were excluded and did not participate in the final research data.

3.7.1 Validity

It is the measure that explains the extent to which requirements of scientific research are accurate, understandable and relevant (Chan & Idris, 2017). The researcher employed construct validity to test the responsiveness of the instrument to the research objectives. It involved checking if the instrument is aligned to the theoretical, and empirical. The researcher engaged the help of research experts and also got the view and guidance of the supervisor on areas to edit and correct the instrument; such that it covered information that aligned to the study objectives.

3.7.2 Reliability

It is about getting similar responses from using the same instrument every single time (Chan & Idris, 2017). The researcher employed the internal consistency method to confirm the reliability of the instrument based on multi-scale response of the Likert scale that was used in the questionnaire. The research checked for consistency of the items in the instrument to the elements in the study using the Cronbach Coefficient Alpha test. An Alpha index of 0.7 was set as the threshold. Obtained index results of 0.7 and above showed the fitness of the research instrument.

Table 3. 3: Reliability Results

Variable	Items	Alpha
Scope Planning	5	0.711
Stakeholder Engagement	7	0.745
Scope Control	5	0.829
Work Breakdown Structure	6	0.790
Performance of Projects	5	0.864
Aggregate	**27**	**0.787**

Source: Researcher (2022)

Table 3.3 shows the reliability results where the alpha test results are shown to be above 0.7 for all the study variables. This is an indication is the questionnaire was fit for use.

3.8 Data Analysis and Presentation

Data analysis is the process of extraction of information from the instrument after field data collection is completed. It involves converting the raw data by grouping the data into smaller sizes that are easily managed and identifying patterns and findings from which conclusions will be drawn (Gupta & Bashir, 2018). The researcher started by editing, coding and entering the data into SPSS version 25.0 and Ms. Excel and then the researcher embarked on analysis. Descriptive analysis and inferential statistics were done through correlation and regression analysis.

The regression model was:

$$\mathbf{Y= \beta 0+ \beta_1 X_1+\beta_2 X_2+\beta_3 X_3 +\beta_4 X_4 + \varepsilon}$$

Where Y= performance of water and sanitation infrastructure

B_0 = Constant

β1, - β4 are Coefficients

Y= performance of water and sanitation infrastructure projects

ε = error term

X_1= scope planning (as a composite index of project charter, scope management plan and requirements traceability matrix)

X_2= stakeholder engagement (as a composite index of definition of project scope, approval of scope changes and monitoring projects progress)

X_3= scope control (as a composite index of change requests, project management plan updates and evaluating project process)

X_4= work breakdown structure (as a composite index of deliverable-based WBS, phase-based WBS and work packages)

The findings of the research study were presented in tables, pie-charts and discussions. Qualitative data from the open-ended questions was analyzed through content analysis and the data was arranged in themes as per the study variables. The study analysis model is as shown in Table 3.2

Table 3.4: Study Analysis Model

Objective	**Method of data collection**	**Type of data to collect**	**Method of analysis**	**Data analysis tool**
Scope planning	Questionnaire	Quantitative	Descriptive statistics	SPSS
Stakeholder engagement	Questionnaire	Quantitative	Descriptive statistics	SPSS
Scope control	Questionnaire	Quantitative	Descriptive statistics	SPSS
Work breakdown structure	Questionnaire	Quantitative	Descriptive statistics	SPSS

Diagnostic Tests

Tests were conducted on the data to check on model assumptions for any violations. The researcher embarked on conducting diagnostic tests including normality using values of skewness or Kurtosis and checking if the data set is well modeled and follows the normal distribution curve. It was done through calculation of getting normally distributed data from the study's variable set of data.

The multicollinearity test was done through the use of VIF –Variance of inflation factor and showed the exact linear relation that two variables have with each other. Presence of multicollinearity is detected by observing the correlation matrix for the VIF values. When VIF values range from 1-10 it was an indication that the data set lacks multicollinearity.

The autocorrelation test was done through the Durbin Watson statistics that detected presence of lag 1 autocorrelation in regression analysis residuals. When the values obtained range from 0-2 points it demonstrates that there is positive autocorrelation and when the values range from 2-4, they indicate negative autocorrelation.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter presents the demographic statistics, descriptive and inferential statistics results.

4.2 Response Rate

The researcher distributed 46 questionnaires and from the 46 questionnaires distributed, 33 were filled and returned. This marked a response rate of 71.7% as indicated in Table 4.1 below.

Table 4. 1: Response Rate

Response	Frequency	Percentage
Response	33	71.7%
Non-response	13	28.2%
Total	**46**	**99.9**

Source: Survey Data (2022)

The results show that 33 of the 46 questionnaires were filled and return. This marked a response rate of 71.7%. Therefore, the study's response rate of 71.7% is fit for use in generalization of the findings to cover the entire study population of water projects.

4.3 Demographic Information

4.3.1 Gender

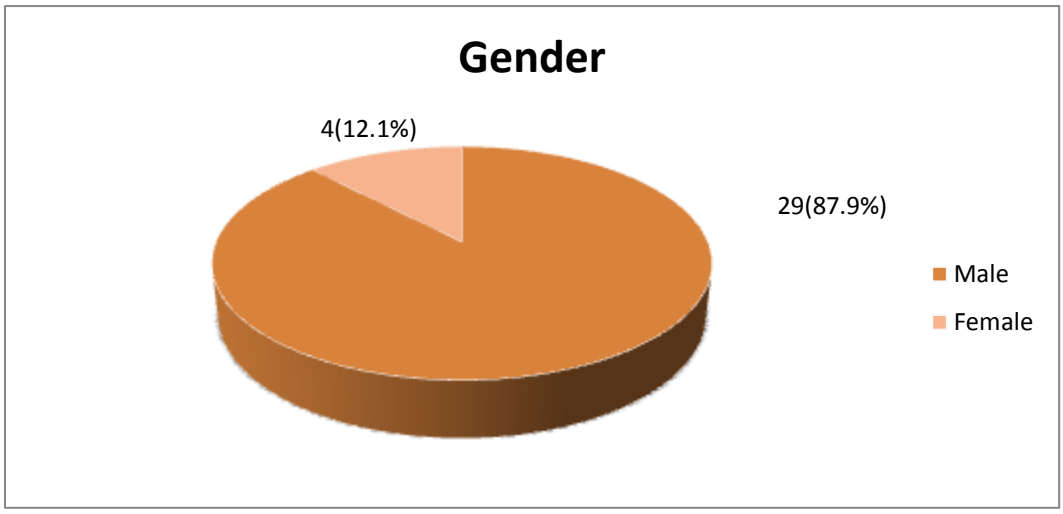

Figure 4. 1: Gender of Respondents

Source: Survey Data (2022)

Results indicate that male respondents were the majority with a frequency of 29 accounting for 87.9% of the response group. There were few female respondents at only a frequency of 4, accounting for 12.1% of respondents. The findings do not point at a bias in the study but rather at a verifiable national statistic where the Engineering field is male dominated and there are fewer female project engineers and consultants. This could account for the lower female population in the study.

4.3.2 Position held at the Water Project

The polled study participants were asked to indicate their role in the water projects. Their responses are as shown in Figure 4.2

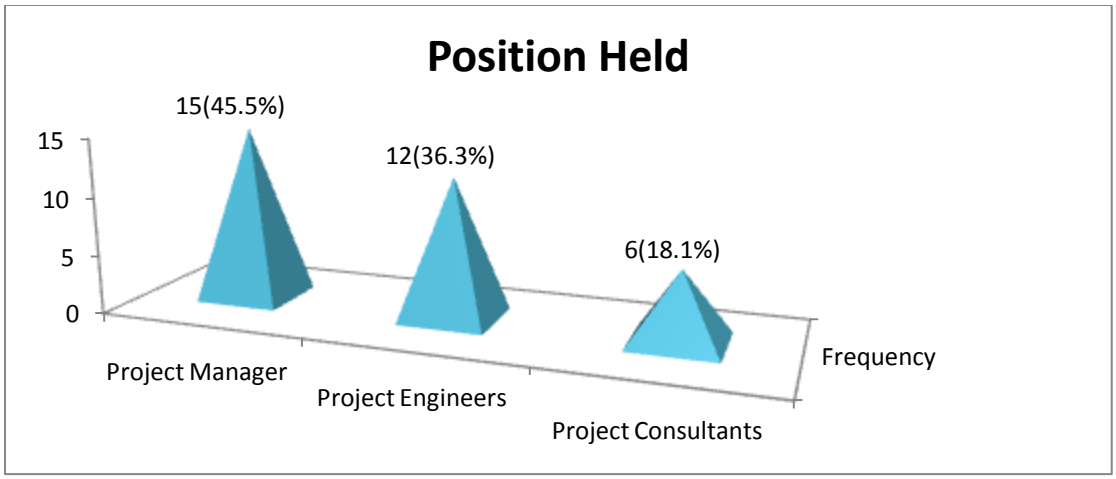

Figure 4. 2: Position Held at the Water Project

Source: Survey Data (2022)

Out of the polled respondents, 6 of them were project consultants, which is 18.1% of all respondents of this study. Project engineers were 12; accounting for 36.3% of the participants and 15 respondents handled the role and function of project managers, which accounts for the highest number of positions for the respondents at 45.5%. These findings imply that inclusion of persons holding different positions in the water projects will furnish the study with their diverse views and enrich this study on project scope management and performance of projects. The high number of project managers also indicates that the study participants had the requisite knowledge and experience to provide credible input for the study.

4.3.3 Length of time Working in the Water Projects

The respondents shared the length in years that they have been working with water projects. Figure 4.3 shares their responses.

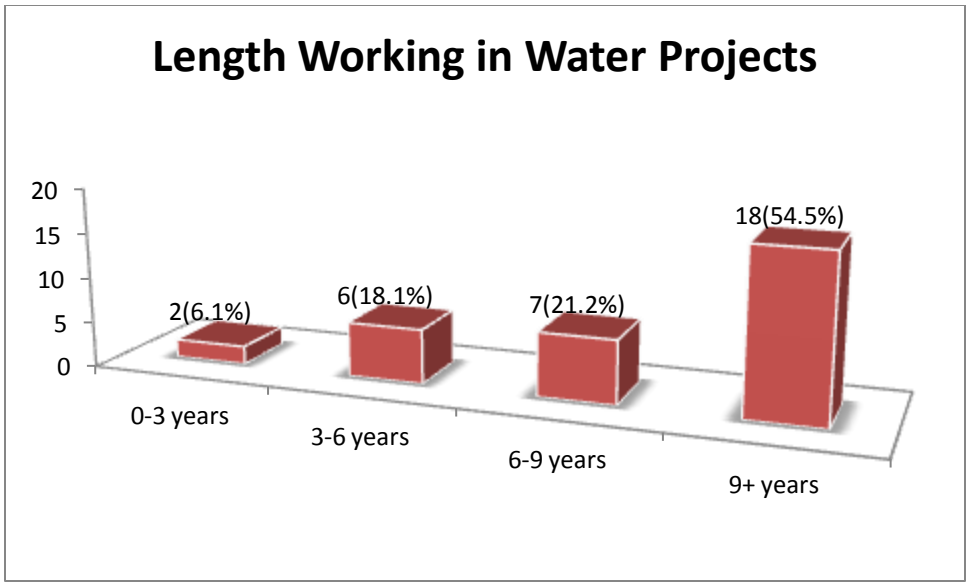

Figure 4. 1: Length Working the Water Projects

Source: Survey Data (2022)

On length working in the water projects, the results shown in Figure 4.3 show that from all the respondents, 2 of them had worked for short periods of 0 to 3 years, which is 6.1% of all respondents. Those respondents who had worked between 3 and 6 years were 6, accounting for 18.1% and 7 respondents had worked in the water projects for a period of 6 to 9 years. Majority of the respondents had been working in the water projects for more than 9 years, as seen with 18 respondents which is 54.5% of all polled respondents. The findings mean that respondents had worked long enough in water projects to have unique exposure and information that they can share in this study. These respondents had inside information on water projects and could give details in project scope management and performance of these projects in a manner that will enrich this study.

4.3.4 Highest Education Qualification

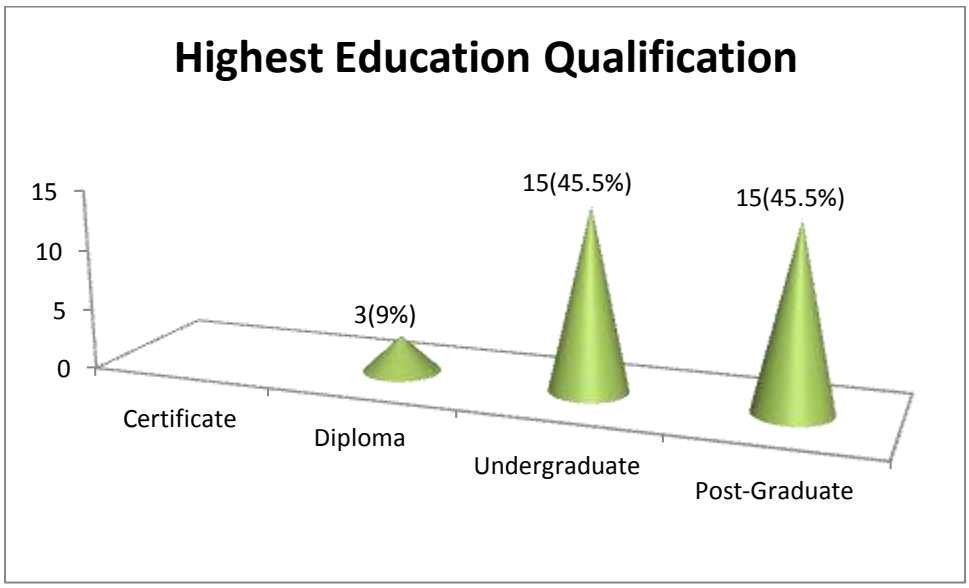

Figure 4. 2: Highest Education Qualification

Source: Survey Data (2022)

The results in Figure 4.4 show that none of the respondents held a certificate and only 3 respondents, representing 9% of all respondents, held a diploma as their highest educational qualification. There were 15 respondents with an undergraduate degree and 15 others indicated that they had attained a post-graduate degree as their highest educational level. These 15 respondents accounted for 45.5% of respondents. This indicated that a majority of the respondents, at 91%, held undergraduate and post-graduate degrees as their highest education qualification. These findings imply that the respondents were sufficiently educated to be able to read, comprehend and respond to the questions asked. It also implies that high education qualification is needed as a bare minimum requirement for the profession.

4.4 Descriptive Analysis

The researcher conducted descriptive analysis through adoption of the five-point Likert scale ranging from 1-5 (1=strongly disagree, 2 = disagree, 3= neutral 4 =agree and 5 strongly agree). The results are shown in the subsequent sections.

4.4.1 Scope Planning

Table 4. 2: Scope Planning

Scope Planning	Mean	Std. Dev.
The projects have a clear charter that states its mission and vision	4.212	0.696
The scope of the water projects dictates the management structure	4.09	1.042
The water project has a clear reporting structure	4.151	0.712
The water project tasks is broken down into phases that are assigned different project teams	3.909	0.947
Project leaders usually develop a requirement traceability matrix that is shared with donors and government	4.242	0.791
Overall Score	**4.121**	**0.848**

Source: Survey Data (2022)

The results of the descriptive analysis on scope planning captured in Table 4.2 show that the average mean score was 4.121 and average deviations of 0.848. The implication is that respondents agreed that scope planning influenced performance of the water projects and the variance in responses was very low. Bingham and Gibson (2017) concur with this finding and posit that elements of scope definition led to high performing infrastructure projects. Similarly, Collins, *et al.* (2017) submitted that projects with a clear scope definition showed high performance in terms of improved cost management and delivery of the project on schedule.

The highest mean was recorded for the statement on project leaders developing traceability matrix that was shared with stakeholders like donors and the government (M=4.242, SD = 0.791). Similar conclusions are shared by Sakaedani, *et al*. (2012) who demonstrated project traceability matrix to be an information management method for realizing high quality project management.

The statement on projects having a clear charter that highlighted the mission and vision also recorded high scores of (M=4.212, SD = 0.696). This implies that having a project charter helped in directing and guiding the project team hence delivering highly performing projects. These findings are supported by Heldman (2011), who asserted that the careful consideration given to the development of the project mandate is directly responsible for the flow and ease of project attainment and that an excellent project charter keeps every single person involved in any way in the project on the same page.

On the statement of having clearly outlined reporting structure, the average score was (M=4.151, SD = 0.712), an indication that many respondents shared that when each project team member is aware to whom they report to, it creates positive synergies and an easier work environment. This results in improved project performance, sentiments that are also shared by Crispin, (2020) in his findings that the need for well-defined organizational reporting structure for projects cannot be over emphasized. It serves as the pillar for appropriate project implementation and that some of the conflicts arising in the project environment would not have occurred if the right organizational structure was in place.

On the statement that scope of the water projects dictates the management structure, the scored means were (M=4.09, SD = 1.042). These results are shared by the researcher Yang, *et al.* (2020) who revealed that up-front planning reduces wastage of time and costs in making decisions on an on-going project. The planning guides agile management that considers the collaborations, coordination and control measures that lead to successful projects.

The smallest recorded means scores were on the statement on break down of the projects tasks and assignment of these tasks to different project teams (M=3.909, SD = 0.947). Just as Ajmal, *et al.* (2019) noted that project scope involves information on the project goals and it is broken down into phases and description of the deliverables and outcomes. The scope also breaks down the project tasks and individuals and teams are assigned different roles and functions, resulting in improved performance outcomes.

On link between planning and performance, the responses are such that the project plans/scope is divided into lots for easier and speedy delivery of project goals. Splitting the overall project scope means that the process of monitoring and evaluation is easy and deliverables can be attained. Another respondent revealed that easing the M&E process means that projects can be completed on time and as per the timeliness. The polled participants also shared that scope planning helped give a clear project structure which positively affected adaptability of the project and realization of its specifications.

Scope planning has an advantage in that it sets the completion timeline and helps in reducing elements of time overruns that affect cost and expenditures of the project. It also leads to minimal variations and changes in project activities that help reduce overruns of cost and time. Another respondent shared that the scope plan works to identify the project objective and goals, estimate the timelines and improve on deliverables. In general, scope planning helps the project managers and project team members in preparation by estimating time and costs that improves project outcomes.

Whenever feasibility study is not properly done, the scope planning will have a problem that will reflect poorly on project performance outcomes. Another issue that was noted was inadequate funds and delays in release of funds which meant that the scope planning was delayed and extended to implementation and delivery of the project. Once delays are realized on one aspect, it affects other project phases. The major problem with scope planning is funding challenges and delays in release of the funds.

From the responses given, it is clear that scope planning is important in preparation and forecasting and also setting measures for monitoring and tracking the progress of the project. These results imply that scope planning aides in delivering projects on time, as per the budget since costs and expenses are reduced and quality.

4.4.2 Stakeholder Engagement

Table 4. 3: Stakeholder Engagement

Stakeholder Engagement	Mean	Std. Dev.
Project managers engage the stakeholders (donors, government and residents) in designing the scope of the water projects	4.03	0.809
The stakeholders must approve any changes in the water project scope before it is implemented	3.424	1.091
The scope is a reflection of the expectations of the stakeholders	3.848	0.939
Stakeholders are communicated to on the progress of the water projects	4.212	0.892
The communication lines are open to receive views/feedback from project stakeholders	4.000	0.829
The stakeholders are involved in monitoring and evaluation of the projects for transparency	3.545	1.033
Stakeholders are involved in all phases of the project	3.697	1.015
Overall Score	**3.822**	**0.95**

Source: Survey Data (2022)

Table 4.3 shows that respondents agreed overall that stakeholder engagement had influence on performance of the water and sanitation projects. The overall mean score was (M=3.822) with an average standard deviation of (SD=0.95). Such findings are echoed by Amadi, *et al.* (2017) who noted that stakeholders can influence the outcome of the project. Furthermore, Lückmann and Färber (2016) found close association between project performance and stakeholders, as project success relied on interactions with all project stakeholders.

The highest mean score was on stakeholders getting frequent communication on the progress of the water projects (M=4.212, SD = 0.892). The was also mentioned by the researcher Maina and Kimutai (2018) confirming that good communication led to high success rates of the projects because communication is one tool that enhances engagement and involvement of all stakeholders. The respondents strongly agreed that all the stakeholders were engaged during the process of designing the scope for the water projects (M=4.03, SD = 0.809). This is an indication that stakeholders such as the local community, the national and county governments and donors' opinion and views were included in the design of the water project. PMI (2017) shares that engagement of

stakeholders is a crucial element in guiding the decision-making process and in execution of agreed upon strategic project plans, resulting in successful projects.

On the statement about open communication lines for reception of views and sharing feedback on the project, the respondents agreed to it with scores of (M=4, SD = 0.829). Similar sentiments were shared by Magassouba, *et al.* (2019) that stakeholder involvement is important and a core element in planning and executing projects. Maina and Kimutai (2018) noted that communication channels and systems that were open, allowed incorporation of views from all stakeholders that resulted in better executed projects and the final delivered project is of good quality.

The respondents held strong conviction that the scope of the water and sanitation projects was a reflection of the expectations held by the stakeholders (M=3.848, SD = 0.939). This means that the water project scope was aligned to the stakeholders' expectations. Karimi, *et al.* (2020) also noted that highly performing projects rely on understanding, managing and incorporating the needs and expectations of all stakeholders. On involvement of stakeholders in all phases of the project, the results showed (M=3.697, SD = 1.015). Karimi, *et al.* (2020) further shared that involving all stakeholders removes some unwarranted delays, eases the decision making process that delivers quality and timely projects. Inclusion of all stakeholders has positive effects on performance of projects. Njogu (2016) advises that involving stakeholders in all project phases cuts down operational cost, enhances efficiency and increase satisfaction rates.

The respondents had averagely agreed that all the stakeholders had been involved in M&E of the projects as a way to increase transparency. The average scores were (M=3.545, SD = 1.033). These results are also echoed by Amadi, *et al.* (2017) who noted that engaging, involving and participation of stakeholders in monitoring and evaluation process enhances the level of transparency and openness. On the statement about stakeholders approving changes in the scope of the water project before its implementation, the scores were average at (M=3.424, SD = 1.091). It means that not all respondents agreed that changes in the project scope was approved by all stakeholders,

such that some changes might have been implemented without approval of all or some stakeholders. Karimi, *et al.* (2020) noted that when stakeholders are involved there are no delays since corporate decisions are the ones that are made and every idea, view and opinion is deliberated upon and the best option picked. There is a higher success rate of projects, when all stakeholders are involved.

The respondents were also asked to share what other ways are stakeholders engaged in water and sanitation projects in Mombasa and Kilifi. The respondents shared that stakeholders can be reached in meetings and social media where they will be informed on matters affecting the project. The project managers can also host stakeholder's forums where all stakeholders are involved in all project activities for its sustainability.

The stakeholders can take part in environment assessment of the viability of the project and they are encouraged to visit the site whenever they can, so as to enhance transparency and help in monitoring the progress. Another response is such that stakeholders should be involved in feasibility studies, and negotiations with the local communities that has an effect on acceptability of the project. The success of the project can be enhanced when some stakeholders work in mobilizing funds and closely monitoring its use such that the delivered water project will be of quality. Involving stakeholders in making major and minor decisions on concerns of the project, resulted in better coordination of project activities and deliver highly performing water projects. The local communities, as key stakeholders, can be engaged by getting project employees from community members. This way a cordial relationship between the project team and the local community is built and maintained. The completed projects are handed over to the local community for operating and maintenance, this promotes sustainability. The stakeholders included ministry of interior, national land commission, NEMA and roads authority that can enact policies that eases the working relations in a project. The regulatory authorities are also involved in approvals for the project design such that it aligns with the standards and delivers quality project.

4.4.3 Scope Control

Table 4. 4: Scope Control

Scope Control	Mean	Std. Dev.
The project scope is changed based on requests of the project stakeholders	3.848	1.064
There is constant monitoring of all activities of the water projects	4.242	0.751
The project scope is adopted to manage actual changes in the water projects	3.939	0.788
There is constant review of the different activities in each project phase	3.970	1.015
Project teams receive continuous updates on the progress of the water projects	4.151	0.712
Overall Score	**4.03**	**0.88**

Source: Survey Data (2022)

The highest mean score was on the statement that there is constant monitoring of all project activities which scored a average values of (M=4.242, SD = 0.751). This means that regular monitoring efforts have had positive effect on performance of the water and sanitation projects. These results are shared by the sentiments of Nibyiza (2015) who noted that changes made on the project scope and project activities is associated with reviews, suggestions and feedback given that shape the action and activities to be taken in the project execution.

On project team receiving continuous updates with information on the progress of these water and sanitation projects, where the average scores were (M=4.151, SD = 0.712). When all the project team members understand the project progress they feel a sense of belongingness and being valued, which reflects on their work attitude that enhances individual output that is reflected positively on project performance outcomes.

The respondents agreed on there being constant review for all different activities taking place in the project and in each of the project phases (M=3.97, SD = 1.015). The same findings were found by Nibyiza (2015) who shared that better scope control involves reviews and constant monitoring to avoid excess expenditures and delays that will affect the overall project in terms of cost and time overruns. Turatsinze (2018) advocates for the

need for project managers to have provision and accommodate changes in the project scope and plan; which improves the chances for success.

On the statement about presence of project scope that is adopted and implemented in the water project as a means of managing actual changes, the obtained scores are (M=3.939, SD = 0.788). This means that the scope helps to manage the changes in the water project. On changes made on the project scope as instigated by the project stakeholders, the respondents agreed at (M=3.848, SD = 1.064). This is echoed by Al-Rubaiei, *et al.* (2018) who revealed that changes made to the project plan, the project scope, mobilizing and distribution of project resources and requirements; only works at the say of all stakeholders.

The respondents shared that the controls are achieved through the design reports, regular progressive reports and agreed upon completion report that is signed by the project managers, stakeholders and beneficiaries. The scope control also sets restrictions and limits to what is acceptable and what is unacceptable and guide the activities in the project. The scope control is also a matter of contract amongst all the players and the contract dictates the role and function of each party and expected deliverables. The scope control helped in reviewing all the project activities and resulted in a project that was delivered in a timely manner, within cost and as per the specifications. The control measures were achieved through the monitoring, evaluation and control functions such that there was compliance with the budget estimates, timelines and quality. In some instance, the respondents shared that the project scope control led to changes and modifications that resulted in better performing projects. Another respondent noted that the scope control guided the activities of the project to align with the contract clauses and regulations and policies as dictated in law. This implied that the control aspect led to delivery of quality projects since it aligned its activities with contractual and legal stipulations that might have been missed during planning or which might creep in during implementation. It also means that stakeholders were satisfied with the final delivered project.

Adhering to the project scope and its control measures meant little or no conflicts or disagreements, meaning all efforts are directed and focused on the project activities. This allowed the projects to keep to the scheduled timeline and cost. Another respondent shared that control allowed little room for scope creep and adjustments that would otherwise lead to cost and time overruns. There was better resource and asset management that delivered quality water projects in Mombasa and Kilifi.

4.4.4 Work Breakdown Structure

Table 4. 5: Work Breakdown Structure

Work breakdown structure	Mean	Std. Dev.
Use of WBS breaks the water project components to smaller tasks	3.727	1.126
Through using WBS water project tasks are easily managed	4.181	0.682
WBS integrates costs, time and resources	4.090	0.879
The entire project is divided into phases for attaining project deliverables	3.757	0.830
There is better water project asset management through use of WBS	3.909	0.804
The work packages cover all groups of project tasks for delivery of quality projects	3.787	0.960
Overall Score	**3.908**	**0.89**

Source: Survey Data (2022)

The overall mean score and standard deviation was M=3.908, Std. Dev=0.89. The high average score implies that many respondents were of the opinion that work breakdown structure helped to improve the performance outcomes of the water projects. These findings are shared by Al-Kasasbeh, *et al.* (2020) who revealed that work breakdown structure outlines what is to be done by the project team, the use of resources, scheduling and time keeping for attainment of the project deliverables. In the same line, Siami-Irdemoosa, *et al.* (2015) revealed that modeling methodologies for WBS significantly affected its capacity and improved project outcomes.

The highest mean score was on the statement of work breakdown structure easing the management of the project tasks (M=4.181, SD =0.682). Rianty, *et al.* (2018) shared the same sentiments when he submitted that work breakdown structure eases management of the project, since it is broken into smaller parts and assigned to an individual. The

management is also made easier since the project is standardized and adopts similar approaches that yield better project results.

The respondents also concurred that work breakdown structure integrated the aspects of cost, time and resources with scores of (M=4.09, SD =0.879). This shows that the WBS structure was comprehensive such that it covered the key areas in any project – time, cost and resources. Findings by Siami-Irdemoosa, *et al.* (2015) showed that WBS developments helped to improve project tasks including planning for workload, estimation of project costs, budgeting for expense, scheduling and planning for activities that improve performance outcomes. On the statement of water project asset management, the respondents agreed that WBS helped in improving management of assets that enhanced production level of the water projects. The scores of (M=3.909, SD =0.804) were realized, implying that better asset management was reflected in the overall good performance of the water and sanitation projects.

The respondents agreed that the WBS and the work packages covered all project tasks and its processing units, such that it led to delivery of quality projects at average scores of (M=3.787, SD =0.96). Similar findings were shared by Burghate (2018) who noted that through WBS aspect of logical assigning tasks and responsibilities; the project specification is met. Close tracking and monitoring improved the attainment of project deliverables. The project was divided into phases and each phase worked to attain the overall project deliverable. The obtained scores of (M=3.757, SD =0.83) imply that many of the respondents agreed to the statement. These results are echoed by Burghate (2018) who shared that WBS is an excellent tool for managing projects through proper planning, execution of plans, control, monitoring and reporting that enable projects deliver as per the specifications.

The lowest mean score was for the statement on work breakdown structure breaking the water project into components of smaller tasks for attaining it. The scores were of (M=3.727, SD =1.126). This finding implies that not many respondents agreed with the statement and some averagely agreed with it. The same results are echoed by Rianty, *et*

al. (2018) who agrees that WBS is about breaking down the project activities into small parts for easy management and attainment of project goals. Since the projects are mostly standardized, then the project managers can easily forecast and implement the plans.

On the same, the respondents shared that WBS has enabled the project managers to identify roles and highlight the roles of each project team member. Through clear job description, the project managers could easily note the project components that are lagging behind and initiate changes that would improve project outcomes.

Respondents shared that WBS helped project managers to identify tasks that needed workers with technical and expertise skills and knowledge. This brought about the aspect of specialization, division of labor and sub-contracting non-core tasks; resulting in efficiency in the water projects in Mombasa and Kilifi County. Further, results showed that through the work breakdown structure, every team player was able to handle their role and hence overall delivery of the project was of good quality and kept to the estimated timelines and costs. The WBS helped contractors and project managers to quickly and effectively develop work schedules that were easily understood by the project team members, resulting in high quality of the completed and delivered projects. The respondents also agreed that WBS helped in timely delivery of water projects, the projects were as per the specifications and kept to the estimated time and cost. The performance of projects was better since WBS helped in streamlining processes and made the project assessment exercise easier. But there were respondents who thought that WBS was not applicable in the structure employed by local contractors.

4.4.5 Performance of Projects

Table 4. 6: Performance of Projects

Project Performance	Mean	Std. Dev.
The water projects are delivered on time as per the stipulated timeline	3.454	1.201
There is no budget overruns in the water projects	3.000	1.089
Delivery of the water projects are as per their specifications	4.000	0.968
The water project stakeholders' are satisfied with the project quality	3.969	0.636
Each project phase maintains the budget lines in its expenses	3.545	0.869
Overall Score	**3.594**	**0.97**

Source: Survey Data (2022)

On each project phase maintaining its budget lines and expenses, the scores are (M=3.545 SD = 0.869). This was also revealed by Kerzner (2017) sharing that the project managers should be able to cut costs so as to keep the project costs and expenditures within the budget lines. The performance was also measured in terms of delivering the water and sanitation projects as per the stated timeline. The scores were low at (M=3.454, SD = 1.201) meaning that some projects failed to keep to the scheduled timeline. Ngure (2019) revealed that in order to satisfactorily attend to the needs of the beneficiaries and other stakeholders, timely delivery is a key measure of water projects' performance. Performance was also measured using the indicator of costs and budgets. The respondents shared that on the statement of lack of budget overruns in the water and sanitation projects in Mombasa and Kilifi Counties, the means were the lowest at M=3 SD = 1.089). This is an indication that the water projects had issues with keeping their costs and expenditures within the budget.

They also shared that performance can be measured through feedback received from stakeholders, the impact that the project has on the end-users and decrease in costs of accessing water for individuals and households. Other measures include the number of households that are able to access clean and safe water, employee satisfaction levels – applicable to the employees of the water projects and amount of revenues collected from the water projects over some duration of time.

The respondents also shared that performance of the water projects can be a measure of extended coverage of beneficiaries or increased number of beneficiaries, and increased volume of water supply to the people of Kilifi and Mombasa Counties. Respondents also noted that performance can be measured through conducting socio-economic surveys to assess the impact of the water projects to everyday life for the people from the two counties. It can also be measured by the quality of service provided by the different water service providers.

The performance is measured from audits by qualified persons, who assess the impact of the project using socio-economic indicators and also how long the water project is operational without needing service and repairs. Quality projects are sustainable and operational for a long time to serve local communities in Kilifi and Mombasa County. The findings show that other than performance indicators of time, cost and quality of the project, other measuring indicators include impact on socio-economic lifestyle of the people, accrued benefits and satisfaction of stakeholders.

4.5 Correlation Analysis

The researcher conducted correlation analysis to assess the association that project scope management practices have on performance of projects. The results are as shown in Table 4.7

Table 4. 7: Correlation Analysis

Correlations

		Project Performance	Scope Planning	Stakeholder Engagement	Scope Control	WBS
Project Performance	Pearson Correlation	1	.436*	.584**	.741**	.202
	Sig. (2-tailed)		.011	.000	.000	.259
	N	33	33	33	33	33
Scope Planning	Pearson Correlation	.436*	1	.726**	.675**	.352*
	Sig. (2-tailed)	.011		.000	.000	.044
	N	33	33	33	33	33
Stakeholder Engagement	Pearson Correlation	.584**	.726**	1	.842**	.356*
	Sig. (2-tailed)	.000	.000		.000	.042
	N	33	33	33	33	33
Scope Control	Pearson Correlation	.741**	.675**	.842**	1	.282
	Sig. (2-tailed)	.000	.000	.000		.112
	N	33	33	33	33	33
WBS	Pearson Correlation	.202	.352*	.356*	.282	1
	Sig. (2-tailed)	.259	.044	.042	.112	
	N	33	33	33	33	33

The correlation analysis show that scope planning had positive and moderate influence to performance of the water projects (r=.436, p-values of 0.000). Stakeholder engagement and scope control had positive and significant effect to project performance with (r=.584, p-values of 0.000) and (r=.741, p-values of 0.000) and work breakdown structure had positive but weak association with performance of the water projects based on (r=.202, and p-values of 0.000). Thus, scope control has the strongest association with performance of the water projects with (r=.741) followed by stakeholder engagement (r=.584). Scope planning was the third practice in influencing water and sanitation project performance at (r=.436) and the practice with the least effect to performance was work breakdown structure (r=.202). The results also showed that two practices that of scope control and stakeholder engagement had positive and significant correlations to water project performance based on their r values being above 0.5. However, scope planning had positive but moderate associations with performance since its r value ranged between

0.3 and 0.49, while work breakdown structure had weak associations to performance of water and sanitation since its r value ranged between 0.1 -0.29.

4.6 Diagnostic Tests

In the study, diagnostic tests were conducted to ensure that there was no violation in the assumptions made on the data set.

4.6.1 Normality Test

This was done by applying Skewness and Kurtosis with values ranging from +3 to -3 an indication of normality in the data (Sekaran & Bougie, 2016). The findings are presented in Table 4.8.

Table 4. 8: Test for Normality

	Skewness		Kurtosis	
	Statistic	**Std. Error**	**Statistic**	**Std. Error**
Performance of Projects	-1.329	.221	1.747	.438
Scope Planning	.324	.221	-1.181	.438
Stakeholder Engagement	-.388	.221	-1.172	.438
Scope Control	.521	.221	-.393	.438
Work Breakdown Structure	.467	.221	-.509	.438

Table 4.8 shows that the data was normally distributed based by the values of Skewness and Kurtosis, which were in the range of -3 and +3. The results signify the presence of normality in the dataset.

4.6.2 Multicollinearity Test

The researcher tested for multicollinearity using VIF –Variance of inflation factor to show the exact linear relation that any two variables have with each other. The results are as seen in Table 4.9

Table 4. 9: Multicollinearity Test

	Collinearity Statistics	
	Tolerance	**VIF**
Scope Planning	.641	1.560
Stakeholder Engagement	.274	3.644
Scope Control	.301	2.912
Work Breakdown Structure	.290	3.445
Mean VIF	**.377**	**2.890**

4.6.3 Autocorrelation

The presence of serial correlation in the data was through Durbin Watson statistic as summarized in Table 4.10

Table 4. 10: Autocorrelation Test

Model	Durbin-Watson
1	1.793

Table 4.10 shows results of the autocorrelation test which used the Durbin Watson and findings were 1.793 which can be rounded off to the nearest whole number of 2 and shows positive autocorrelation. The result indicates the absence of serial correlation in the data set and imply the dataset is suitable for use in conducting the regression analysis

4.7 Regression Analysis

Table 4. 11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.747[a]	.558	.495	2.52865

Table 4.11 indicates that the correlation coefficient is at 0.747 an indication that project scope management has strong and positive relations to performance of the water projects in Mombasa and Kilifi Counties. The coefficient of determination is presented by the R square at 0.558, meaning that 55.8% of changes in the performance of the water projects in Mombasa and Kilifi County can be traced back to project scope management practices. There are 44.2% of practices that account for performance in the water projects that are outside the scope of the present research study.

Table 4. 12: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	225.936	4	56.484	8.834	.000
Residual	179.033	28	6.394		
Total	404.970	32			

The ANOVA statistics results that was calculated at 0.05 significance level shows that F calculated was 8.834 and F critical was 2.714. Since F calculated (8.834) > F critical (2.714) then the model is accepted.

Table 4. 13: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
Model	**B**	**Std. Error**	**Beta**	**T**	**Sig.**
(Constant)	8.691	2.187		3.974	.000
Scope Planning	.073	.026	.162	2.760	.006
Stakeholder Engagement	.190	.026	.642	7.409	.000
Scope Control	.499	.097	.448	5.141	.000
Work Breakdown Structures	.553	.273	.195	2.025	.034

Equation:

$$\mathbf{Y = 8.691 + 0.073X_1 + 0.190X_2 + 0.499X_3 + 0.553X_4}$$

Y = Performance; X_1 = Scope Planning; X_2 = Stakeholder Engagement, X_3 = Scope Control and X_4 = Work Breakdown Structures

This study established that scope planning (β=.073, p-values = 0.006 < 0.05) positively influenced water projects' performance. The results are also shared by Bingham and Gibson (2017) who revealed that elements of scope definition and planning led to high performance in the infrastructure project. While Collins, *et al.* (2017) agrees with the sentiment by sharing that scope definition and planning improved cost management and helped in scheduling of project activities that positively impacted project performance and its success. Yang, *et al.* (2020) found that through scope planning or up-front planning, there was reduction of cost and time wastage that reflected positively on project performance.

Further results show that stakeholder engagement had positive and significant effect to performance of water projects based on (β=.190). From the results obtained, stakeholder engagement also contributed to the performance of the water and sanitation projects. Similar results were found by Lückmann and Färber (2016) who shared that project performance was associated with close interactions between project stakeholders. The stakeholders were at the core at planning; hence integral to project performance (Magassouba, *et al.*, 2019). Furthermore, Njogu (2016) found out that involving stakeholders in all project phases cuts down operational cost, enhances efficiency and increase satisfaction rates. Thus, involvement of stakeholders is associated with high project performance.

Work breakdown structure was regressed against performance of the projects and results showed (β=.553, p-values = 0.034 < 0.05). The results imply that work breakdown structure positively and significantly influenced performance. These results were also found by Al-Kasasbeh, *et al.* (2020) who revealed that work breakdown structure outlines project activities, scheduling and assigning of duties that positively affect project performance and its deliverables. At the same time, Siami-Irdemoosa, *et al.* (2015) found out that improved project performance outcomes were influenced by WBS developmental

elements that helped in scheduling activities, dividing and sharing tasks and better asset and resource management.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presented the overall study findings with the purpose of answering the research questions. The chapter also presented the drawn conclusion on the relationship between project scope management and performance of projects. It also shares the recommendations for policy and practices and concludes with suggestions on how to expand knowledge by future researchers.

5.2 Summary of Findings

The study's main aim was linking scope management and performance; and the specific objectives of the study were scope planning, stakeholder engagement, scope control and work breakdown structure and how they affected performance of the water and sanitation projects. The respondents agreed that scope planning (M=4.121); stakeholder engagement (M =3.822); scope control (M =4.03) and work breakdown structure (M=3.908) affected performance of the water projects.

Scope planning affected the performance of the projects and from the regression analysis, findings showed positive and significant effects. This is based on beta and p-value results where β=.073, p-values = 0.006 < 0.05. The respondents agreed on the need for a project charter that had a clear mission and vision of the project, clear reporting structure and a well-defined management structure. They further agreed that scope planning should encompass a requirements traceability matrix and that there was value in having the project broken down into assignments/work packages and shared to project team members.

On stakeholder engagement, the regression analysis found strong influence to project performance; since beta results were β=.190 and p-values showed 0.000 < 0.05. The

study found that respondents engaging all stakeholders in all project phases and installing a regular communication process enhanced water project performance outcomes. Open communication lines allowed sharing of views and feedback and monitoring and evaluation process that improved transparency levels at the water projects. Success of the water projects relied on involvement of stakeholders in all the project lifecycle and phases.

On the effects of the work breakdown structure on project performance, results show significant and positive associations. This is based on the findings from the regression where β=.553 and p-values = 0.034 < 0.05. Respondents agreed that through WBS, project tasks were grouped into phase and easily managed by the project team. The entire water project activities were broken down into smaller components and each part is assigned its duty and worked to deliver on the project. The WBS helped in better asset management that improved water project productivity. The integration of scope management practices helped deliver high performing project

5.3 Conclusions

The performance of the projects was measured using elements such keeping to project specifications and keeping to the budget and timeline estimates. Performance is also about satisfying the stakeholders of the water projects including donors, government, beneficiaries and local communities. The project must be of high quality that will enhance sustainability and extract the highest utility for its users. To improve performance outcomes, the surveyed 14 projects adopted the project scope management practices.

Basing on the findings scope planning influenced the projects by β=.073. Thus, the study concluded that enhancing water and sanitation projects performance was based on adopting scope planning aspects such as each water project having a charter, management structure, reporting structure and traceability matrix. The findings revealed that work breakdown structure affected the performance of water and sanitation projects with beta

results of β=.553. Thus, the conclusions made were such that work breakdown structure significantly and positively affected performance of the projects. Work breakdown structure involved breaking the project components into smaller parts, easing the asset and overall management structure.

The study also concluded that stakeholder engagement affected the performance of the water projects by β=.190 and it had positive and significant effects to water project performance. The stakeholders were engaged in designing the project scope, approving any changes made and in conducting monitoring and evaluation. The stakeholders' engagement was based on presence of open lines of communication and adopting a project scope that reflected the expectations and needs of the stakeholders.

5.4 Recommendations

The study recommends that scope planning should clearly state the mission and vision and explain the aim of the project for acceptability of the project by all stakeholders. The scope plan should have flexible components that will need the interpretation of the project managers and team members during the implementation. This will mean less major changes that have negative effects on time and cost elements of project performance; but flexible components will solve such problem. The study also recommends that all stakeholders (internal and external ones) be involved in all phases of the project. This is because in some instances, local community members are often sidelines in major projects and in the past it has led to conflicts and unacceptability of some projects.

The study also suggests, to the management team of the water projects to break down the project into components and departments. The managers should assign each task to a supervisor to handle its execution and deliver quality projects. There is also need to integrate the plan with the expectations of the stakeholders, the available resources and time for delivery of quality water projects. Every person associated with the water project should be involved and their views incorporated in the overall project scope.

5.5 Suggestion for Further Research

Based on the regression results, there was a residual effect of 44.2%of practices that affected performance but were not explored since they were outside the scope of the current study. Thus, the study suggests that future researchers explore all the factors that affect the performance of water and sanitation projects.

REFERENCES

Abdilahi, S. M., Fakunle, F. F., & Fashina, A. A. (2020). Exploring the extent to which project scope management processes influence the implementation of telecommunication projects. *PM World Journal, 9,* 1-17.

Albrecht, S. L., Bakker, A. B., Gruman, J. A., Macey, W. H., & Saks, A. M. (2015). Employee engagement, human resource management practices and competitive advantage: An integrated approach. *Journal of Organizational Effectiveness: People and Performance*, *2*(1), 7-35.

Matu, J., Kyalo, D., Mbugua, J., & Mulwa, A. (2020). Stakeholder Participation in Project Planning: Prerequisite to Effective Completion of Urban Road Transport Infrastructure Projects in Kenya. *Journal of Building Construction and Planning Research*, *8*(1), 73-91

Kholbaev, B. A. (2020). Efficient Project Management: Work Breakdown Structure. *Economics and Innovative Technologies*, *2020*(4), 3

Jones, T. M., Donaldson, T., Freeman, R. E., Harrison, J. S., Leana, C. R., Mahoney, J. T., & Pearce, J. L. (2016). Management theory and social welfare: Contributions and challenges. *Academy of Management Review*, *41*(2), 216-228.

Siami-Irdemoosa, E., Dindarloo, S. R., & Sharifzadeh, M. (2015). Work breakdown structure (WBS) development for underground construction. *Automation in construction*, *58*, 85-94

Rianty, M., Latief, Y., & Riantini, L. S. (2018). Development of risk-based standardized WBS (Work Breakdown Structure) for quality planning of high rise building architectural works. In *MATEC Web of Conferences* (159) 01019. EDP Sciences

Burghate, M. (2018). Work breakdown structure: Simplifying project management. *International Journal of Commerce and Management*, *3*(2), 453-461.

Al-Kasasbeh, M., Abudayyeh, O., & Liu, H. (2020). A unified work breakdown structure-based framework for building asset management. *Journal of Facilities Management, 18 (4), 437-450*

Aggarwal, R., & Ranganathan, P. (2019). Study designs: part 2–descriptive studies. *Perspectives in clinical research*, *10*(1), 34

Ahmadabadi, A. A., & Heravi, G. (2019). The effect of critical success factors on project success in Public-Private Partnership projects: A case study of highway projects in Iran. *Transport Policy*, *73*, 152-161.

Ajmal, M., Khan, M., & Al-Yafei, H. (2019). Exploring factors behind project scope creep–stakeholders' perspective. *International Journal of Managing Projects in Business*, *13*(3), 483-504

Akhwaba, J. K. (2020). The Moderating Influence of Project Scope on Leadership Skills, Stakeholder Management, and Execution of Fibre Optic Infrastructure. *Advances in Civil Engineering*, *2020*

Alqaisi, I. F. (2018). The effects of stakeholder's engagement and communication management on projects success. In *MATEC Web of Conferences* 162*(1),* 02037) EDP Sciences.

Al-Rubaiei, Q. H. S., Nifa, F. A. A., & Musa, S. (2018). Project scope management effect on variation orders in government funded projects: a proposed study on the sultanate of Oman. *Malaysian Construction Research Journal*, *3*(1), 52-62.

Al-Rubaiei, Q. H. S., Nifa, F. A. A., & Musa, S. (2018). Project scope management through multiple perspectives: A critical review of concepts. In *AIP Conference Proceedings* 1, 020025. AIP Publishing LLC

Amadi, C., Carrillo, P., & Tuuli, M. (2018). Stakeholder management in PPP projects: external stakeholders' perspective. *Built Environment Project and Asset Management, 8*(4), 403-414.

Bingham, E., & Gibson Jr, G. E. (2017). Infrastructure project scope definition using project definition rating index. *Journal of management in engineering, 33*(2), 04016037

Chan, L. L., & Idris, N. (2017). Validity and reliability of the instrument using exploratory factor analysis and Cronbach's alpha. *International Journal of Academic Research in Business and Social Sciences, 7*(10), 400-410.

Collins, W., Parrish, K., & Gibson Jr, G. E. (2017). Development of a project scope definition and assessment tool for small industrial construction projects. *Journal of management in engineering, 33*(4), 04017015

Erkul, M., Yitmen, I., & Celik, T. (2019). Dynamics of stakeholder engagement in mega transport infrastructure projects. *International Journal of Managing Projects in Business 13* (7), 1465-1495

Fashina, A. A., Abdilahi, S. M., & Fakunle, F. F. (2020). Examining the challenges associated with the implementation of project scope management in telecommunication projects in Somaliland. *PM World Journal, IX*, 1-16.

Ghauri, P., Grønhaug, K., & Strange, R. (2020). *Research methods in business studies*. Cambridge University Press

Gunduz, M., & Yahya, A. M. A. (2018). Analysis of project success factors in construction industry. *Technological and Economic Development of Economy*, *24*(1), 67-80.

Gupta, S., & Bashir, L. (2018). Social networking usage questionnaire: development and validation in an Indian higher education context. *Turkish Online Journal of Distance Education*, *19*(4), 214-227.

Heldman, K. (2011). Project Management JumpStart. John Wiley & Sons

Hilali, A., Charoenngam, C., & Barman, A. (2019). Barriers in contractual scope management of international development projects in Afghanistan. *Engineering, Construction and Architectural Management*

Junqueira, M. A. D. R., & Passador, C. S. (2019). The impact of the project management office on scientific research. *Revista de Administração Pública*, *53*(6), 1179-1188

Kanda, E., Muchelule, Y., & Mamadi, S. (2016). Factors influencing completion of water projects in Kakamega County, Kenya.

Karimi, S. S., Mulwa, A. S., & Kyalo, D. N. (2020). Stakeholder engagement in monitoring and evaluation and performance of literacy and numeracy educational programme in public primary schools in Nairobi County, Kenya. *Journal of Educational and Developmental Psychology*, *10*(2), 10

Kariuki, J. T. (2018). The effect of project manager's leadership style on performance of water projects in Kenya. *European Scientific Journal*, *14*(17), 33-45.

Kerzner, H. (2017). *Project management: a systems approach to planning, scheduling, and controlling*. John Wiley & Sons

Lester, A. (2006). *Project management, planning and control: managing engineering, construction and manufacturing projects to PMI, APM and BSI standards*. Elsevier.

Lückmann, P., & Färber, K. (2016). The impact of cultural differences on project stakeholder engagement: A review of case study research in international project management. *Procedia Computer Science*, *100*, 85-94.

Madhuri, K. L., Suma, V., & Mokashi, U. M. (2018). A triangular perception of scope creep influencing the project success. *International Journal of Business Information Systems*, *27*(1), 69-85.

Magassouba, S. M., Tambi, A. M. B. A., Alkhlaifat, B., & Abdullah, A. A. (2019). Influence of Stakeholders Involvement on Development Project Performance in Guinea. *International Journal of Academic Research in Business and Social Sciences, 9*(1), 1111-1120.

Maina, S. M., & Kimutai, M. G. Stakeholder Management and Project Performance of Open Air Market Projects in Nyeri County, Kenya. *Journal of Business and Management*, *20* (7), 47-56

Moustafaev, J. (2014). *Project scope management: A practical guide to requirements for engineering, product, construction, IT and enterprise projects*. CRC Press

Mujere, N. (2016). Sampling in research. In *Mixed methods research for improved scientific study* (pp. 107-121). IGI Global.

Ndungu, R. W. (2014). *Factors Influencing The Completion Time Of Water Projects In Water Service Boards In Kenya: A Case of Athi Water Services Board, Kiambu County* (Doctoral dissertation, University of Nairobi).

Ngure, E. W. (2019). *Effect of Project Scope Management Practices on Performance of Liquefied Petroleum Gas Firms in Kenya* (Doctoral dissertation, University of Nairobi)

Nibyiza, F. (2015). *Analysis of project scope change management as a tool for project success*. (Doctoral dissertation, Jomo Kenyatta University of Agriculture and Technology).

Nicholas, J. M., & Steyn, H. (2017). *Project management for engineering, business, and technology*. Taylor & Francis

Njogu, E. M. (2016). *Influence of stakeholders' involvement on project performance: A case of Nema automobile emission control project in Nairobi County, Kenya* (Doctoral dissertation, University of Nairobi).

Nyakoyo, O. G., & Odhiambo, A. I. (2020). Stakeholder Involvement and Implementation of Sustainable Community Food Security Projects in Nyando Basin, Kenya. *Journal of Food Security*, *8*(1), 22-28.

Olago, D. O. (2019). Constraints and solutions for groundwater development, supply and governance in urban areas in Kenya. *Hydrogeology Journal*, *27*(3), 1031-1050.

Onubi, H. O., Yusof, N. A., & Hasan, A. S. (2020). Effects of sustainable construction site practices on environmental performance of construction projects in Nigeria. *Planning Malaysia*, *18*(11).

Parke, M. R., Weinhardt, J. M., Brodsky, A., Tangirala, S., & DeVoe, S. E. (2018). When daily planning improves employee performance: The importance of planning type, engagement, and interruptions. *Journal of Applied Psychology*, *103*(3), 300

Radujković, M., & Sjekavica, M. (2017). Project management success factors. *Procedia engineering*, *196*, 607-615

Rugenyi, F. (2015). Assessment of the Triple Constraints in Projects in Nariobi: The Project Managers' Perspective. *International Journal of Academic Research in Business and Social Sciences*, *5*(11), 1-16.

Sakaedani, A. & Ohkami, Yoshi & Kohtake, Naohiko. (2012). Construction of a traceability matrix for high quality project management. Synthesiology English edition. 5. 1-16. 10.5571/syntheng.5.1.

Taherdoost, H. (2017). Determining sample size; how to calculate survey sample size. *International Journal of Economics and Management Systems*, *2*

Tengan, C., & Aigbavboa, C. (2017). Level of stakeholder engagement and participation in monitoring and evaluation of construction projects in Ghana. *Procedia engineering*, *196*, 630-637.

Turatsinze, J. (2018). *Scope Change Management and Project Success in Rwanda: A Case Of Rwanda Social Marketing Project (RSMP)* (Doctoral dissertation, Mount Kenya University).

Yang, X., Yu, M., & Zhu, F. (2020). Impact of project planning on knowledge integration in construction projects. *Journal of Construction Engineering and Management*, *146*(7), 04020066

APPENDICES

Appendix I: Approval Letter

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 4150

Internal Memo

FROM: Dean, Graduate School

DATE: 18th March, 2022

TO: Gichuhi John Gitahi
C/o Management Science Dept.

REF: D53/OL/MSA/26064/2018

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

This is to inform you that Graduate School Board at its meeting 2nd March, 2022 approved your Research Project Proposal for the M.BA Degree Entitled, "Project Scope Management and Performance of Projects: A Case of Water and Sanitation Infrastructure Projects in Mombasa and Kilifi Counties, Kenya".

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking and Progress Report Forms per semester. The Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

ANNBELL MWANIKI
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Management Science Department.

Supervisors:

1. Dr. Francis Kiarie
C/o Department of Management Science
Kenyatta University

AM/lnn

Appendix II: Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **911797**

Date of Issue: **05/April/2022**

RESEARCH LICENSE

This is to Certify that Mr., Gichuhi John Gitahi of Kenyatta University, has been licensed to conduct research in Kilifi, Mombasa on the topic: PROJECT SCOPE MANAGEMENT AND PERFORMANCE OF PROJECTS: A CASE OF WATER AND SANITATION INFRASTRUCTURE PROJECTS IN MOMBASA AND KILIFI COUNTIES, KENYA for the period ending : 05/April/2023.

License No: **NACOSTI/P/22/16553**

911797

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

Appendix III: Questionnaire

Kindly answer all questions by marking with an [X] in the provided safe

PART A: BIO-DATA

1. Gender

   Male [ ] Female [ ]

2. What position and role do you hold in this water project?

   Project Manager [ ]
   Project Engineers [ ]
   Project Consultants [ ]

3. How long have you been doing water projects?

   0-3 years [ ]
   3-6 years [ ]
   6-9 years [ ]
   9+ years [ ]

4. What is your highest education qualification?

   Certificate [ ]
   Diploma [ ]
   Undergraduate [ ]
   Post-Graduate [ ]

PART B: PROJECT SCOPE MANAGEMENT

The likert rating ranges from 1-5 where: 1=strongly disagree, 2 = disagree, 3= neutral 4 =agree and 5 strongly agree.

I) SCOPE PLANNING

1. Using the 5-point Likert scale rate how these statements on scope planning affect the performance of water projects.

Scope Planning	**1**	**2**	**3**	**4**	**5**
The projects have a clear charter that states its mission and vision					
The scope of the water projects dictates the management structure					
The water project has a clear reporting structure					
The water project tasks is broken down into phases that are assigned different project teams					
Project leaders usually develop a requirement traceability matrix that is shared with donors and government					

2. How else has scope planning affected the performance of the water and sanitation projects?

……
……

II) STAKEHOLDER ENGAGEMENT

3. Kindly rate how stakeholder engagement has affected the performance of water projects.

Stakeholder Engagement	**1**	**2**	**3**	**4**	**5**
Project managers engage the stakeholders (donors, government and residents) in designing the scope of the water projects					
The stakeholders must approve any changes in the water project scope before it is implemented					
The scope is a reflection of the expectations of the stakeholders					
Stakeholders are communicated to on the progress of the water projects					
The communication lines are open to receive views/feedback from project stakeholders					
The stakeholders are involved in monitoring and evaluation of the projects for transparency					
Stakeholders are involved in all phases of the project					

4. In what other ways have the water and sanitation projects in Mombasa and Kilifi engaged its stakeholders?

……
……

III) WORK BREAKDOWN STRUCTURE

5. Kindly rate the extent to which you agree with these statements on work breakdown structure in the water projects

	1	2	3	4	5
Use of WBS breaks the water project components to smaller tasks					
Through using WBS water project tasks are easily managed					
WBS integrates costs, time and resources					
The entire project is divided into phases for attaining project deliverables					
There is better water project asset management through use of WBS					
The work packages cover all groups of project tasks for delivery of quality projects					

6. What effects have work breakdown structure had on performance of the water projects?

……
……

PART C: PROJECT PERFORMANCE

7. Please state how the performance of the water projects is, based on adoption of project scope management aspects

Project Performance	1	2	3	4	5
The water projects are delivered on time as per the stipulated timeline					
There is no budget overruns in the water projects					
Delivery of the water projects are as per their specifications					
The water project stakeholders' are satisfied with the project quality					
Each project phase maintains the budget lines in its expenses					

8. How else can the water and sanitation projects in Mombasa and Kilifi Counties be measured?

……
……

Thank You.

Appendix IV: Water Projects in Kilifi and Mombasa

S/N	Project Name
1	Marere Pipeline Replacement
2	Malindi WSP Reticulation Improvement
3	Kilifi WSP Reticulation Improvement project
4	KIDDP_Mariakani Kaloleni Water supply Improvement project
5	Malindi Informal settlement Lot 2: Kibokoni.
6	Malindi Informal settlement Lot 1: Kisumu Ndogo.
7	Rehabilitation / Extension of Mombasa Water Supply Works – Lot 2
8	Rehabilitation / Extension of Mombasa Water Supply Works – Lot 1
9	Extension of Water and Sanitation Services to Informal Settlements In Mombasa Lot 2-Matopeni, Shauri Yako, Kisumu Ndogo and Maweni
10	Mombasa West Mainland Sewerage Rehabilitation
11	Mombasa West Mainland Sewerage Rehabilitation
12	Drilling and Equipment of the three (3) Replacement Boreholes in Baricho Wellfield
13	Baricho Immediate Works with the following Lots: Augmentation of the Baricho Well field & Electromechanical Work.
14	Immediate Baricho Works Expansion & New Pipelines to Kilifi & Gongoni (Lot 3)
Total	

Source: CWWDA, 2021