

INFLUENCE OF PROJECT MANAGEMENT CAPABILITY ON IMPLEMENTATION OF WATER PROJECTS IN ARID AND SEMI-ARID AREAS OF KENYA: A SURVEY OF EAST POKOT SUB-COUNTY

¹Wamuga Kenneth Gaitho, ²Wanyoike Daniel

School of Business,
Jomo Kenyatta University of Agriculture and Technology, Kenya

wamugakenneth@gmail.com

Abstract: Various agencies have supported communities with water projects but the projects have not been sustainable. Premised on the foregoing realization, it was imperative to examine the influence of water management capability on implementation of water projects in arid and semi-arid areas of Kenya with the view of suggesting recommendations which if implemented would alleviate the problems associated with water shortage in the said regions. The study was guided by the agency theory. The study adopted a survey research design. The target population comprised of contractors, Sub-County water and irrigation officer, project managers, project supervisors and water management committee members working with water projects in arid and semi-arid areas of Kenya. 219 stakeholders working with the aforesaid water projects in East Pokot Sub-County constituted the accessible population. A sample of 88 respondents was drawn from the study population using stratified random sampling technique. A structured questionnaire was used in data collection. The Statistical Package for Social Sciences software facilitated data processing and analysis. The study employed both descriptive and inferential statistics in the analysis. The study findings were presented in form of tables. It was found there existed a positive, moderate and statistically significant relationship between project management capability and successful project implementation. It was concluded that project management capability moderately influenced successful completion of water projects. It is recommended that the water project management capability should tally with available resources and intended purposes of the project.

Keywords: East Pokot Sub-County, Project Implementation, Project Management Capability, Water Project.

1. INTRODUCTION

The implementation of the national water supply and sanitation project in Azerbaijan was initiated in July, 2009 [1]. The project which had been approved by the World Bank in May, 2008, underwent mid-term review in October, 2012 which was 25 months late when compared to the planned mid-term review. The project was supposed to be closed before March, 2013, but the date was revised to end of December, 2017. The cost of implementing and managing the cost supposed to be US\$ 1.60 million. The overall rating of the project in respect to implementation progress was satisfactory. As at the present, the implementation status report (ISR) indicated that the project implementation schedule has been updated by project implementation agency in the country in order to align the implementation process with recent construction advances [1].

A report by Water Sanitation Program [2] centred on water supply and sanitation in Mozambique. The report indicated that the challenge facing water supply in rural areas of the country lies in expansion of access to water and sanitation

services and also ensuring the aforementioned services are sustainable. In Senegal, a report on river basin integrated water resources management project was compiled [3]. The foregoing project was approved in mid-2016 and the closing date for the project is yet to be stated. The implementation progress of the project is presently rate as being satisfactory. Notably, the institutional capacity for implementation and sustainability of the project was rated lowly when being approved and is still being given low ratings. The statistics hold that the foregoing water resources management project is not being implemented according to stakeholders' expectations.

There are various water projects in Kenya have been completed whereas others are in various stages of implementation. These projects are funded by various entities; both local and international. These include the World Bank, the Government of Kenya, and other donors. The implementation of these projects is undertaken by contracted firms. While some water projects are completed timely and with the allocated budget, there are others that never start or stall as they are being implemented [4]. In the light of the foregoing, this study examined the influence of project management capability on implementation of water projects.

2. STATEMENT OF THE PROBLEM

About 80% of Kenya is arid and/or semi-arid. The problem of availability of raw water is likely to increase [5]. The highlighted problem is in line with the issues articulated by the Sustainable Development Goals. Goal numbers one and two aim at ensuring there is no poverty, and zero hunger respectively. Goal number six is on clean water and sanitation. Essentially, therefore, ensuring that there is successful implementation of water projects will address the aforesaid three goals of the 17 SDGs. Some of the areas that face grave water shortage in Kenya include East Pokot Sub-County which is found in Baringo County. These areas have water projects that have been initiated and completed by various agencies. However, the challenge of water shortage continues to be experienced. This raises the issue of sustainability of these water projects after they have been completed. In spite of the fact that the communities residing in this region are pastoralists and as such do not engage in farming activities, the situation has several times occasioned ethnic conflict among the locals. The warring communities often fight for very few and diminishing water resources for both their livestock and households. This implies that unsustainability of water projects has, to a significant extent, contributed to the aforesaid conflict. Questions exist whether the unsustainability of the water projects could be as a result of poor project management capability. Premised on the foregoing realization, it was imperative to examine the influence of project management capability on implementation of water projects in arid and semi-arid areas of Kenya with the view of suggesting recommendations which if and when implemented would alleviate the problems associated with water shortage and sustainability in the said regions and particularly East Pokot Sub-County.

Objective of the Study

The study examined the influence project management capability on successful project implementation.

Research Hypothesis

H₀: There is no statistically significant relationship between project management capability and successful implementation of water projects in East Pokot Sub-County.

3. AGENCY THEORY

The agency theory was proposed by Jensen and Meckling [6]. The theory states that there exists a conflict between the owners of a firm (principals) and the persons entrusted to run the organization (agents) on behalf of the owners. The foregoing conflict arises from contrasting interests of the two parties. Agency theory describes an environment in which there exists a contract where a given party (principal) engages another party (agent) in order to execute a given task or service on the behalf of the principal [7]. This involves delegating part of decision making authority to the agent [6]. The principal-agent problems are witnessed when the two parties have different goals; the principal is unable to determine if and when the agent has conducted themselves appropriately.

It is postulated that the agency theory can be employed to give possible explanation for the success or failure of a project [8]. According to the theory, a greater outcome-basis of the contract between the project manager and project implementers reduces goal conflict and as such increases the chances of the project succeeding. It is averred that the agency theory has been applied in the past in examining the general success of a project in principal-agent setting where one group of individuals delegate the task of project implementation to another group [9].

In view of these assertions, it is in order to state that the agency theory can be applicable in the context of water project implementation. There exists a chain of principal-agent relationships in the entire process of implementing water projects. The project clients engages contractors to implement the water projects on their behalf. In the foregoing setting, the clients act as the principals whereas the contractors are the agents in the principal-agent (contract) agreement. Many projects, including water projects, have stalled partly due to agency conflict arising between the clients and contractors. Over-quoting of the project budgets, for instance, make the available funds inadequate to successfully complete the implementation of water projects. In the water project implementation, there also exists a principal-agent relationship between project contractors and managers where they serve as principals and agents respectively. Another principal-agent relationship is between the project managers and supervisors. Regardless of the stage of the principal-agent relationship, any arising conflict is bound to result in stalling of project management capability whereas congruence of goals between the parties concerned is likely to result in successful project implementation.

4. PAST STUDIES ON PROJECT MANAGEMENT CAPABILITY AND PROJECT IMPLEMENTATION

A study by Lawani and Moore examined project management practices in government organizations in developing countries [10]. The study noted that the level of capability of an organization in dealing with its projects highly depends on the project management practices of the organization. The study established that structural factors, government control procedures, contractor issues and lack of project management knowledge have an impact on project management practices. The study proposed that a combination of the aforementioned is required to facilitate the enhancement of project management practices in the developing countries government organizations.

Another study investigated project management practices and critical success factors in Ghana [11]. The study employed exploratory approach and used a survey method to collect data on project management practices from 200 managers from different sectors of the economy. The findings of the study revealed that a project's success critical factors include top management support, effective communication, and clarity of objectives and goals and stakeholders involvement. The study noted that documentation and dissemination of critical success factors and best practices in project management will improve the quality of project management.

In Kenya, an empirical study examined the factors influencing the performance of community based water projects in Bomet County [12]. The study revealed that financial management practices, governance, community participation and project management practices have an influence on the performance of community based water projects. The project management practices investigated were training, monitoring and evaluation and work plan for projects. The study revealed that 96.6% of the respondents have received training on the various project management practices. Moreover, having a work plan for the projects and carrying out monitoring and evaluation positively influences the performance of water project.

5. CONCEPTUAL FRAMEWORK

A conceptual framework outlines variables of a study and their presumptive relationship either diagrammatically or in form of narrative or both. It is postulated that a conceptual framework facilitates identification of study variables and also clarifies the hypothesized relationships among the stated variables [13]. The predictor variable include project design. The dependent variable, on the other hand, is successful project implementation. It is hypothesized that the stated predictor variable is one of the notable factor that influence successful implementation of water projects in arid and semi-arid areas of Kenya. The study was guided by the foregoing general hypothesis.

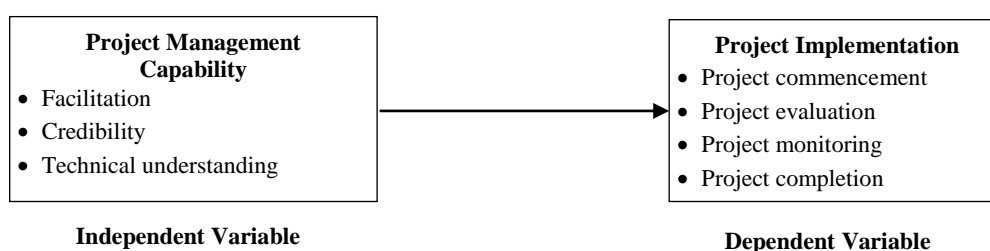


Figure 1: Conceptual Framework

6. RESEARCH METHODOLOGY

6.1 Research Design

This study adopted a survey research design since it was conducted over a specific period of time and involved respondents cutting across various water projects in East Pokot Sub-County. Quantitative approach was employed where the data collected in respect of the study objectives were categorical. This approach involves explaining phenomena through collection of numerical data that are analyzed by use of mathematical methods, otherwise referred to as statistics [14]. In the context of the present study the phenomena revolved around implementation of water projects in arid and semi-arid areas.

6.2 Target Population

The target population comprised of water and irrigation officers, contractors, project managers, project supervisors and water management committee members working with water projects in arid and semi-arid areas of Kenya. The 219 Sub-County water and irrigation officer, contractors, project managers, project supervisors and Water Management Committee (WMC) members working with the aforesaid water projects in East Pokot Sub-County constituted the accessible population.

6.3 Sampling Technique

This study adopted stratified random sampling as shown in Table 1, because the distribution of the members of the study population was heterogeneous. This technique reduces the sampling process bias since it ensures that there is fair and equitable distribution of respondents across all strata as shown in Table 1.

Table 1: Sample Distribution

Strata	N	Sampling Proportion	n
Sub-county water engineer	1	0.05	1
Contractors	16	0.07	6
Project managers	34	0.15	13
Project supervisors	76	0.35	31
WMCM	92	0.42	37
Total	219	1.00	88

6.4 Research Instrument

A structured questionnaire was used to facilitate data collection. The reason this tool was chosen was founded on the fact that it was able to facilitate collection of quantitative data particularly in respect of study variables and objectives. In relation to study variables, the questionnaire constituted item on a 5-point Likert scale.

6.5 Data Processing and Analysis

The data collected from the respondents were first screened in order to ensure completeness and appropriateness of the filled questionnaires. The Statistical Package for Social Sciences Version 24.0 software facilitated data processing and analysis. The study employed both descriptive and inferential statistics in the analysis. Precisely, frequencies, percentages, means, and standard deviations comprised descriptive statistics. In addition, Spearman's rank correlation analysis and multiple regression analysis comprised inferential statistics. The study findings were presented in form of tables. The following regression model guided the inferential analysis.

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where

Y = Project implementation

β_0 = Constant

X_1 = Project management capability

ε = Error term

β_1 = regression coefficient of predictor variable

7. FINDINGS AND DISCUSSION

7.1 Response Rate

Eight-eight questionnaires had been issued to the sampled respondents that comprised of area Sub-County water and irrigation officer, contractors, project managers, project supervisors, and water management committee (WMC) members. After allowing the respondents to fill in the questionnaires, a total of 84 filled questionnaires were collected. This represented a 94.45% response rate.

7.2 Descriptive Findings and Discussion

The study sought the opinions of water projects' stakeholders regarding the capability of project management particularly in respect of water projects in East Pokot Sub-County. The descriptive results to this effect are as illustrated in Table 2. According to the study findings, all the respondents either agreed (69.0%) or strongly agreed (31.0%) that there is effective facilitation of the project terms by the management purposed to aid effective projects implementation. There was a general agreement regarding this proposition (mean = 4.31) while the variation in opinion was not significant (std dev = 0.468). It was also revealed that 92.9% of the sampled respondents admitted that there is high credibility of the project team that enhances effectiveness of water project implementation. In tandem, the respondents had a general concurrence (mean = 3.90) and insignificant variation of views (std dev = 0.261) regarding this assertion.

Majority of water project stakeholders were found to admit that the project managers and teams are highly flexible, a factor that enhances success in project implementation (agree = 90.5%), and also have high technical understanding that enable them to ensure successful project implementation (agree = 71.4%). In addition, while 69.0% of the respondents agreed that all water projects undergo financial aptitude during the implementation phase, 31.0% others were indifferent regarding this assertion. However, there was a general agreement (mean \approx 4.00) regarding the foregoing propositions and the variation in opinions in respect of the said assertions was found to be insignificant (std dev < 1.000).

Table 2: Descriptive Statistics for Project Management Capability

	n	SA	A	N	D	SD	Mean	Std. Dev.
There is effective facilitation of the project terms by the management purposed to aid effective projects implementation	84	31.0	69.0	0	0	0	4.31	.468
There is high credibility of the project team that enhances effectiveness of water project implementation	84	0	92.9	7.1	0	0	3.93	.261
The project managers and teams are highly flexible, a factor that enhances success in project implementation	84	0	90.5	9.5	0	0	3.90	.297
The project managers and teams have high technical understanding that enable them to ensure successful project implementation	84	4.8	71.4	23.8	0	0	3.81	.505
All water projects undergo financial aptitude during the implementation phase	84	0	69.0	31.0	0	0	3.69	.468

The study further examined the views of stakeholders pertinent to water projects in East Pokot Sub-County regarding successful implementation of the aforesaid projects. The pertinent descriptive results are as outlined in Table 3. As shown, the study observed that 35.7% and 64.3% of respondents agreed and strongly agreed respectively that water project implementation often witness time overruns that curtail its success. In general, respondents were in strong agreement (mean = 4.64) regarding this proposition while having insignificant variation in their views (std dev = 0.485). Similarly to 90.5% of the respondents admitting that the implementation of water projects is appraised regularly with the aim of ensuring its success, there was an average agreement (mean = 4.00) and insignificant variation in opinion (std dev = 3.12) regarding this proposition.

Similar observations were made in respect of the assertion that the implementation of water projects is closely monitored to ensure that it is successful. In this regard, 90.5% of the respondents were in agreement which was further supported by general admission (mean = 4.00) and insignificant variation in opinion (std dev = 0.312) in respect of the foregoing proposition. It was agreed by a majority of respondents that the implementation of water projects is evaluated regularly by

competent personnel (agree = 92.9%), and that implementation of water projects is commenced on schedule in order to enhance successful implementation (agree = 76.2%). The variation in respondents' views in respect of these assertions was found to be insignificant (std dev < 1.000). However, majority of the respondents (73.8%) disputed that water projects are usually completed on time. Generally, the assertion was disputed (mean = 1.83) and the respondents had insignificant variation in their views (std dev = 0.490).

Table 3: Descriptive Statistics for Project Implementation

	n	SA	A	N	D	SD	Mean	Std. Dev.
Water project implementation often witness time overruns that curtail its success	84	64.3	35.7	0	0	0	4.64	.485
The implementation of water projects is appraised regularly with the aim of ensuring its success	84	4.8	90.5	4.8	0	0	4.00	.312
The implementation of water projects is closely monitored to ensure that it is successful	84	4.8	90.4	4.8	0	0	4.00	.312
The implementation of water projects is evaluated regularly by competent personnel	84	2.4	92.9	2.4	2.4	0	3.95	.379
Implementation of water projects is commenced on schedule in order to enhance successful implementation	84	9.5	76.2	14.3	0	0	3.95	.492
Water projects are usually completed on time	84	0	0	4.8	73.8	21.4	1.83	.490

7.3 Inferential Findings and Discussion

This section presents results emanating from inferential analysis. The results are interpreted and discussed in relation to past empirical studies on implementation of projects particularly water projects. In this respect, the results of the coefficient of determination (R^2) indicate the extent to which the studied factors explained successful water project completion. This section also shows the results of analysis of variance (ANOVA) which seek to test the significance of the regression model. The last part outlines the regression coefficient that indicates the extent to which successful project implementation is influenced by the studied factor, and also the results of t-statistics that facilitate testing of the null hypothesis.

7.3.1 Correlation Analysis

The Pearson's correlation coefficient was employed to determine how the studied factor related to project implementation. The pertinent correlation results are shown in Table 4. The study found that there existed a positive, weak but statistically significant relationship between project management capability and project implementation ($r = 0.377$; $p < 0.05$). The correlation results were interpreted to mean the more capable the relevant stakeholders were in project management, the more likely it was to implement water projects successfully, and the reverse was equally true.

Table 4: Correlation between Credit Accessibility and Financial Empowerment

		Project Implementation
Project Management Capability	Pearson Correlation	.377*
	Sig. (2-tailed)	.014
	n	84

*. Correlation is significant at the 0.05 level (2-tailed).

7.3.2 Regression Analysis

According to the results of ($R^2 = 0.142$), the project management capability explained only 14.2% of water project implementation. This implied that there were other factors represented by 85.8% that could possibly impact on implementation of water projects in the aforesaid Sub-County, but were not examined by the present study.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.377 ^a	.142	.121	.16536

a. Predictors: (Constant), Project Management Capability

The significance of the following regression model was tested and the pertinent results are as shown in Table 6

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

The study found that the aforesaid regression model was statistically significant ($F = 6.632$; $p < 0.05$).

Table 6: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.181	1	.181	6.632	.014 ^a
	Residual	1.0949	83	.027		
	Total	1.275	84			

a. Predictors: (Constant), Project Management Capability**b. Dependent Variable: Project Implementation**

The results of linear regression analysis are illustrated in Table 7 shown below.

Table 6: Regression Coefficients for Project Management Capability and Project Implementation

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	2.588	.444			5.826	.000
Credit Accessibility	.291	.113	.377		2.575	.014

a. Dependent Variable: Project Implementation

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Substitution of the model :

$$Y = 2.588 + 0.291 X_1$$

The above regression model was interpreted to mean that a unit increase in project implementation required 0.291 unit increase in project management capability while other factors that were not studied were held constant as represented by ($\beta_0 = 2.588$). According to the results of the regression analysis project management capability was the not very important in relation to successful implementation of water projects in East Pokot Sub-County. Given that project planning is closely linked to project management capability, it was imperative to infer that the results of this study deviated from the findings revealed in a past study that project planning had the most significant effect on the performance of water projects [15]. In respect of the present study, project management capability which encapsulate project planning, had the least effect on successful implementation of water projects. Similar to the results of this study were the findings of a past study conducted in Kenya [12]. This was found to be true since project management capability and project implementation were established to be positively correlated. The results of the t-statistics led to the rejection of the null hypothesis ($t = 2.575$; $p < 0.05$), which had stated that the influence of project management capability on project implementation was not statistically significant.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions of the Study

The study inferred that there is effective facilitation of the project terms by the management which is aimed at aiding effective implementation of water projects. The study also concluded that there is high credibility of the water project teams, a factor that enhances effectiveness of water project implementation. It was further concluded that the project

managers and teams are highly flexible which impacted positively on implementation of water projects. The study further concluded that financial aptitude is carried out during implementation of water projects. Moreover, it was inferred that improving the capability of water project management, was bound to result in a slight improvement in implementation of water projects.

8.1 Recommendations of the Study

It is important for the project management team to stipulate clear terms for all project stakeholders including contractors, project managers, supervisors and WMCs in reference to their roles pertinent to project implementation. It is important to ensure that all project stakeholders are adequately involved and that they prioritize the interests of water projects to their own. It is rational to consider important factors like professional qualifications, skills, competence and experience of prospective members of water project teams before inculcating them in the implementation of the aforesaid water projects.

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