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**RISPER OKUMBE**

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# FACTORS INFLUENCING IMPLEMENTATION OF IRRIGATION WATER DEVELOPMENT PROJECTS: A SURVEY OF THE PROJECT TEAM IN MWEA, KENYA

[1]Risper Okumbe, [2]Dr. Jane Queen Omwenga, [3]Dr. Jacob Kinyanjui Nga'nga

[1]MBA Student, Jomo Kenyatta University of Agriculture & Technology (JKUAT), Kenya

[2]Lecturer, Jomo Kenyatta University of Agriculture & Technology (JKUAT), Kenya

[3]Lecturer, University of Nairobi (UON), Kenya

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**ABSTRACT**

The purpose of the study is to investigate the influence of project team on implementation of irrigation water management improvement projects. The focus of the study was on the project consultants, project contractors, project client and project beneficiaries of the Mwea irrigation water management improvement project, Mwea, Kenya. The problem the study seeks to address is implementation of irrigation water management improvement projects with regards to the project team. The research designs for this study were descriptive and correlation research designs. Descriptive research design will be used to measure the centrality of data through measures of mean and standard deviation. Correlation research design was used to measure the relationships of the variables under investigation. The study sampled 133 respondents drawn from four villages within Mwea area. A questionnaire was used to collect data which includes close-ended and Likert scale question items. The descriptive analysis of the influence of project team on implementation of irrigation projects showed that the highest mean score observed was for project team variable was type of skills influence project time as 68.5 % of the respondents agreed that they influence completion of projects in time. The least contributing factor among the project team variable was project teamwork influence project time as cited by 31.5 % of the respondents. The study concludes that project team factors influence the implementation of irrigation projects. The study recommends that it is important for the project team to be constituted during the planning stages and not only during the implementation of the project. This will allow the project team to be more committed to the project through teamwork. This study, thus, proposes that further studies should be carried out to determine other factors which contribute to 53% variations in implementation of irrigation water development projects.

**Key Words:** Implementation of Irrigation Water Management Projects, Project Team, Critical Success Factors

## 1.0 Introduction

Since its introduction in the 1950's the discipline of project management has sought to define criteria against which projects can be measured (Ebbesen & Hope, 2013). It is through projects that organisations seek to achieve their objectives and meet their consumers' needs and expectations. A project is an organization of people dedicated to a specific purpose or objective, projects generally involves large, expensive, unique, or high risk undertakings which have to be completed by a certain date, for a certain amount of money, within some expected level of performance (Shenhar & Dvir, 2007).

There are several factors that have been associated with the implementation of projects. Chan, Scott and Chan (2004) argue that factors affecting implementation of irrigation water management improvement projects can be distinguished into five main categories. Human-related factors which relates to the personnel or project team. Likewise, project-related factors may be those that are directly caused by the implementation of project.

Implementation of complex construction projects in Nigeria with respect to scope and cost significantly varied from the original projections due to lack of funds to finance the project to completion, changes and lack of effective teamwork among the project team members involved and scope change requests by clients (Owolabi, 2012). Sambasivan and Soon (2006) study on the causes of delay factors and effects on completion of construction projects further argue that inadequate contractor experience and inadequate client's finance and lack of timeliness in payments for completed work influences time and cost overrun.

In agreement with the above agreements, Okumbe (2015) indicates that Mwea Irrigation Water Management Improvement Projects took longer than the initially planned programme due to lack of adequate experience of the project team and inadequacy of project finance. Consequently, Okumbe (2015) further argues that project delays significantly increased the project cost by 30 %. Li, Love and Dawe (2006) argue that due to staggering project activities, the project manager may be confronted with additional costs and decline in quality by 11.5% of the original plan. Further, injecting additional resources can significantly increase project costs and prolonged overtime work causes decline in project quality and implementation (Love and Dawe, 2006).

### 1.1 Implementation of Mwea Irrigation Water Improvement Project

The main objective of the Mwea Irrigation Scheme Water Management Improvement Project was to implement interventions required for improvement of water management in Mwea Irrigation scheme comprising lining of existing canals, improvement of water regulation and measurement facilities, infrastructure and construction of appropriate off- takes along canal sections as well as reconstruction of on farm water distribution structures for 6000 Ha. However, the project was completed behind schedule and also experienced cost overruns. The project team factors were assumed to influence late completion and cost overrun.

## 2. Literature Review

The literature review consists of review of existing theoretical and empirical literature with respect to implementation of irrigation water management improvement projects.

### 2.1 Ten Factor Model

In the early nineties, Pinto published a number of articles on Critical Success Factors (CSFs) and is widely known for the 10 CSF list (Pinto & Covin 1989; Pinto & Mantel, 1990; Pinto & Slevin 1989). The critical success factors identified by Pinto (2000) were grouped into ten independent variables which included variables such as project mission, top

management support, project schedule or plan, client consultation, personnel, technology to support the project, client acceptance, monitoring and feedback, channels of communication and troubleshooting expertise. In the same way, Hartmann, (2006) proposed a framework similar to that of Pinto and Slevin (2000), where factors were rooted in projects that were strategically managed According to

**2.2 Belassi and Tukel Model**

Belassi and Tukel (1999) distinguished factors related to the project in terms of size and value of a project, uniqueness of project activities, and the urgency of a project outcome from the project manager and the team members such as project manager's and team members' skills. On the other hand, Belassi and Tukel (1999) distinguished between the organization where top management support is important and the external environment comprising the political, economic, and social factors. According to Ingason and Jonasson (2010) the model enables understanding of the relationships and implications, when these factors are not addressed and that CSFs vary with industry where top management support is vital.

**2.3 Project Team and Implementation of Irrigation Water Management Improvement Projects**

According to Chan et al. (2004), construction projects are becoming much more complex and difficult. The project team is facing unprecedented changes and project team dimensions may have one or more indicators which are influenced by various project characteristics (Enhassi et al., 2009).

Chan and Kumaraswamy (2008) in the comparative study of causes of time overruns in Hong Kong construction projects conducted a questionnaire survey administered to 20 project managers. Similarly, Chan and Kumaraswamy (2008) argues that construction project requires teamwork by all parties from the client to architect, construction manager, contractor, and subcontractor is a crucial factor as it affects time and cost overruns in projects. In addition, Chan and Kumaraswamy (2008) argue that the attributes of the project team includes project team leaders' experience and skills, project team leaders' commitment on time, cost and quality, project team leaders' involvement, project team leaders' adaptability and working relationship, and the last one is support of the project team leaders' parent companies.

Chan and Kumaraswamy (2008) concluded that the project team composition influences time and cost delivery of implementation of irrigation water management improvement projects. The gaps identified therefore are the lack of inclusion of level of education as an indicator to measure project team factors. Likewise, the study was limited in terms of the sampling frame because only 20 project managers were selected.

Owolabi et.al (2014) study on the factors, causes and effects of time delays in implementation of construction projects, adopted a structured questionnaire in Likert scale for data collection. The data analysis and findings indicated that poor communication between project teams often led to low speed of decision making which affected successful time of implementation of irrigation water management improvement projects. In the study, Owolabi et.al (2014) used project team communication as the indicator for project team. The gaps identified, therefore, were exclusion of the level of education and skills of the project team.

**3. Methodology**

**3.1 Population and Sampling**

The target population for this study was 235 respondents. In this study, a multi- stage sampling procedure was used where the respondents were selected randomly from the four clusters identified. The sample size for this study was drawn from Saunders et al. (2009) who calculated the sample size of 125

respondents from a target population of 200 respondents using the formula:

$$Na = \frac{n*100\%}{re\%}$$

The sample for this study was, therefore, 133 respondents. Table 3.1 shows the sample population.

**Table 3.1: Sample Population**

| Clusters | Category of respondents | Target Population |
|---|---|---|
| Karima | 30 % | 67 |
| Thiba | 30 % | 56 |
| Rurumi | 30 % | 49 |
| Mucii-Wa-Urata | 30 % | 65 |
| **Total** | | **235** |

### 3.2 Research Design

The researcher adopted correlation and descriptive research designs. Descriptive research design was used to describe the selected sample without interfering with it and to obtain information on how the groups of data were clustered around a central value from the data collected (Rangarjan, 2013). In addition, correlation research design was used to establish whether correlations exist between the variables under investigation. Porter and Carter (2000) indicate that correlation research design is used when the researcher seeks to determine the relationship that exists between two or more variables of interest.

The questionnaire was the research instrument used in this study. It is an ideal instrument to gather descriptive information from a large sample in a fairly short time (Kothari, 2004). The questionnaire was closed ended for ease of analysis. In addition, it is divided into 2 sections. The first section requested for bio data which informed the demographic characteristics of the respondents. In the second section, the relationship between project team and implementation of irrigation water management improvement projects was requested. The respondents were asked to indicate by way of ticking the appropriate statement using a scale of 5 to 1 where 5 represented SA – Strongly Agree; 4 represented A –Agree; 3 represented N– Neutral; 2 represented D – Disagree; while 1 represented SD – Strongly Disagree. Nine items were used from which information was drawn on the effects

## 4 Results

The descriptive analysis of the influence of project team on implementation of projects were presented in Table 1.1. Twelve items were developed to measure the extent of this relationship.

**Table 1.1: Influence of Project Team on Implementation of Irrigation Projects**

| No.4 | Item | N | Mean | Standard Deviation |
|---|---|---|---|---|
| a. | Project team level of education influence project time | 133 | 4.34 | 1.122 |
| b. | Project team level of education influence project cost | 133 | 4.24 | 1.020 |
| c. | Project team level of education influence project scope | 133 | 3.92 | 1.988 |
| d. | Project team Experience influence project team | 133 | 3.93 | 1.117 |
| e. | Project team Experience influence project cost | 133 | 3.95 | 1.020 |
| f. | Project team Experience influence project scope | 133 | 4.44 | 1.650 |
| g. | Project teamwork influence project time | 133 | 3.48 | 1.104 |
| h. | Project teamwork influence project cost | 133 | 3.77 | 1.140 |
| i. | Project teamwork influence project scope | 133 | 4.36 | 1.085 |
| j. | Project team type of skills influence project time | 133 | 4.89 | 1.990 |
| k. | Project team type of skills influence projects cost | 133 | 4.01 | 1.969 |
| l. | Project team type of skills influence scope | 133 | 4.14 | 1.947 |
| | Composite Mean= 4.13 | | | |
| | Composite Standard Deviation= 1.15 | | | |

Inferential analysis of the results was carried out through ANOVA on SPSS. The research objective of this study was designed to determine the influence of project team on implementation of irrigation water management improvement projects. The hypothesis formulated and tested for this objective was:

**Hypothesis 1**

$H_{0:}$ Project team does not influence implementation of irrigation water improvement management projects

$H_{1:}$ Project team influence implementation of irrigation water improvement management projects

The results arising from running ANOVA on SPSS are presented in Table 4.8- 4.10. The analysis was done at 0.05 level of significance.

**Table 1.2: Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .216(a) | .47 | .036 | 4.05027 |

a Predictors: (Constant), Project Team

**Table 1.3: ANOVA (b)**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 72.049 | 1 | 72.049 | 4.392 | .039(a) |
| | Residual | 1476.418 | 90 | 16.405 | | |
| | Total | 1548.467 | 91 | | | |

a Predictors: (Constant), Project Team

b Dependent Variable: Project Implementation

**Table 1.4: Coefficients (a)**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | B | Std. Error |
| 1 | (Constant) | 16.571 | .691 | | 23.968 | .000 |
| | Project Team | -.019 | .009 | -.216 | -2.096 | .039 |

## 5. Discussion

From the descriptive analysis: Table 1.1, the composite mean for these items was 4.13 while the composite standard deviation was 1.15. In respect to this study, the implications of this result meant that the respondents agree that project team influence the implementation of irrigation of water management improvement projects.

From the inferential analysis Table 1.2 - 1.4, the calculated correlation coefficient shows that r= 0.216. According to Shirley et al. (2005), the strength of the relationship will be considered weak for $0.1 \leq r \leq 0.29$, moderate for $0.3 \leq r \leq 0.59$ and strong if $0.6 \leq r \leq 0.9$. It can, therefore, be concluded that there is a weak positive correlation between project team and implementation of irrigation projects. Therefore, an enhanced project team leads to a marginally positive impact on implementation of irrigation water management projects. Additionally, a unit % increase in project team would result to 47 % improvement in project implementation as represented in $R^2$. Table 4.9 the P value was 0.039. This value being less than 0.05, the null hypothesis was, therefore, rejected and it was concluded that there was a significant relationship between project team and implementation of irrigation water management improvement projects.

### 5.1 Conclusions

The research objective was to determine the influence of the indicators for project team were project team level of education, type of skills and teamwork. With the null hypothesis rejected, it was concluded that there was a significant relationship between project team and implementation of water management projects. Similarly, the correlation analysis indicated that an increase in project team leads to a positive increase in implementation rate of projects. This supports findings by Chan and Kumaraswamy (2008) which revealed that construction project teamwork leads to increased rate of project implementation.

The study therefore recommends that further research should be carried out to establish other factors which contribute to 53% variations in the of implementation of projects.

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