



**DETERMINANTS OF IMPLEMENTATION OF WATER AND SEWERAGE PROJECTS IN INFORMAL SETTLEMENTS IN NAIROBI CITY COUNTY, KENYA**

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**ABSTRACT**

*The purpose of the study was to examine the determinants of implementation of water and sewerage projects in the informal settlements in Nairobi City County, Kenya. A census was used and data was collected through the use of questionnaires. The data was analyzed by use of both qualitative and quantitative methods with the help of Statistical Package for Social Sciences (SPSS) version 22. The coefficient of determination ( $R^2$ ) was used to measure the regression model's ability to explain the variation of the independent variables. It was notable that there existed a strong positive relationship between the independent variables and dependent variable as shown by R value (0.799). The data showed that the high R squared value of 0.638. It showed that the independent variables in the study were able to explain 63.80% variation in the implementation of water and sewerage projects in the informal settlements while the remaining 36.20% was explained by the variables or other aspects outside the model. The standard error was minimal with a value of 0.001 meaning the model used in the study had minimal effects of errors associated with utilization of ICT in projects. This indicated that the independent variables were important factors that need to be enhanced to boost implementation of the projects in the study area. The study recommended for the enhancement of the project funding on implementation of the projects. There was need to enhance proper communication during the implementation of the projects. The poor and distorted information slowed down project implementation and led to extra cost. The study recommended for the adequate M & E plans for continuous monitoring of project activities. The staff working on monitoring and evaluation should be dedicated to the function. The roles and responsibilities of monitoring and evaluation personnel should be specified at the start of the project. Further, there is need for the training for project team competency to be enhanced to increase efficiency of the procurement process and reduce delayed payment in the projects. The project team competency facilitates decision making in the projects and enhance transparency levels in the implementation of the projects. The project team cohesion can also increase implementation of the project and enhance contract scope changes in the project.*

**Key Words:** Project Team, Project Communication, Project Training, Monitoring and Evaluation, Water and Sewerage Projects

## INTRODUCTION

One of the most important natural resource is water. It is the essence of life on earth. The availability of safe water is critical not just for health reasons, but also for social and economic development (WHO and UNICEF, 2015). The development agenda highlighted water supply and sanitation as a result of the UN conference in 1977 in Argentina. The International drinking Water supply and sanitation Decade was declared in the 1980s with the aim of ensuring every person has access to safe water, of adequate quantity and basic sanitary facilities, by 1990 (World Water Assessment Programme, 2013).

Despite this, one billion people in the world today are without access to improved sources of water, and access to consistent safe drinking water not withstanding water being at the center of economic and social development; (World Bank, 2015). When the issue of Sanitation arises it is clear that in most urban centers in Africa, Asia and Latin America less than one third of the population in each country has what is referred to as “good quality sanitation”. It is approximated that more than 100 million urban dwellers world-wide are forced to defecate in the open, into waste paper and plastic bags because public toilets are not available or are too distant and expensive (WHO and UNICEF, 2013).

The Informal settlement in Nairobi County lacks systems for disposal of sewage, silage and solid wastes, which may cause health and environmental dangers specifically. Informal settlements are areas where inhabitants have no land security land for where they dwell. The Residents are deemed as squatters and live in s setup where the rental for housing is informal. The areas normally have no access to the basic services and infrastructure. Housing mostly do not normally comply with the planning and building regulations, and often they are situated in areas that are geographically and environmentally dangerous (UN HABITAT, 2013).

Residents in these areas are not officially recognized by the government, and more so do not possess birth certificates or national identification cards. It can be concluded that they do not even exist in the country for their records are scarce (Scalar & Mary, 2013).

The rapid expansion of cities throughout the world has been accompanied by equally rapid growth of informal settlements. Informal settlements develop as the formal housing market is unable to cater for the number of migrants, many of whom are extremely poor. It is estimated that by 2030, nearly five billion people will be living in urban areas. Slum conditions are defined by the UN as lacking at least one of the basic conditions of decent housing: adequate sanitation, improved water supply, durable housing or adequate living space. Although the proportion of urban dwellers living in slums appears to be falling, the absolute number is rising rapidly. This expansion is occurring quickest in the world’s poorest regions such as Southern Asia and sub-Saharan Africa (worldbank, 2013).

Regionally, Tanzania is one country in East Africa that can be said to be having a population structure that has almost a pure peri-urban settlement. This is evident in towns like Dar es- Salaam, Tanga, Dodoma and Mwanza (Stacey et al. 2015). According to (AfDB ,2014) ,in April 2013 discussions with staff from Dar es Salaam’s water utility, Dar es Salaam Urban Water and Sewerage Authority (DAWASA), it was noted that Dar -es Salaam residents with connections now have “rationing” where supply is only available for short periods. This was attributed in part to minimal investment over the last 40 years, though AfDB funding of the Dar es- Salaam Water Supply and Sanitation Project (DWSSP) is enabling systematic rehabilitation of the existing infrastructure. (Stacey *et al.* 2015) add that, in this country where its annual water resources are at present average 2700 Cubic meters of water per

year, the situation is worse in informal settlements in urban areas like Arusha, Tanga, Mwanza and Dares salaam where by 1/3 of the urban population live without complete access to piped water and organized waste control and management. According to (Theodry, 2009), it is only 40% of the population in the slums of Arusha that is said to have access to reliable water supply and very poor sanitation.

Kenya annual informal settlements growth is believed to be the highest at 5% and will double in the next 30 years if measures are not put into place (UNDP, 2006). The infrastructure in these residents are not sufficient to cater for the huge number of residents, which leaves many of them without access to safe drinking water and adequate sanitation and all forms of pollution (UNEP, 2011). A publication on Amnesty international (2010) shows that, in Kenya there are 8.5 million people that live in low income settlements and the population will increase rapidly at 6% per year.

### **Statement of the Problem**

One of the most important interventions to discuss is water and sewerage infrastructure improvements. This is a critical point of discussion, because nearly all of the water access problems in any human settlements are as a result of lack of this infrastructure. Meaningful improvements to water infrastructure in both formal and informal settlements could lead to effective provision of water and sewerage services to the people. Formal settlement gets treated clean water for consumption and has a proper sewerage system where all the waste is collected at a central point. Piped sewer solid that accumulate in septic system are removed periodically usually after 2- 5 years depending on design and usage to maintain proper function and prevent plunging overflows and resulting to release of septic tank system (UNICEF, 2011).

Access to clean treated water in the formal settlement has made people living in the formal settlement to be less prone to water bone diseases for instance cholera, typhoid and amoeba. Use of safe water and improve sanitation has also reduced death rate for the people living in the formal settlement (World Bank, 2013). Safe and clean water is essential for the satisfaction of life despite this, majority of the Kenya's population-more specifically those in the slums- are without access to improved water supply or sanitation services (WHO & UNICEF, 2013). Human beings cannot survive without water. Unfortunately, water is scarce in Kenya, despite having access to reliable water sources and rainfall (WHO & UNICEF, 2011).

This becomes worst as almost 80% of the peri-urban people in Kenya lack these basic commodities. A number of private and government sponsored organizations have tried to invest in water and sanitation providence to the slum dwellers for example since 1992 but have faced challenges that include: poor financial support from both the national and local governments, poor infrastructure, poor community perceptions and participation, poor training on the importance of such projects, poor rates of returns to the firms involved in WSS among other challenges (UNICEF, 2013).

Inadequate implementation of water and sewerage system in informal settlements in Nairobi County has several consequences to the people living in these areas. This include poor sanitation, blocked sewerage system, poverty, lack of clean water, noise pollution, water pollution and poor water disposal system this has increased diseases for instance Cholera, malaria, dengue and typhoid for the most people living in the informal settlement (WHO, 2012). No study has been conducted in informal settlement Nairobi County in relation to implementation of water and sewerage projects. Some of the previous studies conducted in this

context have not suggested ways on how implementation of water and sewerage projects in informal settlements can be achieved. There is also lack of accurate statistics on the rate of rural-urban migration and resulting informal settlements proliferation within the Kibra. The study sought to establish the determinants of implementation of water and sewerage projects in Kenya.

### **Objectives of the study**

The purpose of the study was to examine the determinants of implementation of water and sewerage projects in the informal settlements in Nairobi City County, Kenya. The specific objectives were to:

- Examine influence of project team on implementation of water and sewerage projects in the informal settlements in Nairobi City County, Kenya.
- Establish the influence of project communication on implementation of water and sewerage projects in the informal settlements in Nairobi City County, Kenya.
- Find out the influence of project training on implementation of water and sewerage projects in the informal settlements in Nairobi City County, Kenya.
- Determine the influence of monitoring and evaluation on implementation of water and sewerage projects in the informal settlements in Nairobi City County, Kenya.

## **LITERATURE REVIEW**

### **Theoretical Review**

#### **Fielder's Contingency Model and Aldair's Model**

Fielder's contingency model (1967) as quoted by Dixon (1994) suggested that there were three factors which influence a leader; a member's relations, tasks structure and position power. The theory identified two basic leader motivations: task

motivation and relationship motivation. Task motivation emphasized on completing the task while the relationship motivation emphasized a machinery good interpersonal relations. The leader behavior research has also stimulated the development of frameworks for the design of management training program of which the managerial grid approach is one of the best known examples.

Aldair's model (1968) argued that for a group to be successful there were three types of needs; task needs, group needs and individual needs. Vroom-Yetton-Jago (1993), as quoted by Luthans (1981) model attempted to provide a specific model i.e. how decisions 'ought' to be made in given situations. The model emphasized the participative dimension of leadership. Vroom-Yetton-Jago (1993) model differed from Fielders (1967) and Hersey and Blanchard's model (1988) in that it stressed on assessing the situation before determining the best leadership style. The path goal theory differed from Fielder's contingency model (1967) as it suggested that the same leaders in different situations could use various styles. Unlike other contingency models, the path goal approach not only suggested what type of leadership might be most effective in a given situation but also attempted to explain that it was the most effective. However, in many cases, delays plague the delivery of projects in many developing countries where such projects are often implemented. The above theory supports the influence of project team on implementation of projects.

#### **Social Exchange Theory**

This theory guided the study in establishing the relationship between project communication and successful implementation of projects. One way of analyzing social interaction among project team members is through the social exchange theory. This theory also called the communication theory of



social exchange is a commonly used theoretical base for investigating individual's knowledge-sharing behavior. According to Blau (1964) and Molms (2001), this theory explains how individuals regulate their interactions with other individuals based on a self-interest analysis of the costs and benefits of such an interaction. That is, it suggests that human beings make social decisions based on perceived costs and benefits, such that they seek to maximize their benefits and minimize their costs when exchanging resources with others (Blau, 1964) and (Molm, 2001). These benefits need not be tangible since individuals may engage in an interaction with the expectation of reciprocity (Gouldner, 1960). In such exchanges, people help others with the general expectation of some future returns, such as gaining desired resources through social reciprocity. In order to maximize the resources gained, individuals may build social relationships with others by sharing their knowledge.

The fundamental dimension in the social exchange theory is individual cognition, which may include perceived benefits and organizational commitment. For sythe et al (2006) defined the term perceived benefits" as the individual's subjective perception of gain from their behaviors. The theory thus declares that individuals engage in social interaction based on the expectation that it will in some way lead to social rewards such as approval, status, and respect (Forsythe et al, 2006). For example, Kankanhalli et al. (2005) believes that an individual's perceived benefit is one of the major factors that encourage employees to contribute knowledge to electronic knowledge repositories. According to Ma and Agarwal (2007), the amount of knowledge that people contribute to a virtual community depends on the level of satisfaction that they too derive from being members of the community.

### **Competency Theory**

The work of McClelland & McBer in the 1980s established the competence theory. The authors defined competency as the underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or situation. Since then a number of competency frameworks have been developed by different project management institutes. Crawford (as cited in Boyatzis, 1982 & Spencer, 1993), puts a model of competence that integrates knowledge, skills, demonstrable performance, and core personality characteristics, noting the last, personality characteristics, as challenging to develop and assess through training. She argues that two of the most influential project management standards, the PMBOK, address only the knowledge aspect of competence while a third, Australia's National Competency Standards, draws from knowledge but focuses only on demonstrable performance. Crawford, (2010) study found out that project managers "do not necessarily have the required competence or perform the full activities required to promote and implement the changes that they are leading as part of their projects.

Interest in project management competence stems from the very reasonable and widely held assumption that if people who manage and work on projects are competent, they will perform effectively and that this will lead to successful projects and successful organizations (Beer, 1990; Smith, 1976). Competence is generally accepted, however, as encompassing knowledge, skills, attitudes and behaviors that are causally related to superior job performance. Crawford (as cited in Boyatzis, 1982 & Spencer, 1993), stated that professional competence in project management is attained by combination of knowledge acquired from training and its subsequent application and other skills developed in the course of work. Previous management studies have investigated the impact of competency on performance.

Dainty,(2004) have argued for a competency based performance model for construction project managers where managerial behavior input is appraised and nine performance indicators for PM competency are developed to comprise team building, leadership, decision-making, mutuality and approachability, honesty and integrity, communication, learning, understanding and application, self-efficacy, and maintenance of external relations. In the context of construction projects it is assumed that if the project manager and the project team members have all the required competence (project training) for the projects being undertaken.

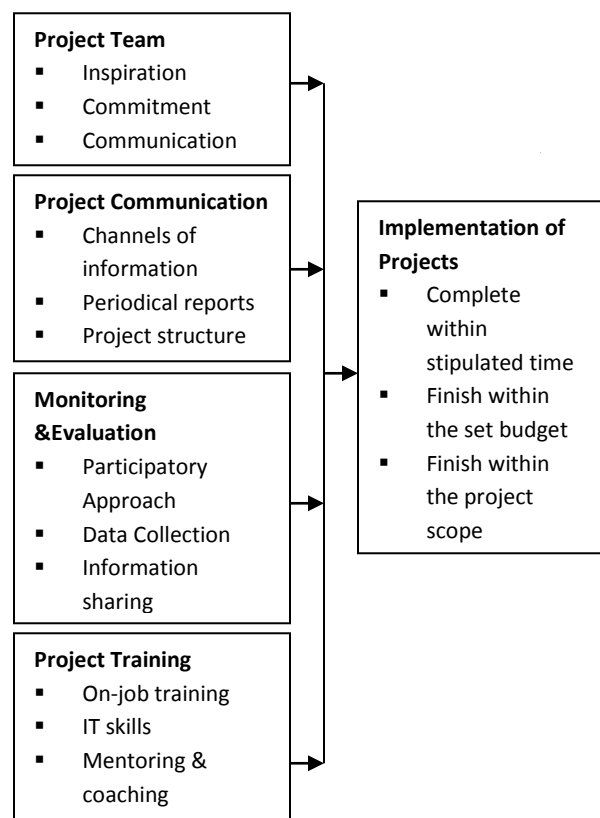
### Control Theory

Control theory, invented by Ouchi (1979) and Eisenhardt (1985) uses the notion of modes of control to describe all attempts to ensure that individuals in organizations act in a way that is consistent with organizational goals and objectives (Kirsch, 1997). The concept of control is based on the premise that the controller and the controlee have different interests. These different interests will be overcome by the controller's modes of control (Tiwana, 2009). Modes of control may distinguish between formal and informal mechanisms. Formal modes of control are defined as Behavior control and Outcome control. Behavior control consists of articulated roles and procedures and rewards based upon those rules. Outcome control is mechanisms for assigning rewards based on articulated goals and outcomes. The informal modes of control are carried out by the control modes labelled as clan and self. Clan are the mechanisms of a group sharing common values, beliefs, problems, and these mechanisms work through activities as hiring & training of staff, socialization etc. The control mode of the self is about individually defined goals and can be carried through the mechanisms of individual

empowerment, self-management, self-set goals, etc. (Kirsch, 1997).

In the context of project management the project manager and the project teams have different interests. In order for the project manager to control cost and schedules during the project execution phase, he has to come up with different modes that ensure that teams are compliant. The control mechanisms and rules must also be aligned with the overall construction goals as well as the goals of individual teams. Based on this understanding, PM this research will use control theory to focus on modes of monitoring and evaluation on completion of projects.

### Conceptual Framework



**Independent Variables      Dependent Variable**

**Figure 1: Conceptual Framework**

## **Project Team**

Soham, & Rajiv (2013) states that the management needs to be involved in the up-front planning efforts and effectiveness of communication, control system, management system and organizational culture. Studying the significant factors that cause delay of construction projects in Malaysia, Alaghbari, Kadir, Salim and Ernawati (2007) three categories for analysis, namely contractor, consultant and owner. As far as causes related to contractor actions are concerned, 'financial problems', 'shortage of materials' and 'poor site management' were ranked among the top three. Owner causes included 'delayed payments', 'slow decision-making' and 'contract scope changes'. The top three consultant causes were 'poor supervision', 'slowness to give instructions' and 'lack of experience'

Andawei (2014) reports on a study finding that motivational factors significantly influence the performance of workers. McLeod et al. (2012).research also found out that project team commitment is one of the most important factors for project implementation. Darrington, & Howell (2010). emphasized that motivation schemes on construction site workers should not be centred on monetary incentives because it destroys intrinsic motivation, which makes construction site workers be less productive. He proposed that intrinsic motivation should be encouraged so that parallel positioning of incentive structures with motivation can result in successful projects for the client and economic and psychological advantage to the contractor. Ochieng, & Price (2010) pointed that a project manager needs to understand the individual desires of each team member. To achieve a project environment where the majority of the members involved are motivated about the project, project managers have to be sensitive to the needs and wants of the team members.

## **Project Communication**

Communication is a key issue for successful project implementation and management. It is specifically a challenging task for projects where a number of interdependent role players are needed to achieve the desired project outcomes (Abdulaziz *et al.*, 2015). Communication is very essential in project execution. It plays a vital role in all stages of construction such as design production, organization and management (Mehra, 2009). Statistics have shown that over 50% of projects in Africa are unsuccessful due to inappropriate communication method (Kasim & Usman, 2013). Various professionals in the construction industry must communicate effectively for any given project to be successful. During the course of project execution, information in the form of drawings, specifications and construction methods must be fully disseminated (Aishwi & Underwood, 2009).

Some professionals may not be able to understand some aspects of a project if little information is available thus leading into project failure. Ineffective communication system leads to demotivated workforce, design errors, slowdown in the entire job and failure in production (Topli & Ilyasu, 2014). Project professionals should communicate throughout all construction stages. There is need for professionals within the construction industry to appropriately communicate with each other for the successful delivery of performance goals within the organization. Scope of work and details of projects are communicated by means of drawings, contract documents, addenda and specifications (Kasim & Usman, 2015).

## **Monitoring and Evaluation**

Monitoring can be defined as the ongoing process by which stakeholders obtain regular feedback on



the progress being made towards achieving their goals and objectives while evaluation is a rigorous and independent assessment of either completed or ongoing activities to determine the extent to which they are achieving stated objectives and contributing to decision making (UNDP, 2009). Monitoring and evaluation is conducted for several purposes namely to learn what works and does not; to make informed decisions regarding programme operations and service delivery based on objective data; to ensure effective and efficient use of resources; to track progress of programmes; to assess extent the programme is having its desired impact; to create transparency and foster public trust; to understand support and meet donor needs; and to create institutional memory.

Moyo, Mangore, & Chigara (2014), Zint & Montgomery (2012) argued that evaluation should not be encouraged in the following circumstances: when a programme is unstable, unpredictable and/or has not achieved a consistent routine; when those involved cannot agree about what the programme is trying to achieve; and when a funder and/or manager refuse to include important and central issues in the evaluation. Zint & Montgomery (2012) in their online publication, defined evaluation as the critical examination of a programme. Zint & Montgomery posited that evaluation involves collecting and analyzing information on programme activities, characteristics and outcomes. Zint & Montgomery (2012) saw the purpose of evaluation as making a judgment so as to improve the programme's effectiveness, thus informing programming decisions.

### **Project Training**

Training and education are being given the importance that they deserve throughout the industry and business. If people cannot use the new technologies, they cannot take responsibility for

their own quality; this is because the customer requirements are more and more stringent, so Skills can quickly be unsatisfied. Training is important and necessary, but it is also costly (Read and Kleiner, 1996). Keep (1989) suggests that training can be viewed either as a cost or as an investment. According to Greig (1997), in general terms, the analysis divides in-service training into three classifications: (i) Training that can be conducted most readily and effectively outside the enterprise; (ii) Training that can be carried out most readily and effectively inside the enterprise; (iii) Training that, both technically and cost-effectively, can be delivered equally well outside or inside the enterprise. Priority human capacities for E-government system are combined: those who have knowledge about technology, business and information in governance. Training is adequate to meet and maintain e-government skills (AONSW, 2001). Also, the re-engineering of work processes needs to manage well, as well as retraining and educating the relevant staff members (Jupp, 2001). The importance of training, hands-on support and a proactive stance towards adjusting the technology to the work have been identified as important both by practitioners (Orlikowski et al., 1995, Karsten et al., 1997).

### **Implementation of Projects**

Tonnquist (2008) considers competence of project manager, competence of project team, quality of subcontractor services, and top management support as CSFs of project management. In Lithuania, Gundecka (2012) states that project management's experience, project value, project manager's experience, experience of contractor, project size, competence of project team members, clear and realistic goals, decision making effectiveness of project management, and technical capability of project management are the most important success factors for construction projects. Wanjiku (2012) contends that financial issues,

human resources conditions, site characteristics and design quality aspects to be factors influencing performance of contractors of government funded building projects in Kirinyaga County. Wambugu (2012) identifies strategy, project term capacity, project communication, monitoring and evaluation, and client consultation as factors influencing success of projects in Nyeri County.

Project implementation requires considerable financial, human and other resources. The project sponsor defines the project characteristics. Investment in these resources is key to the project success. It is incumbent on the investors – whether these resources are international, national, regional or even local – to assess the impact and success of the activities and outcomes according to the description of the project to be implemented. First Tranche online blog (2012) noted that the success rate for projects with high levels of quality monitoring and evaluation (QME) was 93%, compared to a 3% success rate for those with low levels of QME. Zint & Montgomery (2012) noted that effective supervision was necessary for project success. The following can be regarded as important in effective M&E: it allows actors to specify the determinants of success, it provides points of unity for adjustments, it identifies best practices, and it encourages the improved use of resources and capacities.

## **Empirical Literature Review**

### **Project Team**

Soham, & Rajiv (2013) states that the management needs to be involved in the up-front planning efforts and effectiveness of communication, control system, management system and organizational culture. Studying the significant factors that cause delay of construction projects in Malaysia, Alaghbari, Kadir, Salim and Ernowati (2007) three categories for analysis, namely contractor,

consultant and owner. As far as causes related to contractor actions are concerned, 'financial problems', 'shortage of materials' and 'poor site management' were ranked among the top three. Owner causes included 'delayed payments', 'slow decision-making' and 'contract scope changes'. The top three consultant causes were 'poor supervision', 'slowness to give instructions' and 'lack of experience'.

### **Project Communication**

Abdulziz et al.,(2016) did a study on the role of communication and coordination in project success. In this context, a two-stage case study of construction phase delay control for an oil and gas industrial project is presented. A process improvement methodology was carried out in the first stage and the root causes for the delays were identified. The investigation results revealed that the scope of one item of work, piping, dominated a large portion of delays. It was found that piping packages were not processed smoothly due to four main causes: incomplete testing, frequent piping modifications, incomplete as-built drawings, and incomplete punch listing. Seventy percent of the delays were caused by incomplete testing activities and incomplete as-built drawings. The improvement study suggested establishing a new unit for piping test package control and coordination. The review process was improved and the dedicated control team was implemented for the second unit, resulting in a substantial drop in the number of delayed test packages (down from 48 to 8%) and punch list items (down from 3,075 to 2,371). The findings of the case study demonstrate the importance of communication and coordination in successful project management for complex projects. The case presented is an example of process improvement use for successful delay management..

## Monitoring and Evaluation

First Tranche online blog (2012) noted that the success rate for projects with high levels of quality monitoring and evaluation (QME) was 93%, compared to a 3% success rate for those with low levels of QME. Zint & Montgomery (2012) noted that effective supervision was necessary for project success. The following can be regarded as important in effective M&E: it allows actors to specify the determinants of success, it provides points of unity for adjustments, it identifies best practices, and it encourages the improved use of resources and capacities. Citing (Thomson & Hoffman, 2003), (Kimani 2013) argued that evaluation should not be encouraged when a program is unstable, unpredictable and/or when it has not achieved a consistent routine as when those involved cannot agree about what the program is trying to achieve the funder and/or manager may refuse to include important and central issues in the evaluation. Hence complete involvement of all stakeholders is key in a project.

## Project Training

Project team training on Project Procurement Management (PPM) is part of the project management process in which products or services are acquired or purchased from outside the existing employee base (which would work on the project) in order to complete the task or project (Jarkas, & Bitar, 2011). There are essentially two different types of procurements, one in which the company is responsible for the particular product or service under a legal contract, this PPM includes contract management responsibilities that issue specific tasks to various team members (Kerzner, 2013). According to PM (2004) Project Procurement Management (PPM) can also include responsibility of the contracts in which, the buyer that is hired for this particular project is performing the task for a certain seller, this contract is placed between the one providing a service and the particular team that

was responsible for completion of this project (Jarkas, & Bitar, 2011)

According to Ngacho,(2014) in his research on performance evaluation framework of development projects, he concluded that understanding the needs of the community through proper involvement of the representatives of the community and other stakeholders and accordingly selecting suitable projects which would cater to their needs. Choge, (2014) in his study on the factors affecting adherence to cost estimates found out that the experience with rating “high” is a significant factor to adherence to cost estimates as indicated by 80% of the respondents. It also established that poor distribution of labour, poor site management, inadequate technical and managerial skills, inadequate quality control skills, and bankruptcy are aspects influence contractors experience thus determining its significance to adherence to cost estimate.

## METHODOLOGY

The study was a descriptive research design to establish the determinants of implementation of water and sewerage projects in Nairobi City County, Kenya. According to Creswell (2012) this design is used when both quantitative and qualitative data, together, provide a better understanding of the research problem than either type by itself, when one type of research (qualitative or quantitative) is not enough to address the research problem or answer the research questions and in case of pragmatism (practicality; multiple view points; biased and unbiased; subjective and objective). The target population comprised of 65 water and sanitation construction projects in the informal settlements in Nairobi City County completed between 2011 and 2017. The Multiple Regression model that aided the analysis of the variable relationships was as follows:  $Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$ , where,

$Y_i$  = Implementation of projects;  
 $\beta_0$  = constant (coefficient of intercept),  
 $X_1$  = Project Team  
 $X_2$  = Project Communication  
 $X_3$  = Monitoring & Evaluation  
 $X_4$  = Project training  
 $\epsilon$  = Error term;  
 $\beta_1 \dots \beta_4$  = regression coefficient of four variables

## RESULTS

### Project Team

The study sought to assess the influence of project team on implementation of water and sewerage projects in informal settlements in Nairobi City County, Kenya in the study area. This section presents findings to statements posed in this regard with responses given on a five-point likert scale (where 5 = Very Great Extent; 4 = Great Extent; 3 = Moderate Extent; 2 = Small Extent; 1 = Very Small Extent). Table 1 presents the findings. The scores of 'Very Great Extent' and 'Great Extent' have been taken to represent a statement equivalent to mean score of 3.5 to 5.0. The score of 'Moderate Extent' has been taken to represent a statement moderately, equivalent to a mean score of 2.6 to 3.4. The score of 'Small Extent' and 'Very Small Extent' have been taken to represent a statement equivalent to a mean score of 1.0 to 2.5.

Table 1 below presented the findings. The majority of respondents indicated to great extent with most statements posed that the team competency enhance efficiency of the procurement process (3.236). the team competency reduce delayed payment (3.456); the team competency facilitated decision making in the projects (3.332); the team competency enhanced transparency levels in the management of the projects (3.109); team

cohesion reduce procurement cycle in your project (3.902); the team cohesion enhance contract scope changes in the project (3.221); the leadership encourage up front planning efforts (3.098); the leadership that encourage up front planning efforts in your project (3.228); team commitment encourages intrinsic motivation in the implementation of the projects; the team commitment which encourages intrinsic motivation in the implementation of the projects (2.108). The study findings imply that project team influence implementation of water and sewerage projects in the informal settlements in Nairobi City County, Kenya.

The study findings corroborates with the findings of Andawei (2014) and McLeod et al. (2012) who found out that project team commitment is one of the most important factors for project implementation. Darrington & Howell (2010), emphasized that motivation schemes on projects should not be centered on monetary incentives because it destroys intrinsic motivation, which makes construction site workers be less productive. He proposed that intrinsic motivation should be encouraged so that parallel positioning of incentive structures with motivation can result in successful projects for the client and economic and psychological advantage to the contractor. Ochieng & Price (2010) pointed out that a project manager needs to understand the individual desires of each team member. To achieve a project environment where the majority of the members involved are motivated about the project, project managers have to be sensitive to the needs and wants of the team members. Soham & Rajiv (2013) states that the management needs to be involved in the up-front planning efforts and effectiveness of communication, control system, management system and organizational culture.

**Table 1: Project Team**

Statements	Mean	Std. Dev
Does team competency enhance efficiency of the procurement process?	3.236	.456
How does team competency reduce delayed payment	3.456	.762
How does team competency facilitated decision making in your project	3.332	.112
How has team competency enhanced transparency levels in the management of the projects	3.109	.865
Does team cohesion reduce procurement cycle in your project?	3.902	.456
How does team cohesion enhance contract scope changes in your project?	3.221	.098
How does leadership encourage up front planning efforts?	3.098	.237
Do you have leadership that encourages up front planning efforts in your project?	3.228	.556
Do you have team commitment which encourages intrinsic motivation in the implementation of the projects?	2.108	.816

**Project Communication**

The study sought to assess the influence of project communication on implementation of water and sewerage projects in informal settlements in Nairobi City County, Kenya in the study area. This section presents findings to statements posed in this regard with responses given on a five-point likert scale (where 5 = Very Great Extent; 4 = Great Extent; 3 = Moderate Extent; 2 = Small Extent; 1= Very Small Extent). Table 2 presented the findings. The scores of 'Very Great Extent' and 'Great Extent' have been taken to represent a statement equivalent to mean score of 3.5 to 5.0. The score of 'Moderate Extent' has been taken to represent a statement moderately, equivalent to a mean score of 2.6 to 3.4. The score of 'Small Extent' and 'Very Small Extent' have been taken to represent a statement equivalent to a mean score of 1.0 to 2.5.

The study findings in Table 2 the respondents indicated to a great extent that the project team has experience in interpretation of working drawings (3.226); The poor and distorted

information slow down project implementation and lead to extra cost (3.765); The unclear channels of communication has slowed and culminated delay in project implementation (3.980); they do regular site meetings between the consultants and contractors (3.258); There is regular review and adjustment of communication report (3.560); there were regular annual reports (3.335); There is information on work breakdown structure necessary for division of labour (3.255). The study findings imply that the project communication influence implementation of the service innovation projects in the public hospitals in Kenya. The study findings corroborate with literature review by Heldga (2008) confirmed that project communication is very important for the successful implementation of projects. During programme design and implementation, emphasis is placed on project communication so that the services provided can continue throughout the project. Abdulziz et al.,(2016) indicated that project communication and coordination in project success. In this context, a two-stage case study of construction phase delay control for project is presented. Communication is a key issue for



successful project implementation and management. It is specifically a challenging task for projects where a number of interdependent role players are needed to achieve the desired project outcomes (Abdulaziz *et al.*, 2015). Communication

is very essential in project execution. It plays a vital role in all stages of construction such as design production, organization and management (Mehra, 2009).

**Table 2: Project Communication**

Statement	Mean	Std
The project team has experience in interpretation of working drawings	3.226	.321
The poor and distorted information slow down project implementation and lead to extra cost	3.765	.906
The unclear channels of communication has slowed and culminated delay in project implementation	3.980	.460
We do regular site meetings between the consultants and contractors	3.258	.568
There is regular review and adjustment of communication report	3.560	.330
There are regular annual reports	3.335	.580
There is information on work breakdown structure necessary for division of labour	3.255	.560

### Monitoring & Evaluation

The study sought to assess the influence of monitoring and evaluation on implementation of water and sewerage projects in informal settlements in Nairobi City County, Kenya in the study area. This section presents findings to statements posed in this regard with responses given on a five-point likert scale (where 5 = Very Great Extent; 4 = Great Extent; 3 = Moderate Extent; 2 = Small Extent; 1= Very Small Extent). Table 3 presents the findings. The scores of 'Very Great Extent' and 'Great Extent' have been taken to represent a statement equivalent to mean score of 3.5 to 5.0. The score of 'Moderate Extent' has been taken to represent a statement moderately, equivalent to a mean score of 2.6 to 3.4. The score of 'Small Extent' and 'Very Small Extent' have been taken to represent a statement equivalent to a mean score of 1.0 to 2.5.

According to Table 3, with the grand mean of 3.176, the study established that majority of the respondents stated that the top management takes

a leading role in management of the project (3.456); there is continuous evaluation of the status of the project (3.235); the project management encourage participation approach on running project activities (3.780); the participatory M & E encourage upfront planning efforts in the project (3.226); there are periodic reports generated and share on the status of the projects (3.560); the project personnel continuously monitor their implementation of project activities (3.554). The study results show that monitoring and evaluation plays a very important role on implementation of service innovation projects in Kenya.

The study findings are in agreement with literature review by Valadez & Bamberger (2014) who indicated that the systemic and regular collection of data from projects will assist the project team to learn from experience and improve practices, allow for both external and internal accountability of the resources invested and the results realized as well as ensure planned activities are adhered to (O'Sullivan, 2014). Monitoring checks activities and

progress against plans allowing documentation of project progress and this improves greatly the chances of project success and sustainability. Evaluation focuses on systematically and objectively assessing a phase of a project or the whole project after it is completed (Rossi, Lipsey, & Freeman, 2014). Evaluation of project phases allows detect deviation from plan in time and allow for timely rectification (Valadez & Bamberger, 2014). Project

phase evaluation also allows assess relevance of the project to community needs, efficiency of the project team and use of resources, effectiveness of the interventions and also impacts being realized from the project or impacts anticipated, this allows the project manager analyze the expected implementation levels of the project (Junbeum, *et al.*,2007).

**Table 3: Monitoring & Evaluation**

Statement	Mean	Std
Does top management takes a leading role in management of the project?	3.456	.097
Is there continuous evaluation of the status of the project?	3.235	.876
Does the project management encourage participation approach on running project activities?	3.780	.543
Does the participatory M & E encourage upfront planning efforts	3.226	.009
Are there periodic reports generated and shared on the status of the projects?	3.560	.800
Do the project personnel continuously monitor their implementation of project activities?	3.554	.654

**Project Training**

The study sought to assess the influence of project training on implementation of water and sewerage projects in informal settlements in Nairobi City County, Kenya in the study area. This section presents findings to statements posed in this regard with responses given on a five-point likert scale (where 5 = Very Great Extent; 4 = Great Extent; 3 = Moderate Extent; 2 = Small Extent; 1= Very Small Extent). Table 4 presents the findings. The scores of ‘Very Great Extent’ and ‘Great Extent’ have been taken to represent a statement equivalent to mean score of 3.5 to 5.0. The score of ‘Moderate Extent’ has been taken to represent a statement moderately, equivalent to a mean score of 2.6 to 3.4. The score of ‘Small Extent’ and ‘Very Small

Extent’ have been taken to represent a statement equivalent to a mean score of 1.0 to 2.5.

Table 4 below presents the findings. From the study it was found that majority of respondents from the organization have highly agreed to moderate the extent that they are offered monthly trainings to acquire knowledge and skills (2.908); The project offers training to enhance knowledge and individual development in the organization(2.239); The trainings offered by the project boost their moral, confidence and motivation to work in the organization (3.002); The trainings offered by the project have made them to continue working in the organization (3.040); Training courses assist in developing both professional and personal career paths (3.123). The project provides mentorship programs to project team members (3.578); the project offers training scholarships to project team

members as a means of promoting Professional and skill development (3.897); Trainings Modules

conducted are relevant (3.990)

**Table 4: Project Training**

Statements	Mean	Std. Dev
We are offered monthly trainings to acquire knowledge and skills	2.908	.007
The project offers trainings to enhance knowledge and individual development	2.239	.088
The trainings offered by the project boost my moral, confidence and motivation to work in the organization	3.002	.080
The trainings offered by the project have made me to continue working in the organization.	3.040	.336
Training courses assist in developing both my professional and personal career paths	3.123	.531
The project provides mentorship programs to project team members	3.578	.215
The project offers training scholarships to project team as a means of promoting Professional development	3.897	.347
Trainings Modules conducted are relevant to our projects	3.990	.320

**Implementation of Projects**

The study sought to examine the determinants of implementation of water and sewerage projects in the informal settlements in Nairobi City County, Kenya, attributed to the influence of project team, project communication, monitoring and evaluation and project training. The study was particularly interested in three key indicators, namely finish within schedule, budget and scope, with all the three studied over a 3 year period, running from 2015 to 2017. Table 5 below presents the findings and reveal improved implementation of the projects across the 3 year period running from the year 2015 to 2017 The implementation of projects in within schedule recorded low positive achievement with a majority of the respondents

indicated to less than 10% in 2015 (40%) and 2016 (40%), to improved by more than 10% in 2017(40%). A similar trend was implementation of projects in within budget, improving from less than 10% (40%) in 2015, to improved by 10% in 2016 (36%), 2017(46%) stated to have improved by more than 10%. The implementation of projects in within scope further recorded improvement with a majority affirming to less than 10% in 2015 (38%) and 2016 (36%) stated improved by 10%, to improved by more than10% in 2017(36%). It can be deduced from the findings that implementation of projects in within time, budget and schedule have considerably improved in the informal settlements as influenced by among other attributes by project team, project communication, monitoring and evaluation and project training.

**Table 5: Implementation of Projects**

Finish within Schedule	2015	2016	2017
Improved by less than 10%	40%	40%	32%
Improved by 10%	32%	28%	28%
Improved by more than 10%	28%	32%	40%

<b>Finish within Budget</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
Improved by less than 10%	40%	34%	22%
Improved by 10%	35%	36%	32%
Improved by more than 10%	25%	30%	46%
<b>Finish within Scope</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
Improved by less than 10%	38%	36%	30%
Improved by 10%	36%	33%	36%
Improved by more than 10%	26%	31%	33%

### Multiple Regression Analysis Model

**Table 6: Model Summary**

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of the Estimate
1	.799	.638	.598	.001

**Table 7: ANOVA Results**

Model	Sum of Squares	d.f	Mean Square	F	Sig.
Regression	65.890	4	16.4725	21.861	.000 <sup>a</sup>
Residual	33.908	45	.7535		
Total	99.798	49			

NB: F-critical value = 17.564

### Regression Coefficients

**Table 8: Coefficient Results**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	B		
1	(Constant)	5.890	.932		6.321	.000
	Project Team	.834	.122	.502	6.834	.000
	Project Comm.	.821	.153	.455	5.342	.001
	M& E	.799	.163	.405	4.900	.003
	Project Training	.720	.185	.309	3.884	.007

a. Dependent Variable: Implementation of projects

With the aid of model  $Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$ ; Y = Dependent variable (Implementation of

water and sewerage projects);  $\alpha$  = Constant (The intercept of the model),  $\beta$  = Coefficient of the X

variables (independent variables). Therefore, the general form of the equation was to predict implementation of water sewerage projects from  $X_1 =$  Project team;  $X_2 =$  Project Communication;  $X_3 =$  Monitoring & Evaluation;  $X_4 =$  Project Training is:  $(Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon)$  becomes:  $Y = 5.890 + 0.834X_1 + 0.821X_2 + 0.799X_3 + 0.720X_4 + 0.932$ . This indicates that Implementation of water and sewerage projects =  $5.890 + 0.834 * \text{Project Team} + 0.821 * \text{Project Communication} + 0.799 * \text{Monitoring \& Evaluation} + 0.720 * \text{Project Training} + 0.932$ .

### CONCLUSION AND RECOMMENDATIONS

The study established that a majority of respondents indicated to a moderate extent with most statements posed as regards influence of project team on implementation of service delivery innovation projects. Majority particularly highly agreed that the team competency enhance efficiency of the procurement process and reduce delayed payment. The team competency facilitated decision making in the projects and enhanced transparency levels in the management of the projects. The project team cohesion reduces procurement cycle in your project and enhances contract scope changes in the project. The leadership encourage up front planning efforts and the team commitment encourages intrinsic motivation in the implementation of the projects.

The study sought to assess the influence of project communication on implementation of water and sewerage projects in the informal settlements in Kenya. The study findings indicated to a great extent that the poor and distorted information slow down project implementation and lead to extra cost. The unclear channels of communication has slowed and culminated delay in project implementation. They do regular site meetings between the consultants and contractors. There is

regular review and adjustment of communication report. There were regular annual reports. There is information on work breakdown structure necessary for division of labour. This indicates that project communication is important factor on the implementation of the projects.

The study established that there is continuous evaluation of the status of the project. The project management encourages participation approach on running project activities. The participatory M & E encourage upfront planning efforts in the project. There are periodic reports generated and share on the status of the projects. The project personnel continuously monitor their implementation of project activities. The study results show that monitoring and evaluation plays a very important role on implementation water and sewerage projects in Kenya.

From the descriptive statistics the study established that a majority of respondents from the projects indicated to a moderate the extent that they are offered monthly trainings to acquire knowledge and skills. The project offers training to enhance knowledge and individual development in the organization. The trainings offered by the project boost their moral, confidence and motivation to work in the organization. The trainings offered by the project have made them to continue working in the organization. The record keeping control capital invested in the projects. Training courses assist in developing both professional and personal career paths. The project provides mentorship programs to project team members. The project offers training scholarships to project team members as a means of promoting Professional and skill development. Trainings Modules conducted are relevant.

### Conclusions of the Study

The study concludes that project team influence implementation of water and sewerage projects in



the informal settlements in Kenya. The regression coefficients of the study show that project team has a significant influence on implementation of water and sewerage projects in the informal settlements in Kenya. This implies that increasing levels of project team would influence positively the levels implementation of water and sewerage projects in the informal settlements in Kenya.

The study concludes that project communication influence implementation of water and sewerage projects in the informal settlements in Kenya. The regression coefficients of the study show that project communication has a significant influence on implementation of water and sewerage projects in the informal settlements in Kenya. This implies that increasing levels of project communication would influence positively the levels implementation of water and sewerage projects in the informal settlements in Kenya.

The study concludes that monitoring and evaluation influence implementation of water and sewerage projects in the informal settlements in Kenya. The regression coefficients of the study show that monitoring and evaluation has a significant influence on implementation of water and sewerage projects in the informal settlements in Kenya. This implies that increasing levels of monitoring and evaluation would influence positively the levels implementation of water and sewerage projects in the informal settlements in Kenya.

The study concludes that project training influence implementation of water and sewerage projects in the informal settlements in Kenya. The regression coefficients of the study show that project training has a significant influence on implementation of water and sewerage projects in the informal settlements in Kenya. This implies that increasing levels of project training would influence positively

the levels implementation of water and sewerage projects in the informal settlements in Kenya.

### **Recommendations of the Study**

The study recommended for the enhancement of project team competency in the projects. The team competency can facilitate the decision making and transparency levels in the management of the projects. The project team competency enhances skill to reduce project procurement cycle and enhances contract scope changes in the project. The leadership skills are required to enhance up front planning efforts and the team commitment during the implementation of the projects.

There is need to enhance proper communication during the implementation of the projects. The poor and distorted information slow down project implementation and lead to extra cost. There should be clear channels of communication to facilitate and eliminate the delays project implementation. The implementers should have regular site meetings between the consultants and contractors, review and adjustment of communication reports. The information on work breakdown structure should be well understood to enhance the implementation of the projects.

The study recommended for the adequate M & E plans for continuous monitoring of project activities. The staff working on monitoring and evaluation should be dedicated to the function. The roles and responsibilities of monitoring and evaluation personnel should be specified at the start of the project. The top management should take a leading role in implementation of the projects and there should be a continuous evaluation of the status of the project. There should be a participatory M & E encourage upfront planning efforts in the project and periodic reports generated and shared on the status of the projects.

The project personnel should continuously monitor their implementation of project activities.

Further, there is need for the training for project team competency to be enhanced to increase efficiency of the procurement process and reduce delayed payment in the projects. The project team competency facilitates decision making in the projects and enhance transparency levels in the implementation of the projects. The project team cohesion can also increase implementation of the project and enhance contract scope changes in the project.

#### **Knowledge Gained for Policy and Practice**

The study contributes the body of knowledge by examining the determinants of implementation of water and sewerage projects in Kenya is greatly affected by project team, project communication, project training and monitoring and evaluation. The study contributes to the existing literature in the field of project management by elaborating exiting theories, models and empirical studies on implementation of water and sewerage projects in Kenya. The study thus contributes to the existing knowledge in project management by reviewing

theories and models that can be applied to improve implementation of water and sewerage projects in Kenya.

#### **Areas for Further Research**

The study is a milestone for further research in the field of project management in Africa and particularly in Kenya. The findings have demonstrated influence of project team, project communication and monitoring & evaluation on the implementation of water and sewerage projects in the informal settlements in Kenya. The current study should therefore be expanded further in future in order to determine other factors that affect the implementation of water and sewerage projects in Kenya since the study established there could be the remaining 36.20% is explained by the variables or other aspects outside the model. Further, the existing literature indicates that as a future avenue of research, there is need to undertake similar research in other government funded projects in Kenya and other countries in order to establish whether the explored factors can be generalized whether they influence implementation of the projects.

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