PROJECT PLANNING AND IMPLEMENTATION OF WATER CONSTRUCTION PROJECTS IN BOMET COUNTY, KENYA

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Project Planning and Implementation of Water Construction Projects in Bomet County, Kenya

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DECLARATION

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

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DEDICATION

This thesis is dedicated to my late husband Eng. Stanley Kipyegon Rotich, son Lenny and daughter Valerie as well as all my relatives and friends who were instrumental in their guidance and encouragement in completion of this study.

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ABBREVIATIONS AND ACRONYMS

ADB	African Development Bank
AGFI	Adjusted Goodness of Fit Index (statistical)
AMOS	Analysis of Moment Software
AMREF	Africa Medical and Research Foundation
ANOVA	Analysis of Variance
AWSB	Athi Water Services Board
BCIDP	Bomet County Integrated Development Plan
BOMWACO	Bomet Water Company
CBD	Central Business District
CBOs	Community Based Organizations
CFA	Confirmatory Factor Analysis
CGB	County Government of Bomet
CLRM	Classical Linear Regression Model
CWP	Community Water Projects
EMCA	Environmental Management and Co-ordination Act
FGLS	Feasible Generalized Least Square Model.
GoK	Government of Kenya
IWRM	Integrated Water Resources Management

JICA	Japan International Coop oration
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KNBS	Kenya National Bureau of Statistics
KMO	Kaiser-Meyer-Olkin
KRCS	Kenya Red Cross Society
KEWASNET	Kenya Water and Sanitation Civil Society Network
LVSWSB	Lake Victoria South Water Service Board
MDGs	Millennium Development Goals
MoWI	Ministry of Water and Irrigation
MPHS	Ministry of Public Health and Sanitation
NACOSTI	National Council for Science and Technology
NEMA	National Environment Management Authority
NFI	Normal Fit Index
NGOs	Non-Governmental Organizations
NWSS	National Water Services Strategy
PCA	Principal Component Analysis
PMBOK	Project Management Book of Knowledge
PMI	Project Management Institute
PWC	Price Waterhouse Coopers

RBT	Resource Based Theory
RMSEA	Root Mean of Square Error Approximation
SCAMP	Sub-Catchment Management Plan
SAGA	Semi -Autonomous Government Agency
SEM	Structural Equation Model
SPAs	Service Provision Agreement
SPSS	Statistical Package for Social Sciences
UN	United Nations
UNDP	United National Development Programme
UNEP	United Nations Environmental Programme
UNICEF	United Nations Intentional Children's Education Fund
USA	United States of America
VIF	Variance Inflation Factor
WASREB	Water Services Regulatory Board
WHO	World Health Organization
WCP	Water Construction Projects
WRMA	Water Resources Management Authority
WSBs	Water Services Boards
WSPs	Water Services Providers

WSRS	Water Sector Reform Secretariat
WSTF	Water Services Trust Fund
WUAs	Water User Associations

DEFINITION OF OPERATIONAL TERMS

Budget Planning:	This is a quantitative expression of a financial plan for a defined period of time, usually one year. It may also include planned sales volumes and revenues, resource quantities, costs and expenses, assets, liabilities and cash flows. Companies, governments, families and other organizations use it to express strategic plans of activities or events in measurable terms (Marginson & Ogden 2015).
Communication Planning:	This is a policy-driven approach to provide stakeholders with framework for project communication so tasks can be easily managed. The plan formally defines who should be given specific information, when that information should be delivered and what communication channels will be used to deliver the information (Beardsley, 2012).
Implementation of water projects:	This is the drilling and construction of unique water sources such as boreholes and dams and the acquisition of water storage facilities such as water tanks undertaken either by regional, local, county or state level government through development funding devolved from the national governments which enable citizens‟ access to clean and safe drinking water (Kikuvi, 2016).
Project Planning:	a discipline addressing how to complete a project in a certain time frame, usually with defined stages and designated resources. One view of project planning divides the activity into these steps: setting measurable objectives. Identifying deliverables. Scheduling (PMBOK, 2008).
Resource Planning:	This involves determining what resources (people,

equipment, materials, etc.) are needed in what quantities to perform project activities (Kumari & Vikranth, 2012).

Schedule Planning: This is a series of steps to be carried out or goals to be accomplished. It is concerned with the techniques that can be employed to manage the activities that need to be undertaken during the development of a project. Scheduling of projects is considered one of the basic requirements of project planning (Fugar & Agyakwah, 2010).

Technology Integration: This is the use of information technology to enhance and support the educational environment. Technology integration in water project can also support water system by creating opportunities for improve service delivery. It refers to the use of an integration platform and application programming interface (API) in the management of a water projects by use of software (Breslin, 2011).

Water Construction: This is the process of planning, designing and financing of building water projects. It is the act of building something, typically a large structure (Kanda *et. al.*, 2016).

ABSTRACT

Water projects all over the world have been initiated for the purpose of solving water problems. For many years in Kenya, various government agencies, Non-Governmental Organisations (NGOs) and donors have been investing large sum of money in water projects like building dams, boreholes, and wells. Fewer projects are being completed within the budget or meeting original goals. However, limited research has been carried out on project planning and implementation of water construction projects in Bomet County. Many studies have been carried out on the influence of project planning on projects implementation, but the main focus has been on project management practices and project performance. The study sought to fill this knowledge gap. The main objective of this study was to analyze the relationship between project planning and implementation of water construction projects. It sought to examine the relationship between schedule planning, budget planning, communication planning, resource planning, and the intervention of technology on implementation of water constructions projects in Bomet County. The study used descriptive survey design and therefore, water projects in the county of Bomet were the unit of analysis. The unit of observation were project managers, finance managers, project consultants, site engineers and county administrators who were involved in the project. The target population of the study was 440 and the sample size were 164 respondents drawn from all targeted unit of analysis. This study carried out a census on all types of initiated water projects in the county of Bomet. Pre-test study was administered to 18 respondents of Kajiado County to test the reliability and viability of the instruments. Data was collected through administration of a questionnaire and semi structured individual interview. Regression analysis was used to measure the relationship between variables on project planning and implementation of water construction projects with the help of Statistical Package for Social Science (SPSS) and Analysis of Moment Structures (AMOS) software. Further analysis was done to test the significance of the model by use of Analysis of Variance (ANOVA) and R^2 was used to measure the extent of the goodness of fit of the regression model. Hypothesis was tested by use of t-test at 95% confidence level. The results showed that all the variables, schedule planning, budget planning, communication planning and resource planning were significant on implementation of water project with the F statistics value of 85.480, 49.64, 62.247 and 55.179 respectively and P-value of 0.000. The coefficient determination of explanatory variable explains 52.7% of the variations. Technology integration (moderating variable) was found to have an influence on the relationship between project planning and implementation of water projects. In conclusion, therefore schedule, budget, communication and resource planning influenced implementation of water projects with R of 0.726 and 0.868 in the absence and presence of moderator respectively. The study recommends that Arid and Semi-Arid regions can replicate the findings of this study to improve on accessibility to safe and clean drinking water to its citizens. Furthermore, this study can be used by policy makers to make informed decisions regarding best strategies on water policy.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Water projects all over the world have been initiated for the purposes of solving water problems. According to (World Bank, 2015), it is a serious challenge to provide water and sanitation facilities in today's world to a population of 6 billion people. Water supply and sanitation in Indonesia is characterized by poor levels of access and service quality. Over 40 million people all over the world are faced with deficiency improved water and more than 110 million of the worlds' 240 million population have no access to clean and safe drinking water. Governments, NGOs, local and international organizations from all over the world have invested on implementation of water projects to encourage safe rural water supply and cleanliness over the years. However, there has been minimal impact on implementation of these water infrastructures and water supply systems in most project areas.

Globally, fresh water and water resources are unevenly distributed in regions such as Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, North America and West Asia where overall fresh water consumption has increased sixfold between 1900 and 1995. As the state's population grows and industries such as mining, agriculture and horticulture expand, sustainability of human population remains a challenge (WRMA, 2015).

In Africa, water shortages are related to both under-development of potentially available water resources and their uneven distribution while conserving the catchments' sustainability. The study by Price Water Coopers which covered all major sectors in the global economy sampled from the organizations drawn from Africa, Asia, Australia, Europe, North America and South America, found out that 50% of business projects failed, and only 2% achieved 100% success (PWC, 2014). With over 75% of the poor Africans living in rural areas the need to develop sustainable water service to these areas is imperative. Water projects fail due to

various aspects that include misunderstanding of the specific context of the community or a lack of effective support structures.

The Kenya Vision 2030 aims to ensure that improved water and sanitation are available and accessible to all by 2030.Kenya has experienced tremendous population increases in the last 40 years with an estimated rate of 2.63% in 2010 (World Bank, 2010). Fluoride is found more frequently in different sources of water, with higher concentration found in ground water due to presence of fluoride bearing mineral rocks (WHO, 2002). This has increased the demand for water. It is estimated that piped water supply systems cover only 28% of the population in Kenya, while boreholes, springs and wells provide water to 37% of the population. The boreholes, springs and wells also include unimproved drinking water sources. The country like many other developing countries is facing formidable freshwater planning and management challenges. Less than 65% of the population has access to safe drinking water (Furst & Hermegger, 2014). Global demand for agricultural and energy production (mainly food and electricity), both water-intensive, is expected to rise by about 60% and 80% by 2025 (Alexandratos & Bruinsma, 2012; OECD, 2012). At the same time, wetter regions generally becoming wetter and drier regions becoming even drier (IPCC, 2014). These aspects of global change illustrate the need for swift planning and execution of strategic, reasonable and effective management and counter measures against deteriorating water security (Burek et al., 2016).

The government sank boreholes, constructed catchment dams and provided infrastructure in the last three decades, to increase accessibility to water, (Ngigi & Macharia, 2006). Adek (2016), asserts that despite this development water scarcity still remains a big challenge across majority of counties in Kenya today. The 1974 Kenya Water Act was revised in 1999 and 2002, with main focused on the decentralization of water services and separating water policy formulation from regulation and services provision. Further to this, the act defined the government's role as regulatory and the private sector, municipalities and communities were given the responsibility to provide water services. Nevertheless, this has remained a challenge to the realization of the goal of Kenya's water policy because they are ambiguous and often conflicting (Ndambiri & Rotich, 2018).

The government of Kenya has applied varied strategies in its effort to improve accessibility to water services for its citizens. One, among these strategies is the Water Act 2002 which relegated the Ministry of Water and Irrigation (MWI) to a policy and coordinating agency and vested the Water Resources Management Authority (WRMA) with the daily management of water resources, and the Water Service Regulatory Board (WASREB) with that of regulating water supply. In this framework, community water is supplied through the Water Service Providers (WSPs), thus excluding Water Resource Users' Associations (WRUAs) from supplying water services. Thus, is the case in Bomet, where Bomet Water company (BOMWACO) supply and bill water usage in the county. Section 53 (2) of the Water Act 2002 stipulates that WSPs shall only be either a company, a non-governmental organization or a person providing water services under and in accordance with an agreement with a licensee (the WRSB) (GoK, 2002). Section 15(5) states that WRUAs will act as for conflict resolution and cooperative management of water resources (GoK, 2002).

1.1.1 Global Perspective of Project Planning

Globally, there is need for environmental planners to protect the resources that humans and the wider biosphere depend upon for their long-term survival (Carter, 2017). Water is just one of a number of vital natural resources and water project managers, whether in government or private sectors; it has to make difficult water allocation decisions. They have to increasingly allocate decreasing supplies among ever-increasing demands. The stress on water resources is further increase by drivers such as demographic and climatic changes. The traditional fragmented approach is no longer viable and it is essential to adopt a holistic approach to water management. According to UN-water (2015), this is the rationale for the Integrated Water Resources Management (IWRM) approach, which has now been internationally accepted as the way forward for the efficient, equitable and sustainable development and management of the world's limited water resources and to meet conflicting demands.

Findings by Pulse indicate that fewer projects globally are being completed within budget or meeting original goals and there are essential needs to improve project performance. Results show that the position of the project outcomes that were completed within original budget constitute 55%, project completed on time 51%, failed project's budget lost 32% (PMI, 2016). To enhance project implementation, (Lin, Ho, & Huang, 2007) recommended understanding of the processes of rework, effectiveness and efficiency in project delivery within time, cost and quality standard.

In order to improve implementation of water construction projects the stakeholders which include the owners, consultants and contractors, may use these findings to enlist the support of NGO's, CWPs and Public Private Partnership. Consequently, the findings may be used together with others in policy formulation strategies to improve water service delivery.

Currently, the greatest challenge caused by lack of financial resources is the fact that monitoring of water resources is inadequate; hence it hampers the planning and management of water resources which is yet to expand beyond national waters to Trans boundary waters. Decision making in Bomet County is done by knowledgeable individuals and this excludes the vulnerable groups such as women and the poor in the community, who often lose out in the process of water resource formulation because they lack the resources (knowledge, time, travel and money required to obtain formal authorisation (Cheruiyot, 2016). Little guidance is given in the legislation on how equitable distribution of water is applied to households and other sector demands. Furthermore, inequitable allocation of water is contributed by poor response to water rights, lack of transparency, lack of project finance and accountability in the Ministry of Water and Irrigation (MWI). Available Water Dams in the county does not have the ability to supply water continuously. The residents of this area are therefore in dire need of continuous supply of clean and safe water for their use.

1.1.2 Regional Perspective of Project Planning

In Africa, water shortages are related to both under-development of potentially available water resources and their uneven distribution while conserving the catchments' sustainability. The study by Price Water Coopers which covered all major sectors in the global economy sampled from the organizations drawn from Africa, Asia, Australia, Europe, North America and South America, found out that 50% of business projects failed, and only 2% achieved 100% success (PWC, 2004). With over 75% of the poor Africans living in rural areas the need to develop sustainable water service to these areas is imperative. Water projects fail due to various aspects that include misunderstanding of the specific context of the community or a lack of effective support structures.

Africa's fundamental objective is to achieve lasting and vibrant participation in the global economy while developing its natural and human resources without repeating the negatives experiences on some other regions' development paths. According to (UNEP, 2015), only 5 percent of the potential water resources of Africa are currently developed, with an average per capita of 200 m^3 (compared to 6,000 m^3 in North America). Only 5% of Africa's cultivated land is irrigated and less than 10% of hydropower potential is utilized for electricity generation. Owing to rapid population growth and changes in socio-economic activities, urbanization and industrialization and the water- intensive lifestyles has greatly contributed to a global water crisis (UNEP, 2015).

1.1.3 Kenyan Perspective of Project Planning

The National Water Master Plan 2030 which was launched on 26th March 2014 is a product of an intensive study of Kenya's water resources and meteorological conditions to facilitate planning for development and management of the same. According to (MoW, 2007), the core objective is first to assess and evaluate availability, reliability, quality, and vulnerability of country's water resources up to around 2050 taking into consideration climate change. Secondly is to renew the National Water Master and formulate an action plan for activities of WRMA up to

2022 to strengthen their capability. And lastly is to strengthen the capacity of water resources management through transfer of technology.

The Water Act 2002 led to establishment of WASREB as the Regulatory Board with powers to issue licenses for the provision of Water Services, determine standards for the provision of Water Services to consumers and establish procedures for handling complaints by consumers against licensees among others. This law was repealed by the Water Act 2016 which was operationalized in April 2017 which technically repeals the Water Act 2002 (WSRB, 2016). The Act presents a number of changes in the water sector with the aim of improving services. This includes provision of regulation, management and development of water resources, water and sewerage services; and for other connected purposes (Chepyegon & Kamiya, 2018).

The key elements of the national water and sanitation program include: a clear policy and legislative framework; an implementation program which has provided water infrastructure for over 9 million people in less than 10 years. Top-level political commitment to water and sanitation, sustained consistently over a long time period, is critically important to the success of national sector programs. Clear legislation is necessary to give guidance and confidence to all the agencies working in the sector. Devolution of authority from national to local government and communities improves the accountability of water and sanitation programs. The involvement of a wide range of local institutions, social, economic, civil society, and media empowers communities and stimulates development at the local scale. The sensitive, flexible, and country-specific support of external agencies can add significant momentum to progress in the water and sanitation sector (Chepyegon & Kamaiya, 2018).

1.1.4 Water Construction Projects in Bomet

The County of Bomet has various water schemes and community water projects that face governance challenges and solutions lie in rehabilitation, modernization and proper management. The county government is working closely with the national government and other development partners to complete various water projects and distribute water to public institutions and markets. More so it seeks to further increase access to water for productive use through irrigation, dams and water pan

projects. Sources of water in the county include ponds, dams, streams, wells, boreholes, piped and tanks. Some of the major projects ongoing in the county include the proposed Bosto dam project by National Water Conservation and Pipeline Corporation.

When replicated at the county level, management of water service provision in Bomet County is done through delegated authority by Bomet Water Company Limited. Community water projects are also regulated by the Water Services Regulatory Board (WASREB). Majority of the water supply schemes in the county are pumping systems and the cost of power is quite high. To cut down the cost of operation in the water schemes, it is important to develop gravity systems in order to eliminate most of the pumping. There is also need to improve on water storage through construction of dams and rain water harvesting by roof catchment especially by institutions such as schools and dispensaries.

The County has several rivers: Kipsonoi River flows through Sotik to Lake Victoria, Chemosit flows through Kimulot in Konoin Sub-County, Nyongores flows from the Mau Forest southwards through Tenwek area, Amalo which originates in the Transmara Forest (Kimunchul) flows along south western boundary of the county, and Tebenik/Kiptiget Rivers which flow along the northern boundaries of the county. Dams are found in the drier zones of Chepalungu, parts of Sotik sub-County and Longisa in Bomet East sub-County. Annual rainfall trends in the county indicate that rainfall patterns have changed drastically in the last decades. In terms of spatial variability, the upper part of the county which covers Konoin and parts of Bomet Central, Bomet East, and Sotik receives more rainfall than the lower part (GoK, BCDP 2018).

1.1.5 Water Planning in Bomet

Bomet Water Company Limited, a Semi-Autonomous Government Agency (SAGA) of the County Government, currently manages nine water supply schemes. These are Itare, Sotik, Bomet, Longisa, Sigor, Chepalungu (Olbutyo), Kamureito, Ndanai and Sergutiet. Sigor water supply has been upgraded to serve a population of 68,000 residents through a joint program between the County Government and Kenya Red

Cross Society (KRCS). There are also several community water projects supported mainly by the County Government, national institutions such as Water Service Trust Fund (WSTF) and State Department of Water, and other development partners e.g. African Development Bank (ADB) (GoK, BCDP 2018).

Efforts by WSBs (the government's water infrastructure implementing agencies) to contribute towards this goal by increasing access to safe water and sanitation services in their areas of jurisdiction through infrastructure development remain a big challenge which calls for a concerted effort to address (WASREB Impact Report, 2009). Professional planning, implementation and monitoring of water projects would accelerate the achievement of this goal by ensuring that the projects are completed within the allocated time, cost, quality and scope. While WSBS have been able to implement several investment projects under the umbrella of vision 2030 their investment realization level is still below par (Wasreb Impact Report, 2009).

The County's water resources are well equipped. Permanent rivers originating from the Mau Forest and flowing through the county are Oinab Ng'etunyet, Nyongores, Kipsonoi, Itare, Kiptiget, Chemosit, Amalo and Maramara. Sisei River originates from several swamps in Bomet Central Sub- County and is fast diminishing due to intensified cultivation along its banks and catchment areas. A majority of the population draw water from rivers, water pans and springs. Rain water harvesting is practiced by the households that have corrugated iron roofs. The County government has protected a total of 27 springs since 2013 (GoK, BCDP 2018).

1.2 Statement of the Problem

A survey carried out on 10,640 implemented projects globally which was valued at approximately US$7.2 billion, found out that only 2.5% achieve 100% project success globally and over 50% global business project fail (PWC, 2014). In Kenya, about 25% to 30% of recently completed water projects become dysfunctional in the first three years following completion. In many areas, constructed water projects remain incomplete (GoK, 2021), therefore the country still faces serious challenges related to provision of water to its citizens. In spite of great efforts in water resource management, with construction of large water

projects, there is still under provision of water for domestic use particularly in the rural and slum areas of Kenya, owing to the fact that 67% of rural household cannot access clean and safe drinking water (UNDP, 2015). The problems of irregular water supply due to poor maintenance, lack of funds, broken facilities and rapid population growth among other factors, have now reached a critical state. There is today a sense that the nation's water resources management organizations and projects are not adequately addressing contemporary water problems.

Access to safe and clean water remains a big challenge in the county. Access to piped water is currently at 25%. Borehole yield for the northern and central parts of the county have very low and unreliable yields. This is not different in the county of Bomet where the problem is compounded by the hilly terrain that makes it hard to fetch water from valley bottoms where most of water points are located. The fact that some people draw water from unprotected springs and open streams is also worrying given that such water is shared with animals and also is highly polluted due to intensive agriculture with increasing population. During the dry seasons, the distance covered to the water point increases considerably to about 5kms (GoK, BCDP, 2018).

Some studies have been conducted on the challenges faced by water projects in Kenya. Ndugu (2014) carried out a study on factors influencing completion of water services in Kiambu County. Research on implementation of water projects under devolved government was carried out in the counties of Meru and Mombasa by Munene (2017) and Adek (2016) respectively. However, the majority of empirical studies have focused on project management practices, project performance and stakeholders' participation. However, only a few studies have been carried out on the influence of planning on implementation of water construction projects. Project planning, implementation and technology is key component in project management. Therefore, this study sought to fill this knowledge gap because not many studies have been done on planning in Bomet.

Owing to deforestation of Mau Forest, rivers in Bomet county have dried and in some cases water level has decreased immensely. Continuous deforestation of Mau Forest has led to catastrophic environmental damage leading to adverse effect on the volume of water. Bomet County was chosen based on the fact that scanty information exists in relation to planning and improved implementation of water projects. The study variables were selected based on the research areas of influence.

1.3 Research Objectives

The objectives of the study were as follows:

1.3.1 General Objectives

The purpose of this study was to establish the relationship between Project Planning and Implementation of water construction projects in Bomet County, Kenya.

1.3.2 Specific Objectives

The specific objectives of this study were to:

i. Examine the relationship between schedule planning and implementation of water construction projects in Bomet County, Kenya.
ii. Determine the relationship between budget planning and implementation of water construction projects in the County of Bomet, Kenya.
iii. Analyze the relationship between communication planning and implementation of water constructions projects in Bomet County, Kenya.
iv. Assess the relationship between resource planning and implementation of water construction projects in the County of Bomet, Kenya.
v. Determine the moderating influence of technology used on implementation of water construction projects in Bomet County, Kenya.

1.4 Research Hypotheses

H_{01}: Schedule Planning has no significant influence on implementation of water construction projects in Bomet County.

H_{02}: Budget planning has no significant influence on implementation of water construction projects in the County of Bomet.

H_{03}: Communication planning has no significant influence on implementation of water construction projects in Bomet County.

H_{04}: Resource planning has no significant influence on implementation of water construction projects in the County of Bomet.

H_{A5}: Technology does not moderates' implementation of water construction projects in Bomet County.

1.5 Justification of the Study

1.5.1 National Government

Household access, distribution and management of improved water planning including rural water supply coverage and maintenance of water distribution systems still remains a grey area that require further investigation. Adequate information is still required on basic daily minimum and maximum household water requirement from improved water sources and the effectiveness of the current rain water harvesting techniques among rural communities in Bomet County. The study on influence of planning on implementation of water construction projects would help water planners understand how implementation of water projects on time, cost, quality and meeting its objectives helps the government measure their performance on use of resources.

For many years in Kenya, various Government Agencies, Non-Governmental Organisations (NGOs) and donors have been investing large sums of money every year for construction of water projects. According to KNBS economic survey (2016), the water sector's approved development budget by Government of Kenya rose from Kshs 37 billion in 2015/16 financial year to Kshs 48 billion in 2016/1017 financial year. This points an increase in expenditure on water projects

in Kenya. Despite all these efforts to improve on water supply, majority of citizens are yet to be connected with clean and piped water and in some areas, people travel long distance to fetch water (UNICEF, 2015). If the project operating results are unsatisfactory, the findings from this study will be used by policy makers to make informed decisions, reformulate policy plans, and develop more reasonable targets for future periods.

1.5.2 County Government

Currently, the greatest undoing owing to lack of financial resources is the inadequate monitoring of water resources because it hampers the planning and management of water resources which are yet to expand beyond national waters to trans boundary waters. Decision-making in the county is dominated by knowledgeable individuals and this excludes the vulnerable groups such as women and the poor in the community, who often lose out in the process of water resource formulation because they lack the resources (knowledge, time, travel and money required to obtain formal authorization (UNDP, 2015). Little guidance is given in the legislation on how equitable distribution of water is applied to households and other sector demands. Furthermore, inequitable allocation of water is contributed by poor response to water rights, lack of transparency and accountability in the Ministry of Water and Irrigation (MWI), poor financial mechanisms by the government together with corrupt officials and poor rehabilitation of water catchments.

The fact that local regulations for environmental flows is lacking, monitoring and controlling of water resources has not been thoroughly implemented (KNBS, 2016). The different activities such as deforestation, water abstraction for livestock and agricultural irrigation among others are heavily affecting the ecosystem (Ndambiri et. al., 2011), but the major cause of deteriorating access of quality household water demand from improved sources remains unknown. The findings of this study are therefore expected to fill this gap.

1.5.3 Water Utility Companies

This study will provide useful information to water utility companies on the influence of planning on implementation of water construction projects and give recommendations on ways to improve on implementation of ongoing and future recommended projects. BOMWACO can utilize the findings from the study to improve on policy framework for policy formulation and regulation.

Human population has been growing rapidly and is putting a lot of pressure on available water resources, whose quality has greatly deteriorated due to intensified human activities such as agriculture and livestock production. The demand for water resources has doubled over the past 20 years and is expected to double again by 2020 (Water and Rivers Commission, 2000a). This has been a challenge to water utilities companies like the BOMWACO which is contracted by LVSWSB to provide water and sanitation services on its behalf. The board may use the findings from this study to strengthen their financial and risk mitigation practices to enhance achievement of objectives thus making them more effective.

1.5.4 Academic

Increasingly, academics are positing the view that the user perceptions of project appear to play a significant role in influencing levels of compliance (Soon, 2010). In this regard further insights in this issue are of great importance to scholars in project management generally. The findings may further be used as a source of references by other researchers. Additionally, academic researchers may require the findings of this study so as to simulate further research in this area and hence forms a basis of good background for further researches. Researchers will benefit from both theoretical literature review and the findings of this study whose objectives aims at determining the influence of planning on implementation of water construction projects**.** It will as well contribute to organizational learning and knowledge sharing by reflecting upon and sharing experiences and lessons within the ministry of water.

1.6 Scope of the study

This study sought to determine the influence of planning on implementation of water construction projects. It looked at the influence of schedule, budget, communication, resource and technology planning only. The study focused on water project in the county of Bomet which is the unit of analysis. This includes county government water projects, water supply schemes, rehabilitation pan, irrigation schemes, springs and plastic water tanks. The unit of observation were project managers, finance managers, project consultant, site Engineers and ward representatives of both operational and ongoing water projects.

1.7 Limitation of the Study

Bomet County is characterized by undulating topography with most parts being hilly terrains; hence therefore this was a challenge accessing water projects in the county. The researchers used other means of communication like the motor cycle to access these projects. On the other hand, Bomet is a multi-ethnic county but predominantly occupied by the Kipsigis sub-tribe. Hence, therefore language barrier was a challenge leading to misunderstanding of the questionnaires and to overcome this, research assistant was accompanied by a translator. Respondents were not willing to share information and therefore the researcher and the research assistant were given an introductory letter from the university and NACOSTI to attest that the information gathered was purposely for academic purposes. Confidentiality policy of the organization was another limiting factor among the respondents. This was solved by assuring the respondents of utmost confidentiality and more so seeking authorization from water management authority.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature relevant to this study. It first of all reviews theories that support this research. It then discusses the conceptual framework of the study. It also deals with empirical review, critique of the existing literature, research gap and summary of empirical literature.

2.2 Theoretical Framework

Brouwer, Faramarzi and Hoogendoorn (2014) defines theoretical framework as a group of concepts that are systematically organized to provide a tool for interpretation of information. It is considered as a visual or written product, one that explains in a narrative form, the main things to be studied, the key factors, concepts, or variables and the presumed relationships among them (Mohan & Ganesh, 2012). Theoretical framework can also be described as a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation (Vasquez, 2011). Scholars in project management have used various theories to explain influence of planning on managing projects. Theory of planning, project implementation theory, capital structure theory, cash management theory, communication theory and resource-based theory will be used.

2.2.1 Theory of Planning

Management involves planning and organizing as postulated by the theory of planning and further explained as planning and organizing (Koskela & Howell, 2002). Theory of planning, postulate that in planning a project, there is a managerial part whose main function is planning. The key function of effector part is to translate the resultant plan into action (Koskela & Howell, 2002).

Planning requires the assembly of the necessary resources (inputs: manpower, materials, time and money) for carrying out the work defined in the plan (Kraemer,

et al., 2014; Weiss & Wysocki, 1992). Project planning in construction project management entails tailoring the requirements of the specific project (Knoepfel, 1992). in management of construction project according to (Knoepfel, 1992), means to define the work tasks with the responsibilities, to allocate them to positions, to design the procedures in the organization, and to select adequate performers for the positions. Management-as-organizing is optimally aimed at assembling necessary resources into an interrelated structure in accordance with the project plan requirements (Weiss & Wysocki, 1992).

According to *PMBOK Guide*, the planning of projects is systematically described from the point of view of different knowledge areas. This study will be modeled on the theory of Planning advanced by the PMBOK Guide. The theory was used in the general field of operations and reveals that the perspective is that of management-as-planning (Johnston & Olson 2011). The output from these processes, the project plans, makes up an input to the executing processes of issuing "orders," it takes plan to be essentially synonymous with action.

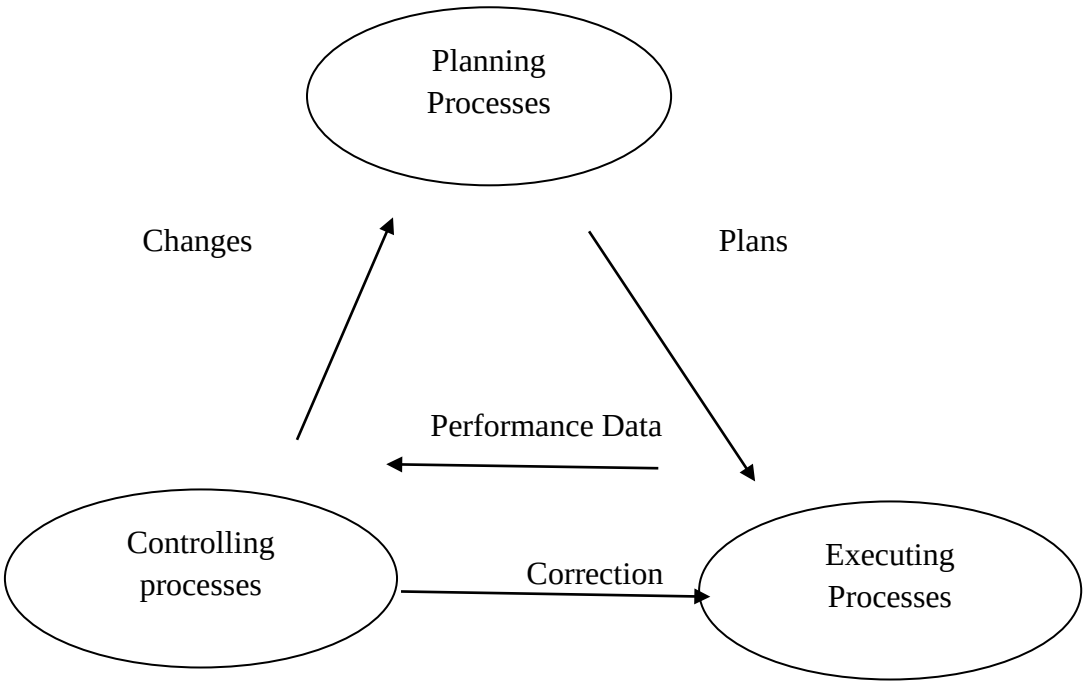

Figure 2.1: The Closed Loop of Managerial Processes in Project Management

The primary theory of execution is similar to the idea of job dispatching in manufacturing where it provides the edge between plan and work (Emerson, 1917). The basic issue in dispatching is assigning of jobs activities to machines or work crews, from a centralised authority. Job dispatching is defined as a model that select a job for processing into an available machine through by logical decision rules (Bhaskaran & Pinedo 1991).

Dispatching involves the decision for selecting task and communicating the assignment to the workstation while in project management, it is taken care of by planning. Hence therefore dispatching is reduced to communication only. Planning theory is relevant to construction project management and thus relevant to this study. The model put emphasis on schedule plans and tasks reducing delays that may occur during implementation of water construction projects. Scheduling is a significant tool used to estimate required time of the project enabling management to communicate timely decisions to the stakeholders. Hence this theory helped the researcher to determine different approaches to ensure projects plans are implemented in water construction projects.

2.2.2. Project Implementation Theory

The theory of project implementation emphasizes several critical success factors in project implementation (Mutungi, 2018). Some of these include: management support, project schedule plan, personnel, trouble shooting and monitoring. This theory was postulated by Warburton and Cioffy (2014). For any project to be successful there should be support from top management. According to Schultz, Slevin and Pinto (1987), management support during project implementation is a major determinant to the success or failure of the project. Project management could be regarded as one of the means in which the top management implements its goals and objectives for the firm.

Nutt (1986) refers to implementation as a series of steps taken to plan change process so as to elicit compliance required to install changes. Implementation theory according to Palfrey (2002) is an area of research which investigates goal setting and the mechanisms put in place to achieve those goals. According to (Kamau & Muturi, 2015), the theory of project implementation is employed by project managers to make predetermined changes in organizations by creating environments in which the changes can thrive. In line with this theory (Slevin& Pinto, 1989) argue that it is a difficult and complex exercise to implement a project successfully. The project manager is required to dedicate more effort and time to financial, human and technical variables if he has any intention of realizing project success. Kamau and Muturi (2015) further argue that quite a number of factors are capable of influencing project implementation if they are not handled with care. These include inflation which has the effect of increasing the project cost, bureaucracy in government institutions, poor performance of contractors, increase or decrease in scope of the work, frequent change of leadership, change in pre-contract consultants, ineffective and inefficient project finance structure, variations in designs and political influence (Kamau & Muturi, 2015).

Project schedule plan is the other factor highlighted in the project implementation theory. It involves providing a road plan or strategy of how to achieve the desired objectives in the project. According to (Slevin& Pinto, 1989), there are parallels

between the different stages of project implementation. The client's consultant (usually the project manager) is involved in formulating the project schedule plan. However, the consultant must engage the client in formulating the plan. Anyanwu (2003) asserts that the degree to which the client is involved in the planning process determines the level of success experienced by the project. The critical success factors highlighted within the project implementation theory are determinants in implementation of water construction projects. The client and project manager should show support for the projects being undertaken, a project schedule plan should be prepared, competent personnel should be employed and the entire process of implementation should be monitored.

This theory on implementation is relevant to this study because the study sought to find out whether planning influences implementation of water construction projects. Such plans and the implementation of such plans, forms a good basis for this research. This theory explains how planning for implementation ensures that things are done according to the plans, specifications, and requirements. In that regard, it enhances understanding of implementation of water projects which plays a significant role in socio-economic development. Hence it ensures the outcome of the research makes a strong case for governments to intervene in water through regulations and investments.

2.2.3 Capital Structure Theory

In this study budgeting practices will be considered using the theory of capital structure theory. Budget planning is understood as the task of determining how an organisation intends to achieve its strategic goals and objectives. Wachira (2018), postulates that whereas entities in the private sector will create a financial plan, those in public sector will develop budgets immediately after the vision and objectives have been set. Both financial and budget plans describe each of the activities, resources, equipment and materials that are needed to achieve these objectives, as well as the time frames involved.

The theories on capital structure give an overview of how an organisation is financed. There are many arguments that capital structure of an organization is a challenge and the debate has been in determining the best capital structure composition as per (Modgllian & Miller, 1951). Financing has been a fundamental issue in many organisations, they consider the best model of financial framework that would be applicable to them. Water companies like other organisations faces the same problem of capital structure composition (Handoo & Sharma, 2014). The Capital structure theory postulates that financial policy to be used in shaping the company's capital structure is the combination between debt and equity which significantly promotes the optimization of the firm's value (Ukhriyawati, Ratnawati & Riyad, 2017).

Capital structure influences company's financial stability. Mujahid and Akhtar (2014) carried out a study on the influence of capital structure on the organizations financial stability and shareholders wealth in textile sector of Pakistan. The study found out that the capital structure positively influences the firm's financial stability and shareholders wealth.

The connection between organization capital structure and profitability is very important owing to the fact that profitability of the organization can be affected by the capital structure decisions therefore impacting on the long-term sustainability of the organization (Velnampy & Niresh, 2012). Abor (2015) found out that there is a significant relationship between total debts and total assets that make up the capital structure, suggesting that firms depend more on debt as a way of financing which influenced financial sustainability. The composition on the capital structure in organizations is structured in terms of equity and debt distribution. Capital structure, being total debt to total asset at book value influences both profitability and riskiness of the firm (Handoo & Sharma, 2014). Companies have been struggling with the composition of capital structure for many decades in an effort to balance and be stable and it's not unique for the water companies.

The capital structure theory has been adopted for this study to help analyse how water companies structure their capital and how they budget their finances in order to maximize returns, while ensuring that they maintain the costs of capital so as they don't supersede the benefits. This theory is important to this study because it spells out the context in which budget plans can affect implementation of water construction projects. Of essence to this study is the theory preposition that financial and budget plans describes each of the activities, resources, equipment and materials needed to achieve project objectives. Thus, the theory is significant in explaining how budget plans can effectively and efficiently be used to implement water projects in the county of Bomet.

2.2.4 Cash Management Theory

This model was developed by Morton Miller and Daniel Orr in 2009 in trying to create a more reasonable way to deal with finance management. The model figures out how to accomplish a sensible level of authenticity while not being excessively detailed. It conjectures that the aggregate cash flows are constantly distributed with very low levels of the mean and standard deviation (Fwamba, 2017). This is a stochastic or a probabilistic model which accepts instability in finance management. It accepts that the day-by-day cash flows are unverifiable and, in this manner, take after a trendless random walk. This model thus sets bounds inside which money ought to be managed.

These cut-off points are: A furthest breaking point, is the base value of money to be held (thought to be zero), and return point, which is the target amount of money considered optimal. Ghadome and Thaeer (2013) indicate that the ampleness of finance and current resources together with their successful taking care of for all intents and purposes decides the survival or death of a concern. An endeavor ought to keep up satisfactory liquidity for its smooth working. In the event that materials are heedlessly bought, it will bring about dormant moderate moving and outright stock. In any case, deficient value of stock will result to stock outs and interference in operations (Gadome & Thaeer, 2013). Finances should likewise be effectively

managed. It might likewise result to expanded cost because of misusing, waste and theft.

Insufficient level of finance balance for instance can prompt stoppage in business operations. An organization might be beneficial however with no liquid finance which can result to operations intrusions. The organization can likewise be constrained into ending up by its creditors.

Cash management theory has been adapted to this study in that it helps the investors to meet their financial obligations through planning and resource allocation so as to derive maximum utility for the projects. This theory relates to budgetary allocation on planning and implementation of water construction projects on this study. The theory is important when addressing the financial factors influencing planning on implementation of water construction projects. Organizations delivering projects are faced with financial constraints either due to late payment, poor financial budgeting and delay in releasing project funds. This theory guides in the understanding of project funding on the extent to which budget plans influence implementation of water construction projects.

2.2.5 Communication Theory

Communication theory involves information and mathematical process of information which is a technical process of human communication. According to (Shannon, 2011), communication theory is interlinked to the advancement of information theory in the early 1920s). The publication of an article by Claude Shannon in the Bell System Technical Journal in July and October 1948 under the title "A Mathematical Theory of Communication" initiated the improvement of communication theory. Shannon focused on the problem of how best to encode the information that a sender wants to transmit. Shannon came up with information entropy as a way of measuring for the uncertainty in a message while initiating the field of information theory.

The theory of communication was further postulated by Paolo Freire (1970). It asserts that the fact that human nature involves dialog and therefore, communication plays a significant role in human life. Human beings are in constant dialogue with others and it is therefore through these processes that create the human nature. Freire is of the view that dialogue is a right which favors the democratic decisions of educators so as to support free and critical learning hence promoting the inquisitiveness of the learner. The purpose of the dialogue is always to unveil the truth interacting with others and the world. In his dialogic action theory, Freire differentiated between dialogical actions, those that promote understanding, cultural creation, and liberation; and not-dialogic actions, which deny dialogue, distort communication, and reproduce power.

This theory is relevant to the study because it can be applied in implementation of water projects in order to foster dialogue and resolve stakeholders' conflicts in resource uses. Dialogue particularly between leaders and community, is essential to better address the community concerns and needs especially concerning projects intended to better their lives. Freire's theory makes emphasis on dialogue which is related with this study. The communication theory helped in analyzing the influence of communication because it is the oil that lubricates the implementation of water projects,

2.2.6 Resource Based Theory

Resource based theory (RBT) was proposed by Grant (1991). Awino and Marendi-Getuno (2014), postulate that resource-based view of the organization was introduced by Wernerfelt (1984) and later supported by Barney (1991) in his works. The theory highlights the significance of organizational resources and their effect on firm's performance and its competitiveness in the market. The theory asserts that each firm has a set of unique resources which are critical in ensuring the firm not only survives but also grows within the industry in which it operates. These resources range from technical, financial, physical and human, and they all contribute to the success of the project. However, according to Awino and Marendi-Getuno (2014), critiques of the theory have argued that while some resources

promote competitive advantage of the firm, others do not. It can also be argued that mere presence of resources does not contribute to success until such resources are coordinated and integrated (Awino & Marendi-Getuno, 2014).

In respect to water projects, the resources available include the staff hired by the national and county governments and water companies, the finances collected and/or disbursed to them, and also the facilities including the infrastructure and water to facilitate the execution of various tasks that the said water projects are required to supply to the public. Relative to resource - based theory, the bundle of productive resources includes staff, finances and infrastructure among others. On the other hand, capabilities include the expertise possessed by the water project staff. Therefore, the theory is relevant to this study in that it is cognizant of the aforementioned resources and capabilities in water utilities in Kenya.

The theory offers critical and fundamental insights into why firms with valuable, rare, inimitable, and well-organized resources may enjoy superior performance (Barney, 1995). The resource-based theory was found relevant when it comes to determining the resources available when implementing water projects. According to (Colbert, 2004) it brings into considerations, the profitability and the value factor associated with the firm. As per this theory, the competitive advantage can be delivered to an organization when the organization is able to utilize its resources in unique and valuable manner than the competitors of the firm (Colbert, 2004).

Resource based theory implies that the organization can determine the resources available within them at the stage of planning. The theory also brings the concept of competitive advantage which is applicable in the completion of water projects to help them be financially self-reliant. This brings the projects more success in the emerging economy of the world (Das & Teng, 2000). Resources develop organizational capabilities to have sustained competitive advantage that led to positive economic and financial performance.

Resource-based theory is of the view that owning of resources is important, not easy to imitate, rare, and cannot be substituted. The resource-based theory asserts that organizations can take advantage of the internal resources to gain competitive

advantage, which is the organization brand. Any construction project requires resources. The resources listed in the Resource Based View Theory such as technical, financial, physical and human are all utilized in every construction project.

This theory is deemed relevant to variable in resource planning owing to the fact that it supports implementation of water projects with the available resources. Project planning is key activity in the organization of projects. Lack of resources leads to project delays leading to cost overruns, and therefore planning resources ensures availability of resources both on time and quality. It helps in analyzing the effective use of resources in implementation of water projects in Bomet County.

2.3 The Conceptual Framework

Conceptual framework explains the relationships between independent variable and dependent variable. Kothari (2014) explained that independent variable is presumed to be the cause of the changes and influences of the dependent variable. In the conceptual framework depicted in Figure 2.2, planning is hypothesized to influence implementation of water construction projects. Planning is defined as schedule, budget, communication and resource allocation. Implementation of water construction projects is defined as number of water connected, customer satisfaction and revenue collected. The framework postulates that the status of schedule, budget, communication and resource allocation in the county directly affects water connection, customer satisfaction and revenue collected. However, this relationship may be modified by technology available.

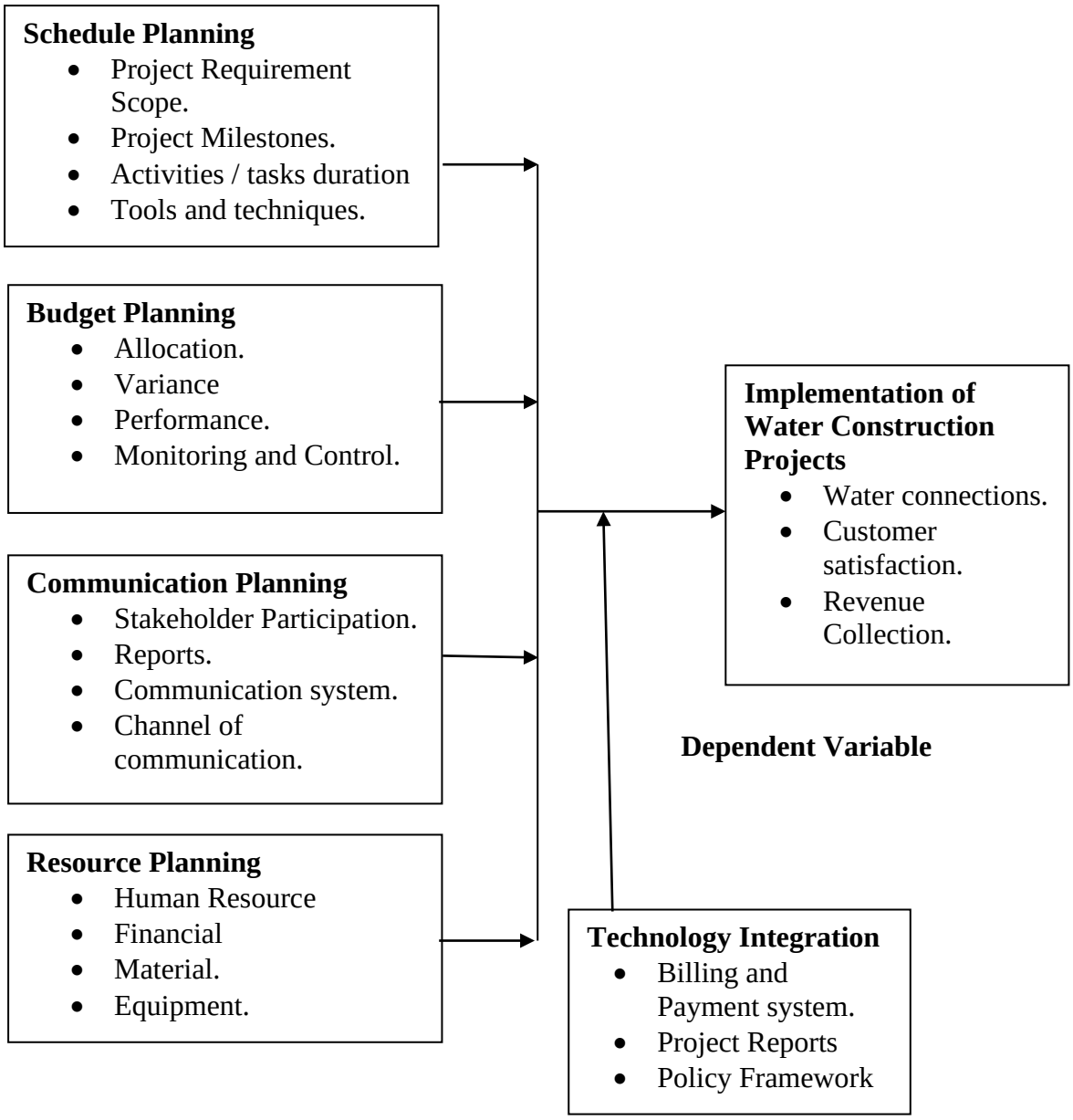

Figure 2.2: Conceptual Framework

2.3.1 Schedule Planning

Schedule plan is a significant tool in project planning that is used to estimate the time required in constructing projects. Kerzner, (2018) posits that schedule enables management to plan and measure the pace of the work and communicate timely decision to the stakeholders. It reveals the main reason as to why there is delays in implementation which in most cases are not limited to changes initiated by designers,

client requirement, weather, site conditions, late deliveries and economic conditions (All-Momani, 2000).

Project construction delays are generally acknowledged as the most common, costly, complex and risky problem encountered in construction projects. Because of the overriding importance of time for both the owner and the contractor, it is the source of frequent disputes and claims leading to lawsuits (Ahmad et. al. (2003). Delays do not always result from a single catastrophic event. They frequently develop slowly during the course of work. To determine the critical delay, we have to compare as-planned and as-built schedules (Lane, 2004). Delays can cause substantial damages to an owner. This has motivated the owners to devise contract provisions and project processes to anticipate, manage and compensate for such delays, so that they could be in safe position than the contractor (Brennan, 2002). The successful execution of construction projects and keeping them within estimated cost and prescribed schedules depend on a methodology that requires sound engineering judgment.

Many studies have carried out to assess the causes of delays in construction projects. A report published by the World Bank in 1984 has supported the fact, that most of the projects executed in many developing countries have faced difficulties due to three reasons, namely: 1) Unclear policy of the government 2) Lack of appropriate project design and, 3) Lack of institutional capabilities. The delay in public construction works has immensely affected the cost of the project. Sjoberg (2000) estimated that, a 14–18-month delay would generate an additional cost of $261 million to $344 million to state and local governments in USA. Ogunlana et. al, (2014) carried out a study on causes of delays in building projects in Thailand, as a model of developing countries' economy. In which they found three types of prevailing problems i) challenges related to shortages cause by resources to be supplied ii) Challenges related to consultants and the clients and lastly iii) challenges brought about by incompetence of contractors.

Mansfield et. al. (2004) carried out a study on the causes of delay and cost overrun in construction projects in Nigeria. The outcome revealed that financing and payment for completed works, poor contract management, changes in site conditions, shortage

of material and improper construction planning lead to delay of projects. In 2002, Thomas and Ellis studied problem of delays in highway construction in Florida, USA. Out of many factors, most important causes found in research are i) construction work taking as business as usual, ii) lacking team accountability for timely project completion, iii) utilities are unidentified or incorrectly located iv) delays in relocation of utilities v) differing or unseen site vi) inadequate planning by contractor vii) design errors and omissions.

Progress reporting brings to light any negative variances and enables the necessary corrective measures. Gantt charts are the typical tools for communication project schedules status. It serves as a means of tracking and trending schedule performance. Adding actual and revised time estimates to the Gantt chart gives a quick overview of the project status. A combination of baseline Gantt chart and tracking Gantt shows the planned and actual star and finish times of an activity. This will enable monitoring of performance towards completion Kerzener, (2003).

Design changes and rework contributes to delay. Time control procedures should be reviewed regularly. Schedule data should be collected, evaluated, and reported in appropriated ways. Delays will impact negatively on both cost and project scope. With delay it may be necessary to adopt a different approach to complete the project, modifying the project objectives, increasing the personnel, scheduling shift work or running some activities in parallel (Richmann, 2002). Time schedule slippage may be the results of unreliable time estimates, minor changes in design, scope creep or unavailable resources. Early detection reduces the chance of small delays growing large ones and helps the project to stay on schedule. Actual time performance will be checked against the project network schedule (Gray & Larson, 2008).

2.3.2 Budget Planning

Budget planning provides the monetary resources required to meet the project construction finances as represented by disbursement of projects funds and adequacy of project budget. When the funds allowed for the project are short the contract time is extended, or scope decreased, or both. It is then imperative that investment and financing plans based on feasibility studies are made to enable adequate funding.

(Devarpiya & Ganesan 2002) obtains that poor financing arrangements, inadequate construction funding and budgets, bad cash flow that may be occasioned by contractor's and unexplained cost benefit analysis, and inaccessibility to formal structured finance have a heavy bearing on the project smooth running leading to delayed completion of a project. (Thomas, 2002) also identified financing as a major success criterion of construction projects.

Estimating time and costs for each work package facilitate the development of project network and time phased budget which will be needed to control schedule and cost as the project implemented (Gray & Larson, 2003). The cost control system should be established and costs allocated to the appropriate project codes. The concept of cost control will ensure that costs are incurred in the genuine pursuit of project objectives. All the payments to the Contractor should be authorized.

At present capital investment in water is almost entirely financed from public funds. WSBs access funds to execute infrastructure investment projects from the treasury in form of loans and grants (Ndungu, 2014). Though the public sector is charged with the responsibility of providing public services, the numerous competing demands from the different sectors of the economy make it difficult for available fiscal resources to match investments required in water services infrastructure (Wasreb Urban Water Financing Report, 2011). Further, the constitution recognizes the human right to water and sanitation which impacts the development, organization and management of water services provision in the country. This has made partnership with the private sector critical in plugging the finance gap for infrastructure development. (Ndungu, 2014), asserts that the Kenya Water sector should then continue making efforts to attract financial support from development partners and develop its commercial financing potential. This can only be achieved on the basis of sound management practices and adequate financial planning.

Budget planning is very important as far as operation and maintenance of donor projects is concerned. The aspect of budget planning also entails setting of water tariffs. Continuing transparency on income and expenditure, book keeping and accounting are essential aspects in sustainability of projects (Bolt & Fonseca, 2001).

These particular aspects of budget planning have led to most donor projects to collapse due to underhand techniques used by water committees. Many community water projects struggle with issues of tariff setting, accounting, revenue collection, billing, record keeping and transparency. Financial sustainability is often an elusive goal for many projects.

2.3.3 Communication Planning

Communication plans significant in implementation of projects. The capabilities of communication are the main factor for the project success especially where project management appeared to be done (Weldearegay & Biedenbach, 2012). Additionally, communication is significant in a complex environment, maintaining project and carrying out innovation. Communication process ensures that project information is always communicated from a centralized point, relevant information is usually communicated within a reasonable period of time within the project team and other stakeholders.

Tipili, Ojeba and Ilyasu (2014) carried out a study in which they sought to evaluate the influence of communication in construction project delivery in Nigeria. The research was a survey on a sample 40 professionals working in the construction industry in Bauchi, Nigeria. The study found out that within the Nigeria construction industry, project communication is a key success factor. However, there were numerous communication hindrances. These hindrances include; unclear communication objectives, unclear channels of communication, ineffective reporting system, ineffective communication between the parties on the project. The study established that poor communication led to project delays, cost overrun and eventual project abandonment. The study concluded that communication had a strong effect on project performance. (PMBOK, 2000) opined that updated project scope, schedule and budget are clearly communicated to key stakeholders and buy-in and consensus gained project.

Bubshait, Siddiqui and Al-Buali (2014) carried out a two-stage case study of construction phase delay control for an oil and gas industrial project. The study found out that communication and coordination play a key role in successful

completion of complex projects. Communication tools impacts different phases of project progress. The main objective of efficient and effective communication strategy is to advertise the organization. This is a marketing technique organization uses to target their customers, since it is difficult to communicate on a specific product or services as each product are different from the other (Goozol & Scoubreau, 2003).

Communication goals are defined according to the interest of stakeholders. During the execution of the project, the project managers' ability to communicate is crucial to the success of the project. One of the important tasks for the project managers is to communicate with the stakeholders (Tonnquist, 2018). Successful communication may not be always successful persuasion hence it is a significant basic tool of communication to enable exchanging the right information. In the modern dynamic environment, communication is still constant desirable for managing projects (Henderson, 2018). The research study in this area by (Locovou *et., al*. 2019) asserts that quality communication is relayed from a credible, complete, accurate and timely information for the input of the project officials.

The Internal and external communication systems in an organization is very important for the success of projects. External communication is related with managing the flow of information or managing communication to satisfy the demands of external stakeholders (Johannessen, 2012). When the complexity of projects is limited, the interpretation of communication is serviceable, internal and external communication increases when the rate of exchange is great (Engwall ,2002), cited in Johanssen, (2012) discussed the main reason why project fails; he highlighted that inadequate leadership (coordination, planning, and technical solutions), oppositions from important, insufficient resource and changing objectives. The communication on projects stated that, project complexity and rate changes when the social needs have related with project will change. The importance of project communication will escalate, as the project size increases and more complex (Johannessen, 2012). Bigger projects require more coordination mechanisms to cope up with systematic dependence.

2.3.4 Resource Planning

Resource planning is quite important in the construction of projects due to the fact that lack or shortage of resources leads to stalled projects**.** The aim of water resources project planning may be by the use of constructed facilities, or structural measures, or by management and legal techniques that do not involve constructed facilities. The latter are called non-structural measures and may include rules to limit or control water and land use which complement or substitute for constructed facilities (Bubshait, 2014). A project may consist of one or more structural or non-structural resources. Water resources planning techniques are used to examine what measures should be adopted to resolve water needs and to take advantage of opportunities for water resources development, and also to preserve and enhance natural water resources and related land resources.

Resources are limited, and hence a project manager should plan for their use. Each person can be assigned to a duty in one place at a time, working on one task, matched to his or her unique skill set. Effective resource planning enhances delivery of projects on time regardless of shifting deadlines, changing priorities, and common project evolutions. Resource planning keeps utilization rates at a profitable level, reducing the non-billable time your resources spend on projects (Mutungi, 2018).

The scientific and technological development has been clearly evident during the twentieth century. But since water resources have been practiced for many centuries, the development in this field may not have been as spectacular as, say, for computer sciences. However, with the rapid development of substantial computational power resulting in lower computation costs, in the last century the planning strategies have seen new directions which using the best of the computer resources. Further, economic considerations used to be the guiding constraint for planning a water resources project. But during the last couple of decades of the twentieth century there has been a growing awareness for environmental sustainability. And now, environmental constrains find a significant place in the water resources project (or for that matter any developmental project) planning besides the usual economic and social constraints (Ukhriyawati, Ratnawati & Riyad, 2017).

Water resource projects are constructed to develop or manage the available water resources for different purposes. According to the National Water Policy (2002), the water allocation priorities for planning and operation of water resource systems are for domestic consumption, irrigation, hydropower, industrial, ecology, navigation etc. The policy makers responsible for making comprehensive decisions of water resources planning are faced with various parameters.

2.3.5 Technology Integration

Technology assumes importance in the context of project management due to greater challenges in today's technology-enabled work environment, where technology tools are routinely used for collaboration, communication, and deployment of project management practices (Anantatmula, 2018). It is becoming common practice for even co-located project teams to use the electronic medium for these purposes. Notwithstanding the importance of technology, research has shown that it is difficult to associate the use of technology with business performance and the absence of such relation can be extrapolated to project performance as well (Anantatmulah & Kinango, 2015). However, technology can play a major role in supporting project managers in managing projects effectively and efficiently. Several studies have addressed the importance of information technology on managing projects. However, billing, project reports and policy framework responsibilities of a project manager towards effective implementation of construction projects is an area that needs further study. In this research effort, using the literature review, important people-related factors of project performance are identified.

Information Technology (IT) involves use of computers, software and internet connections infrastructure for supporting information processing and communication functions (Thite, 2019). Abushamsieh, Lopez, Hernandez & Ortiz (2013) suggest that, failure to use information technology is a contributing factor to poor government transparency. This study helped to analyze underlying interactions among these factors and, consequently, understand the supportive function of technology to the project manager in improving project performance.

Information technology facilitates storage and quick retrieval of large amounts of data and information. One of the modern technologies of 21st century to administer the platform of project communication is project portal (Tonnquivist, 2014) where the project organization can control, stored documents and maintained by a simple website. This is usually possible to control the activities by anyone who has access of the information by passwords protecting the site. Project portal also known as project work area is a simple communication platform where projects can be implemented by sharing of reports, and plans of the projects. One of the advantages of this website is that it can administer multiple-projects at the same time.

Technology promotes project management tools for planning and web-based support systems which are significant for communication, conflict resolution, knowledge sharing and integration of complex projects. Information technology enables for efficient and effective conversion between data and information but not a good option for disseminating information to knowledge (Marnwick & Labneuschag, 2011). Many firms invest in technology to advance organizational performance and to gain a competitive advantage. The role of technology in project performance depends on how technology systems are designed in firms (Anantatmula & Kanungo, 2015). Technology can meet the project management needs of documentation, storage and retrieval. Research on the benefits of adopting information technology practices in projects indicated that information technology contributed to a greater extent to improved organizational process flexibility as a strategic benefit whereby, 95% of organizations considered having achieved this through the adoption of IT.

Likewise, 94% of organizations identified, improved customer/supplier satisfaction as a strategic benefit. A key motivation for adopting IT was to develop service quality and owing to the outcome, perceived, improvements in customer/supplier satisfaction have been acquired (Zika-Viktorsson, Sundstro, & Engwall, 2016). At a tactical level, improved service quality, improved contract administration, and improved response to changes were identified as being experienced by more than 90% of the organizations sampled. Information technology is profoundly affecting project management capabilities, scope and leadership styles (Theodore, 2014).

According to Mukulu et., al. (2016) on technological capital and innovation performance in youth enterprises in Kenya, indicated that technological skills, technological facilities and information management system had positive and significant relation with innovation performance in youth enterprises in Kenya. However technological skills and technological facilities were the most significant in influencing the level of innovation performance in youth enterprises in Kenya. Therefore, investing in technological capital is of essence in promoting innovation performance in Youth enterprises in Kenya.

Technology can help project managers to improve the project processes they use to manage the project complexity, project integration and resource utilization. The difficulty facing organizations is how to connect information technology investments to business performance (Marchand et al., 2010). Information technology projects will continue to fulfill a vital role in the new global economy. Communication is essential in the project team. Information technology facilitates communication and allows timely and efficient passing on of relevant information for action by the project team (Dey, Kinch, & Ogunlana, 2017). This is very critical for project success. Communication efforts often lead to improved collaboration, establishing trust and making better decisions. It further facilitates interaction between organizational members, encourages discussion and promotes the flow and collection of knowledge.

2.3.6 Implementation of Water Construction Projects

The construction industry, in particular, water projects, plays a significant role in socioeconomic development as it provides the basic services such as water supply and sanitation which are necessary for the wellbeing of the society. Achieving project completion on time, within budget, at specified quality standards, and most importantly without unprecedented cost escalations is a major criterion of success of a project (Kanda, et. al., 2016). This is the period of hectic activity for the project. It is during this phase that people can begin to see the project. Equipment installation, trial run and commissioning take place at this phase. The bulk of the project activity will be done at this phase (80-85%). All the techniques of project management are

applied to this phase essentially. This phase, being more or less, the whole project, all attempts will be made to fast track and control the various activities. The requirements of the implementation phase will have given birth to what will be considered as modern project management (Slevin, and Pinto 2011).

The implementation phase, because of its peculiarities, has high need for coordination and control. Time that will be lost in the earlier phases of the Project Life Cycle normally be made up in the implementation phase only. Such being the case, meticulous coordination and high-pressure management and control will be required during this phase (PMBOK, 2008). Cost time and budget estimates are the lifeline for control; they serve as the standards for comparison of the actual and plan throughout the life of the project.

Around the world poor people place a high priority on drinking water and, to a lesser degree, sanitation. This is the reason as to why customer satisfaction was used in this study as a measure of successful implementation of water projects. Considerable evidence suggests that improved water generate substantial economic benefits, mainly by saving time and energy. Fetching a family's basic water requirement can be both time consuming and physically exhausting and the burden falls disproportionately on women and children. Seeking privacy for open defecation forces many women to wake up an hour early every day of their lives (Lane, 2004). Being ill with a water-related disease, or caring for an ill family member, also consumes much time and money. The time and energy saved by improved water supply can be used in economically productive or educational activities. Water programs also contribute to economic development by creating jobs, although the impact is relatively modest, as the number of permanent jobs created is small at the community level. These economic factors make a strong case for governments to intervene in water through regulation or investment.

Planning is an aspect of implementation for water construction works which focus on schedule planning, financial planing, communication planning and resource planning. The system for carrying out these aspects was critically important to implementation of construction project and should be adhered to throughout a project

from conception and design to construction and installation. For water construction projects, planning ensures that things are done according to the plans, specifications, and requirements (Satterfield, 2013). The schedule system will be set out as required by the contractual terms of the client. Systems will then be put in place to meet the requirements. The objective will be to provide a formalized system which means that the needs of the customer or the stated objectives of the system are continually being met.

2.4 Empirical Review

2.4.1 Schedule Planning

In the project planning stage, activities and resources concerning the project are defined and arranged in an orderly manner to deliver a unique product or service. The deliverable of the project planning phase is the project plan. Baars, (2016) is of the view that planning communicates the activities of the project in terms of: what tasks will be done; who is responsible to perform the tasks; when will the tasks be performed; what resources will be applied to complete the tasks; and how the tasks will be sequenced.

The project plan execution process ensures effective and efficient carrying out of planned activities of a project. The execution has to be done according to measurements against project plans, specifications and the original project feasibility concept. Without a defined project execution process each team in the project would execute projects using their own best practices, experience, and methods making it harder to control, track and take corrective action (Anbari, 2013). According to Ogogo et., al. (2018) on influence of competence of contractor on performance of government construction projects in Kenya, showed that there was a significant and positive relationship between contractor’s competence and performance of government construction projects in Kenya. The study concluded that contractor’s competence enhances the performance of government construction projects.

2.4.2 Budget Planning

According to (Mwendera & Atyois, 2018) on a review of water storage for Socioeconomic Development in South Africa, the results show that, though the country has invested a lot in water infrastructure there is still room for the increase and improved infrastructure. Owing to the fact that major rivers are trans-boundary, the government ought to develop additional storage bearing in mind the ecological requirements and international obligations.

The determinants of willingness to pay for improved management of water projects among households in Baringo County, Kenya revealed that households were, on average, willing to pay Kshs. 233.30 ($2.75) and a median of Kshs. 200 ($2.35) for improved management of water projects, (Rotich, et. al., 2018). Further findings revealed the mean and median policy value of improving management of water projects were estimated at Kshs. 129.6M ($1.30) and Kshs 111.1M ($1.11). The study concludes that there were significant characteristics for improved management of water projects, which is important for implementation of water management plans.

2.4.3 Communication Planning

According to Kisumbi, et. al., (2017) on the role of citizen participation in sustainability of water projects, found out that citizen power and water projects sustainability were not important (0.637). Further findings revealed that households did not participate fully in the project cycle. Planning stage of the project falls under the project life cycle and hence therefore stakeholders (households) were not involved. Further findings on influence of Tokenism in sustainability of rural community water projects revealed that households did not participate fully in the initiation and implementation of water projects to solve the inherent water problems (Kisumbi & Omboto 2018).

2.4.4 Resource Planning

According to Gebrehiwot and Gebrewahid, (2016), on the study of the need for agricultural water management in sub-Saharan Africa found out that water management policy focused on maximization of water use efficiency and water

productivity should be prioritized in order to meet the food demand of the growing population and cope with water scarcity problems. According to (Muller & Tuner, 2014) the employment of agency can have a direct influence on decision-making effectiveness, it can compensate for organizational inadequacies of a process or political nature, and it can be constrained in the evidence of formal and effective organizational practices. Decision making for capacity expansion of water supply systems studies developed a systematic decision-making process for water supply capacity expansion using the analytic hierarchy process. The decision-making criteria were categorized into environmental, economic, technical and socio-cultural aspects Alhassan, et. al., (2015).

2.4.5 Technology Integration

The impact of project schedule attributes on ERP system implementations provides new insights on the extent to which prior assumptions from the information systems literature apply in the ERP system implementation context. The results indicate that team empowerment and cohesion are not necessary precursors to project success as their impact depends on the adoption context (Marcus, et. al., 2010).

Key decision-making attributes for project planning studies analyzes and identifies research limitations/implications and found out that planning during early inception stages with briefing workshops is both challenging and difficult. Ito provides data to indicate where one can begin to try to overcome these deficiencies. Jim, et. al., (2014). Jim, (2015) on the method for performance briefing at the project initiation stage found out that the process involved is described with the development and selection of organizational strategic options with the council stakeholders. This work can assist the facilities manager to play an important role in the development of the initial performance-based on brief during the project inception stage that can assist clients and guide the design team.

Project management software allows project managers to enter all project expenses at the outset and then track them during the project life cycle.

2.5 Critique of existing Literature

From the literature reviewed, it was clear that number of studies have been conducted on the effect of financial planning and budgeting practices on performance of water projects. Attempts have been to extend this research to county government level. However, a lot remains undone in relation to the formation of county governments in the wake of the *Constitution of Kenya*, 2010. Most studies recommend that effective budget implementation should be facilitated through capacity building, robust systems and processes prioritization, and close monitoring for evaluation Mutai, (2018). Just as it had been explained in participative budgeting, stakeholders should get involved in budget preparation in order to enhance the overall budget implementation. Further, financial management systems should be supported in order to ensure prudent management of funds and adequate sensitization of both the employees and the public on best financial management practices to enhance the oversight role. This component of budget making process has largely been deactivated to avoid transparency and accountability

While it would be true to say that quite a number of authors have addressed the issue of resource management, the author's view is that the subject of resource planning and leveling in the Kenyan construction industry is not well covered. This is due to a number of reasons which create a gap to be researched on. Many models have been formulated for both resource planning and leveling and cited by different authors such as Abeyasinghe et., al. (2011); Ballard, (2010); Bandelloni et., al., Garmsiri and Abassi (2012); Hussain et al. (2014); Reddy and Nagaraju (2015) and Schweiz (2014). However, all these models have been postulated by authors from developed countries for their construction industries. This means that using these models for the Kenyan industry would therefore be misleading. The same argument holds for the challenges, barriers and benefits associated with resource leveling established in this literature review. Further, some of the challenges, barriers and benefits associated with resource management found in literature review have been based on the manufacturing sector in the developed countries.

2.6 Research Gaps

The research gaps are identified after an objective critique of local studies and in relations to the study objectives. An empirical study conducted by (Okelo et. al., 2013) observed that there existed a positive relationship between budget deficits and economic growth. This study, however, did not clearly address the aspect of budget planning given that budget deficit is only a part of the budget management. Moreover, the study did not focus on water companies. A later study by (Kamolo, 2014) emphasized the need for county governments to collect much revenue by way of taxes in order to address the increasing financial expenditures budgeted by the county government. This study did not address budget management in relation to financial sustainability.

A study by (Njeru, 2013) examined the effect of aid on government fiscal behavior. The study noted that there were possibilities for creating opportunities for corruption because the freed-up resources were not directed to their intended objectives. This study fell short of being explicit in respect of financial controls in devolved governments. A study by (Wakiriba et. al.,2014) found that hat there were weaknesses in the implementation of financial controls. However, this study centered on national government departments as opposed to county governments. In addition, these two studies did not address the aspect of financial sustainability in county governments in Kenya.

In 2007 the government of Kenya rolled out The Kenya Vision 2030 which is a development plan that aims to transform the country into a middle-income country by 2030 by improving economic, social and political sectors. The plan acknowledges the pivotal role of water in the growth of economic and social sectors as the country gets industrialized and more urbanized (WHO, 2016). In that regard the plan anticipates a universal access to water by 2030, which is apparently congruent with UN's 2030 Sustainable Development Goals on water and sanitation. In addition to the water needs contained in the plan, the Kenya constitution promulgated in 2010 further treats the enjoyment of clean and safe water in adequate quantities by every Kenyan citizen as a basic right. The increased water requirement therefore demands

great efforts from the Kenya water sector management in water resources conservation and water services development.

It is clear that challenges facing the water sector, ranging from water scarcity, water quality, population pressure, climate change, among others, are shared globally and the role of water sector management in confronting the challenges cannot be underestimated. In order for Kenya to meet its 2030 development agenda, the water problem is one of the issues that need to be addressed. (KNBS, 2014), observed that little research work has been done to uncover the challenges facing the Kenyan water sector.

Other studies have been conducted on the challenges faced by water projects in Kenya. Few studies have been carried out on the influence of planning being a core capability in the construction industry and project management processes. The majority of empirical studies have focused on project management practices, project performance and stakeholders' participation. This study sought to fill this knowledge research gap.

2.7 Summary

The literature review in this study covered the theoretical framework, conceptual framework, and empirical review. In theoretical framework the literature on the theory of planning explains planning for projects; project implementation theory explains schedule plans. On the other hand, the literature on capital structure and cash management theory explains Budget planning. Communication theory explains communication plan while resource allocation plan is explained by resource-based theory.

Many models have been formulated for both planning and implementation which have been cited by different authors such as Olawale and Sun, (2014); Ahmad et., al., (2010); Mansfield et., al. (2014); Gray and Larson (2018); Devarpiya and Ganesa (2012); Bolt and Fonseca,(2014); Weldearegay and Biedenbach, (2012); Tipili et., al. (2014); PMBOK, (2013); Goozol & Scoubreau, (2013); Olsson and Johansson, (2011); Johannessen (2012); Gregory, (2017); Cromity, (2011); Bubshait, (2014);

Tonnquivist, (2014); Marnwick and Labneuschag (2011); Anantatmula and Kanungo (2015); and Kanda et., al. (2016). However, all these models have been postulated by authors from developed countries for their construction industries. This means that using these models for the Kenyan industry would, therefore, be misleading. The same argument holds for the schedules, communication, budget and resource plans associated with implementation as established in this literature review. Further, some of the challenges, barriers and benefits associated with resource management found in literature review have been based on the house construction, technology and health projects in the developed countries.

Empirical review in the study has been carried out to identify the knowledge gaps from previous studies relevant to the current study that was carefully critiqued and research gap identified. It is evident from the many studies carried out that planning of projects is a major challenge in the construction industry both in developed and developing countries. The literature also reviews that there are many underlying factors contributing to this phenomenon; among them financing, contract variations, poor construction management and inadequate control systems most of which occur during the construction phase. While it would be true to say that quite a number of authors have addressed the issue of planning for construction projects, the author feels that the subject of planning and implementation in the water sector is not well covered. This is due to a number of reasons which create a gap to be researched on.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter sought to build up the general methodological framework, which was used to analyze the relationship between planning and implementation of water construction projects in the county of Bomet. Therefore, this chapter presents research methodology which is relevant to this study which deals with research philosophy, the research design, population, sampling frame, sample and sampling techniques, sample size, data collection instruments, data collection procedure, data analysis and presentation and operationalization of the study variable.

3.2 Research Philosophy

According to Creswell, (2012), a research philosophy is an idea about the way in which data about an incident should be gathered, analyzed and used. Research philosophy refers to how knowledge is developed about reality and the nature of that knowledge. It explains assumptions that people make about nature of reality (Babbie, 2016). Two major research philosophies have been identified in the western tradition of science, first is positivist (sometimes called scientific) which is quantitative in nature. Second one is Interpretivists (also known as anti-positivist), which is qualitative (Galliers, 2011). Ideally, Interpretivists argue that only through the subjective interpretation of and intervention in reality can that reality be fully understood. According to Cooper and Schindler, (2016), positivism takes the quantitative approach and is based on real facts, objectivity, neutrality, measurement and validity results. Swanson and Holton (2015), stipulates that this philosophical approach, scientists give their view points to evaluate social world with the help of objectivity, hence this study adopted a positivism philosophy (Cooper & Schindler, 2016). This study was based on this approach. Under positivist approach research starts with theory then data is collected to support or reject the theory (Creswell, 2012). Researcher's own beliefs have no value to influence the research study. (Cooper & Schindler, 2014), asserts that the positivism philosophical approach is

mainly related with the observations and experiment to collect numeric data. Positivists believe that reality is stable and can be observed and described from an objective viewpoint without inferring with the phenomena being studied (Levin, 2014).

This study adopted the positivist philosophical orientation since it is directly associated with the idea of objectivity which is very significant in assessing the influence of planning on implementation of water projects in Bomet County without interfering with the planning phenomena under study. Additionally, the positivist philosophical orientation provides an opportunity to quantitatively evaluate social world with the help of objectivity in place of subjectivity (Cooper & Schindler, 2016). The study was guided by theories with the aim of testing hypotheses. This research was grounded on positivist research philosophy, a philosophy orientation characterized by a belief in theory before research, statistical justification of conclusions and empirically testable hypothesis, the core tenets of scientific methods (Cooper & Schindler, 2016).

3.3 Research design

A research design refers to the process that the investigator will follow from the inception to completion of the study (Cooper & Schindler, 2016; Kothari, 2011). A research design is an arrangement of conditions or collections (Muaz, 2013). The study adopted a descriptive survey design using both qualitative and quantitative approaches (Mugenda & Mugenda, 2003). Quantitative approach emphasizes measurement and data is analyzed in a numerical form to give precise description. According to (Mugenda & Mugenda, 2003), quantitative approach also known as the scientific method, has been considered as the traditional mode of inquiry in both research and evaluation. Quantitative approaches places emphasis on methodology, procedure and statistical measures to test hypothesis and make predictions. Research bases on quantitative helps in analyzing information in a systematic way so as to come up with useful conclusions and recommendations on the social settings and the individuals who portray those characteristics (Berg, 2011).

3.4 Target Population

A target population refers to a set or group of all possible elements fitting a given set of specification which the findings of the research are to be applied (Shukla, 2020). According to Neuman, (2011), the primary purpose of sampling in research is to create a representative sample. The target population refers to the entire group of people, events or things of interest the researcher wishes to investigate (Bougie, 2010). It is the entire group of individuals and objects having similar observable characteristics (Kothari, 2004; Mugenda & Mugenda, 2003). The target population of this study comprised of 440 from each category involved in water projects which formed the unit of observation of the study. The unit of observation included project managers, finance managers, project team leaders, project consultants and county administrators. The unit of analysis and the unit of observation was chosen owing to the fact that it would enable the study meet it is objectives. Table 3.1 presents the distribution of the projects. In total there are 88 projects and each represents the target category of respondent, which sum the total target population to 440 respondents.

Table 3.1: Population of the Study

Serial No.	Population Category	Total
1.	Water Supply Scheme Projects	**13**
2.	CGB Water Projects	**28**
3.	Community Water Projects	**23**
4.	Proposed water projects	**24**
	Total	**88**

3.5 Sampling Frame

According to Kothari, (2014), sampling frame is a list of members of the research population from which a random sample may be drawn. The sampling frame for this study was drawn from both on going, completed and stalled water projects managed and funded by county government of Bomet, water supply schemes and community-based projects.

3.6 Sample and sampling technique

A sample is a portion or part of the target population. According to (Mugenda & Mugenda, 2003), sampling enhances understanding about the characteristics of the entire population. This study used purposive sampling also known as deliberate sampling which involve deliberate selection of a particular unit of respondents. This technique ensured that each cluster is represented in the sample and is more accurate in reflecting the elements of the population (Kothari, 2014). The target respondents were chosen because they are informative and have the required characteristics. In this study the researcher picked the leaders of the implementation teams because they are involved in planning, implementation and practical experience in the construction of water projects. Their experiences thus serve as suitable indication of the key factors influencing planning in implementation of water projects from owners, contractors and consultant perspectives.

3.6.1 Sample Size

The target population of this study was 440 and the researcher adopted both stratified sampling and purposive technique since the population is homogenous. According to Mugenda and Mugenda (2009), stratified sampling target population is divided into sub groups which are closely homogenous than the entire population. This provided overall better representation. Subject (items) were purposively selected from each stratum to make a sample. Owing to the fact that each stratum was more homogenous, stratified sampling technique output gave more reliable and efficient detailed information for the study. Sample size was determined by computing 30% of each stratum or sub groups. The information was tabulated in the tables to represent the collected data in more clear way and the procedure can be cost effective in the final analysis of the project process. In the determination of the of the sample size, the Slovian's formula was used to calculate the sample size (at 95% confidence level and $\alpha = 0.05$) as indicated in equation 1 below;

$n = N/(1+Ne^2)$ …… Equation 1

Where;

n = is the desired sample size

N = is the population size

e = is the margin of error (at 95% confidence level)

Therefore, the sample size will be;

n = $N/ (1+Ne^2)$

n = $440/ [(1+440(0.05^2)]$

n = 440/ **[**(1+440(0.0025)]

n = 440/ **[**(1+2.1)]

n = 440/ **[**2.1]

n = 164

Table 3.2: Sample Size

Serial No.	Population Category	Total Population	Sample size
1.	Water Supply Scheme	65	24
2.	CGB Water Projects	140	52
3.	Community Water Projects	115	43
4.	Dam Water Projects	120	45
	Total	**440**	**164**

3.7 Data Collection Instruments

According to (Saris, 2017) a questionnaire is self-report data collection research tool that each research participant fills out as part of research study. The researcher used this method because questionnaires are free from bias of the interviewee and at the same time give the respondent enough time to adequately give well thought out answers. A questionnaire provides straight forward information to analyze.

Qualitative data was collected through the use of unstructured questionnaires. This gave the respondents freedom to fully express themselves without limitation and enhance the gathering of more information which otherwise would be difficult to get (Savin-Baden & Major, 2010). Unstructured questionnaires were distributed to the respondents who gave more information regarding the research topic (Savin-Baden & Major, 2010).

3.7.1 Pilot Study

Pilot test was done to assess the capability of the research instruments to collect required data for research. To be fair and to represent all the respondents in the sampling frame, eighteen respondents were picked. Therefore, to ensure validity of the research instruments in this study, a pre-test was carried out using 18 questionnaires in Kajiado County. This is because the county has the same characteristics in terms of constructions of water projects. According to (Munene, 2017), this can be conducted to reduce obscurity of questionnaires and interview guide items and enhanced data integrity.

3.7.2 Reliability of the Research Instruments

According to Mugenda (2008), the reliability of the research instrument is the variance by which an instrument (questionnaire or interview), produces results as to the required results. The questions in the questionnaire were tested for reliability by use of Test-retest, whereby the questions were taken through a check by experts to ensure reliability of data to be collected. Cronbach's Alpha (α) was used to test reliability.

3.7.3 Validity of the Research Instruments

Bryman, (2012), asserts that validity is the study of the performance at measuring or investigation of what the researcher sets out to investigate and the extent to which the research findings can be applied to new settings. Validity is the extent to which an instrument measures what it purports to measure (Saunders, 2017). Content validity focuses on the degree to which the instrument fully assesses or measures the construct of interest. Glesne (2015) posits that data need not only to be reliable but

also has to be true and accurate. The validity of the questionnaire was ascertained by seeking expert opinion from my supervisor and other scholars.

3.7.4 Diagnostic Tests

It is essential to ensure non-violations of the assumptions of the classical linear regression mode (CLRM) before attempting to estimate equation. Estimating these equations when the assumptions of the linear regression are violated runs the risk of obtaining biased, inefficient and inconsistent parameter estimates (Brooks, 2008). Therefore, linearity test, the multi-collinearity and heteroscedasticity was conducted to ensure proper specification of equation.

3.7.4.1 Normality Tests

Parametric tests such as correlation and multiple regression analysis require normal data. When data is not normally distributed it can distort the results of any further analysis. Preliminary analysis to assess if the data fits a normal distribution was performed. To access the normality of the distribution scores graphical method approach was used. When non-significant results (>0.05) is obtained for a score, this indicates that data fits a normal distribution (Tabachnik & Fidell, 2007).

3.7.4.2 Heteroscedasticity

Since the data for this research is a cross-section of different projects, this raises concerns about the existence of heteroscedasticity. The classical linear Regression Models (CLRM) assumes that the error term is homoscedastic, that is, it has constant variance. If the error variance is not constant, then there is heteroscedasticity in the data. Running a regression model without accounting for heteroscedasticity would lead to biased parameter estimates.To test for heteroscedasticity, the Breusch-Pagan Godfrey test (1979) was used. The null hypothesis of this study is that the error variance is homoscedastic. If the null hypothesis is rejected and a conclusion made that heteroscedasticity is present in the panel data, then this would be accounted for by running a Feasible Generalized Least Square (FGLS) model.

3.7.4.3 multi-collinearity

Test for multi-collinearity was carried out in cases of perfect correlation between predictor variables. Multi-collinearity can imply that a unique least square solution to a regression analysis cannot be computed (Field, 2009). Multi-collinearity inflates the standard errors and confidence intervals leading to unstable estimates of the coefficients for individual predictors. Multi-collinearity was assessed using Variance Inflation Factor (VIF) and Tolerance. Inflation Factor (VIF) <10 and Tolerance >0.1, indicate that the variables are not highly correlated, hence non-existence of multi-collinearity.

3.7.4.4 Linearity Test

Linearity means that two variables, independent and dependent variable are related. The importance of testing for linearity lies in the fact that many statistical methods require an assumption of linearity of data. This occurs when data is sampled from a population that relates the variables of interest in a linear fashion. This means that before using common methods like linear regression, tests for linearity must be performed (Jin, Parthsarathy, Kuyel, Geiger & Chen, 2005). Linearity test was conducted for each statistical software tool through ANOVA testing methods. This was used to observe the possibility of the data arriving from a linear population.

3.8 Data Collecting Procedure

Burns and Grove (2010), define data collection as the precise, systematic gathering of information which is relevant to the research problems, using such methods as interviews. The process of primary data collection therefore started by acquiring an introduction letter from the University to the Bomet County Government, Bomet Water Service Board and the National Council for Science, Technology and Innovation (NACOSTI). A research permit was provided by NACOSTI after application. This permit worked hand in hand with the letter from JKUAT University and was therefore attached to the questionnaires.

3.9 Data analysis and Presentation

According to (Yin, 2013), data analysis is an instrument for reducing as well as organizing data to yield findings that need to be interpreted. Once data was collected, it was coded and edited for uniformity and wholeness. Data was analyze using both descriptive statistics and inferential analysis using SPSS and Analysis of a Moment Software (AMOS). Data presentation was in the form of graphs frequency distribution tables, and piecharts to facilitate descriptions explanation of the study findings.

3.9.1 Qualitative Analysis

Qualitative data analysis was done by use of variable description, comparison and descriptive statistics as opined by Creswell (2013). Content analysis was used to analyze qualitative data to help triangulate qualitative data. This established the relationship of planning and implementation of water construction projects. In this study, the researcher was interested in the analysis of information in a systematic manner to be able to come up with a meaningful, useful conclusions and recommendations. Information about the phenomena was obtained by use of qualitative research design.

3.9.2 Quantitative Analysis

Quantitative data for the 88 water projects was subjected to Likert scale type of questionnaire and secondary resources. Data analysis employed SPSS and AMOS. This software was chosen for its analytical superiority, availability and its ability to handle large amounts of data. Smith, Bekker and Cheater (2011) assert that quantitative data is used to explain survey findings. Quantitative analysis gives basic information; it was used because it goes further to test the theories in the theoretical framework for the purpose of approving or disapproving them. Frequency distribution tables, charts and graphs were used to present the analyzed data by the characteristics of the study population.

Further statistical analysis and test including, the chi-square which were done to ascertain the association of the variables. Regression analysis was used to establish the influence of planning on implementation of water construction projects. This was in line with the research questions, hypothesis, research design and nature of data being collected as explained by (Kinnear & Gray, 2000). To ascertain the relationship and strength between the variables, the researcher used Pearson's correlation analysis. Analysis of variance (ANOVA) was done to test the significance of the model and R^2 was used to measure the extend of the goodness of fit of the regression model. Finally, the hypothesis was tested by use of t-test at 95% confidence level.

The regression model is in the form of:

Model without moderating variable

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \text{.....(i)}$$

Y = Implementation of Water Projects

β_0 = Intercept term

X_1 = Schedule Planning

X_2 = Budget Planning

X_3 = Communication Planning

X_4 = Resources Planning

ε = Error term

Model with moderating variable

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_1 Z + \beta_6 X_2 Z + \beta_7 X_3 Z + \beta_8 X_4 Z + \varepsilon \text{(ii)}$$

Where

Y = Implementation of Water Projects

β_0 = Intercept term

X_1 = Schedule Planning

X_2 = Budget Planning

X_3 = Communication Planning

X_4 = Resources Planning

Z = Moderating Variable

ε = Error term

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter provides the empirical results of the research data analysis and the corresponding interpretations. In the first section of this chapter, missing values and the response rate analysis are presented. This is followed by demographic data, describing the characteristics of individual respondents and those pertaining to the firms surveyed. The third section of the chapter presents descriptive statistics of the respondents in line with the measurement tool. The fourth section addresses the factor analysis results together with scale reliability. The fifth section presents the regression analysis and hypothesis testing and discussion of the results.

4.2 Response Rate

In this study, out of a total of 164 questionnaires that were distributed to the sampled respondents, 134 of them were filled and returned. Of the returned questionnaires, 3 were incorrectly filled and therefore were not used in the final analysis. Therefore, 131 that were correctly filled were the once used for the analysis, which made up a response rate of 80 % this is in line with Mugenda and Mugenda (2013) who opined that response rate that is above 50% is sufficient and necessary for analysis. The study established that the researcher employed various strategic techniques that were attributed to the high response rate. For example, the researcher recruited two research assistants who were tasked with the distribution and collection of the questionnaires.

Table 4.1: Response Rate of Respondents

Serial No.	Respondents	Percentage
1. Returned Questionnaires	134	82
2. Not Returned Questioners	30	18
Total	**164**	**100**

4.3 Demographic Information

This section covers the demographic characteristics of the target population. This aimed at ensuring that there was no biasness in the manner in which the respondents were selected to participate in the study.

4.3.1 Distribution of Respondents by Age-Group

The study sought to establish the age groups of the respondents in the Study. The distribution of the respondents according to their age groups are shown in Figure 4.1. The findings indicated that majority of the respondents in the study were between ages 20-30 years bracket representing a 45 %; 30.5% were between 31-40 years of age; and 16% were between 41-50 years of age, 8.4%. This meant that the sample used by the study was well distributed in terms of age and could therefore give reliable information. The study established that the highest respondents were mainly young adults (ages 31-40).

Young people are innovative and creative in problem solving and solution finding: they are the key to helping communities meet their subsistence needs, and in doing so, improving local people's long-term security and control to create a stable society. Workforces are becoming increasingly diverse in age demographics, creating professional environments that are rich with experience and maturity as well as youthful exuberance. Organizations that employ workers in wide ranges of age have the advantage of creating a dynamic, multi-generational workforce, with a diverse range of skill sets that is beneficial to the organization. A workforce composed of different age demographics, thus creates an environment where each generation brings different skills and talents to the table.

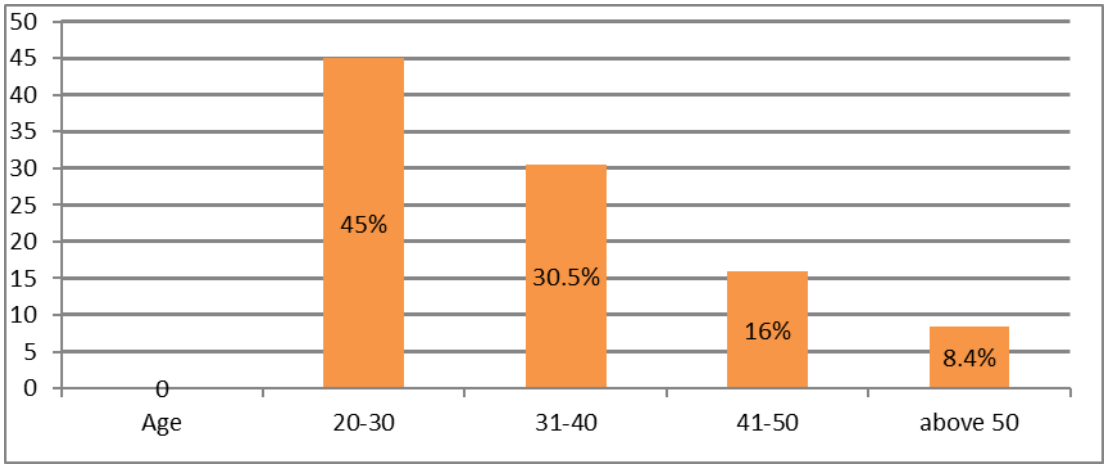

Figure 4.1: Ages of Respondents

4.3.2 Distribution of respondent by Education

The findings on Table 4.2 indicate that majority of the respondents had a university degree represented by 54.2%. 40.5% had attained diploma level of education, 3.0% had attained master's level of education, 2.3 % had attained PhD level of education. This showed that most of the respondents were knowledgeable and gave valid, reliable and more accurate response in regard to research question concerning the relationship between planning and implementation of water construction projects in Bomet County, Kenya. The level of education therefore was very key in this respect.

Education is very important as it is exhibited in our Curriculum Vitae. CVs are all about educational background of an individual. It tells of our educational journey and how careers are developed out of education. As one grows in profession so does the CV and the growth is reflected in it. 54.2% of the respondents who were degree holders meant that the respondents were knowledgeable and highly skilled employees who improved productivity, enhanced quality of products and services, and are capable of effecting positive changes in processes of delivering quality service to customers.

Table 4.2: Education of Respondents

	Frequency	Percent
PhD	3	**13**
Masters	4	**28**
Bachelor's Degree	71	**23**
Diploma	53	**24**
Total	**131**	**100**

4.4 Distribution of respondent by Knowledge of Construction of Projects

The study sought to establish knowledge of constructions of projects among the respondents in the study. The distribution of the respondents according to their knowledge of constructions of projects are shown in Table 4.3. The findings indicate that majority of the respondents had knowledge of constructions of projects representing a 90.9 % while a mere 9.1% were unaware about the knowledge of constructions of projects. This meant that the sample used by the study was well distributed in terms of knowledge of constructions of projects.

Table 4.3: Knowledge of Construction of Projects

	Frequency	Percent
Yes	119	90.9
No	12	9.1
Total	**131**	**100**

Source: Researcher 2023

4.5 Distribution of respondent by causes of poor implementation of water projects

The study sought to establish the causes of poor implementation of water projects of respondents in the study. Table 4.4 shows the distribution of the respondents according to their knowledge on causes of poor implementation on constructions of projects. The findings in Table 4.5 indicate that lack of resources at 38.4 % were the main causes of poor implementation of water projects in Bomet with lack of community participation being the least reason for poor implementation of water projects at 12.2 %.

Table 4.4: Causes of poor implementation of water projects

	Frequency	Percent
Poor Management	31	23.8
Poor Planning	34	25.6
Lack of Resources	50	38.4
Lack of Community Participation	16	12.2
Total	**131**	**100**

4.3.7 Remedial Measures Set to Counter the Problems

The respondents were further requested to indicate the remedial measures they have set to counter the problems in water provision. From the results, the respondents indicated that the County of Bomet has various water schemes and community water projects that face governance challenges and solutions lie in implementation, modernization and proper management. The respondents indicated that the county government is working closely with the national government and other development partners to complete various water projects and distribute water to the residence of Bomet County. More so it seeks to further increase access to water for productive use through irrigation, dams and water pan projects. The respondents further indicated that the sources of water in the county include ponds, dams, streams, wells, boreholes, piped and tanks.

4.3.8 The State of Water Supply in Bomet

The respondents were asked to indicate the state of water supply in Bomet. Key; 1=Very unsatisfied, 2= Unsatisfied,3=Neutral, 4=Satisfied, 5=Very Satisfied. The results were as shown in Table 4.5 below. From the results, 55% of the respondents were neutral on the adequacy of water supply in Bomet, 13% of the respondents were unsatisfied, 12% were satisfied, 11% were very unsatisfied while 9% of the respondents were very satisfied with the adequacy of water supply in Bomet. In relation to reliability, 44% of the respondents were neutral on the reliability of water supply in Bomet, 23% of the respondents were satisfied, 13% were very unsatisfied, 10% were unsatisfied while 10% of the respondents were very satisfied with the reliability of water supply in Bomet.

Concerning to accessibility, 49% of the respondents were neutral on the accessibility of water supply in Bomet, 21% of the respondents were satisfied, 15% were unsatisfied, 9% were very unsatisfied while 6% of the respondents were very satisfied with the accessibility of water supply in Bomet. On quantity and quality, 39% of the respondents were neutral on the quantity and quality of water supply in Bomet, 35% of the respondents were satisfied, 19% were very satisfied, 11% were very unsatisfied while 15% of the respondents were unsatisfied with the quantity and quality of water supply in Bomet County.

Table 4.5: State of Water Supply in Bomet

	1	**2**	**3**	**4**	**5**
Adequacy	11	13	55	12	9
Reliability	13	10	44	23	10
Accessibility	9	15	49	21	6
Quantity and Quality	15	11	39	35	19

4.3.9 Length of Time Working in water projects

The respondents were further requested to indicate the duration of time they had worked in water projects in the County Government of Bomet. The results were as shown in Figure 4.2. From the results, 41% of the respondents indicated 6-10 years, 37% of the respondents indicted 1-5 years while 22% of the respondents indicated 10 years and above. This implies that most of the respondents have worked in water projects in the county government of Bomet long enough to avail the needed information.

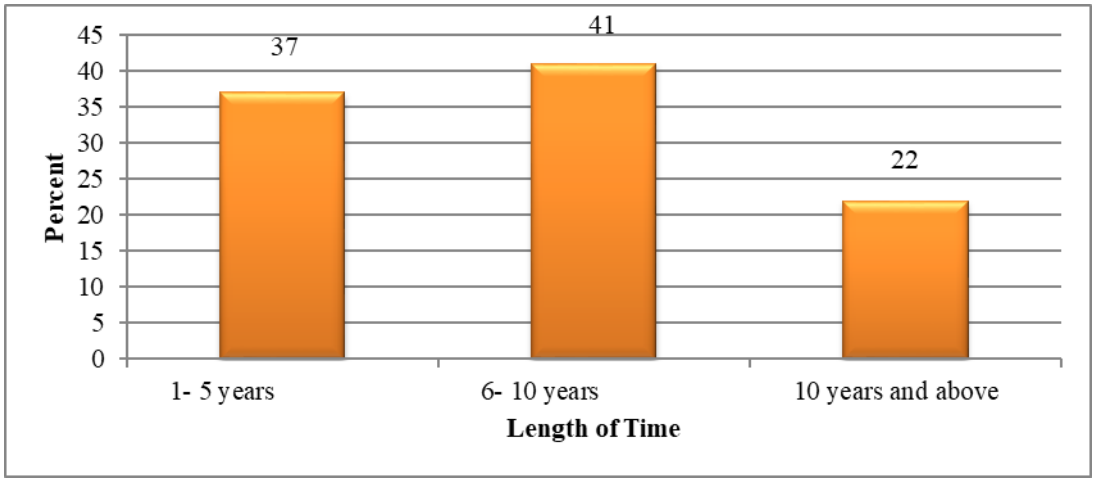

Figure 4.2: Length of Time Working in water projects

4.3.10 The Nature / Type of Water Project

The respondents were further requested to indicate the nature of the Water projects. The results were as shown in Table 4.6. From the results, 79% of the projects belong to County Government of Bomet (CGB), 8% of the projects were being implemented by Non-Governmental Organization (NGO), 7% of the projects were being implemented by Lake Victoria South Water Service Board (LVSWSB) while 6% of the projects were being implemented by Community Based Organization (CBO). This implies that most of the water projects are owned by County Government of Bomet (CGB).

Table 4.6: Nature / Type of Water Project

Category	Percent
Non-Governmental Organization (NGO)	8
Community Based Organization (CBO)	6
County Government of Bomet (CGB)	79
Lake Victoria South Water Service Board (LVSWSB)	7

4.3.11 Number of Staff involved in Water Projects

The respondents were further requested to indicate the number of staff involved in the water projects. The results were as shown in Table 4.7. From the results, 35% of

the respondents indicated that 41-60 staff are involved in water projects, 20% of the respondents indicated 21-60 staff are involved in water projects, 17% of the respondents indicated 61-80 staff are involved in water projects, 13% of the respondents indicated 81-100 staff are involved in water projects, 8% indicated 0-20 staff are involved in water projects while 7% of the respondents indicated 100 and above.

Table 4.7: Number of Staff involved in Water Projects

Category	Percent
0-20 Staff	8
21-60 Staff	20
41-60 Staff	35
61-80 Staff	17
81-100 Staff	13
100 and above	7

4.6 Pilot Testing

4.6.1 Reliability and Validity of Research Instrument

The level to which the items or indicator variables under consideration measures the same thing or value under similar conditions consistently without biasness or error is referred to as reliability of the research instrument. In instances where the items under investigation or consideration yield similar results when applied more than ones indicates that the instrument is reliable. Besides that, validity is another concept which is described as a measure of what the researcher wants to measure. For instance, the research instrument is said to be invalid if it measures different concept than what it was intended to measure initially. Testing the validity and reliability of the research instrument is valid and necessary before using it to collect data. To test for reliability and validity tests, unidimensionality verification is always taken into consideration. Avcılar and Varinli, (2013), describes unidimensionality as concept in which observed variables used to measure every dimension, measures only one dimension. For this reason, reliability and Construct validity must be computed in order to ascertain unidimensionality.

Construct validity simply refer to an instance where observed variables are connected to some unobserved variables while dissociation of observed variables from other observed variables that are connected to other latent variables is referred to as discriminant validity. The construct validity indicates that the observed variables do not measure any latent variable other than what they are connected in the conceptual model. However, it will not be correct to conclude that the validity of the construct has been realized without confirming the reliability as illustrated by Gerbing and Anderson, (1988). Construct validity in most cases is measured using confirmatory factor analysis (CFA) which is basically the measurement equation model for structural equation model (SEM). To determine the goodness of fit for measurement equation model fit indices will be applied and for insufficient measurements equation model, the fit indices of the structural model will be low. Besides that, the standard value of each coefficient in the measurement model is known as factor loading of the confirmatory factor analysis. Each factor load should be higher than 0.50. Otherwise, the fit indices of the general model will be low indicating that the model is not good.

In this study, the reliability of the instrument was tested using Cronbach's alpha constant which measures the internal consistency and average correlation among the indicators under consideration. Cronbach's value normally ranges between 0 and 1 according to Kipkebut, (2010). The commonly acceptable value of alpha should be at least 0.70 as described by Mugenda and Mugenda (2010). Higher alpha coefficient values imply that there is consistency among items under consideration that measures the concept of interest. In this study, Cronbach constant test was carried out for every variable. And the findings were as follows:

For scheduled planning there were eight items/indicator variables under scrutiny and from the finding, no item was expunged since the alpha coefficient recorded was 0.848 which was above 0.7. For budget planning, the alpha coefficient was 0.733 with no item removed out of ten items tested since the coefficient was above the threshold. The reliability test using Cronbach alpha based on communication planning was also conducted and out of eight items alpha value of 0.472 was recorded and after one item having been removed, the overall alpha coefficient recorded was 0.742 which was also above 0.7. Similarly, the Cronbach's alpha

coefficient for resource planning was carried out and out of seven indicator variables used to measure alpha coefficient a value of 0.600 was obtained which later came to be 0.706 after deleting the seventh item which was also above 0.7. Considering items forming technology integration and Implementation of water construction projects alpha values were found to be 0.909 and 0.809 respectively far much beyond 0.7 which is the threshold value. In conclusion, alpha test for all the items were found to be reliable for measurement because the reliability coefficient was found to be above the recommended threshold of 0.7. The findings are shown in the Table 4.8.

Table 4.8: Reliability and Validity of Research Instrument

		Item-Total Statistics					**Reliability Statistics**		
Variables	Items	Scale mean if Item Deleted	Scale variance if Item Deleted	Corrected Item-Total (R)	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	Cronbach's Alpha Based on Stdzd Items	N of Items
Scheduled Planning	SP1	26.97	12.830	.527	.379	.660	**.848**	**.852**	**8**
	SP2	27.21	13.416	.294	.135	.706			
	SP3	27.14	13.489	.297	.192	.705			
	SP4	26.97	13.461	.312	.210	.701			
	SP5	27.08	13.308	.347	.265	.694			
	SP6	26.98	11.899	.548	.412	.648			
	SP7	26.99	12.254	.546	.374	.651			
	SP8	27.39	12.809	.378	.229	.688			
Budget Planning	BP1	26.8966	29.094	.552	.498	.698	**.733**	**.812**	**10**
	BP2	26.7356	29.057	.607	.421	.695			
	BP3	27.0230	28.092	.457	.450	.703			
	BP4	27.3218	26.593	.607	.560	.679			
	BP5	27.0460	27.207	.705	.618	.675			
	BP6	26.6207	26.447	.139	.130	.828			
	BP7	27.2069	27.399	.590	.519	.685			
	BP8	26.9885	30.174	.397	.315	.715			
	BP9	27.6437	29.418	.402	.397	.712			
	BP10	27.5517	31.320	.212	.270	.735			
Communication planning	CP1	19.1000	12.226	.043	.193	.795	**.742**	**.738**	**7**
	CP3	18.6778	9.457	.531	.453	.692			
	CP4	18.7222	10.203	.471	.555	.708			
	CP5	18.8333	9.399	.581	.474	.681			
	CP6	18.7333	9.209	.604	.429	.674			
	CP7	18.5667	9.911	.531	.367	.694			
	CP8	18.7667	10.001	.469	.306	.708			
Resource Planning	RP1	15.8556	9.451	.451	.218	.668	**.706**	**.700**	**6**
	RP2	16.0556	7.649	.593	.414	.611			
	RP3	16.3111	7.430	.624	.472	.599			
	RP4	16.0000	7.955	.637	.505	.602			
	RP5	16.0333	9.224	.329	.194	.701			
	RP6	15.9111	10.936	.051	.054	.771			
Technology	TI1	21.6111	19.072	.801	.689	.887	**.909**	**.910**	**7**

Integration	TI2	21.5333	19.488	.738	.593	.895			
	TI3	21.7333	19.658	.681	.559	.902			
	TI4	21.6889	20.486	.732	.559	.896			
	TI5	21.5000	20.073	.722	.581	.896			
	TI6	21.3778	20.170	.752	.589	.893			
	TI7	21.4222	20.606	.675	.562	.901			
Implementation of water construction projects	IM1	12.6333	5.561	.462	.506	.813	**.809**	**.812**	**5**
	IM2	12.4444	5.104	.692	.557	.744			
	IM3	12.2111	4.865	.738	.578	.728			
	IM4	11.9444	5.064	.648	.577	.756			
	IM5	11.7889	5.517	.467	.414	.812			
Overall Alpha							**.774**	**0.800**	**43**

4.4.2 Factor Analysis

The integral part of factor analysis is mainly concerned with the internal-correlations among the items under scrutiny just to ensure that correlation among the items under consideration are consistent as illustrated by Mugenda, (2010). Most scholarly contributions suggest that factor loading should be 0.5 and above for instance that Cooper and Schindler (2008) suggest that factor loading above 0.5 should be acceptable. Other scholars claim that factor loads of 0.4 should be allowed.

Factor analysis is mainly considered mainly for the following objectives; detecting construct validity, highlight variability among observed variables and to also check for any correlated variables in order to reduce redundancy in data Hair et al., (2010). In simple terms it is used to reduce the number of indicators which do not explain the relationship between various planning and Implementation of water construction projects in Bomet County, Kenya. According to Hair et al., (1998) and (Tabachnick & Fidell, 2007), the factor loadings are classified as follows: 0.32 (poor), 0.45 (fair), 0.55 (good), 0.63 (very good) or 0.71 (excellent).

In this study, scheduled planning had 8 items and none of the items recorded factor loading less than 0.50. The factor loading of 8 items for scheduled planning were ranging between 0.542 and 0.748. On whether the project manager had a clear scope of the project requirements, had a factor loading of 0.701. on whether the project is implemented within the stipulate scope had a factor loading of 0.542, on whether the project experience various milestones had a factor loading of 0.722, on whether managing project milestones improves scheduled plans of water project had a factor loading of 0.748. Furthermore, on activities of whether the activities of the project

were well stipulated had a factor loading of 0.711, on whether if each staff was informed of their duties and responsibilities in the project had a factor loading of 0.620, on whether the project manager had a clear scope of the project requirements had a factor loading of 0.656 and on whether the project is implemented within the stipulated scope had a factor loading of 0.625.Because these values were above the threshold, the factors were therefore considered to be valid for the constructs represented. Table 4.9 (a) present the finding of factor loading for every item of scheduled planning.

For budget planning 8 items were used and the finding suggests that: budget allocations are agreed upon by all stakeholders had factor loading of 0.582, on whether our project did not experienced budget variances in the last one year, had factor loading of 0.583, The budget is subject to amendments during its implementation, had a factor loading of 0.642, The periodic Budgetary performance relies on projects operations. had factor loading of 0.629, The budgetary performances of county projects have been on an upward path had factor loading of 0.613, There is an effective system for budget control had factor loading of 0.540, on whether the budget allocations are agreed upon by all stakeholders had a factor loading of 0.599 and on our project did not experienced budget variances in the last one year had a factor loading of 0.676.

In summary all the 8 items had factor loading above 0.50 that is between 0.540 and 0.676. Therefore, all the items were found to be valid for the constructs they represented and could therefore be used in the study. A summary of factor loading for every item on budget planning is shown on Figure 4.9(b).

The validity of communication planning was also investigated using an instrument comprising of 8 items and the results were published. In this case no item was deleted. Factor loading values recorded were between 0.500 and 0.768 as shown in Table 4.9(c). To highlight to some of the finding shows that the project has clear channels of communication had factor loading of 0.768, The reporting system put in place is effective had factor loading of 0.693, The communication between the parties on the project is effective had factor loading of 0.579, All required

information is sent to the relevant receiver had factor loading of 0.500. It is clear who is responsible for which communication had factor loading of 0.613, channel of communication used effectively to share Information on a timely manner had factor loading of 0.570, Communication channels are regularly reviewed to match changes had factor loading of 0.643 and lastly community members participate in the conception and design of the water projects had factor loading of 0.512. Since no item recorded factor loading lower than 0.50, the items were therefore considered to be valid to measure effect of communication planning on Implementation of water construction projects in Bomet County, Kenya.

Resource planning had eight items and from the original list of eight items put forward to measure the effect of resource planning, the principal component Analysis (PCA) method discarded no item. Factor loading registered were ranging between 0.608 and 0.946 as shown in Table 4.10 (d). There is sufficient trained personal in repairs and maintenance of water system had factor loading of .0 .769, there is enough technical & financial support from the NGOs, churches, in water system management, had factor loading of 0.758. Construction equipment's are available had factor loading of 0.946. The county government has put in place effective internal audit trails for all financial transactions within its purview had factor loading of 0.763, There is enough capacity within the locality on accessing and purchasing repair materials had a factor loading of 0.608. Materials for the construction of water projects are easily accessible had factor loading of 0.802, All employees have targets to achieve had factor loading of 0.874. The cost of constructions equipment's is affordable had factor loading of 0.834. From the finding, it was clear that all the items under consideration were valid.

To measure the moderating effect of Technology Integration on Implementation of water construction projects in Bomet county Kenya. Six items were used. Planning of water projects has led to increased number of water connections in the county had average factor loading of 0.506, The procedures of water connections have improved due to the role of planning in water construction projects had average factor loading of 0.591, There is improved accessibility and availability of clean and safe water services in the county due to increased number of implemented water projects had

average factor loading of.0.585, Customers are satisfied with the implementation of water projects had average factor loading of .582, There is an increase in revenue collected due to increased number of implemented water projects in the county had average factor loading of 0.589, In total, the entire six items were found to have acceptable factor loading of values between 0.506 and 0.589 and thus all the items were considered to be valid for inclusion in the data collection instrument and further analysis. Table 4.10 (e) indicates factor loading per item.

The validity of Implementation of water construction projects within Bomet County was tested using, an instrument comprising of six items was considered. Planning of water projects has led to increased number of water connections in the county had a loading factor of 0.542. The procedures of water connections have improved due to the role of planning in water construction projects had a loading factor of 454. There is improved accessibility and availability of clean and safe water services in the county due to increased number of implemented water projects had a loading factor of 0.496. Customers are satisfied with the implementation of water projects had a loading factor of 0.476. There is an increase in revenue collected due to increased number of implemented water projects in the county had a loading factor of 0.590. Planning of water projects has led to increased number of water connections in the county had a loading factor of 0.480. The procedures of water connections have improved due to the role of planning in water construction projects had a loading factor of 0.542. Subsequently, no item, with low factor loading was discarded. The factor loading were ranging between 0.454 and 0.590 as indicating that none was considered for removal as shown in Table 4.10(f). Based on these findings all the factors were considered valid to measure effect of Implementation of water construction projects in Bomet County, Kenya.

Table 4.9: Factor Loadings

(a) Scheduled Planning	Factor Loadings
The project manager had a clear scope of the project requirements	.701
The project is implemented within the stipulated scope	.542
The project experience various milestones	.722
Managing project milestones improves scheduling plans of water project	.748
Activities of the project were well stipulated	.711
Each staff was informed of their duties and responsibilities in the project	.620
The project manager had a clear scope of the project requirements	.656
The project is implemented within the stipulated scope	.625
Total	**0.667**
(b) Budget Planning	**Factor Loadings**
The budget allocations are agreed upon by all stakeholders	.582
Our project did not experienced budget variances in the last one year.	.583
The budget is subject to amendments during its implementation.	.642
The periodic Budgetary performance relies on projects operations.	.629
The budgetary performances of county projects have been on an upward path	.613
There is an effective system for budget control	.540
The budget allocations are agreed upon by all stakeholders	.599
Our project did not experienced budget variances in the last one year.	.676
Total	**0.608**
(c) Factor loadings for Communication Plans	**Factor Loadings**
The project has clear channels of communication	.768
The reporting system put in place is effective	.693
The communication between the parties on the project is effective.	.579
All required information is sent to the relevant receiver.	.500
It is clear who is responsible for which communication.	.613
Channel of communication used effectively to share Information on a timely manner.	.570
Communication channels are regularly reviewed to match changes.	.643
Community members participate in the conception and design of the water projects.	.512
Total	**0.610**
(d) Factor loadings for Resource Planning	**Factor Loadings**
There is sufficient trained personel in repairs and maintenance of water system.	.769

There is enough technical & financial support from the NGOs, churches, in water system management.	.758
Construction equipment's are available.	.946
The county government has put in place effective internal audit trails for all financial transactions within its purview.	.763
There is enough capacity within the locality on accessing and purchasing repair materials	.608
Materials for the construction of water projects are easily accessible	.802
All employees have targets to achieve	.874
The cost of constructions equipment's is affordable	.834
Total	**.794**

	Factor Loads
(e) Factor loading for Technology Integration	
The objectives of water projects are clearly communicated to enhance stakeholder's participation.	.506
Community members participate in the conception and design of the water projects	.591
The reporting system put in place is effective.	.585
Communication between the parties on the project is effective.	.582
All required information is sent to the relevant receiver on time.	.589
It is clear who is responsible for which communication.	
Channel of communication used effectively to share Information on a timely manner.	.536
Communication channels are regularly reviewed to match changes.	.518
	.613
Total	**0.565**
(f) Factor loadings for Implementation of Water Construction Projects	**Factor Loads**
Planning of water projects has led to increased number of water connections in the county	.542
The procedures of water connections have improved due to the role of planning in water construction projects.	.454
There is improved accessibility and availability of clean and safe water services in the county due to increased number of implemented water projects	.496
Customers are satisfied with the implementation of water projects.	.476
There is an increase in revenue collected due to increased number of implemented water projects in the county.	.590
Planning of water projects has led to increased number of water connections in the county	.480
The procedures of water connections have improved due to the role of planning in water construction projects.	.542
Total	**0.511**

Confirmatory factor analysis (CFA)

Instead of principle component analysis (PCA), Confirmatory factor analysis (CFA) was also employed to establish construct validity. In this case the study was conducted using fit indices. Lower values of fit indices indicate that the measurement model is a bad model because scales used to measure the dimensions of conceptual framework will always not be validated. For a good Confirmatory factor analysis (measurement model) model to be obtained, every factor loading of the CFA should be more than 0.50. Factor loading is simply described as the standardized value of each coefficient within the Confirmatory factor analysis model. Factor loading higher than 0.5 is a clear indicator of convergent validity of research instrument. In addition to that, critical rate value higher than 2 for every item in CFA findings suggest that the item is loaded to the factor it is connected. In this study all the items under scheduled planning, budget planning, communication planning, resource planning, technology Integration and Implementation of water construction projects had a factor loads above 0.5 suggesting all the factors were valid enough.

Table 4.10: Results of Confirmatory Factor Analysis (CFA)

			Standardized Estimate factor loads	Unstandardized Estimates factor loads	Std error.	Critical value.	P-Value
SP1	<---		.651	1.000			
SP2	<---		.420	.788	.184	4.271	***
SP3	<---		.564	.482	.175	2.748	.006
SP4	<---	Scheduled	.506	.547	.173	3.165	.002
SP5	<---	Planning	.522	.921	.177	5.200	***
SP6	<---		.689	1.299	.198	6.571	***
SP7	<---		.590	1.028	.178	5.782	***
SP8	<---		.572	.907	.191	4.753	***
BP1	<---		.558	1.000			0.00***
BP2	<---		.556	.852	.163	5.240	***
BP3	<---		.654	1.311	.235	5.591	***
BP4	<---	Budget	.541	1.532	.245	6.262	***
BP5	<---	Planning	.596	1.376	.207	6.660	***
BP6	<---		.719	1.125	.185	6.093	***
BP7	<---		.579	1.158	.214	5.400	***
BP8	<---		.517	.800	.178	4.509	***
CP1	<---		.509	1.000			0.00***
CP2	<---		.539	1.010	.179	5.649	***
CP3	<---		.639	.807	.160	5.052	***
CP4	<---	Communicat	.623	1.126	.177	6.352	***
CP5	<---	ion planning	.609	1.035	.166	6.219	***
CP6	<---		.576	.941	.159	5.920	***
CP7	<---		.752	1.233	.165	7.478	***
CP8	<---		.526	.863	.159	5.440	***
RP1	<---		.541	1.000			
RP2	<---		.522	.924	.253	3.646	***
RP3	<---		501	.620	.107	-.769	.0442
RP4	<---	Resource	.593	1.274	.301	4.229	***
RP5	<---	Planning	.635	1.417	.325	4.360	***
RP6	<---		.754	1.523	.328	4.648	***
RP7	←-		.549	1.208	.296	4.078	***
RP8	<---		.528	1.296	.324	3.998	***
TI1	<---		.802	1.000			
TI2	<---		.701	.933	.127	7.373	***
TI3	<---	Technology	.702	1.075	.153	7.040	***
TI4	<---	Integration	.542	1.126	.145	7.737	***
TI5	<---		.501	1.185	.143	8.259	***
IM1	<---	Implementat	.633	1.000			

			Standardized Estimate factor loads	Unstandardized Estimates factor loads	Std error.	Critical value.	P-Value
IM2	<---	ion of water	.605	1.016	.180	5.657	***
IM3	<---	construction	.630	1.185	.203	5.845	***
IM4	<---	projects	.635	1.230	.209	5.881	***
IM5	<---		.721	1.299	.201	6.453	***
IM6	<---		.604	1.010	.179	5.652	***

The result shown in table 4.11 is also displayed on confirmatory factor analysis figure 4.12 Confirmatory Factor Analysis (CFA). The fit indices result also shows that the confirmatory Factor Analysis Model was good enough: $\chi 2/DF$ =2.9721, CFI=0.986, IFI=0.94, AGFI=0.93 RMSEA= 0.0021.

Table 4.11: Model Fit indices

Fit indices Model	CMIN/DF	CFI	IFI	AGFI	RSMEA
Fit indices Value	2.9721	0.986	0.94	0.93	0.0021

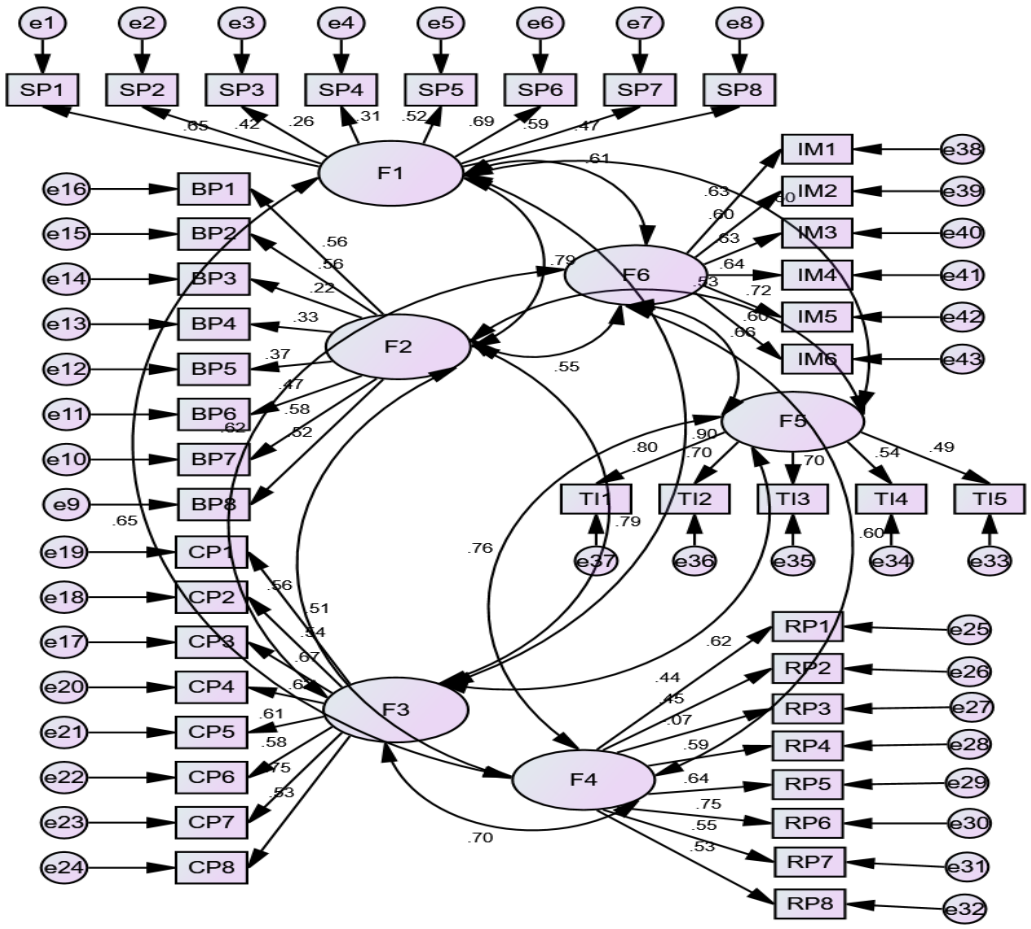

Figure 4.3: Confirmatory Factor Analysis

The study has exposed the importance of project planning on implementation of water projects in the county of Bomet. Project planning have potential of providing solutions to some of the problems encountered on implementation of water projects. First, the influence of schedule planning is known to save time because the time spent on implementation is saved when scheduling of resources is applied to ensure successful implementation of water projects.

4.7 Descriptive Statistics of Study Variables.

This section provides the research findings as presented in tables and the number of respondents per each test item for each variable**.** The main purpose of the study was to establish the relationship between project planning and implementation of water construction projects in Bomet County, Kenya. The researcher analyzed the

following variables for the study; Scheduled Planning, Budget Planning, Communication Planning, Resource Planning, and Technology Integration.

4.7.1 Objective 1: Scheduled Planning

The study sought to establish the extent to which the project manager had a clear scope of the project requirements. The study found out that 7.6% of the respondents strongly disagreed. A further 10.3% of the respondents disagreed, 18.5% of the respondents were neutral, 55.43% of the respondents agreed while 8.2% of the respondents strongly agreed. Majority of the respondents (55.43%) agreed that the project manager had a clear scope of the project requirements. Overall, 17.9% of the respondents generally disagreed that the project manager had a clear scope of the project requirements. On the other hand, 63.63% of the respondents generally agreed that the project manager had a clear scope of the project requirements.

On whether the project is implemented within the stipulated scope, the study established that 10.86% of the respondents strongly disagreed. A further 19.6% of the respondents disagreed, 26.1% of the respondents were neutral, 36.41% of the respondents agreed while 7.1% of the respondents strongly agreed. Majority of the respondents (36.41%) agreed that the project is implemented within the stipulated scope. Overall, 30.46% of the respondents generally disagreed while 43.5% of the respondents generally agreed. The results of the study clearly indicate that the project is implemented within the stipulated scope. The results of this study corroborate studies conducted by Cornelius (2010) who sought to establish the indicators of project scope in an organization.

On the issue of whether the project experiences various milestones, the study found out that 1.1% of the respondents strongly disagreed. A further 10.9% of the respondents disagreed, 33.2% of the respondents were neutral, 47.8% of the respondents agreed while 7.1% of the respondents strongly agreed. Majority of the respondents (47.8%) agreed that the project experience various milestones. Overall, 12% of the respondents generally disagreed while 54.9% of the respondents generally agreed. Another significant number of respondents (33.2%) were not sure if the project’s experience various milestones.

The element of whether managing project milestones improves scheduling plans of water project was also looked into in the study. The study found that 2.2% of the respondents strongly disagreed. A further 8.2% of the respondents disagreed, 31% of the respondents were neutral, 50% of the respondents agreed while 8.7% of the respondents strongly agreed. Majority of the respondents (50%) agreed that managing project milestones improves scheduling plans of water project. Overall, 10.4% of the respondents disagreed while 58.7% of the respondents generally agreed.

The study finally sought to establish whether staffs were informed of their duties and responsibilities in the project. The study found that 1.1% of the respondents strongly disagreed. A further 3.8% of the respondents disagreed, 15.8% of the respondents were neutral, 63% of the respondents agreed while 16.3% of the respondents strongly agreed. Majority of the respondents (63%) agreed that staff were informed of their duties and responsibilities in the project. Overall, 4.9% of the respondents generally disagreed while a significant majority of the respondents (79.3%) generally agreed. Averagely for each item considered under schedule planning, mean values ranging between 3.54 and 4.57 were obtained clearly demonstrating that the respondent were in agreement with the items considered. Overall mean recorded was 4.005 with standard deviation of 0.93 again showing that the respondents were in agreement with all the items scheduled planning. The results of the study are a true reflection of studies conducted by Brown and Sessions (2016).

Table 4.12: Respondents opinion on Scheduled Planning

Statement	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mean	Std. Dev	Total (%)
The project manager had a clear scope of the project requirements	7.6	10.3	18.5	55.43	8.2	3.82	1.14	100
The project is implemented within the stipulated scope	10.86	19.6	26.1	36.41	7.1	3.54	1.09	100
The project experience various milestones	1.1	10.9	33.2	47.8	7.1	3.84	.725	100
Managing project milestones improves scheduling plans of water project	2.2	10.3	20.1	58.2	9.2	4.09	.758	100
Activities of the project were well stipulated	2.2	8.2	31	50	8.7	4.17	.924	100
Each staff was informed of their duties and responsibilities in the project	1.1	3.8	15.8	63	16.3	4.57	.964	100
Total						**4.00**	**0.93**	**100**

Respondents were also asked to indicate other ways they think schedule plans influences implementation of water construction projects. The respondents indicated that the schedule outline how quickly the work will get done, it also outlines how the work will get done. The schedule defines the sequence and method in which the materials will be put in place.They explained that schedule plans generate knowledge of the details and fewer surprises well into the project by the need to pre-plan the project, it maximizes quality control measures by properly sequencing the work and improves planning of resources such as labor and equipment. Some of the respondents indicated that:

"Schedule plans enhance coordination efforts between client and construction operations"

"Schedule plans dives the affected parties such as the subs, vendors, designers and client time to better plan their own activities"

"Schedule plans improves safety performance by sequencing the activities to ensure maximum protection for workers"

Therefore, it was clear that schedule panning decreases risk of damage to adjacent property and installed work leading to a reduced punch list. Also, schedule plans help achieve the highest level of productivity in order to complete the project in the shortest time frame reasonably possible. The findings concur with those of the Construction Industry Institute (CII, 2019) that conducted a study and found that a positive, quantifiable relationship exists between the effort expended during the per-project planning phase and the ultimate success of a project. There is no substitute for proper planning. Success in every endeavor comes with appropriate planning and the hard work required implementing the plan. A properly prepared schedule will yield many benefits for all team members. Therefore, construction project managers should plan for success.

Respondents were also asked their opinion on ways of improving project planning. Respondent explained that the earlier the schedule is put on and communicated to the project team, the better. They also explained that the construction scheduler needs to think through how to put in place the proposed elements while maintaining the integrity of the design. Some respondents explained:

"The scheduler must understand the proposed scope of work and the details affecting the connection of each component in order to create a proper construction schedule."

"The schedule should build into the sequences a maximum level of efficiency and productivity for each contractor or subcontractor involved in the placement and assembly of the various components and systems."

By knowing the actual lead times and the way materials will be assembled, a good scheduler can evaluate several possible installation sequences to arrive at the most productive sequence. Avoiding improvisation imposed by last minute surprises, or lack of foresight, benefits a project by preventing unnecessary costs and delays.

4.7.2 Objective 2: Budget Planning

The study sought to establish whether budget allocations are agreed upon by all stakeholders. Table 4.13 shows that 22.3% of the respondents strongly disagreed, 39.7% of the respondents disagreed, 19% of the respondents were neutral, 15.2% of the respondents agreed while the remaining 3.8% of the respondents strongly agreed. This shows that majority of the respondents (39.7%) disagreed that budget allocations are agreed upon by all stakeholders. A further 22.3% of the respondents strongly disagreed that budget allocations are agreed upon by all stakeholders. The results are a clear indication that budget allocations are not agreed upon by all stakeholders.

The study further sought to establish if the project did not experienced budget variances in the last one year. The above table shows that 5.4 % of the respondents strongly disagreed that there exists piece rate as a mode of reward. A further 9.8% disagreed that the project did not experienced budget variances in the last one year, 15.8% of the respondents were neutral, 56% of the respondents agreed that the project did not experienced budget variances in the last one year while 13% of the respondents strongly agreed that the project did not experienced budget variances in the last one year. The results clearly indicate that the project did not experienced budget variances in the last one year since this is the position taken by majority of the respondents (56%). A further 13% also strongly agreed, thus making a total of 68% who generally agreed that the project did not experienced budget variances in the last one year.

On whether the budget is subject to amendments during its implementation, the study found out that 3.3% of the respondents strongly disagreed that the budget is subject to amendments during its implementation. A further 10.3% of the respondents disagreed that the budget is subject to amendments during its implementation, 28.8%

of the respondents were neutral, and 45.7% of the respondents agreed that the budget is subject to amendments during its implementation while 12% of the respondents strongly agreed that the budget is subject to amendments during its implementation. Overall, a total of 57.7% of the respondents generally agreed that the budget is subject to amendments during its implementation. The results, therefore, clearly indicate that the budget is subject to amendments during its implementation.

On whether the periodic budgetary performance relies on projects operations, the study found that 11.4% of the respondents strongly disagreed that the periodic budgetary performance relies on projects operations. A further 21.2% of the respondents disagreed that the periodic Budgetary performance relies on projects operations, 16.8% of the respondents were neutral, 42.4% of the respondents agreed that the periodic Budgetary performance relies on projects operations while 8.2% of the respondents strongly agreed that the periodic budgetary performance relies on projects operations.

The study further sought to establish whether the budgetary performances of county projects have been on an upward path. The study established that 35.9% of the respondents strongly disagreed that the budgetary performances of county projects have been on an upward path. A further 39.7% of the respondents disagreed that the budgetary performances of county projects have been on an upward path, 11.4% of the respondents were neutral, 10.3% of the respondents agreed that the budgetary performances of county projects have been on an upward path while 2.7% of the respondents strongly agreed that the budgetary performances of county projects have been on an upward path. The results are clear indication that the budgetary performances of county projects have not been on an upward path with a total of 75.6% of the respondents generally disagreed that the budgetary performances of county projects have been on an upward path. Averagely for each item considered under budget planning, mean values ranging between 3.02 and 3.87 were obtained clearly demonstrating that the respondent were in agreement with the items considered. Overall mean recorded was 3.472 with standard deviation of 0.913 again showing that the respondents were in agreement with all the items budget planning. This finding corresponds to the findings of Munene (2017), who agreed that

sufficient allocation of financial resources facilitates decrease in the number of reported cases of water borne diseases.

Table 4.13: Respondents opinion on Budget Planning

Statement	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mean	Std. Deviation	Total (%)
The budget allocations are agreed upon by all stakeholders	22.3	39.7	19	15.2	3.8	3.02	0.914	100
the budgetary performances of county projects have been on an upward path	35.9	39.7	11.4	10.3	2.7	3.26	0.896	100
Our project did not experienced budget variances in the last one year.	5.4	9.8	15.8	56	13	3.84	1.09	100
The budget is subject to amendments during its implementation.	3.3	10.3	28.8	45.7	12	3.74	0.825	100
The periodic Budgetary performance relies on projects operations.	11.4	21.2	16.8	42.4	8.2	3.69	0.748	100
The budgetary performances of county projects have been on an upward path	35.9	39.7	11.4	10.3	2.7	3.17	0.944	100
There is an effective system for budget control	7.6	21.7	38.6	29.3	2.7	3.57	0.962	100
Average						**3.472**	**0.913**	**100**

Respondents were also asked to indicate other ways in which budget planning influences implementation of water construction projects. They provided several ways. They explained that:

"Every successful construction project is a combination of quality, time, and budget. Setting up cost estimation helps in planning, coordinating, and executing activities."

"Budget planning also helps a construction manager stay on top of each task while also being aware of the project's limitations and progress."

All construction projects can only be taken forward with a well-planned budget. The measure of the required amount of funds determines the time and nature of the activities involved. The absence of a construction project budget may lead to cost and time overruns. When a project budget is inaccurately planned, one can expect a lot of situations to occur, and none of them yields a positive outcome. One of them is being unable to deliver the promised project within time and quality. It may significantly affect the contractors as well as the company's credibility and that of the project site engineers involved in the project. Also, since most of the construction projects are of higher value, so being able to complete the construction without having to burn all the available resources is fundamental.

When a project budget is inaccurately planned, one can expect a lot of situations to occur, and none of them yields a positive outcome. One of them is being unable to deliver the promised project within time and quality. It may significantly affect the contractors as well as the company's credibility and that of the project site engineers involved in the project. Respondents were also asked to suggest ways in which schedule plans can be improved to improve project implementation. Some of the responses were:

"Planning may seem to be a cost to some construction companies, but it has a lasting impact on the entire project"

"Budgeting and forecasting is a team effort. Getting everyone involved means that all departments have their needs heard and understood"

"Once you have your budget, you're not done. You want to take a look at it and make sure your figures are accurate. During the project is not the time

to find a typo. You can also seek those experts and other project team members to check the budget and make sure it's right."

They explained that thorough research can help a contractor to meet the objectives and requirements of the project. Investing time, in the beginning, can cover all the unexpected losses that one could incur. There are many components necessary to build a budget, including direct and indirect costs, fixed and variable costs, labor and materials, travel, equipment and space, licenses and whatever else may impact your project expenses. Therefore, to meet all the financial needs of projects, a project budget must be created thoroughly, not missing any aspect that requires funding.

4.7.3 Objective 3: Communication Planning

The study sought to establish the existence of clear channels of communication. The study found out that 9.2 % of the respondents strongly disagreed. A further 30.4% of the respondents disagreed, 23.9% of the respondents were neutral, 30.4% of the respondents agreed while 6% of the respondents strongly agreed. The findings, therefore, indicate that majority of the respondents (30.4%) both disagreed and agreed respectively that there is existence of clear channels of communication. Overall, 39.6% of the respondents generally disagreed that there is existence of clear channels of communication. On the other hand, 36.4% of the respondents generally agreed that there is existence of clear channels of communication.

On whether the reporting system put in place is effective, the study established that 7.1% of the respondents strongly disagreed. A further 23.4% of the respondents disagreed, 21.7% of the respondents were neutral, 42.9% of the respondents agreed while 4.9% of the respondents strongly agreed. Overall, 47.8% of the respondents generally agreed that the reporting system put in place is effective. The results are a clear indication that although the reporting system put in place is effective, they need to improve since it is only a simple majority who concurred with this statement i.e. less than 50%.

The study sought to establish if communication between the parties on the project is effective. The study found out that 6% of the respondents strongly disagreed. A further 15.2% disagreed, 2.5% of the respondents were neutral, 42.4% of the respondents agreed while 11.4% of the respondents strongly agreed. Overall, 53.8% of the respondents generally agreed that communication between the parties on the project is effective.

On whether all required information is sent to the relevant receiver, the study established that 4.9% of the respondents strongly disagreed. A further 28.8% of the respondents disagreed, 31.5% of the respondents were neutral, 29.3% of the respondents agreed while 5.4% of the respondents strongly agreed. In an ideal situation, all required information is supposed to be sent to the relevant receiver. Averagely for each item considered under communication planning, mean values ranging between 3.12 and 4.13 were obtained clearly demonstrating that the respondent were in agreement with the items considered. Overall mean recorded was 3.64 with standard deviation of 0.91 again showing that the respondents were in agreement with all the items communication planning These findings did not corroborate with the findings on communication strategy for the water sector reform program which found out that realistic timelines and expectations were communicated to the people in the initial phase of the reforms in all four countries (MoWRM&D, 2004).

Table 4.14: Respondents opinion on communication Plans

Statement	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mean	Std. Deviation	Total (%)
The project has clear channels of communication	9.2	30.4	23.9	30.4	6	3.24	0.96	100
The reporting system put in place is effective	7.1	23.4	21.7	42.9	4.9	3.86	1.21	100
The communication between the parties on the project is effective.	6	15.2	25	42.4	11.4	3.74	0.89	100
All required information is sent to the relevant receiver.	4.9	28.8	31.5	29.3	5.4	3.69	0.81	100
It is clear who is responsible for which communication.	20.1	38	19	19.6	3.3	3.12	0.92	100
Channel of communication used effectively to share Information on a timely manner.	13	21.2	23.9	38.6	3.3	3.53	0.91	100
Communication channels are regularly reviewed to match changes.	3.8	22.3	28.3	40.8	4.9	3.79	0.74	100
Community members participate in the conception and design of the water projects.	1.1	8.7	28.8	49.5	12	4.13	0.84	100
Average	**6.3**	**18.8**	**26.5**	**40.5**	**7.9**	**3.64**	**0.91**	**100**

Respondents were also asked to indicate other ways in which they think communication planning influences implementation of water construction projects.

> *"Without strong communication skills, project managers would find it incredibly difficult, if not impossible, to effectively manage their teams and coordinate efforts in order to bring about a project's successful resolution."*

> *"A lack of or poor communication leads to misunderstanding in the workflow, weak return on investment (ROI), and even loss of revenue."*

Communication plans help control the flow of information; keeps stakeholders

informed of information reduces confusion, interruptions, and can provide project managers greater autonomy. They also explained that good communication keeps conflict and confusion from bogging project down by ensuring key players are aligned on project goals and know exactly what's expected of them. It also helps build team-wide trust so everyone works better together from project start to finish.

Respondents were also requested to suggest ways in which communication planning can be improved to improve project implementation. It's important to determine a chain of command for communication on a construction project. These are typically spelled out in the contract documents and usually require the owner and general contractor to communicate with each other through the architect. Good planning leads to better project communication. A clear and collaborative project plan is best tool for communicating and tracking all the details, deadlines, and to-dos that will lead your team and project to success. Some respondents stated:

> *"When communicating in construction you want to make every effort to have your message understood the first time you send it. Avoid using jargon or terms that the people you are communicating with might not understand."*

> *"Document and record all communication you have on a construction project."*

The flow of communication affects the flow of a construction project. Problems and delays start to occur when people stop communicating or responding to inquiries. When everyone is collaborating and communicating effectively and efficiently, projects tend to run smoother and be completed on time and within budget. Good communication ensures team members are aligned on project goals and understand exactly what's expected of them. It also helps build trust so everyone works better together from project start to finish.

4.7.4 Objective 4: Resource Planning

The study sought to establish if there is sufficient trained personal in repairs and maintenance of water system. The study found out that 20.1% of the respondents strongly disagreed. A further 27.2% of the respondents disagreed, 24.5% of the respondents were neutral, 25% of the respondents agreed while 3.3% of the respondents strongly agreed. Overall, 47.3% of the respondents generally disagreed that there is sufficient trained personal in repairs and maintenance of water system while 28.3% of the respondents generally agreed. It is important that there is sufficient trained personal in repairs and maintenance of water system.

The study also sought to establish if there is enough technical & financial support from the NGOs, churches, in water system management. The study found that 16.3% of the respondents strongly disagreed that there is enough technical & financial support from the NGOs, churches, in water system management. A further 32.6% of the respondents disagreed, 37% of the respondents were neutral, 13% of the respondents agreed while, 1.1% of the respondents strongly agreed. Overall, 48.9% of the respondents disagreed that there is enough technical & financial support from the NGOs, churches, in water system management while 14.1% of the respondents generally agreed. A significant number of respondents (37%) were not sure whether or not there is enough technical & financial support from the NGOs, churches, in water system management.

The study further sought to establish if construction equipment's are available. The study found that 14.1% of the respondents strongly disagreed. A further 26.6% of the respondents disagreed, 42.4% of the respondents were neutral, 13.6% of the respondents agreed while 3.3% of the respondents strongly agreed. Overall, 40.7% of the respondents generally disagreed while 16.9% of the respondents generally agreed. Another significant number of respondents (42.4%) of the respondents were not sure whether or not construction equipment's are available. Averagely for each item considered under resource planning, mean values ranging between 3.01 and 3.29 were obtained clearly demonstrating that the respondent were in agreement with the items considered. Overall mean recorded was 3.05 with standard deviation of

0.91 again showing that the respondents were in agreement with all the items resource planning. This is in line with a study by Ogogo, Omwenga and Paul (2018) that concluded that resource planning enhances the performance of government construction projects in Kenya.

Table 4.15: Respondents opinion on Resource Planning

Statement `	**Strongly disagree (%)**	**Disagree (%)**	**Neutral (%)**	**Agree (%)**	**Strongly agree (%)**	Mean	Std. Deviation	**Totals (%)**
There is sufficient trained personal in repairs and maintenance of water system.	20.1	27.2	24.5	25	3.3	3.03	0.86	100
There is enough technical & financial support from the NGOs, churches, in water system management.	16.3	32.6	37	13	1.1	3.06	1.11	100
Construction equipment's are available.	14.1	26.6	42.4	13.6	3.3	3.01	0.99	100
The county government has put in place effective internal audit trails for all financial transactions within its purview.	11.4	28.8	39.7	17.9	2.2	3.29	0.61	100
There is enough capacity within the locality on accessing and purchasing repair materials	15.2	27.7	33.7	21.7	1.6	3.11	0.82	100
Materials for the construction of water projects are easily accessible	22.3	33.2	25	15.8	3.8	3.07	0.91	100
All employees have targets to achieve	37	42.9	15.2	1.6	3.3	2.91	0.74	100
The cost of constructions equipment's is affordable	26.1	30.4	35.9	6	1.6	2.94	0.84	100
Average						**3.05**	**0.86**	**100**

Respondents were also asked to indicate other ways they think resource planning influences implementation of water construction projects. They explained that resource planning maximizes efficiency by helping teams to manage their utilization

rates, track capacity, and monitor progress, to keep projects on budget and work on track. Resource costs are a major deciding factor in overall revenue. If the resource costs go beyond a permissible limit, the profit margin will be affected and reduce profitability. Therefore, the onus is on managers to ensure that they do not surpass the resource cost limit. This will help them control the project's finances. Some of the responses were:

> *"Resource management ensures resource managers have on-demand, real-time visibility into people and other resources so they can have greater control over delivery."*

> *"When resource management is executed properly, it can help organization reduce costs, improve efficiencies, and boost productivity"*

Respondents also suggested ways in which resource planning can be improved to enhance project implementation. Respondents stated:

> *"Obtain a realistic view of both demand and capacity to deliver"*

> *"Manage and prioritize work requests and set appropriate expectations with key stakeholders"*

> *"Determine true resource availability; put the right resources on the right work at the right time"*

> *"Allow time for ongoing review and change things up if needed"*

Respondents also suggested that it is important to always debrief. The most informed resource planning comes from insights – both in real-time and after a project is delivered. Before looking forward, take time to look back on what worked well on the resourcing of a project. Before a project even starts, it's imperative to know what roles will be required for its delivery. This will directly influence the project scope, timings and how a project is quoted, so it's essential this is given the right consideration upfront. It is also important to strategically review current project resource plan by asking the questions: Are the right resources being used for the right

projects? Is the current project resource allocation in line with the organization's strategic goals? In addition, mapping out a project's key actions and milestones, and more importantly, what and who is involved in each stage is critical to a project's success. A well thought out project plan supports clear communication, expectations and also resource buy-in of objectives right from the off-set.

4.7.5 Moderating Variable Technology Integration

The study sought to find out if water project embraces information technology on billing and payment systems, the study found out that 3.3% of the respondents strongly disagreed that project embraces information technology on billing and payment systems. A further 10.3% of the respondents disagreed that project embraces information technology on billing and payment systems, 28.8% of the respondents were neutral, and 45.7% of the respondents agreed that project embraces information technology on billing and payment systems while 12% of the respondents strongly agreed that project embraces information technology on billing and payment systems. Overall, a total of 57.7% of the respondents generally agreed that project embraces information technology on billing and payment systems. The results, therefore, clearly indicate that project embraces information technology on billing and payment systems.

The study further sought to find out whether I&T has allowed the organization to manage organizational knowledge of past projects. The study found out that 22.3% of the respondents strongly disagreed. A further 33.2% of the respondents disagreed, 25% of the respondents were neutral, 15.8% of the respondents agreed while 3.8% of the respondents strongly agreed and overall, 55.5% of the respondents generally disagreed that I&T has allowed the organization to manage organizational knowledge of past projects while 28.3% of the respondents generally agreed. It is important that an organization support the use of technology to enhance efficiency and effectiveness of the water system.

The study further sought to establish if the project utilizes ICT as the ideal vehicle for the dissemination of informational content. The study found out that 21.2 % of the respondents strongly disagreed. A further 1.6% of the respondents disagreed, 20.1% of the respondents were neutral, 31% of the respondents agreed while 26.1% of the respondents strongly agreed. Overall, 22.8% of the respondents generally disagreed that the project utilizes ICT as the ideal vehicle for the dissemination of informational content while 57.1% of the respondents generally agreed.

The study sought to establish if communication within and without the organization heavily depends on information technology. The study found out that 6% of the respondents strongly disagreed. A further 15.2% disagreed, 2.5% of the respondents were neutral, 42.4% of the respondents agreed while 11.4% of the respondents strongly agreed. Overall, 53.8% of the respondents generally agreed that communication within and without the organization heavily depends on information technology.

The study further sought to establish whether Information technology has enabled water policy framework to integrate various water construction projects. The study established that 2.7% of the respondents strongly disagreed that Information technology has enabled water policy framework to integrate various water construction projects. A further 10.3% of the respondents disagreed that Information technology has enabled water policy framework to integrate various water construction projects. 11.4% of the respondents were neutral, 39.7% of the respondents agreed that Information technology has enabled water policy framework to integrate various water construction projects while 35.9% of the respondents strongly agreed that Information technology has enabled water policy framework to integrate various water construction projects. The results were clear indication that Information technology has enabled water policy framework to integrate various water construction projects. A total of 75.6% of the respondents generally agreed that Information technology has enabled water policy framework to integrate various water construction projects while 13% of the respondents disagree.

The study finally sought to establish whether Information technology framework to a larger extent governs implementation of improved provision of water services. The study found that 1.1% of the respondents strongly disagreed. A further 3.8% of the respondents disagreed, 15.8% of the respondents were neutral, 63% of the respondents agreed while 16.3% of the respondents strongly agreed. Majority of the respondents (63%) agreed that Information technology framework to a larger extent governs implementation of improved provision of water services. Overall, 4.9% of the respondents generally disagreed that Information technology framework to a larger extent governs implementation of improved provision of water services while a significant majority of the respondents (79.3%) generally agreed. Averagely for each item considered under technology integration, mean values ranging between 3.04 and 4.01 were obtained clearly demonstrating that the respondent were in agreement with the items considered. Overall mean recorded was 3.73 with standard deviation of 0.93 again showing that the respondents were in agreement with all the items technology integration. This is in line with the findings by Marnwick and Labneuschag (2011) who viewed that information technology enables for efficient and effective conversion between data and information but not a good option for disseminating information to knowledge.

Table 4.16: Respondents opinion on Integration of information Technology

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Std. Deviation	Total %
Billing and Payment Systems								
The project embraces information technology on billing and payment systems.	3.3	10.3	28.8	45.7	12	3.63	0.82	100
I&T has allowed the organization to manage organizational knowledge of past projects.	22.3	33.2	25	15.8	3.8	3.04	1.01	100
Project Reporting								
The project utilizes ICT as the ideal vehicle for the dissemination of informational content.	21.2	1.6	20.1	31	26.6	3.81	0.92	100
Communication within and without the organization heavily depends on information technology.	6	15.2	25	42.4	11.4	3.93	1.02	100
Policy Framework								
Information technology has enabled water policy framework to integrate various water construction projects.	2.7	10.3	11.4	39.7	35.9	4.01	0.88	100
Information technology framework to a larger extent governs implementation of improved provision of water services.	1.1	3.8	15.8	63	16.3	3.97	0.94	100
Average	**9.43**	**12.40**	**21.02**	**39.60**	**17.67**	**3.73**	**0.93**	**100**

Respondents were also asked to indicate other ways they think technology influences implementation of water construction projects. Those who want to remain competitive in the construction industry need to discover and adopt the beneficial technologies that are available, or they may get left behind. They explained that technology streamlines daily processes, making them more efficient. Also, construction workers are allowed to focus on other essential areas when you automate their workload. Robots and drones can take over mundane or hazardous jobs and complete them more accurately, which frees employees to work on human-centric tasks. Some of the responses stated:

> *"Technology makes it easier for everyone involved in the project to collaborate more quickly and effectively."*
>
> *"Technology simplifies and automates the information capturing process while integrating data back into company systems in real time"*
>
> *"Teams can use technology to ensure that they are quickly and accurately meeting documentation and compliance regulations."*
>
> *"Teams can access real-time project data by utilizing mobile and cloud-based technologies."*

Therefore, though adopting new technologies may require a significant investment upfront, many of these technologies can actually save time and money in the long run while also increasing new opportunities for business. It is important for construction professionals to stay up-to-date with the latest data on technologies that improve construction efficiency in order to best determine which ones are most beneficial and worth the investment.

4.7.6 Implementation of Water Construction Projects

The study sought to establish whether planning of water projects has led to increased number of water connections in the county. The study found that 4.9% of the respondents strongly disagreed. A further 7.1% of the respondents disagreed, 11.4% of the respondents were neutral, 62% of the respondents agreed while 14.7% of the

respondents strongly agreed. Overall, 12% of the respondents generally disagreed that planning of water projects has led to increased number of water connections in the county while 76.7% of the respondents generally agreed.

The study further sought to establish if the procedures of water connections have improved due to the role of planning in water construction projects. The study found that 6% of the respondents strongly disagreed. A further 11.4% of the respondents disagreed, 25% of the respondents were neutral, 48.9% of the respondents agreed while 8.7% of the respondents strongly agreed. Overall, 17.4% of the respondents generally disagreed while 57.6% of the respondents generally agreed.

The study further sought to establish if there is improved accessibility and availability of clean and safe water services in the county due to increased number of implemented water projects. The study found that 5.4% of the respondents strongly disagreed. A further 15.8% of the respondents disagreed, 21.7% of the respondents were neutral, 43.5% of the respondents agreed while 13.6% of the respondents strongly agreed. Overall, 21.2% of the respondents generally disagreed that there is improved accessibility and availability of clean and safe water services in the county due to increased number of implemented water projects while 57.1% of the respondents generally agreed. Averagely for each item considered under implementation of water construction project, mean values ranging between 3.31 and 4.11 were obtained clearly demonstrating that the respondent were in agreement with the items considered. Overall mean recorded was 3.84 with standard deviation of 1.06 again showing that the respondents were in agreement with all the items implementation of water construction project. These findings were in line with the study carried out by Kanda, et. al., 2016 which conclude that achieving project completion on time, within budget, at specified quality standards, and most importantly without unprecedented cost escalations is a major criterion of success of a project.

Table 4.17: Respondents Opinion on Implementation of Water Construction Projects

Statement	Strongly disagree	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mean	Std. Deviation	Total (%)
Planning of water projects has led to increased number of water connections in the county	4.9	7.1	11.4	62	14.7	4.11	1.06	100
The procedures of water connections have improved due to the role of planning in water construction projects.	6	11.4	25	48.9	8.7	3.86	1.01	100
There is improved accessibility and availability of clean and safe water services in the county due to increased number of implemented water projects	5.4	15.8	21.7	43.5	13.6	4.02	1.03	100
Customers are satisfied with the implementation of water projects.	13.6	20.1	23.9	33.2	9.2	3.89	1.12	100
There is an increase in revenue collected due to increased number of implemented water projects in the county.	31	26.1	20.1	21.2	1.6	3.31	1.07	100
Average						**3.84**	**1.06**	**100**

4.8 Diagnostic Tests

4.8.1 Sample Adequacy Test for the pilot study

To ascertain if the sample size was adequate enough to conduct principal component analysis Kaiser-Meyer-Olkin test was conducted. Kaiser-Meyer-Olkin test compares the values of the observed correlation coefficients with the values of the partial correlation coefficients thus confirming whether the sample size is adequate. The sampling adequacy value should always be more than 0.5 for acceptable or satisfactory factor analysis to be conducted. In this case a common criterion is that the researcher should have 10 – 15 participants per variable. According to (Fiedel, 2005) factor analysis is only inappropriate when the sample size is less than 50. On the other hand, Karagöz (2016), recommends a value 0.5 as minimum, values ranging between 0.7- 0.8 are also acceptable, and values more than 0.9 are very good. The results shows that KMO values were ranging between 0.641 and 0.817 with the least value of 0.641 which was also good enough because it was above the minimum of 0.5 as indicated in Table 4.18.

Bartlett test of Sphericity other than Kaiser-Meyer-Olkin test was performed to establish how suitable the dataset is for principal component analysis (PCA) to be conducted. Should it happen that the null hypothesis is accepted based Bartlett test of Sphericity results then, the analysis should not proceed. Bartlett test of Sphericity normally detects whether the correlation matrix indicating the relationship among the indicator variables is an identity matrix. An identity matrix is also known as unit matrix and it is a matrix in which all the diagonal elements are ones and all off diagonal elements are zeros (Kothari,2009). The results suggest that the entire correlation matrix for all the variables indicators were unit matrices hence there was no multicollinearity among the indicators for all the variables.

Table 4.18: KMO and Bartlett's Test

Schedule Planning (X1)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.717
	Approx. Chi-Square	193.890
Bartlett's Test of Sphericity	Df	28
	Sig.	.000
Budget Planning (X2)		
`Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.689
	Approx. Chi-Square	142.827
Bartlett's Test of Sphericity	df	28
	Sig.	.000
Communication Planning (X3)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.807
	Approx. Chi-Square	323.704
Bartlett's Test of Sphericity	df	28
	Sig.	.000
Resource Planning (X4)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.641
	Approx. Chi-Square	298.687
Bartlett's Test of Sphericity	df	28
	Sig.	.000
Technology Integration (Z)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.789
	Approx. Chi-Square	261.045
Bartlett's Test of Sphericity	df	15
	Sig.	.000
Implementation of water constructions projects (Y)_		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.817
	Approx. Chi-Square	218.813
Bartlett's Test of Sphericity	df	15
	Sig.	.000

4.9 Normality Test

4.9.1 Skewness and Kurtosis Test for Normality

One of the most important assumptions that should be investigated is the assumption of normality just to ensure the data is normally distributed before the regression analysis is conducted. The assumption of normality can be tested using various techniques which may include, Q-Q plot, Skewness and Kurtosis and Kolmogorov-Smirnov and Shapiro Wilk test. In this study, Skewness and Kurtosis was used to test for normality. Generally, skewness is a measure of the extent of deviation of distribution from symmetry while Kurtosis mainly describes the peakedness of

distribution as was illustrated by (Ming'ala, 2002). Skewness is basically obtained by obtaining the ration of difference in the mean and mode with standard deviation. On the other hand, kurtosis values are imputed by use of moments. For normality to be achieved, the values of Skewness should be zero while Kurtosis values should be three. Instances where skewness is not zero, the data is said to be to be positively skewed or negatively skewed. However, values of skewness within the range of +1 and -1 are acceptable for data to be considered normally distributed. Similarly, the values of kurtosis should also fall within a range of values of -2 and +2 according to Field (2009) for data to be considered to be normally distributed. Table 4.19 shown below shows the summery of both skewness and kurtosis values for all the variables which were under scrutiny and were within acceptable range of -2 and +2 are considered normal.

Table 4.19: Skewness and Kurtosis

		X1	X2	X3	X4	Y
Statistic	Skewness	-.717	-.455	-.872	-.470	-.403
	Kurtosis	.921	1.470	.746	.024	-.117
Std. Err	Skewness	.212	.212	.212	.212	.212
	Kurtosis	.420	.420	.420	.420	.420
Conclusion Remark on distribution		Normal	Normal	Normal	Normal	Normal

Variables: Schedule planning (x1), Budget planning (x2), Communication planning (x3), Resource planning (x4) Technology Integration (z), Dependent Variable: Implementation of water constructions projects(Y)

Histogram test for Normality

In most cases, it is always assumed that the residuals of linear regression models are normally distributed with mean zero and variance sigma. Therefore, it is necessary to establish the distribution of the residuals and this can be done by use of histograms which always represent an instant picture of the distribution of data according to Field, (2009). With regards to this, a histogram was also employed in the study to test the normality of the dependent variable as shown in Figure 4.3. It is also important to note that test statistics such as t- test, regression and ANOVA are based

on the assumption that the data were sampled from a Gaussian distribution (Indiana, 2011).

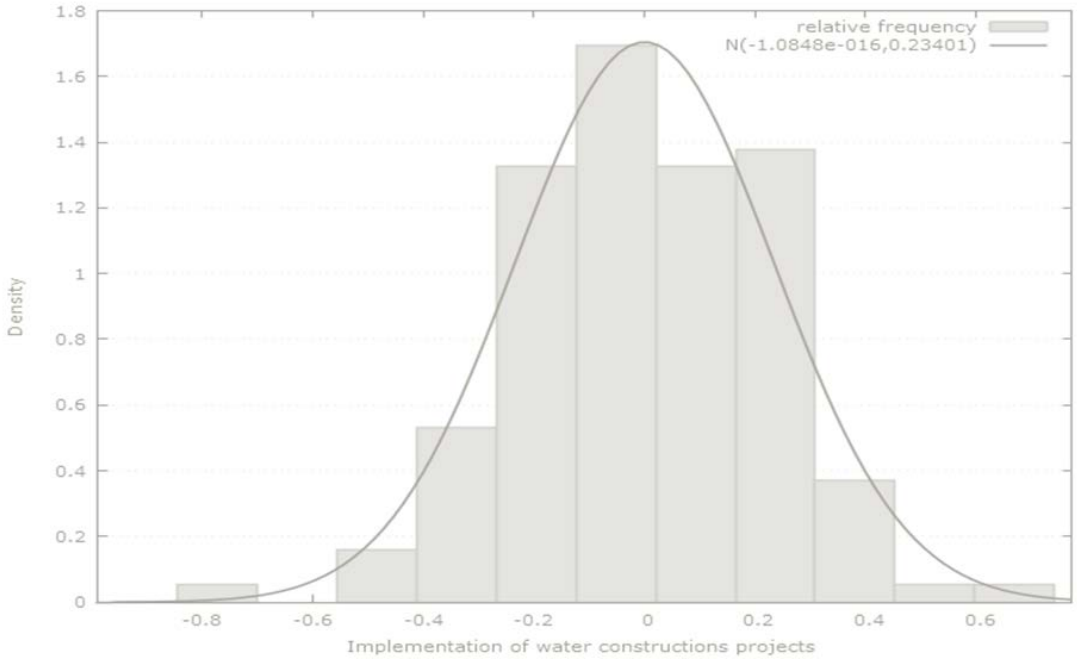

Figure 4.3: Histograms for Normality Test

4.9.2 Kolmogorov- Smirnov and Shapiro Wilk test for Normality

Kolmogorov- Smirnov and Shapiro Wilk was also employed to test whether the data set assumed the Gaussian condition. Kolmogorov- Smirnov and Shapiro Wilk normally compares the scores in the samples and check whether they have the same mean or standard deviation Sarstedt and Mooi (2014). The findings for Kolmogorov-Smirnov showed that, the p- values were greater than 0.05 for all the variables (Schedule planning, Budget planning, Communication Planning, Resource Planning, Technology Integration and Implementation of water constructions projects) indicating that the distributions were normally distributed. Shapiro-Wilk test results also showed that five variables were normally distributed. The details of the findings are shown in Table 4.19.

Table 4.20: Kolmogorov-Smirnov and Shapiro-Wilk

Variables	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	d.f	P-value	Statistic	d.f	p-value
Schedule planning	.062	131	.200*	.985	131	.148
Budget planning	.059	131	.200*	.990	131	.474
Communication Planning	.045	131	.200*	.994	131	.827
Resource Planning	.039	131	.200*	.992	131	.622
Technology Integration	.063	131	.200*	.991	131	.611
Implementation of water constructions projects	.062	131	.200*	.985	131	.148

*. This is a lower bound of the true significance.

4.9.3 Normality using Q-Q plot

Further test for normality was conducted using Q-Q plot particularly for the dependent variable (Implementation of water constructions projects). Figure 4.4 display the output of the finding and it was clear that majority of the observed values were lying along a straight line which clearly suggest the dependent variable (Implementation of water constructions projects) was normally distributed. These results did not deviate from the earlier findings based on Skewness and Kurtosis test, Kolmogorov- Smirnov and Shapiro Wilk test thus showing strong evidence of absence of the data not assuming Gaussian condition which is a prerequisite condition for regression model.

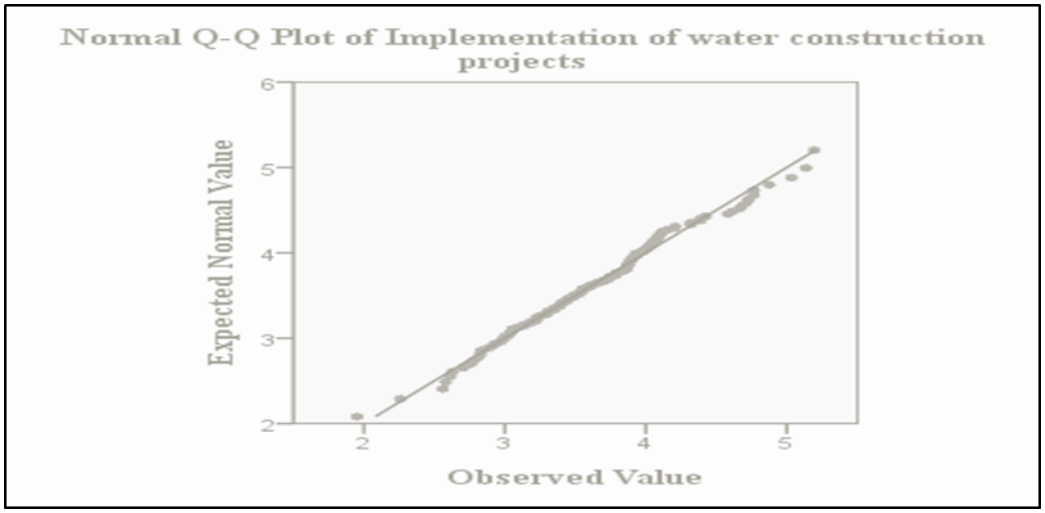

Figure 4.4: Normal Q-Q plot of Implementation of water constructions projects

4.9.4 Outliers Test

An outlier may be explained as that observation which is far from the rest of other observation. The presence of outlier in many cases makes the data not to be normally distributed (i.e not to assume Gaussian condition that is normality condition). It is therefore necessary to test the presence of outliers in any given data and even remove/expunge them for normality condition to be satisfied or met. In this study, the outliers present were tested and removed. Table 4.20 shows the outliers detected and removed. From the table it was clear that for Schedule planning there was no outlier detected, for Budget planning there were two extreme values (outliers) detected and removed, for Communication Planning there was no extreme values detected, for Resource planning , there were three extreme values observed and consequently removed for resource planning list , for technology integration, there were two outliers detected and removed and lastly for Implementation of water constructions projects of state corporation in Kenya, there was only one outlier detected and removed. As already stated, the presence of outlier makes the data not to be normally distributed, therefore the removal of these observations enhanced or improved the normality of the data sets thus fit regression analysis.

Table 4.21: Outliers Detected

Variables	Position of observed outliers	Total number of outliers
Schedule planning	-	0
Budget planning	66, 116	2
Communication Planning	-	0
Resource Planning	23, 58, 36,	3
Technology Integration	47, 102	2
Implementation of water constructions projects	52	1

4.9.5 Collinearity Diagnostic Test

In circumstances where the Eigen value is greater than the others, then the un centered cross products matrix can be highly influenced by small changes in the independent/explanatory variables or outcome. In cases where Eigen values are fairly similar, then the model obtained is likely to be unchanged by small changes in measured variables (Myers, 1990). According to the study results both models had Eigen values fairly greater than the rest indicating that the models obtained were likely to be changed by small changes in measured variable. Besides that, the condition index is another way of expressing Eigen values and they represent square root ratio of the largest Eigen value to the Eigen value of interest. The condition index will always be 1 for the dimension with the largest Eigen value, however, the condition index value can be larger than 1. Large values may indicate that collinearity exist but it is also worth noting that there is no specific value or rule about how large the condition index value should be to indicate collinearity problems. According to the findings in Table 4.21 the model had final condition index values 49.280. The values for dimensions in each model were the same with each other and therefore there was no collinearity.

It is also worth noting that collinearity may be detected looking for predictors that have high variance proportions on the same small Eigen values. High variance proportions will indicate that the variances of their regression coefficients are dependent. In this study 83% of the variance in regression coefficient of schedule planning was associated with Eigen value in dimension number 5, 96% of the variance in the regression coefficient of budget planning was associated with Eigen

value in dimension 2, 58% of the variance in the regression coefficient of communication planning was associated with Eigen value in dimension 5, 84% of the variance in the regression coefficient of resource planning was associated with Eigen value in dimension 2. This clearly indicated that there was no dependency between the five predictor variables for model.

Table 4.22: Collinearity Diagnostics Test

Model	Dimension	Eigen value	Condition Index	Variance Proportions				
				(Constant)	X_1	X_2	X_3	X_4
1	1	4.957	1.000	.00	.00	.00	.00	.00
	2	.018	16.553	.13	.02	.03	.00	.84
	3	.012	20.398	.47	.04	.00	.35	.15
	4	.008	25.541	.16	.11	.96	.07	.00
	5	.005	30.608	.23	.83	.00	.58	.02

a. Dependent Variable: Y

4.9.6 Correlation Analysis of Independent Variables

Correlation analysis clearly shows the strength of the relationship between variables. In O suggest that there was no significant relationship between the independent variables since all the p-values were more than 0.05. Since the p-values were higher, there was no problem of multi-collinearity among the explanatory variables. The findings were also supported with R values which majority was less than 0.4.

Table 4.23: Correlation Analysis of Independent Variable without moderator

		Schedule planning	Budget Planning	Communication Planning	Resource Planning
Schedule planning	Pearson Correlation	1			
	P-value (2-tailed)				
	N	131			
Budget planning	Pearson Correlation	.581**	1		
	P-value (2-tailed)	.000			
	N	131	131		
Communication Planning	Pearson Correlation	.711**	.609**	1	
	P-value (2-tailed)	.000	.000		
	N	131	131	131	
Resource Planning	Pearson Correlation	.475**	.455**	.564**	1
	P-value (2-tailed)	.000	.000	.000	
	N	131	131	131	131

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.24: Correlation Analysis of Independent Variable with moderator

		Schedule Planning *z	**Budget Planning *z**	**Communication Planning *z**	**Resource Planning *z**
Schedule planning *Z	Pearson Correlation	1			
	P-value (2-tailed)				
	N	131			
Budget planning *z	Pearson Correlation	-.026	1		
	P-value (2-tailed)	.772			
	N	131	131		
Communication Planning *z	Pearson Correlation	-.102	.023	1	
	P-value (2-tailed)	.248	.793		
	N	131	131	131	
Resource Planning *z	Pearson Correlation	.132	-.073	.073	1
	P-value (2-tailed)	.133	.410	.405	
	N	131	131	131	131

**. Correlation is significant at the 0.01 level (2-tailed). Z= Technology Integration

4.9.7 Multicollinearity

For multiple regression models, a condition may occur where the independent variables within the study are related with each other. Such condition may be referred to as multicollinearity which in most cases requires testing before

performing regression analysis to ascertain that the problem of multicollinearity does not exist. In this study, multicollinearity was tested using Variance Inflation Factor (VIF) which is a reciprocal of tolerance. Some scholars suggest that a VIF value more than 10 (VIF $\geq$ 10) indicate that there is a problem of multicollinearity. According to Montgomery (2001) the threshold value for existence of multicollinearity is 10 and above with corresponding tolerance statistic values below 0.1 indicating a serious problem while those below 0.2 indicating a potential problem.

The outcome in Table 4.24 suggests that the Variance Inflation Factor (VIF) value for Schedule planning was established to be 2.191 with corresponding tolerance statistic value of 0.456 in the absence of moderator and VIF value of 2.220 with corresponding tolerance statistic value of 0.573 in the presence of moderator. VIF for Budget planning was found to be 1.746 with corresponding tolerance statistic value of 0.551 in the absence of moderator and VIF value of 1.813 with corresponding tolerance statistic value of 0.450 in the presence of moderator. Again, the VIF values for Communication planning was found to be 2.529 with corresponding tolerance statistic value of 0.395 in the absence of moderator and VIF value of 2.561with corresponding tolerance statistic value of 0.390 in the presence of moderator. VIF values for Resource planning was found to be 1.523 with corresponding tolerance statistic value of 0.657 in the absence of moderator and VIF value of 1.574 with corresponding tolerance statistic value of 0.635 in the presence of moderator. Other details of the finding are shown in table 4.24. From the finding it was clear that the independent variables were not related with each other for both models (where the moderator is included and when it's not included) hence the problem of multicollinearity did not exist since the VIF values were within the acceptable limits.

Table 4.25: Multicollinearity Test

	Collinearity Statistics No Moderator		Collinearity Statistics Presence of Moderator	
	Tolerance	**VIF**	**Tolerance**	**VIF**
Schedule planning	.456	2.191	.450	2.220
Budget planning	.573	1.746	.551	1.813
Communication Planning	.395	2.529	.390	2.561
Resource Planning	.657	1.523	.635	1.574
Schedule planning *Z	-	-	.925	1.081
Budget planning *Z	-	-	.981	1.020
Communication Planning *Z	-	-	.941	1.063
Resource Planning *Z	-	-	.961	1.041

4.9.8 Test for Autocorrelation (Independent of Errors)

Independent of error terms in regression model is one of the most important assumptions commonly considered. Independency of error terms simply imply circumstances where error terms are not related with each other that is serial correlation does not exist (error terms are independent of each other). This assumption can be tested using the Durbin-Watson test. Durbin-Watson tests for serial correlations between error terms are tests which indicate whether the adjacent residuals are correlated. Usually, Durbin Watson estimator can be expressed $d_w = \sum_{i=1}^{n}(e_i - e_{i-1}) \Big/ \sum_{i=1}^{n} e^2$. A value of two of Durbin Watson indicates that the residuals are uncorrelated; a value more than 2 indicates a negative correlation between adjacent residuals, whereas a value below two indicates a positive correlation (Field, 2009). However, Durbin-Watson statistical values less than 1 or greater than 3 are definitely cause for concern. In this study the Durbin-Watson statistical values were 1.921, 1.925, 1.849, and 1.642 for simple linear regression models without moderator while values 2.008, 1.904, 1.780 and 1.661 with moderator. Besides that, Durbin-Watson statistical values for the overall regression model in the absence and the presence of moderator were 1.799 and 1.753 respectively which implies that all the values were within the acceptable limits hence there was no problem of autocorrelation for all models in the presence of moderator and absence of moderator (technology integration). A summary of results is shown in Table 4.25.

Table 4.26: Test for independent of errors

Model	Durbin Watson value	Durbin Watson *Z
$Y=B_0+B_1X_1$	1.921	2.008
$Y=B_0+B_1X_2$	1.925	1.904
$Y=B_0+B_1X_3$	1.849	1.780
$Y=B_0+B_1X_4$	1.642	1.661
Overall Regression Model	1.799	1.753

Predictors: Schedule planning (x1), Budget planning (x2), Communication planning (x3), Resource Planning (x4) Technology Integration (z), Dependent Variable: Implementation of water constructions projects(Y)

4.9.9 Heteroscedasticity and Homoscedasticity

Heteroscedasticity in a study normally occurs when the variance of the errors varies across observation, Long and Ervin (2000). Breusch-Pagan was used to test the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables. There were two versions of Breusch-Pagan tests which were conducted that is Breusch-Pagan tests and Breusch-Pagan tests with robust variant. Breusch-Pagan tests the null hypothesis that heteroscedasticity is not present which imply that Homoscedasticity is present. If P-value is less than 0.05, reject the null hypothesis. A large chi-square value greater than 9.22 would indicate the presence of heteroscedasticity (Sazali, Hashida, Jegak & Raduan, 2010). In this study, the chi-square value resulting from each regression model where every independent variable was considered individually as model indicated that heteroscedasticity was not a problem for the entire models. The null hypothesis tested was that variance is constant versus the alternative that variation was not constant. The Variables were: schedule planning, budget planning, communication planning, resource planning and technology Integration. The rest of the findings is shown in Table 4.24a below. The overall chi-square is a value resulting from overall regression which also indicates that heteroscedasticity was absent hence variance was said to be constant, as shown in table 4.26.

Table 4.27: Breusch-Pagan and white test for Heteroscedasticity

Test		Breusch-Pagan test	White's test	Breusch-Pagan test (Robust variant)
	Hypothesis	H_0:Heteroskedasticity not present	H_0:Heteroskedasticity not present	H_0:Heteroskedasticity not present
Regression for Schedule planning	Model 1	Test statistic: LM = 0.000109095 with p-value = P(Chi-square(1) > 0.00011) = 0.991666	Test statistic: LM = 0.118 with p-value = P(Chi-square(2) > 0.118002) = 0.942706	Test statistic: LM = 0.000160671 with p-value = P(Chi-square(5) > 6.97974) = 0.222151
Regression for Budget planning	Model 2	Test statistic: LM = 2.80134 with p-value = P(Chi-square (1) > 2.80134) = 0.0941853	Test statistic: LM = 5.19457 with p-value = P(Chi-square(2) > 5.19457) = 0.0744757	Test statistic: LM = 3.79348 with p-value = P(Chi-square(1) > 3.79348) = 0.0514526
Regression for Communication Planning	Model 3	Test statistic: LM = 3.49689 with p-value = P(Chi-square(1) > 3.49689) = 0.061484	Test statistic: LM = 4.00671 with p-value = P(Chi-square(2) > 4.00671) = 0.134882	Test statistic: LM = 4.0009 with p-value = P(Chi-square(1) > 4.0009) = 0.045476
Regression for Resource Planning	Model 4	Test statistic: LM = 0.130724 with p-value = P(Chi-square(1) > 0.130724) = 0.717683	Test statistic: LM = 0.137364 with p-value = P(Chi-square(2) > 0.137364) = 0.933624	Test statistic: LM = 0.124 with p-value = P(Chi-square(1) > 0.124) = 0.724736
Regression for Technology Integration	Model 5	Test statistic: LM = 0.411673 with p-value = P(Chi-square(2) > 0.411673) = 0.813966	Test statistic: LM = 0.411673 with p-value = P(Chi-square(2) > 0.411673) = 0.813966	Test statistic: LM = 0.0315967 with p-value = P(Chi-square(1) > 0.0315967) = 0.858916
Overall regression for all variables	Model 6	Test statistic: LM = 5.91057 with p-value = P(Chi-square(20) > 21.4093) = 0.373404	Test statistic: LM = 5.91057 with p-value = P(Chi-square(5) > 5.91057) = 0.315019	Test statistic: LM = 6.97974 with p-value = P(Chi-square(5) > 6.97974) = 0.222151

4.10 Linearity Test

One of the most important tests conducted before regression analysis was to find out whether there was linear relationship between schedule planning and Implementation of water constructions projects. Pearson moment's correlation coefficients was

employed as suggested by Cohen, West and Aiken (2003). The result is presented on table 4.27. The findings indicate that the variables Implementation of water constructions projects and schedule planning had a positive relationship indicated by a correlation coefficient value of .631***. This suggests that there was a linear positive relationship between schedule planning and implementation of water constructions projects which implies that an increase in schedule planning would lead to a linear increase in implementation of water constructions projects in the county of Bomet, Kenya.

Further test conducted was to establish the linear relationship between implementation of water construction projects in Bomet County, Kenya. and budget planning and the results indicate that the variables implementation of water constructions projects and budget planning had a positive relationship as was evident by a correlation coefficient value of 0.547**. Similar results show that there was positive relationship between implementation of water constructions projects and communication planning this was supported by correlation coefficient value of 0.657**. Lastly, the results also indicate that there was a strong positive relationship between resource planning and the dependent variable by a correlation coefficient of 0.547**. This implies that an increase in resource planning would result in a linear increase in implementation of water constructions projects.

Table 4.28: Linearity test between dependent variable and independent variables using Correlations Coefficients.

		Implementation of water constructions projects (Y)	**Schedule planning**
Implementation of water constructions projects (Y)	Pearson Correlation	1	.631**
	Sig. (2-tailed)		.000
	N	131	131
Schedule planning	Pearson Correlation	.631**	1
	Sig. (2-tailed)	.000	
	N	131	131
		Implementation of water constructions projects (Y)	Budget planning
Implementation of water constructions projects(Y)	Pearson Correlation	1	.527**
	Sig. (2-tailed)		.000
	N	131	131
Budget planning	Pearson Correlation	.527**	1
	Sig. (2-tailed)	.000	
	N	131	131
		Implementation of water constructions projects (Y)	Communication Planning
Implementation of water constructions projects(Y)	Pearson Correlation	1	.657**
	Sig. (2-tailed)		.000
	N	131	131
Communication Planning	Pearson Correlation	.657**	1
	Sig. (2-tailed)	.000	
	N	131	131
		Implementation of water constructions projects (Y)	Resource Planning
Implementation of water constructions projects(Y)	Pearson Correlation	1	.547**
	Sig. (2-tailed)		.000
	N	131	131
Resource Planning	Pearson Correlation	.547**	1
	Sig. (2-tailed)	.000	
	N	131	131

**. Correlation is significant at the 0.01 level (2-tailed).

Besides product moment correlation coefficient, scatter plot between Implementation of water constructions projects and the independent variables was also conducted to test linearity and the result in Figure 4.5 clearly suggested that there was some linear

relationship between Implementation of water constructions projects and the explanatory variables.

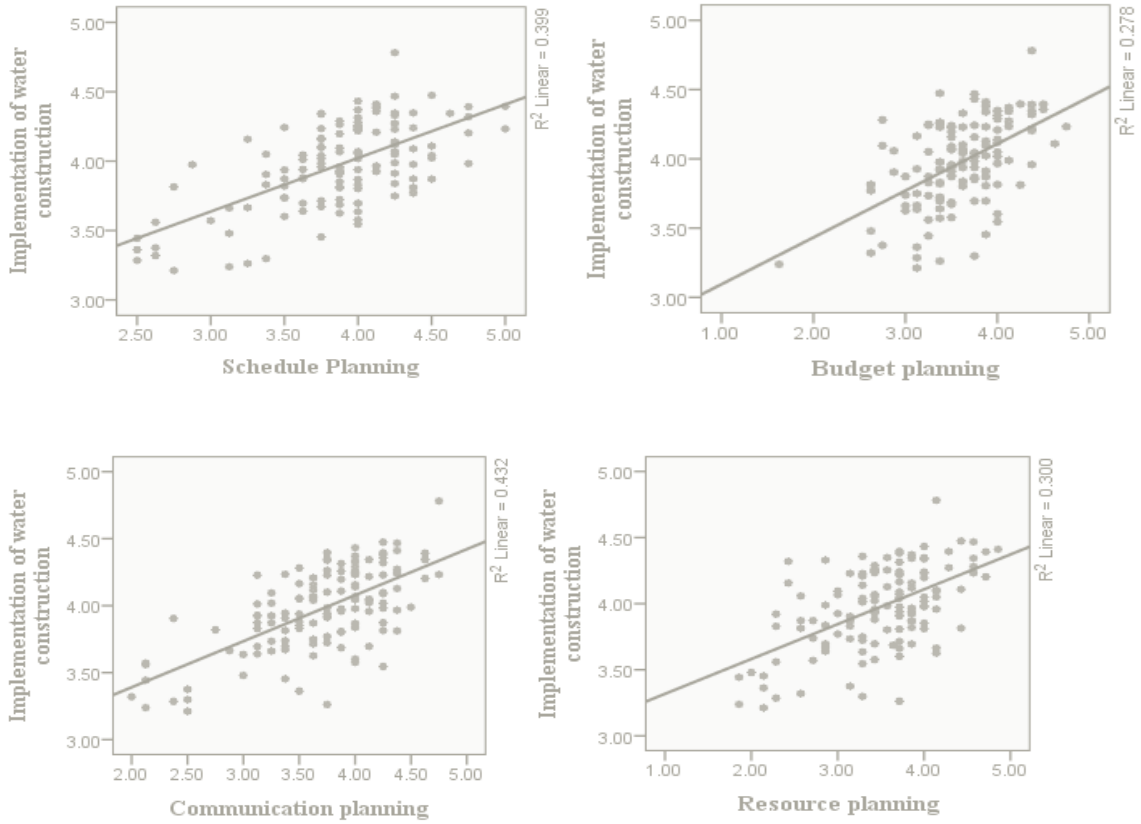

Figure 4.5: Q-Q Plot for Dependent and Independent Variables

4.11 Regression Analysis

The regression analysis was carried out to determine the relationship between the independent variables and the dependent variable. A simple regression was conducted involving running the least square regression model and interpreting the R^2 values to test the proportion of the variance in dependent variable from the independent variable and F values to measure coefficients and the suitability of the model confirm or reject the research hypotheses. The strength of the relationship was measured using correlation coefficient (R) or coefficient of determination R- square. The R-square is a value which shows how well the model fits the data and R- square value which is nearer to 1.0 suggest that the dependent variable entirely depends on the independent variables while a value nearer to 0 indicates no relationship at all

between the explanatory variables and the dependent variable (Ming'ala, 2002). The F test was used to determine the level of significance of the model by comparing the F value with the overall level of significance and P values.

4.11.1 Regression Analysis for Schedule Planning and Implementation of Water Constructions Projects

The empirical analysis to establish the relationship between schedule planning and level of implementation of water construction projects in Bomet County, Kenya was conducted. The null hypothesis was that there was no significant relationship between Schedule planning and implementation of water construction projects in Bomet County, Kenya, against the alternative that there was a positive significant relationship between Schedule planning and implementation of water construction projects in Bomet County, Kenya. The hypothesis was tested by conducting simple linear regression, preliminary findings reveal that there was significant positive relationship between Schedule planning on Implementation of water construction projects in Bomet County, Kenya.

Table 4.28 shows the regression analysis findings between implementation of water constructions projects and schedule planning. The table depicts the value of R-square to be 0.399 and 0.460 implying that 39.9% and 46.0% of implementation of water constructions projects was explained by schedule planning with no moderator and with moderator respectively. Besides that, the fitness of the model was also indicated by F-Statistics value of 85.480 and 54.441 with p-value of 0.000 which was below 0.05 and 0.000<0.05 with no moderator and with moderator. These findings implied that there was a significant relationship between schedule planning and implementation of water construction projects in Bomet County, Kenya. This means that schedule planning significantly affects implementation of water construction projects in Bomet County, Kenya.

Similarly based on the same regression table 4.29, t- test was also used to test the relationship between the predictor variable Schedule planning and Implementation of water constructions projects and there was significance relationship between the two variables with p-value= 0.000 < 0.05 for the model. The regression equations

between Implementation of water constructions projects and Schedule planning for the model can be expressed as; $Y= 2.481+ 0.386X_1$ without moderator and $Y=2.064+0.370X_1+0.132X_1 *Z$ with moderator. The models indicated that for every unit of schedule planning, the value of implementation of water construction projects in Bomet County, Kenya changes by 0.386 in the absence of moderator and 0.370 and 0.132 in the presence of moderator (technology integration). From these results, it was therefore, concluded that Schedule planning had significant positive influence on Implementation of water construction projects in Bomet County, Kenya.

Table 4.29: Rregression Analysis for Schedule Planning and Implementation of water Constructions Projects with moderator.

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	Durbin-Watson
1	.631[a]	.399	.394	.23936	1.921

a. Predictors: (Constant), Schedule planning and Implementation of water constructions projects.

Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
1	Reg	4.897	1	4.897	85.480	.000[b]
	Residual.	7.391	129	.057		
	Total	12.288	130			

a. Dependent Variable: Implementation of water constructions projects

a. Predictors: (constant), Schedule planning

Overall regression coefficients

	Un Std Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Er	Beta			Tolerance	VIF
(Constant)	2.481	.163		15.244	.000		
Schedule planning	.386	.042	.631	9.246	.000	1.000	1.000

Table 4.30: Rregression Analysis for Schedule planning and Implementation of water constructions projects with moderator.

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	Durbin-Watson
1	.678[a]	.460	.451	.22776	2.008

a. Predictors: (Constant), Schedule planning

Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
	Reg	5.648	2	2.824	54.441	.000[b]
1	Residual.	6.640	128	.052		
	Total	12.288	130			

a. Dependent Variable: Implementation of water constructions projects
b. Predictors: (constant), Schedule planning *Z

Overall regression coefficients

	Un Std Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Er	Beta			Tolerance	VIF
(Constant)	2.064	.190		10.880	.000		
Schedule planning	.370	.040	.606	9.274	.000	.989	1.011
Schedule planning *Z	.132	.035	.248	3.804	.000	.989	1.011

4.11.2 Regression Analysis for Budget planning and Implementation of water constructions projects

The study sought to describe the relationship between Budget planning on Implementation of water construction projects in Bomet County, Kenya. The objective was tested using hypotheses that; There is no significant association between Budget planning and implementation of water construction projects in Bomet County, Kenya. Analysis using Pearson's product moment correlation statistic to test the relationship between the Budget planning and implementation of water construction projects in Bomet County, Kenya indicated that R -square value of 0.278 was recorded showing that (27.8%) of implementation of water construction projects in Bomet County, Kenya was explained by budget planning. The inclusion of moderator (technology integration), the coefficient of determination increased to

0.289 showing that 28.9% of the response variable was explained by budget planning as indicated in Table 4.30.

The other section of the fitted simple linear regression models to the data suggest that the models were good and this was supported with p-values 0.000 which were less than 0.05 and F-statistics values 49.64 and 26.044 respectively for both models in the absence of moderator and presence of moderator. Statistically this meant that there was a significant relationship between budget planning and implementation of water construction projects in Bomet County, Kenya and this relationship was much better in the presence of moderator**.**

The models fitted to the data if the moderator is excluded and when the moderator is included were as follows: $Y=2.757+ 0.338X_2$ and $Y= 2.581+0.3382X_2+ 0.054X_2 *Z$ with corresponding p- values of 0.000 being lower than 0.05 significance level against t-statistics values. The models indicated that for every unit of budget planning the value of Implementation of water construction projects in Bomet County, Kenya changes by 0.338 in absence of moderator and 0.3382 in the presence of moderator.

Table 4.31: Rregression Analysis for Budget Planning and Implementation of water constructions projects with no moderator.

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	Durbin-Watson
1	.527[a]	.278	.272	.26227	1.925

a. Predictors: (Constant), Budget planning

Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
	Reg	3.415	1	3.415	49.640	.000[b]
1	Residual.	8.874	129	.069		
	Total	12.288	130			

a. Dependent Variable: Implementation of water constructions projects
c. Predictors: (constant), Budget planning

Overall regression coefficients

	Un Std Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Er	Beta			Tolerance	VIF
(Constant)	2.757	.174		15.836	.000		
Budget Planning	.338	.048	.527	7.046	.000	1.000	1.000

Table 4.32: Rregression Analysis for Budget Planning and Implementation of water constructions projects with moderator.

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	Durbin-Watson
1	.538[a]	.289	.278	.26122	1.904

a. Predictors: (Constant), Budget planning *Z

Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
	Reg	3.554	2	1.777	26.044	.000[b]
1	Residual.	8.734	128	.068		
	Total	12.288	130			

a. Dependent Variable: Implementation of water constructions projects
d. Predictors: (constant), Budget planning.

Overall regression coefficients

	Un Std Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Er	Beta			Tolerance	VIF
(Constant)	2.581	.212		12.152	.000		
Budget planning	.338	.048	.528	7.085	.000	1.000	1.000
Budget planning *Z	.054	.038	.107	1.430	.155	1.000	1.000

4.11.3 Regression Analysis for Communication Planning and Implementation of water constructions projects

To find out if there was significance relationship between Communication Planning and Implementation of water constructions projects, simple regression analysis was conducted. The null hypothesis tested was that; **t**here was no significant relationship between Communication Planning and implementation of water construction projects in Bomet County, Kenya against the alternative that, there was significant relationship between communication planning and implementation of water

construction projects in Bomet County, Kenya. The results obtained showed that R-square value was 0.432 implying that 43.2% of implementation of water construction projects in Bomet County, Kenya was explained by Communication Planning in the absence of moderator which was technology Integration. On the other hand, if the moderator is included, the R- square value increased to 0.493 showing that 49.3% of the dependent variable was explained by communication planning. This clearly illustrate that the relationship between dependent variable and Communication Planning improved.

Further details of the finding show that the F-statistic was 98.068 as presented in Table 4.38 with corresponding p-value of 0.000 which was less than 0.05 indicating that the model was significant showing that the model was sufficiently good as the null hypothesis that regression model between dependent variable and explanatory variable was not a good model and was rejected. The implication was that there was a significant relationship between communication planning and Implementation of water construction projects in Bomet County, Kenya. In the presence of moderator F-statistic increased to 62.247 with p-value of 0.000<0.05 indicating a better model between dependent variable and communication planning. The regression equation between communication planning and implementation of water construction projects in Bomet County, Kenya in the absence of a moderator (Technology Integration) was expressed as; $Y=2.703+0.344X_3$. as shown in Table 4.30. The p value corresponding to t-statistics was 0.000 and this was also less than 0.05. Similarly, if moderator is included in the model, then the model can be expressed as $Y=2.317+0.331X_3+0.123X_3*Z$. The p-value of 0.000<0.05 was recorded. The finding based on table 4.32 and 4.33 implies that there was significant relationship between Communication Planning and Implementation of water construction projects in Bomet County.

Table 4.33: Rregression Analysis for Communication Planning and Implementation of water constructions projects with no moderator

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	Durbin-Watson
1	.657[a]	.432	.427	.23263	1.849

a. Predictors: (Constant), Communication Planning and Implementation of water constructions projects.

Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
1	Reg	5.307	1	5.307	98.068	.000[b]
	Residual.	6.981	129	.054		
	Total	12.288	130			

a. Dependent Variable: Implementation of water constructions projects
e. Predictors: (constant), Communication Planning.

Overall regression coefficients

	Un Std Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Er	Beta			Tolerance	VIF
(Constant)	2.703	.130		20.822	.000		
Communication Planning	.344	.035	.657	9.903	.000	1.000	1.000

Table 4.34: Rregression Analysis for Communication Planning and Implementation of water constructions projects with moderator.

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	Durbin-Watson
1	.702[a]	.493	.485	.22061	1.780

a. Predictors: (Constant), Communication Planning and Implementation of water constructions projects.

Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
1	Reg	6.059	2	3.029	62.247	.000[b]
	Residual.	6.229	128	.049		
	Total	12.288	130			

a. Dependent Variable: Implementation of water constructions projects
f. Predictors: (constant), Communication Planning.

Overall regression coefficients

	Un Std Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Er	Beta			Tolerance	VIF
(Constant)	2.317	.158		14.709	.000		
Communication Planning	.331	.033	.633	10.002	.000	.990	1.010
Communication Planning *Z	.123	.031	.249	3.930	.000	.990	1.010

4.11.4 Resource Planning Regression Analysis

The study sought to determine whether there exists relationship between the Resource Planning and Implementation of water construction projects in Bomet County, Kenya. Regression analysis was performed. From the finding an R- square value of 0.300 was recorded indicating that 30.0% of implementation of water constructions projects was explained by the Resource Planning as shown on summary Table 4.34. The F-statistics presented in Table 4.35 indicated that the overall model was significant, that is, the independent variable, Resource Planning was a good joint explanatory for Implementation of water constructions projects with F-value of 47.018 with P- value of 0.000<0.05 showing that the model was fit when moderator is absent. Similarly, R- square value of 0.425 indicating that 42.4% of dependent variable was explained by resource planning. F-value presented was 55.179 with P- value of 0.000<0.05 showing that the model was fit in the presence of moderator.

The regression equations between Resource Planning and Implementation of water constructions projects in the absence and presence of moderator (technology integration) was; $Y=-3.054+ 0.264X_4$ and $Y= 2.222+0.282X_4+0.206X_4$ *Z respectively. Based on these models formed it was clear that for every unit of Resource Planning, Implementation of water constructions projects was increasing with 0.264 when moderator is not cooperated into the model and 0.206 when moderator is cooperated in the model. The finding is illustrated on Table 4.33 and 4.34 respectively. The findings further imply that there was a positive significant relationship between Resource Planning and Implementation of water construction projects in Bomet County, Kenya. These findings collaborate with the findings by

Akuno and Wanyoike (2020), whose study revealed that resource planning affected performance of elephant conservation projects to a large extent with a significant (value (p= 0.000).

Table 4.35: Rregression Analysis for Resource Planning and Implementation of water constructions projects with no moderator.

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	Durbin-Watson
1	.547[a]	.300	.294	.25830	1.642

a. Predictors: (Constant), Resource Planning

Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
1	Reg	3.681	1	3.681	55.179	.000[b]
	Residual.	8.607	129	.067		
	Total	12.288	130			

a. Dependent Variable: Implementation of water constructions projects
g. Predictors: (constant), Resource Planning.

Overall regression coefficients

	Un Std Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Er	Beta			Tolerance	VIF
(Constant)	3.054	.126		24.296	.000		
Resource Planning	.264	.035	.547	7.428	.000	1.000	1.000

Table 4.36: Rregression Analysis for Resource Planning and Implementation of water constructions projects with moderator.

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	Durbin-Watson
1	.651[a]	.424	.415	.23525	1.661

a. Predictors: (Constant), Resource Planning *Z and Implementation of water constructions projects.

Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
1	Reg	5.204	2	2.602	47.018	.000[b]
	Residual.	7.084	128	.055		
	Total	12.288	130			

a. Dependent Variable: Implementation of water constructions projects
h. Predictors: (constant), Resource Planning *Z.

Overall regression coefficients

	Un Std Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Er	Beta			Tolerance	VIF
(Constant)	2.222	.196		11.358	.000		
Resource Planning	.282	.033	.585	8.672	.000	.988	1.012
Resource Planning *Z	.206	.039	.354	5.246	.000	.988	1.012

4.12 Multivariate Regression Analysis

Multiple linear regression model was conducted to find out if there was significance relationship between independent variables and the dependent variable. This section presents the results on the overall effects of all the independent/predictor variables which were: Schedule planning, Budget planning, Communication Planning and Resource Planning on the dependent variable which was implementation of water construction projects in Bomet County, Kenya. The proposed overall model without moderator for the study was; $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta 5 X_5 + e$ and with the moderator was $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_1 X_1 * Z + \beta_2 X_2 * Z \beta_3 X_3 * Z + \beta_4 X_4 * Z + e$ the where:

Y = Implementation of water constructions projects

X_1 = Schedule planning

X_2 = Budget planning

X_3 = Communication Planning

X_4 = Resource Planning

Z = Technology Integration (Moderator)

Table 4.35 the goodness of the model and from the finding it was obvious that the overall model was satisfactory and this was supported by coefficient of determination also known as the R-square value of 0.527. The coefficient of determination value recorded above implies that all the explanatory/independent variables explain 52.7%

of the variations in the dependent variable (implementation of water construction projects in Bomet County, Kenya).

Based on the same table, the overall model fitness was also evaluated using F-statistics and from the results, it was clear that the overall regression model was significant. This was evident on the value of F statistic value of 35.033 which is less than the F critical value of 2.443. The corresponding p -value of 0.000 which was far much below the conventional probability of 0.05 level of significance chosen arbitrarily as the quantity of risk incurred in committing type I error that is rejecting the null hypothesis when it supposed to be accepted. The result clearly shows that the explanatory variables are good predictors of Implementation of water construction projects in Bomet County, Kenya.

Similar output based on the same table 4.36 suggest that the overall Regression Coefficients associating the dependent variable and the predictor variables and how significant each of the predictor variable affect the response variable that is the significant relationship between Implementation of water constructions projects (dependent variable) and, schedule planning, budget planning, communication planning, resource Planning, (predictor variables). From the finding, the overall model extracted can be presented as follows:

$$Y= 2.197+0.165X_1+ 0.064X_2+0.149X_3+ 0.103X_4 \quad \text{.....(iii)}$$

From the model, it can be seen that beta coefficients of the model are as follows 2.197, 0.165, 0.064, 0.149 and 0.103 which indicates that a unit change in either of the variables will definitely lead to a positive increase in the value Implementation of water construction projects in Bomet County, Kenya.

Model 2 on the other hand captures the overall regression model in the presence of moderator (technology integration). From the finding, it was again without any difficulty in explanation that the model was much superior compared to model 1 since there was an increase in the value of coefficient of determination from 0.527 to 0.754 and the overall model was more significant because the F-statics value published was 46.768 together with the corresponding P-value of 0.000 <0.05 clearly

demonstrating that the overall model was a good model as shown in table 4.32. Concerning the estimates of the coefficients as far as the model is concerned, it was also clear that model generated in the presence of moderator was given as follows:

$$Y= 0.487+.137X_1+ 0.094X_2+0.119X_3+ 0.122X_4 +0.119X_1*Z+ 0.080X_2*Z+0.174X_3*Z+ 0.118X_4*Z \quad \ldots\ldots\ldots\ldots(iv)$$

The beta coefficients established were: 0.487, 0.137, 0.094, 0.119, 0.122, 0.119, 0.080, 0.174, and 0.118 respectively. The t-statistics based on these models also proves that every explanatory variable had a significant relationship with the dependent variable. (Implementation of water construction projects in Bomet County, Kenya).

Table 4.37: Overall Summary Model, ANOVA & regression coefficients with no moderator

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	Durbin-Watson
1	.726[a]	.527	.512	.21488	1.799

a. Predictors: (Constant), Budget planning, Schedule planning, Communication Planning, Resource Planning and Implementation of water constructions projects.

Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
	Reg	6.470	4	1.618	35.033	.000[b]
1	Residual.	5.818	126	.046		
	Total	12.288	130			

a. Dependent Variable: Implementation of water constructions projects
i. Predictors: (constant), Budget planning, Schedule planning and Resource Planning.

Overall regression coefficients

	Un Std Coeff		**Std Coeff**	**t**	**Sig.**	**Collinearity Statistics**	
	B	Std. Er	Beta			Tolerance	VIF
(Constant)	2.197	.164		13.411	.000		
Schedule planning	.165	.055	.270	2.974	.004	.456	2.191
Budget planning	.064	.052	.100	1.238	.218	.573	1.746
Communication Planning	.149	.051	.284	2.914	.004	.395	2.529
Resource Planning	.103	.036	.213	2.818	.006	.657	1.523

Table 4.38: Overall Summary Model, ANOVA and regression coefficients with moderator

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	Durbin-Watson
1	.868[a]	.754	.738	.15738	1.753

a. Predictors: (Constant), Budget planning, Resource Planning, Schedule planning, Communication Planning and Implementation of water constructions projects.

Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
	Reg	9.267	8	1.158	46.768	.000[b]
1	Residual.	3.022	122	.025		
	Total	12.288	130			

a. Dependent Variable: Implementation of water constructions projects

j. Predictors: (constant), Budget planning, Communication planning, Schedule planning and Resource planning.

Overall regression coefficients

	Un Std Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Er	Beta			Tolerance	VIF
(Constant)	.487	.204		2.388	.018		
Schedule planning	.137	.041	.225	3.359	.001	.450	2.220
Budget planning	.094	.039	.146	2.423	.017	.551	1.813
Schedule planning	.119	.038	.227	3.156	.002	.390	2.561
Resource Planning	.122	.027	.254	4.503	.000	.635	1.574
Schedule planning*Z	.119	.025	.223	4.784	.000	.925	1.081
Budget planning*Z	.080	.023	.158	3.476	.001	.981	1.020
Communication Planning*Z	.174	.027	.299	6.458	.000	.941	1.063
Resource Planning *Z	.118	.023	.240	5.240	.000	.961	1.041

a. Dependent Variable: Y (Implementation of water constructions projects (Y)

4.13 Structural Equation Modeling

Another robust analytical model applied for the same study was Structural Equation Modeling (SEM). SEM is a statistical technique which was applied to test or confirm the presence of any relationship among the latent variables and observed

variables. Structural Equation Modeling is made up of two parts namely; structural model and measurement model components. Basically, the measurement equation model is just confirmatory factor analysis model. In this model the analysis is based on observed variables and unobserved variables. The observed variables were obtained and measured directly using an appropriate instrument for collecting data which was questionnaire in this study. Latent variables on the other hand are those variables which cannot be measured directly as asserted by Blunch (2008). In this study the unobserved variables were (latent variables) budget planning, resource planning, communication planning, technology integration and implementation water of projects in Bomet County. The fitness of SEM models is based on the value fit indices. As far as this study is concerned, structural equation model was used to find out or investigate if the predictor variable has significant effect on the response variable and from the findings, it was clear that there was significant relationship between the response variable and predictor variables. Figure 4.6 shows summery of the model estimates between dependent variable and independent variables besides that, Table 4.36 gives the model estimates of the two models and fit indices of the models.

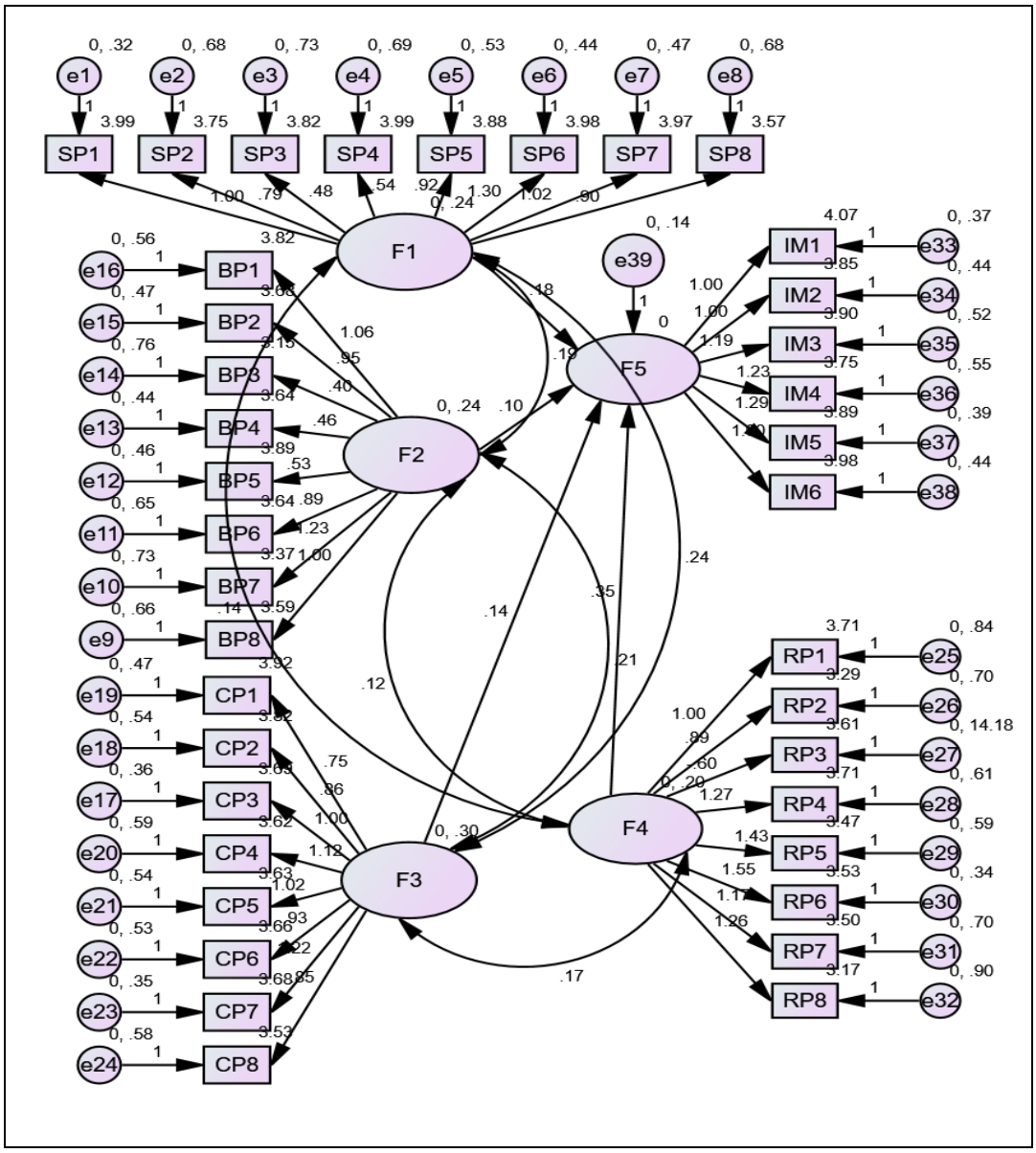

Figure 4.6: SEM model with no moderator

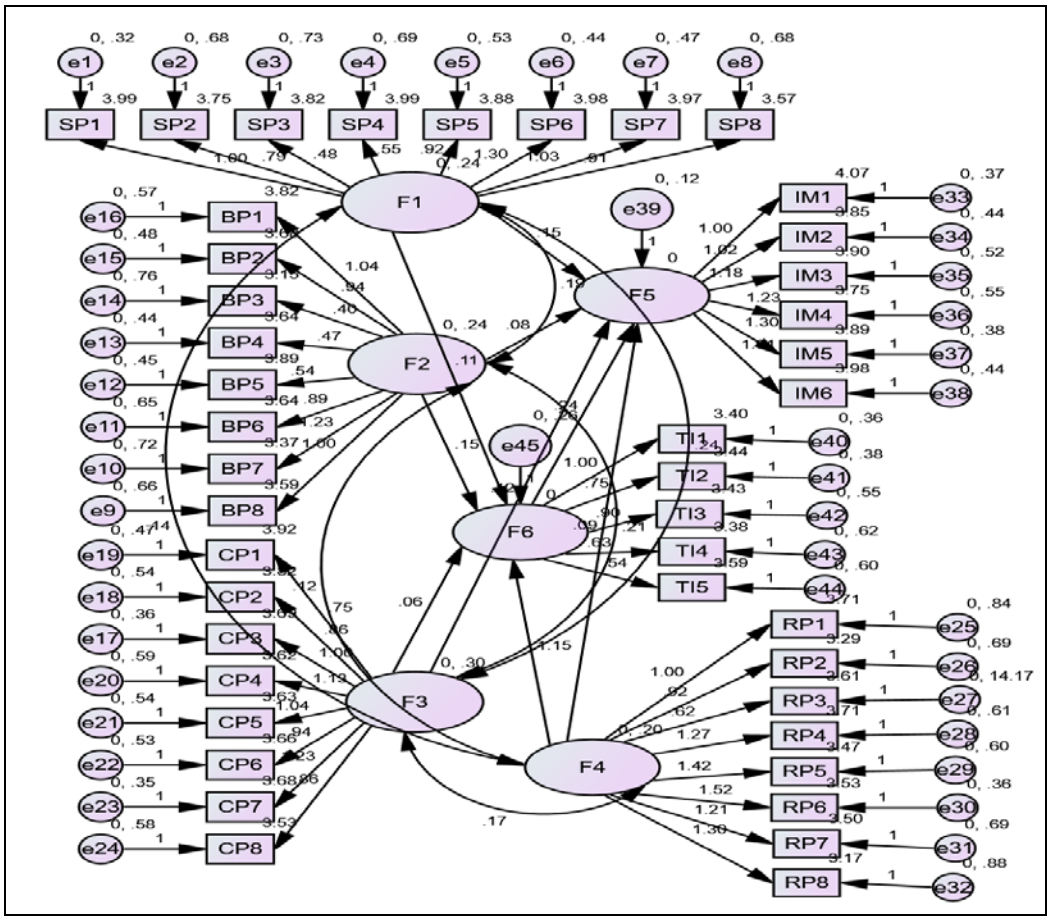

Figure 4.7: Model 2 Structural Equation Model (SEM) With Technology Integration (moderator)

Table 4.37 shows summary of the model estimates with the moderator which is technology integration. From the finding based on the two models, model 2 was more superior than model one since in model 1 budget planning had no significant effect on the dependent variable but in the case of model two where moderator (technology integration) was present, all the four-variable had significant on the response variable (Implementation of water constructions projects)

Table 4.38: SEM Analysis Model 1 and 2

			Estimate	S.E.	C.R.	P
No moderator model 1(Z=Technology Integration)						
Implementation of water constructions projects	<---	F1	.165	.050	3.287	.001
Implementation of water constructions projects	<---	F2	.080	.047	1.691	.093
Implementation of water constructions projects	<---	F3	.155	.046	3.362	.001
Implementation of water constructions projects	<---	F4	.112	.033	3.379	.001
With Moderator 2 (Z=Technology Integration)						
Implementation of water constructions projects	<---	F1	.139	.032	4.387	.000
Implementation of water constructions projects	<---	F2	.107	.030	3.563	.001
Implementation of water constructions projects	<---	F3	.123	.029	4.206	.000
Implementation of water constructions projects	<---	F4	.131	.021	6.223	.000
Implementation of water constructions projects	<---	F1*Z	.124	.019	6.426	.000
Implementation of water constructions projects	<---	F2*Z	.092	.018	5.119	.000
Implementation of water constructions projects	<---	F3*Z	.165	.021	7.886	.000
Implementation of water constructions projects	<---	F4*Z	.129	.018	7.337	.000

4.13.1 Fit statistics for SEM Model

As already mentioned, fit indices also known as fit statistics are commonly used to check or ascertain if the data fits well the proposed model. There are many types fit

indices or fit statistics that have been suggested and discussed by many scholars in literature review. The application of fit statistics or fit indices in most cases depends on how large the sample size is. Bentler and Chou (1987) proposes a sample size which is above 150, other scholars such as Jayaram, Kannan, and Tan, (2004) asserts a sample which is at least ten times the number of parameters to be estimated. In addition, other researchers like Çelik and Yılmaz (2013) postulate a sample size which is more than 200 for structural equation model (SEM). Jayaram, Kannan, and Tan (2004) proposal was adopted in this study. As already indicated that there are many fit indices that can be used to confirm how good the model fits the data, in this section, some definitions of the commonly used fit indices are as follows:

CMIN / DF (degree of freedom) ratio test which is mainly used to test the correspondence between the proposed model and the actual model. In this case if CMIN / DF ratio is below t 3 (CMIN / DF value ≤ 3) and the chi-square value is insignificant then the overall model is considered to be fit as suggested by Meydan and Şen (2011). For zero degree of freedom in structural equation model, then the model is considered to be saturated which indicates that the model fits the data exactly. If degree of freedom is non positive, then the model is undefined which implies that the model is only defined when the degree of freedom is either positive or zero. Acceptable range of CMIN / DF ratios should range between 0 and 2 for model to be considered good. Comparative Fit Index (CFI) another measures of fit index which compares the saturated model and the independent model where the relationship between dimensions that forms the proposed research model does not exist. CFI values normally ranges between 0 to 1 with acceptable values falling within arrange of 0.90 to 1 indicating a good fit for independent models according to Schermelleh-Engel, Moosbrugger, and Müller (2003).

Adjusted Goodness of Fit Index (statistical) (AGFI) is another commonly used fit index which is basically computed by use of degree of freedom. The value of AGFI mainly affected by the sample size which means that as the size of the sample increases AGFI value also increases. AGFI values also ranges between 0 and 1. Values above 0.90 confirms that the model is a good fit according Bayram (2013). In addition to that, GFI fit indice is another measure of the degree of variance and

covariance which is explained by the model. Just like AGFI, GFI fit index value increases with increase in the sample thus making its level of accuracy to be low if the sample size is low. The GFI value normally ranges between 0 and 1. Again GFI values more than 0.90 are acceptable for the model to be considered good.

Root Mean Square Error of Approximation (RMSEA) is also another fit index that is used to compare the mean differences of every expected degree of freedom to that which can be obtained in population. This measure is extremely influenced by the size of the sample size. RMSEA fit index values should be less than 0.05 for good fit according to Bayram (2013) although Byrne (2010). Suggest values ranging between 0.05 and 0.08 for a good fit. Lastly Normed Fit Index (NFI) is another measure which takes values ranging between 0 and 1. High values of NFI is evidence of superb fit that NFI values more than 0.90 are allowed for the model to be considered good but values more than 0.95 are very good.

In this study, the fit indices for both the SEM model without moderator and SEM model with moderator showed that the models were good enough but model 2 where the moderator was present was much superior than model where the moderator was absent. This was supported with fit indices values of: $\chi 2/DF$ =2.442, CFI=0.934, IFI=0.911, RMSEA= 0.041 for model 1 and: $\chi 2/DF$ =2.132, CFI=0.9750, IFI=0.963, RMSEA= 0.000 for model. Table 4.46 below gives the summery results of fit indices.

Table 4.39: Overall Regression Coefficients without Moderator

		Fit Indices for the model					
Model No:	**Nature of the model**	**CMIN/DF**	**CFI**	**GFI**	**AGFI**	**RMSEA**	**IFI**
Model 1	No moderator (Technology integration)	2.3415	0.9432	0.9213	0.897	0.0201	0.9232
Model 2	With moderator (Technology integration)	2.1036	0.9832	0.9881	0.974	0.0001	0.9741

4.14 Optimal Model

The main purpose of the study was to analyze the influence of planning on implementation of water construction projects in Bomet County, Kenya. To achieve the study purpose, the study considered four independent variables e.g., schedule planning, budget planning, ccommunication planning, and resource planning. Further the study sought to evaluate the mediating effect of Technology Integration in promoting Implementation of water constructions projects. Based on the tests conducted in this study it was concluded that the independent variables X_1, X_2, X_3, and X_4 (Schedule planning, Budget planning, Communication Planning and Resource Planning and the moderator Technology Integration) had an effect on the dependent variable Y (Implementation of water construction projects in Bomet County, Kenya.). No variable was dropped therefore the model was retained as was proposed with $R^2 = 0.754$ which was greater than the coefficient of determination of model 1 which registered R-square value of $R^2 = 0.527$ meaning that the proposed study model was retained as the optimal model of study. Therefore, the revised optimal conceptual study model is presented in the figure below

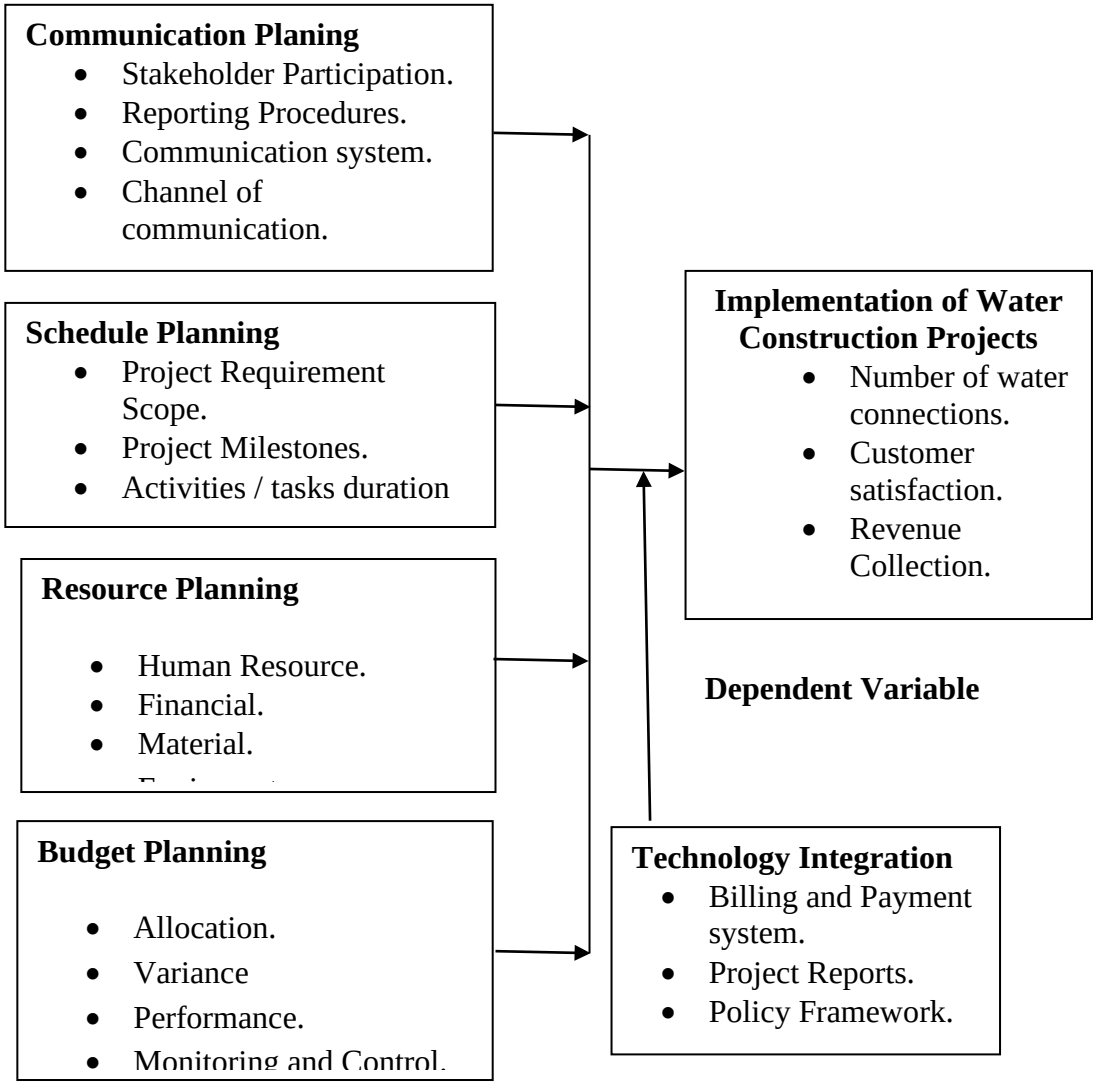

Figure 4.8: Revised Conceptual Framework

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The study sought to establish the influence of planning on implementation of water construction projects in Bomet County, Kenya. This chapter provides a summary of the findings based on the objectives of the study and further presents the conclusions, recommendations and areas of further research in order to fill the gaps identified in the study.

5.2 Summary of the Findings

This study investigated the relationship between project planning and implementation of water construction projects in Bomet county, Kenya. In determining the influence of planning on implementation of water projects, the study sought to understand the extent to which schedule planning, budget planning, communication planning and resource planning had on the implementation of water construction projects. The study investigated the influence of schedule planning that was made up of the project requirement scope, project milestones, activities / tasks duration, tools and techniques. This study attempted to respond to implementation of water project whose descriptive analysis pointed to a possible influence of planning on implementation of water project. This was further clarified through linear and multiple regressions. The summary of the findings is presented for each of the objectives examined.

The study focused on establishing the influence of budget planning on implementation of water construction projects. The coefficient of budget planning was also significant in this study. It can thus be inferred that budget planning have significant effect on implementation of water construction projects in Bomet County, Kenya. The study found out that conducting budget planning on water projects, allocation of sufficient funds to water project activities and establishing the variance that may exist results clearly indicate that the project did not experienced budget

variances in the last one year. Further to this the budgetary performance relying on project operations and effectiveness of this budget monitoring and control, majority of the respondents disagreed to this statement.

The coefficient of resource planning was found to be significant in this study. This implies that resource planning have a significant effect on implementation of water construction projects undertaken in the county. It was also noted that the county government and NGOs had challenges in obtaining adequate financial and technical equipment to complete water projects within the budgeted cost and lacked capacity to acquire technical human resource for constructing water projects. The coefficient of communication planning was also found to be significant. The study found out that communication planning embrace team work in undertaking water projects. There were conflicts among project members. It was also noted that local firms were inefficient and ineffective when undertaking project activities which resulted in poor implementation of the projects. Lack of proper channel of communication in the project caused delays in completing the project within the required time and hence affect the effective implementation of the project.

5.2.1 Objective 1: Schedule Planning

The first objective was to examine the influence of schedule planning on implementation of water construction projects in Bomet County, Kenya. Various sponsors, including government agencies, NGOs, privately sponsored groups have been implementing (measures) projects to address the problem of poor provision and accessibility of water among the residence of Bomet. Project performance and one such approach are the improvements of project planning management to enable stakeholders improve on provision and accessibility of water.

The study through regression revealed that project schedule planning when jointly regressed influenced implementation of water project in Bomet County. The results on schedule planning in the county of Bomet revealed that schedule planning was well applicable in project activities. The employees in Bomet County are familiar with project schedules and they apply scope requirement and milestones activities to

water projects within the county of Bomet. Also, network diagrams and frameworks are used in scheduling organization projects.

5.2.2 Objective 2: Budget Planning

The second objective was to determine the how budget planning aafects implementation of water construction projects in the County of Bomet, Kenya. The findings of this study revealed that budget planning affect implementation of water construction projects in Bomet County. Owing to this, the county government of Bomet is able to increase water supply and increase revenue collection. This in turn improve accessibility to quality water among the residence of Bomet county, Kenya. These findings indicated that budget planning was significant factor of implementation of water construction projects, in that it helped decision makers within the county to increase budget allocation towards improvement of water projects.

5.2.3 Objective 3: Communication Planning

The third objective was to analyze the influence of communication planning on implementation of water constructions projects in Bomet County, Kenya. Communication planning is understood as the task of determining how an organisation intends to achieve its strategic goals and objectives. These findings indicates that communication planning positively influences implementation of water projects in Bomet County, in that efficient and effective communication enhance stakeholder's participation and lead to team cohesiveness. Communication process ensures that project information is always communicated from a centralized point, relevant information is usually communicated within a reasonable period of time within the project team and other stakeholders. Hence leading to successful implementation of water constructions projects.

5.2.4 Objective 4: Resource Planning

The fourth objective was to assess the influence of resource planning on implementation of water construction projects in the County of Bomet, Kenya. Resource planning is quite important in the construction of projects due to the fact

that lack or shortage of resources leads to stalled projects**.** Data analysis and interpretation of the interview and questionnaire responses for the project managers, finance managers, project consultants, site engineers and ward administrators in Bomet County revealed that resource planning influences implementation of water construction projects in Bomet County Kenya. This is because resource planning keeps utilization rates at a profitable level, reducing the non-billable time resources spend on projects.

Resource planning involves determining what resources (people, equipment, materials, etc.) are needed in what quantities to perform project activities. Findings from the study established that resource planning has its place in the implementation process hence highlighting the significance of organizational resources and their effect on firm's performance and its competitiveness in the market. Bomet county has a set of unique resources which are critical in ensuring that county projects especially water projects not only survive but also grows to enable them achieve their mission and vision. These resources range from technical, financial, physical and human, and they all contributed to the success of the project. Resource planning is therefore seen to support implementation of water projects with the available resources.

5.2.5 Objective 5: Technology Integration

The fifth objective sought to establish the moderating effect of technology integration on implementation of water construction projects in Bomet County, Kenya. Technology promotes project management tools for planning and web-based support systems which are significant for communication, conflict resolution, knowledge sharing and integration of complex projects. Data analysis and interpretation of the interview and questionnaire responses for the project managers, finance managers, project consultants, site engineers and ward administrators in Bomet County revealed that technology integration influences implementation of water construction projects in Bomet County Kenya. This is because information technology enhances efficient and effective conversion between data and information. Technology promotes project management tools for planning and web-

based support systems which are significant for communication, conflict resolution, knowledge sharing and integration of complex projects.

Findings from this study depicts that technology can meet the project management needs of documentation, storage and retrieval. Its place in successful implementation of water projects in the county of Bomet is emphasized on dialogue between the project stakeholders. Technology help project managers to improve on project success, manage complex projects and effective utilization of resource. It is further ability on speedy technical change, has enhanced innovative new products and services in the water sector.

5.3 Conclusions

Based on the study findings it can be concluded that all the independent variables (schedule planning, budget planning, communication planning and resource planning) in the study influence implementation of water construction projects (Dependent variable). Water is an essential commodity and therefore. it is the mandate of every government to provide water to its citizens as recommended through the Millennium Development Goals (MDG).

5.3.1 Schedule Planning

Based on the findings of this study it can be concluded that the county government of Bomet should put down ways in which schedule plans can be used to improve successful implementation of water construction projects. Project managers in the county of Bomet should also be keen in monitoring the project process. Lack of good routines and methods are not easy to follow and understand when performing tasks in the projects. Hence the study's conclusion on schedule planning affects implementation of water projects in the county of Bomet to a large extent. This means that water planners have to emphasize on project requirement scope, milestones, tools and techniques as this proves to improve implementation of water projects. Therefore, the effective and efficient implementation of scarce resources on development of water projects and among activities within the life cycle of project

phases is a realistic management opportunity for improving schedule plans performance.

5.3.2 Budget Planning

Based on the study findings, it is therefore concluded that, budget planning in Bomet County should be taken into account while planning construction of water projects and while seeking ways to improve accessibility to water resources. Therefore, budgeting sufficient funds for water projects is important as far as sustainability, operation and maintenance of water projects is concerned.

5.3.3 Communication Planning

Based on the study findings it can be concluded that communication planning in the county of Bomet must be taken into account while developing a mode and media of communication to enhance successful implementation of water construction projects. Communication strategy for the water sector in the county of Bomet needs to communicate realistic timelines and expectations to the residents of Bomet County at the initial phase of the water project. Therefore, there is need to be improve communication to enhance participation and involvement of stakeholders.

5.3.4 Resource Planning

Based on the study findings, it is concluded that resources are well utilized while implementing water projects in the county of Bomet. Owing to resource planning; water projects have been successfully implemented. The county government of Bomet should therefore lay down a clear plan to source and fund for resources before the project commences and how the resources will be utilized to the end of the project. Project managers should also be keen in monitoring the project process to improve accessibility to water resources.

5.3.5 Technology Integration

Based on the study findings on technology as a moderating variable in Bomet County, Kenya, all variables had more influence in the presence of the moderator and

it was concluded that use of technology in implementation of water projects could lead to new innovation and ensures successful implementation of water projects.

5.4 Recommendation

1. Based on the conclusion on schedule planning, the study recommends that schedule planning can be replicated by county officials and project managers who are in charge of water sector across other counties.
2. Based on the conclusions on budget planning, the study recommends that Arid and Semi-Arid regions can replicate the findings of this study to improve on accessibility to safe and clean drinking water to its citizens.
3. The study on the conclusion on communication planning recommends that, this study can be used by policy makers to make informed decisions regarding best strategies on water policy.
4. In view of the conclusions on the objective on resource planning, the study recommends that project managers need to develop project resource plan that should include aspect that pertains to every resource necessary for project from beginning to end.
5. Based on conclusion on the objective on technology integration, it is recommended that the county government of Bomet should integrate technology in planning for constructions of water projects in the county of Bomet.

5.5 Recommendations for further studies

1. This study sought to establish the influence of planning on implementation of water projects in Bomet County, Kenya. The researcher recommends that other variables such as risk planning, quality planning and financial planning can be studied to determine the magnitude of influence on improving accessibility to clean and quality water.
2. The study concentrated on water-based projects, the researcher's recommendation is that other studies can be carried out on areas such as road construction projects, housing projects, agricultural projects etc.

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APPENDICES

Appendix I: Letter of Introduction

Emmy C. Rotich,

P. O. Box 20589,

NAIROBI

Dear Respondent,

REF: REQUEST TO COLLECT DATA

I am a PhD candidate at Jomo Kenyatta University of Agriculture and Technology based at CBD Campus pursuing a doctorate degree in Project Management. I am carrying out my research on **INFLUENCE OF PLANNING ON IMPLEMENTATION OF WATER CONSTRUCTION PROJECTS IN BOMET COUNTY, KENYA.** This is prerequisite in acquiring this degree.

You have been chosen to participate on this research owing to the fact that you are in a better position to provide reliable information which will enable this study achieve its objectives. The above topic will be research by use of questionnaire which will be strictly confidential and for academic purposes only. Therefore, your identity remains discreet.

Any assistance accorded to me in my noble cause will be highly appreciated.

Kind regards,

Emmy Chelangat Rotich

PhD Candidate,

HDE414-C004-1970/2017

JKUAT University (NCBD)

Appendix II: Survey Questionnaire

INFLUENCE OF PLANNING ON IMPLEMENTATION OF WATER CONSTRUCTION PROJECTS IN BOMET COUNTY, KENYA

The

Name of the Project:…...…….……

Interviewer's name: ……..……

Date:……..…

Preamble

I am a PhD candidate doing Project Management at Jomo Kenyatta University of Agriculture and Technology conducting academic research towards my thesis on ***Influence of Planning on Implementation of Water Construction Projects in Bomet County, Kenya.*** The study is about improving implementation of water projects through planning in Bomet County and you have been selected, through a random sampling procedure, as one of the persons to participate in this survey. Your answers are voluntary and will be kept strictly confidential. Before going into the explanation of the aim of the study I would like to ask you the following questions:

SECTION A: SOCIO-DEMOGRAPHIC DATA

1.) Age: 18-27 [ ] 28-37 [ ] 38-47 [] 48-57 [ ] 58-67 [ ] Above 68 [ ]

2.) Level of education

Primary [ ]
Secondary [ ]
College [ ]
University [ ]

3.) Have you ever heard about water construction projects? **1. YES [ ]2. NO[ ]**

4.) If the answer is yes, what is a water construction project?

..……

5.) According to you, what could be the **MAIN** causes of poor implementation of water projects?

1) Poor Management.
2) Poor Planning
3) Lack of Resources.
4) Lack of community participation.

6.) What do you think is the state of water supply in Bomet?

i) Adequacy [ ] iii) Accessibility [ ]

ii) Reliability [ ] iv) Quantity and Quality [ ]

7.) How long have you been with the CGB?

Less than 1 year [ ]
1- 5 years [ ]
6- 10 years [ ]

10 years and above [ ]

8.) What is the nature / type of water project?

Non-Governmental Organization (NGO) [ ]
Community Based Organization (CBO) [ ]
County Government of Bomet (CGB) [ ]
Lake Victoria South Water Service Board (LVSWSB) [ ]
Other (please specify)……

9.) How many staffs are involved in the water project?

0 – 20	[ ]	21 – 40	[ ]	41 – 60	[ ]
61 – 80	[ ]	81 – 100	[ ]	100 and above	[ ]

SECTION B. INFORMATION ON SCHEDULE PLANNING

Indicate using a tick (✓) the extent to which you agree that each of the following statement about schedule plans influences implementation of water construction projects you were involved in.

Statements	**Strongly**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Project Requirement Scope					
The project manager had a clear scope of the project requirements.					
The project is implemented within the stipulated scope.					
Project Milestones					
The projects experience various milestones.					
Managing project milestones improves scheduling plans of water project.					
Project Activities					
Activities of the project were well stipulated.					
Each staff was informed of their duties and responsibilities in the project.					

How else do you think schedule plans influences implementation of water construction projects?

_____

_____

Suggest ways in which schedule plans can be improved to improve project implementation

_____

_____

SECTION C. INFORMATION ON BUDGET PLANNING

Indicate using a tick (✓) the extent to which you agree that each of the following statement about budget planning influences implementation of water construction projects you were involved in.

Statements	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Budget Allocation					
The budget allocations are agreed upon by all stakeholders.					
The budgetary allocations have been on an upward trend.					
Budget Variance					
Our project did not experienced budget variances in the last one year.					
The budget is subject to amendments during its implementation.					
Budget Performance					
The periodic Budgetary performance relies on projects operations.					
The budgetary performances of county projects have been on an upward path.					
Budget Monitoring and Control					
All of our planned projects are completed within budget.					
There is an effective system to monitor and control budget closely.					

How else do you think budget planning influences implementation of water construction projects?

_____

_____

_____

Suggest ways in which budget planning can be improved to improve project implementation

_____

_____

_____

SECTION D: INFORMATION ON COMMUNICATION PLANNING

Indicate using a tick (✓) the extent to which you agree that each of the following statement about communication plans influences implementation of water construction projects you were involved in.

Statements	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Stakeholders Participation					
The objectives of water projects are clearly communicated to enhance stakeholder's participation.					
Community members participate in the conception and design of the water projects					
Project Reports					
The reporting system put in place is effective.					
Communication between the parties on the project is effective.					

Communication system					
All required information is sent to the relevant receiver on time.					
It is clear who is responsible for which communication.					
Channel of communication					
Channel of communication used effectively to share Information on a timely manner.					
Communication channels are regularly reviewed to match changes.					

How else do you think communication planning influences implementation of water construction projects?

_____

_____

_____

Suggest ways in which communication planning can be improved to improve project implementation

_____

_____

_____

SECTION E: INFORMATION ON RESOURCE PLANNING

Indicate using a tick (✓) the extent to which you agree that each of the following statement about resource planning influences implementation of water construction projects you were involved in.

Statements	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Human Resource					
There is sufficient trained personal in repairs and maintenance of water system.					
There is enough technical support from the NGOs, churches, on implementation of water projects.					
Financial					
Water projects heavily depend on the national government for funding.					
The institution has put in place an effective internal audit trails for all financial transactions of the projects.					
Materials					
Materials for the construction of water projects are easily accessible.					
Suppliers are reliable and supply quality materials.					
Equipments					
Construction equipments are available.					
The cost of constructions equipments is affordable.					

How else do you think resource planning influences implementation of water construction projects?

_____

_____

_____

Suggest ways in which resource planning can be improved to improve project implementation

---

SECTION F: INFORMATION ON TECHNOLOGY

Indicate using a tick (✓) the extent to which you agree that each of the following statement about technology influences implementation of water construction projects you were involved in.

Statements	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Billing and Payment Systems					
The project embraces information technology on billing and payment systems.					
I&T has allowed the organization to manage organizational knowledge of past projects.					
Project Reporting					
The project utilizes ICT as the ideal vehicle for the dissemination of informational content.					
Communication within and without the organization heavily depends on information technology.					
Policy Framework					
Information technology has enabled water policy framework to integrate various water					

construction projects.					
Information technology framework to a larger extent governs implementation of improved provision of water services.					

How else do you think technology influences implementation of water construction projects?

_____

_____

_____

SECTION G: INFORMATION ON IMPLEMENTATION OF WATER CONSTRUCTION PROJECTS.

Indicate using a tick (✓) the extent to which you agree that each of the following statement about planning influences implementation of water construction projects you were involved in.

Statements	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Number of Water Connections					
Planning of water projects has led to increased number of water connections in the county.					
The procedures of water connections have improved due to the role of planning in water construction projects.					
Customer Satisfaction					
There is improved accessibility and availability of clean and safe water services in the county due to increased number of implemented water projects.					

Customers are satisfied with the implementation of water projects.					
Revenue Collection					
There is an increase in revenue collected due to increased number of implemented water projects in the county.					
Planned technology has enhanced revenue collection procedures.					

The End

Thank you for your participation and honest opinion.

Appendix III: List of Water Projects in Bomet County

(Source: Bomet County Integrated Development Plan 2018- 2022)

	WATER SUPPLY SCHEMES
1.	SERGUTIET WATER PROJECT
2.	KAMUREITO WATER PROJECT
3.	LONGISA WATER PROJECT
4.	ITARE WATER PROJECT
5.	SIGOR WATER SUPPLY
6.	OLBUTYO WATER PROJECT
7.	NDANAI WATER PROJECT
8.	SOTIK WATER PROJECT
9.	EMBOBOS WATER SUPPLY
10.	ROTINWEK WATER PROJECT
11.	MERIGI WATER PROJECT
12.	KALABU DAM
13.	TILILMET WATER SUPPLY
	COUNTY GOVERNMENT WATER PROJECTS
1.	TINET WATER PROJECT
2.	KIPSIRICHOIK DAM
3.	CHEMANER WATER PROJECT
4.	BOMET WATER PROJECT
5.	KAMUREITO WATER PROJECT
6.	LONGISA WATER PROJECT
7.	SOTIK WATER SUPPLY
8.	MOGOMBET WATER PROJECT
9.	KAPKESOSIO WATER PROJECTS
10.	GELEGELE WATER PROJECT
11.	KAPOSIRIRI WATER PROJECT
12.	TEGAT BOREHOLE PROJECT
13.	SEGUITIET WATER PROJECT
14.	ITEMBE BOREHOLE
15.	CHEBUNYO WATER PROJECT
16.	CHEPTALAL BOREHOLE PROJECT
17.	KAPSET WATER PROJECT
18.	BOMET WATER SUPPLY
19.	MURWASI WATER PROJECT
20.	CHEMANER WATER PROJECT
21.	KABISOGE WATER PROJECT
22.	CHEBARAA WATER PROJECT
23.	NOGIRWET WATER PROJECT

24.	KICHEKA WATER PROJECT
25.	ROTIK WATER PROJECT
26.	KIPTENDEN WATER PROJECT
27.	SASETA WATER PROJECT
28.	TOGOMDA DAM
	COMMUNITY BASED WATER PROJECTS
1.	KAPOSIRIR WATER PROJECT
2.	MOGOMBET WATER PROJECT
3.	KAPECHELUCH WATER PROJECT
4.	YAGANEK WATER PROJECT
5.	TEGAT BOREHOLE WATER PROJECT
6.	ITEMBE BOREHOLE WATER PROJECT
7.	KAPTEBENGWET WATER PROJECT
8.	CHEPTALAL WATER PROJECT
9.	SOGOET WATER PROJECT
10.	KAPKESOSIO BOREHOLE
11.	NYANGOMBE WATER PROJECT
12.	MARINYIN WATER PROJECT
13.	SEGUTIET WATER PROJECT
14.	KIPNGOSOS WATER PROJECT
15.	KAPORUSO WATER PROJECT
16.	CHEMANER WATER PROJECT
17.	MEMOBO WATER PROJECT
18.	KAPSET WATER PROJECT
19.	CHEPCHABAS WATER PROJECT
20.	LILTIK WATER SUPPLY
21.	CHEBULICH SOSUR DAM
22.	KIPIRICHE WATER PROJECT
23.	CHEBIRIR WATER PROJECT
	DAM WATER PROJECTS
1.	CHEBANGANG WATER PROJECT
2.	SISEI WATER PROJECT
3.	AONET WATER PROJECT
4.	TINET WATER PROJECT
5.	TABOINO WATER PROJECT
6.	NYANGOMBE WATER PROJECT
7.	CHAPALUNGU WATER SUPPLY
8.	CHESAMBAIL WATER SUPPLY
9.	SOGOET WATER PROJECT
10.	MARINYIN WATER PROJECT
11.	KAPCHELUCH WATER PROJECT

12	KAPTEBENGWET WATER PROJECT
13.	KAPSIMBIRI WATER PROJECT
14.	YAGANEK WATER PROJECT
15.	KIPNGOSOS WATER PROJECT
16.	MOGOR BOREHOLES PROJECTS
17.	MOGOMA BOREHOLE
18.	LABOTIET BOREHOLE
19.	CHESUNYON WATER PROJECTS
20.	CHESUGON WATER PROJECTS
21.	SUGUTEK WATER PROJECT
22.	BOSTO DAM
24.	KAPSIRICHOIK DAM

Appendix IV: Correelation Coefficints For Indicator Varibales for Both Independent and Response Variables

Schedule Planning (X1)								
	SP1	SP2	SP3	SP4	SP5	SP6	SP7	SP8
SP1	1.000							
SP2	.300	1.000						
SP3	.125	.115	1.000					
SP4	.259	.084	.355	1.000				
SP5	.476	.137	.022	.214	1.000			
SP6	.446	.197	.241	.105	.328	1.000		
SP7	.326	.287	.196	.197	.205	.511	1.000	
SP8	.193	.143	.186	.118	.107	.376	.438	1.000
a. Determinant = .216								

Budget Planning (X2)								
	BP1	BP2	BP3	BP4	BP5	BP6	BP7	BP8
BP1	1.000							
BP2	.439	1.000						
BP3	-.006	.063	1.000					
BP4	.200	.012	.206	1.000				
BP5	.238	.197	.024	.151	1.000			
BP6	.281	.360	-.039	.133	.322	1.000		
BP7	.253	.270	.229	.205	.195	.308	1.000	
BP8	.243	.307	.071	.076	.047	.181	.418	1.000
a. Determinant = .323								

Communication planning (X3)								
	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8
CP1	1.000							
CP2	.551	1.000						
CP3	.400	.415	1.000					
CP4	.196	.283	.587	1.000				
CP5	.179	.248	.366	.433	1.000			
CP6	.135	.323	.317	.391	.524	1.000		
CP7	.298	.317	.430	.434	.559	.505	1.000	

CP8	.143	.204	.326	.293	.329	.346	.463	1.000
a. Determinant = .077								

Resource Planning (X4)								
	RP1	RP2	RP3	RP4	RP5	RP6	RP7	RP8
RP1	1.000							
RP2	.531	1.000						
RP3	-.006	.061	1.000					
RP4	.223	.204	.121	1.000				
RP5	.260	.278	-.076	.321	1.000			
RP6	.205	.216	-.149	.485	.594	1.000		
RP7	.265	.190	.059	.136	.343	.433	1.000	
RP8	.131	.153	-.149	.152	.319	.458	.702	1.000
a. Determinant = .094								

Technology Integration						
	TI1	TI2	TI3	TI4	TI5	TI6
TI1	1.000					
TI2	.580	1.000				
TI3	.521	.539	1.000			
TI4	.349	.388	.467	1.000		
TI5	.335	.322	.380	.473	1.000	
TI6	.323	.496	.410	.391	.582	1.000
a. Determinant = .128						

Implementation of water constructions projects						
	IM1	IM2	IM3	IM4	IM5	IM6
IM1	1.000					
IM2	.554	1.000				
IM3	.396	.344	1.000			
IM4	.317	.286	.459	1.000		
IM5	.425	.327	.492	.530	1.000	
IM6	.437	.395	.314	.360	.462	1.000
a. Determinant = .179						

Appendix V: Map of Bomet County