# Influence of Project Planning on Implementation of Infrastructure Projects in Public Hospitals in Nairobi County, Kenya

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**ABSTRACT**

The infrastructure projects have been indicating lack of adherence to project planning which yields to underperformance of the projects and failing to meet the stakeholder's expectations. The purpose of this study was to examine the influence of project planning on implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya. The study adopted a descriptive research design. The target population for the study was 140 (engineers, supervisors and contractors) involved in the implementation of infrastructure projects in the public hospitals in Nairobi City County, Kenya. The study conducted a census and a pilot study was undertaken to check the validity and reliability of the data collection instrument. A questionnaire was used to collect primary data and consisted of both structured and open-ended questions to give qualitative and quantitative data. Qualitative data was analyzed by the use of content analysis. Quantitative data was analyzed using descriptive and inferential statistics in which frequencies and percentages were used. SPSS was used to analyze the data and to determine whether the independent variables were related to the dependent variable. The study adopted a regression analysis at 0.05 level of significance to determine strength and direction of the relationship of the variables under study. Results revealed that all the project planning dimensions had a positive and significant relationship with implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya. However, the magnitude of the influence was different for the specific project planning dimensions. The project scheduling had the largest effect followed by project resource planning then project participatory planning process and finally the project designing. Consequently, this study provides project managers involved in the implementation of infrastructure projects in the public hospitals with insights of how to improve implementation of projects through project planning. The key recommendations are that implementation of infrastructure projects in public hospitals should embrace project planning practices such as project designing, project resource planning, project scheduling and project participatory planning process in order to realize project implementation  success.

**Keywords**: project, planning, infrastructure, implementation, development

**INTRODUCTION**

The infrastructure projects plays a big role in societies in terms of meeting the development needs of the economy and more so in transforming the quality of life of citizens (Gitonga & Keiyoro, 2017). The government is the single largest implementer of public infrastructure projects thus there is need to ensure that these projects are fully implemented and the factors that have the greatest influence identified to ensure their influence is taken into consideration during the project life cycle (Onyango, Bwisa, & Orwa, 2017). County governments play an important role in free health service delivery offered through public infrastructure development and their full implementation is a catalyst for economic growth in Kenya (Kariri, Onyango, & Njuguna, 2017).

The empirical evidence shows that majority of infrastructure projects do not achieve success since many of them have not taken off while others have stalled (Ndachi & Kimutai, 2018). The lack of completion of the infrastructure projects is a problem of public health concern since it limits health care delivery to the people (Mobegi, Sang, & James, 2019). Despite the commitment from the government and private sector to enhance health access and delivery in the public health facilities, evidence shows that majority of health care projects especially infrastructure projects do not achieve success. It is at implementation stage that most of the public hospitals infrastructure projects fail, and this has given concern to governments as well as the citizens (Kariri, Onyango, & Njuguna, 2017). Implementation of development projects being the most crucial of all the stages of policy is not devoid of certain project planning factors that influence it, some of these factors are: wrong priority; shortfalls in resource availability, inadequate assessment of targets, wrong scheduling of time for

project completion, inadequate project identification, formulation and design, faulty conceptualization of policy among others (Mbutu & Karanja, 2017).

Devolution of the health function for implementation of healthcare projects to enhance provision of this public service has had it fair share of challenges in Kenya. This is evidenced by the fact that most health care facilities lack and have stalled basic amenities such as toilets and clean drinking water (Kariri, Onyango, & Njuguna, 2017) .In Nairobi County, for about 7 years now reporting up to 12% infrastructure positive projects implementation, but a number of the them have failed on the way due to prevailing planning factors like wrong prioritization of development projects, lack of financial resources, political influence, corruption, low levels of technology, poor infrastructure, lack of community involvement, poor management support and many more (Hassan & Guyo, 2017). Due to this insurgency of issues in the projects failure up to the tune of 47%, in the county, the research therefore seeks to examine how project planning affect implementation of public hospitals infrastructure projects in Nairobi County, Kenya

This study examines the relationship between project planning practices and implementation of infrastructure projects in public hospitals. It builds on both the resource-based view and complexity theory to understand what features of the project planning enable them to improve implementation of infrastructure projects in the local setting. Therefore, the current study aims to bridge the gap in the existing project management literature by reviewing current academic knowledge surrounding implementation of infrastructure projects and project planning. Thus, the study addresses the following research question: What configurations of implementation of health infrastructure projects enable the adoption of project planning to improve their project implementation in the dynamic project infrastructure environment in the Kenyan setting? This study addresses the research question by first developing suitable theoretical and empirical frameworks which are then used to investigate the question by means of empirical data

**Global Perspective on Implementation of Infrastructure Projects**

In the global arena in regard to performance of construction projects, there have been indicating lack of adherence to project constraints management which yields to underperformance of the projects and failing to meet the stakeholder's expectations (Rugenyi, 2015). From the past studies it has been reported that the time and cost overruns are common in most projects (Omondi, 2017; Sterman, 2015). Forexample; according to a 2018 IBM survey on project management change, it was established that about 40% of the projects were able to be accomplished within time, scope and cost. In another report, it was found out that one in six of the 1,471 projects carried out had an average of time plus cost overrun that is 200% and 70% respectively (Flyvbjerg&Budzier, 2018).

Further, the Standish Group in 2012 reported that estimated 43% of projects had cost and time overruns and 18% failed to be completed. In other words, they were terminated prematurely. In another study of 5400 large government funded projects, 45% indicated cost overruns and 7% of the projects had time overruns and 56% of these projects had values than the ones earlier predicted (Bloch, Blumberg &Laartz, 2014). Further, Price Waterhouse Coopers (PwC) (2014), based on the survey on several construction projects in 34 industries in 38 countries, established that 86%failure of projects being delivered within time, cost and budget.

Further, 60% of the project failed to be accomplished within the budget, schedule and scope and less than 10% failed to deliver on their time, scope and quality based on the established criterion. Gwaya, Wanyona and Musau (2014), Kiarie and Wanyoike (2016) and Kariungi (2014) also suggested that the construction projects were indicating ridiculous time and cost overruns globally. This call for assessment of the influence of triple constraint in project management to comprehend how they affect particularly the county funded construction projects in the country (Leong *et al*., 2014; Osedo, 2015; The Kenya Alliance of Resident Associations, 2012).

**Regional Perspective on Implementation of Infrastructure Projects**

Infrastructure projects are based on the constraints which include time, cost and quality (Kelly, Male & Graham, 2014). Cheng et al. (2017) evaluated the performance of subcontractors and identified factors that are tied to the performance of the subcontractor. Among the factors are construction techniques, duration control abilities, and material wastage and so on. Mbachu and Nkando (2017) established that quality and attitude to service is one of the key factors constraining successful project delivery in South Africa. The performance of contractors in Zambia is apparently below expectation. It is uncommon to learn of local projects that have not been completed or significantly delayed. This poor performance of many local contractors has huge implications in terms of their competitiveness (Zulu & Chileshe, 2018).

In Ghana, the infrastructure projects show critical factors that contribute to project delays in Ghana are; delay in payment to contractor/supplier, inflation/price fluctuation, price increases in materials, inadequate funds from sponsors/clients, variation orders and poor financial/capital market. The critical effects of delays are cost overrun, time overrun, litigation, lack of continuity by client and arbitration (Amoatey, 2015). Msele and Alananga(2018) observed that single and two-storey incremental housing builders face the same set of human related construction challenges and external cost-push factors but different administrative, physical and interest related constraints. Of all the cost-push factors examined, interest rate intervention is the only observed strategy

that has far reaching potentials to single-storey low cost incremental builders because such builders are less likely to resort to loans as a mechanism to finance projects.

**Kenyan Perspective on Implementation of Infrastructure Projects**

In Kenya, the focus has been mainly on construction projects undertaken by the government and parastatals. Time and cost performance of projects in Kenya is unacceptable with over 70% of established projects are likely to reach time overruns of over 50%. Further, it is reported that 50% of the projects are likely to have a cost overrun of over 20% (Rugenyi, 2016). For example, Thika Road (KARA, 2016), and Langata Road projects have finished late and over budget, just to mention a few. These reports contradict the inverse proportionality between time and cost as envisioned by the 'iron triangle' and the direct proportionality between scope and time and cost.Rugenyi (2016) reported that over the last few decades cost overruns especially in the government funded construction projects have remained common with some projects recording up to 60 % increase from the original contract sum (Foster &Briceño-Garmendia, 2014). Of even more concern is the fact that historical data shows no improvement in cost performance in the last few decades indicating that no significant learning has occurred in this area (Flyvbjerg et al., 2019).

Researchers have shown different magnitude and frequency of cost overruns especially for the government funded construction projects in the country. For example, in one study the average cost overrun for large scale projects was estimated to range between 20.4 to 44.7 % (Chantal C. Cantarelli, Flyvbjerg, Molin, & Van Wee, 2018). Another study by the African Development Bank(AfDB) found the average cost overrun to be 35 %with some cases recording as high as 50% and even 100% (Mthuli, Mugerwa, Lufumpa, &Murinde, 2014).The later also found strong evidence of scale effect where cost overruns were higher in smaller projects- less than 50 kilometers, than in larger projects. This is consistent with the World bank study that recorded 90% of the infrastructure projects having experienced cost overruns averaging 80%

**1.2     Statement of the Problem**

The devolution of the health function for implementation of healthcare projects to enhance provision of this public service has had it fair share of challenges in Kenya. This is evidenced by the fact that most health care facilities lack and have stalled basic amenities such as toilets and clean drinking water (Kariri, Onyango, & Njuguna, 2017) .In Nairobi County, for about 7 years now reporting up to 12% infrastructure positive projects implementation, but a number of the them have failed on the way due to prevailing planning factors like wrong prioritization of development projects, lack of financial resources, political influence, corruption, low levels of technology, poor infrastructure, lack of community involvement, poor management support and many more (Hassan & Guyo, 2017). Due to this insurgency of issues in the infrastructure projects failure up to the tune of 47%, in the county construction projects. The question now remains; are the project planning issues (project designing, scheduling, resource planning and participatory planning process) the actual missing factor especially for implementation of infrastructure projects? If it has been effected, how have they contributed to improvement on implementation of infrastructure projects in Kenya? It is on this premise the study seeks to establish the relationship between project planning issues (project designing, scheduling, resource planning and participatory planning process) and implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya?

In addition, local studies related to project planning and performance of projects has been carried out in different sectors. For instance, Omondi (2017) study focused on the prject planning and WASHES projects completion in Nakuru County, Kenya. Rugenyi and Bwisa (2016) study was on project triple constraint and project manager's perspective on management of projects in Nairobi. Further, Kiarie and Wanyoike (2016) study focused on the government funded projects and specifically integrated financial management information system (IFMIS) project was used as a case study. Sikudi and Otieno (2017) determined the factors influencing implementation of development projects funded by the County Government of Kilifi. Mwangi (2018) study looked at the county government projects performance specifically Gatundu Modern Market, Kiambu County, Kenya. Musau and Kirui (2018) study was on the project management practices influence on the Machakos county government projects implementation. Kimiti and Moronge (2018) focused on the project management practices and Nakuru county governments' projects implementation.

From the aforementioned studies no study has focused on the relationship between project planning and implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya. A gap this study seeks to fill. Moreover, due to the sectorial, contextual, and managerial differences among the sectors, the application of the project planning and construction projects performance and the application of the same would not be assumed to be similar, unless empirical findings reveal so. It is on this premise the study, therefore, investigates the influence of project planning (project designing, scheduling, resource planning and participatory planning process) on implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya.

**Objectives of the Study**
The purpose of the study was to examine the influence of project planning on implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya. The study was guided by the following specific objectives;
   i.   Establish the influence of project designing on implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya.
   ii.  Examine the influence of project scheduling on implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya.
   iii. Assess the influence of project resource planning on implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya.
   iv.  Investigate the influence of project participatory planning process on implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya.

**Research Questions**
The research questions which guided the above stated objectives included;
   i.   To what extent does project designing influence implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya?
   ii.  In what ways does project scheduling influence implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya?
   iii. Does project resource planning influence implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya?
   iv.  How does project participatory planning process influence implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya?

**LITERATURE REVIEW**
**Theoretical Review**
This section contains review of theories relevant and which inform the theoretical background of the research subject matter. Theoretical orientation is a collection of existing theories from literature which supports the conceptual framework and subsequently informs the problem statement (Wanjala & Muiruri, 2016). This section discussed the Theory of Project Triple Constraints, Theory of Project Management and The Pareto Principle of Time Management

**Theory of Project Management**
The theory of project management developed by Koskela and Howell (2002) consists of two theories: the theory of project and the theory of management. The theory of project is modeled from the theory of production derived from the manufacturing industry and it is built on three concepts (Kraemer, Henrich,Koskela,& Kagioglou,2014; Rooke, Koskela, Howell, &Kagioglou,2012), transformation, flow, and value also referred to as the transformation-flow-value (TFV) theory (Kraemer, *et al*., 2014;Rooke, *et al*., 2012). The TFV theory is needed in understanding the nature and requirements along the project conversion (transformation) path and, for the TFV theory to be effective and efficient; it must be used at the same time in a complementary way (Kraemer, *et al*. (2014). While, the theory of control consists of two models: thermostat model and the scientific experimentation model (Koskela& Howell, 2002a). The project control involves gauging performance, identifying deviation and learning what are the causes of deviations, their effects and the best means of countering them. The learning process is an avenue that can be used by contractors to improve on their project management potentials (Inuwa & Kunya, 2015).Construction projects undergo through project initiation, planning, execution, monitoring and closure process. In the context of this study, public health infrastructure construction projects under go transformation through processes. They were initiated, designed and planned with the participation of all stakeholders; some are under implementation process, while the rest have passed the closure process. Project inputs for the public health infrastructure construction projects execution are in form of finances from the County/National governments. The current study will adopt the theory of project management to examine the relationship between project designing and implementation of infrastructure projects in public hospitals in Kenya

**Theory of Project Triple Constraints**
The theory of triple constraints is derived from the very definition of a project which states that a project is a temporary group activity which is designed to produce a desired result or service or a unique product (PMI, 2015).The theory of the triple constraint depicts that the project triple constraint management is an iron triangle of cost, scope, quality and time which bounds the project universe which must be achieved (Dobson, 2004). Construction projects bring complications in project management, needs and constraints and therefore for effective project management, constraints have to be managed. Projects take place inside organizations where, there is a finite amount of resources with which to accomplish infinite tasks. This results in scarcity and the triple constraints; a deadline, a budget, and a minimum acceptable level of performance (Dobson, 2004).

While, triple constraints criteria in project management have been accepted as a measure of project success. Due to uncertainty and involvement of three different and opposing factors time, cost, and quality, most projects are difficult to manage (Jacob &McClelland, Jr, 2001). Every one of the three limitations have their individual impacts on project execution yet since these components have some relationship, one imperative bear an impact on the other two, in the long run influencing ventures expectations (Hamid, *et al*., (2012).This theory from organizational perspectives may work well or fail hence leading to delays if it isn't well embraced. For the health infrastructure construction projects, the time and cost overruns delays are a common problem not only with an immeasurable cost to government and public but also with debilitating effects on the contracting parties (Ondari & Gekara, 2013). This theory will guide the study to establish the relationship between project scheduling and implementation of infrastructure projects public hospitals in Kenya.

**Resource Based Theory**

In the context of project management, Mintzberg, Ahlstrand and Lampel (2000) consider Wernerfelt Birger (1984) as being the first person to develop the idea of resource based view. It is indeed one of the most widely used theoretical frameworks in the management literature. However, the credits for the development of the Resource Based View were given to Jay Barney who transformed it into a complete theory. The theory has earned a reputation as a promising contemporary theory which integrates strategic insights on competitive advantage as well as organizational insights into the existence of the firm. Resource-Based View remains outstanding because of how it focuses on the internal forces of the firm. Barney (1991) stipulates that Resource-Based View (RBV) of a firm's internal strengths and weaknesses largely depends on two fundamental assumptions. Barney (2001) argued that the value of particular resources depends on the market context in which they are applied. These valuable resources have to be described if they are going to be sources of sustained strategic advantage for firms. The main argument of Resource Based Theory (RBT) is that project performance is determined by the resources it owns and that the project with more valuable scarce resources is more likely to generate sustainable competitive advantage (Liang, You, & Liu, 2010; Ville & Wicken, 2015). It is on this basis that the Resource Based Theory is relevant to project sustainability. Projects are used as a vehicle for delivering services or goods to the customers and thus enhancing competitive advantage. Performance of project benefits must be emphasized to achieve the desired outcome thus the relevance of Resource Based Theory to the study. This theory will guide the study to establish the relationship between project resource planning and implementation of infrastructure projects public hospitals in Kenya

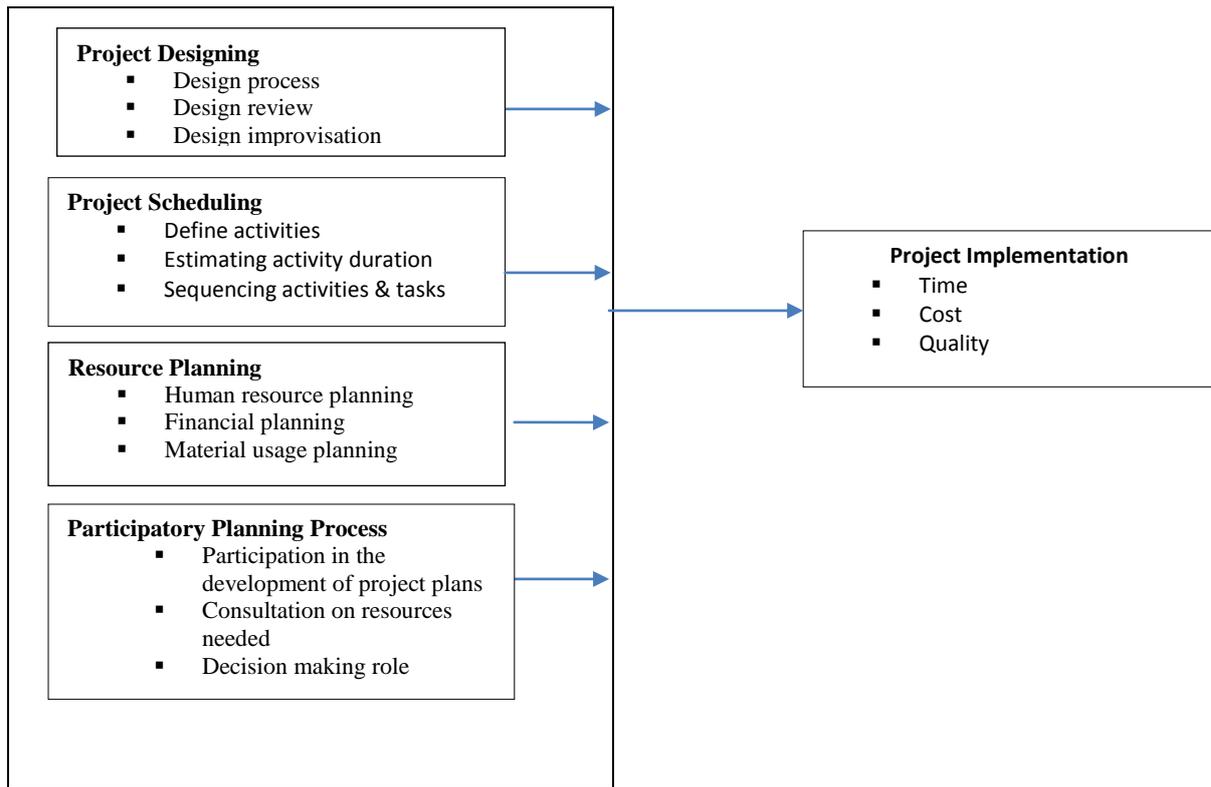**The Pareto Principle of Time Management**

In 1895, Vilfredo Pareto, an Italian economist, noted that about 80% of the land in Italy was owned by about 20% of the people. As he examined his ideas he noticed that this 80/20 rule was equally valid in other ways (Wells, 2012). The idea, which is now called the Pareto principle, relates to time management because 20% of work usually generates about 80% of positive results. Zwikael and Globerson (2006) define time management as the process of determining needs, setting goals to achieve these needs, prioritising and planning tasks required to achieve these goals. Wells (2012) defines time management as behaviours that aim at achieving an effective use of time while performing certain goal-directed activities. This definition highlights the fact that the use of time is not an aim in itself but more of focusing on some goal-directed activity, such as performing a work task which is carried out in a manner that implies an effective use of time (Lugusa & Moronge, 2106).

Time management is not controlling every seconds of life, but it is showing new ways through which people can use the time properly to improve their lives (Cheng, 2014). Thus, by focusing on the vital few (the critical 20%) rather than the trivial many (the remaining 80%), one can get far more accomplished. The 80/20 Rule is therefore a shortcut that helps to manage our affairs and focus our energies since the ability to choose the important tasks is the key to success (Ward & Daniel, 2013). The Pareto principle of time management differs with the 100% rule states that 100% of the work needed to accomplish the project objective must be included in the work breakdown structure. In large, complex projects, there are typically multiple phases and multiple levels of work that must be done to achieve the project objective. By focusing and prioritizing the project work using the Pareto principle of time management theory then the project manager will be able to achieve deadlines in a realistic manner. This theory will guide the study to establish the relationship between project scheduling and implementation of infrastructure projects in public hospitals in Kenya.

**Conceptual Framework**

According to Chepkwei (2019) when conducting a study, a conceptual framework should be developed to show the relationship between the independent variables (project designing, scheduling, project resource planning and project participatory planning process) and dependent variable (implementation of infrastructure project in public hospitals). Out of the literature reviewed various variable are suggested, but in this study the variables are Project designing (design process, review and improvisation), Project scheduling (work break down structure, sequencing of activities and estimate durations), Resource planning (human resource planning, financial planning and material usage planning), Participatory planning process participation in the development of

project plans, consultation on resource needed and decision making role). The implementation of infrastructure projects in public hospitals (completion within time, budget and quality).This is illustrated in Figure 2.1.

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┌──────────────────────────────────────────────┐
│  ┌────────────────────────────────┐           │
│  │ Project Designing              │           │
│  │    ▪ Design process            │──────►     │
│  │    ▪ Design review             │           │
│  │    ▪ Design improvisation      │           │
│  └────────────────────────────────┘           │
│  ┌────────────────────────────────┐           │          ┌──────────────────────────────┐
│  │ Project Scheduling             │           │          │ Project Implementation        │
│  │    ▪ Define activities         │──────►     │──────►   │    ▪ Time                    │
│  │    ▪ Estimating activity       │           │          │    ▪ Cost                    │
│  │      duration                  │           │          │    ▪ Quality                 │
│  │    ▪ Sequencing activities &   │           │          └──────────────────────────────┘
│  │      tasks                     │           │
│  └────────────────────────────────┘           │
│  ┌────────────────────────────────┐           │
│  │ Resource Planning              │           │
│  │    ▪ Human resource planning   │──────►     │
│  │    ▪ Financial planning        │           │
│  │    ▪ Material usage planning   │           │
│  └────────────────────────────────┘           │
│  ┌────────────────────────────────┐           │
│  │ Participatory Planning Process │           │
│  │    ▪ Participation in the      │──────►     │
│  │      development of project    │           │
│  │      plans                     │           │
│  │    ▪ Consultation on resources │           │
│  │      needed                    │           │
│  │    ▪ Decision making role      │           │
│  └────────────────────────────────┘           │
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## RESEARCH METHODOLOGY

**Research Design**

According to Kumar (2019) research design is the plan and structure of investigation used to obtain answers to research questions. Descriptive research design is useful for it depicts a precise summary of situations as a number of units to be investigated and determine the characteristics of interest. The current study adopted a descriptive research design to obtain information for the study on the role of project planning on implementation of health infrastructure projects. It helped the researcher to obtain information concerning the current status and thus relate it to the objective of the research making it relevant to the research.The descriptive research design is able to establish association between variables by quantifying relationship between the variables using techniques such as correlations, relative frequencies or differences between means. Mackey and Gass (2015) agree that descriptive research design enables the researcher to gather information, summarize, present and interpret with the aim for clarification and conclusions.

**Target Population**

A target population is the total collection of all units of analysis which a researcher wishes to consider for specific intended study (Rugenyi & Bwisa, 2016).The target population for the study was 140 (engineers, supervisors and contractors) involved in the implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. They were chosen for the study as they run day to day project activities and were in a better position to provide comprehensive and credible information about the project planning and project implementation in terms of the health construction projects, they are involved to provide the services in the county public hospitals. The projects studied included the one undertaken from the year 2014 to 2020. This is as illustrated in Table 3.1:

**Table 3.1: Target Population**

| Category | Population | Percentage |
|---|---|---|
| Contractor | 102 | 72.86 |
| Engineers | 34 | 24.29 |
| Supervisors | 4 | 2.86 |
| **Total** | **140** | **100** |

**Source: County Government of Nairobi (2020)**

## Sampling Design and Procedure

The study adopted a census and rules out application of specific sampling technique. The study used a census since the population of 140 is small and the study aimed to reach all the health infrastructure projects in the study area The study collected views from the respondents because they were the decision makers in these projects and were actively involved in their day to day operations and seen to be information rich for the purpose of the study. The census approach is justified since according to Orodho (2009), data gathered using census contributes towards gathering of unbiased data representing all individuals' opinions on a study problem (Brymann, 2016). Census provides a true measure of the population since there is no sampling error and more detailed information about the study problem within the population is likely to be gathered (Cresweel & Creswell, 2017).

## Data Collection Instruments and Procedure

Marshall and Rossmann (2014) states that research instrument is a tool for data collection. In a study, usually research data collection instruments are used as per the nature of the study, nature of data to be collected and the kind of population targeted.The study used a structured questionnaireto gather the primary data.It is meant to provide a standardized tool for data collection and attain objectivity in a survey (Yin, 2017). The questionnaire was pilot tested to establish whether the data collection instrument was able to gather the intended information and eliminate ambiguous questions, improve validity and reliability. Mugenda and Mugenda (2012) states that data collection procedure as the precise, systematic gathering of information relevant to the research problem. The study involved seeking for authorization from JKUAT to allow the researcher to collect data. A research permit was also obtained from National Commission for Science, Technology and Innovation. The questionnaires were presented to the respondents under a questionnaire-forwarding letter accompanied by an introductory letter from the university. The researcher identified the respondents, introduced herself and requested to drop the questionnaire and collected back the answered instruments after the respondents had filled them.

## Pilot Study

Pilot study is intended to provide the researcher information on the areas for the modification and remove ambiguous items on the research instruments for the study (Brymann, 2016). This facilitated the researcher to have reliable and valid information. The content validity and reliability of the data collection instrument can be easily established. Usually, the developed research instruments need to be pre-tested to ensure that research instrument is stated clearly and has the same meaning to all respondents. To achieve high precision pilot studies; it is recommended to use 1% to 10% of the population (Maxwell, 2012). In the study, a total of 7 respodents were sampled for pilot testing that is 10% of the sample population.

## Validity of the Research Instruments

Validity is the ability of an instrument to measure what it is designed to measure. It is the correctness or credibility of a description, conclusion, explanation, interpretation, or other sorts of account (Kumar, 205). According to Kumar (2015), there are two approaches to establishing the validity of a research instrument: logic and statistical evidence. Validity was established by a logical link between questions and the objectives. There are three dimensions from which validity can be examined. These include, content, construct, and criterion validity (Orodho, 2019). Content validity will be ensured by designing instrument according to the study variables and their respective indicators of measurement; construct validity, will be maintained through restricting the questions to the conceptualizations of the variables and ensuring that the indicators of a particular variable fall within the same construct.

## Reliability of the Research Instruments

Kumar (2019) states that reliability of a data collection tool as the consistency it yields each time it is administered to same subjects. Brymann (2016) states that the measurement of reliability should provide consistency in the measurement variables. It is recommended that Cronbach alpha to be adopted in determining the internal consistency of the data collection tool. The threshold alpha of 0.7 is recommended as the minimum level for item loadings (Creswell & Cresweel, 2017).

## Data Analysis and Presentation

The study collected both the quantitative and qualitative data. The quantitative data was analyzed using Statistical Package for Social Sciences (SPSS) computer software. The analyzed data was presented in the form of frequency distribution tables, pie charts and bar graphs where necessary. Qualitative data was analyzed by the use of the content analysis. The quantitative data was analyzed by the use of the measures of dispersion and inferential statistics that is bivariate regression analysis to establish the relationship of the variables at 5% level of significance. In this study, the statistical modeling from the conceptual framework was developed and was as follows: the dependent variable (DV) was the implementation of health infrastructure projects the variable [Y], and the independent variables (IV) denoted by $X_1, \ldots X_4$. The statistical analysis was done using the model:

$Y= \beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+ \varepsilon$

Where: Y= Implementation of health infrastructure projects

$\beta_0$= Intercept

$\beta_1$……..$\beta_4$= regression coefficients of independent variables
$X_1$…..$X_4$ = Independent Variables (Project designing, scheduling, resource planning and participatory planning process)
$\varepsilon$ = Error term

## DATA ANALYSIS, FINDINGS AND DISCUSSION

### Response Rate

The study dispatched a total of 140 questionnaires to the respondents. A total of 109 questionnaires were fully filled and returned thus representing a 77.86% response rate. This response rate was considered adequate for further analysis as recommended by Fincham (2008), stated that a response rate of 50%-60% is fair,, 61%-70% is good and above 70% is excellent. In reference to the achievement of 77.86%, the response rate was excellent thus it was recommended for further analysis as represented in Table 4.1.

**Table 4.1: Response Rate**

| Item | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| Returned Questionnaires | 109 | 77.86 | 77.86 |
| Unreturned Questionnaires | 31 | 22.14 | 100.00 |
| **Total** | **140** | **100** | |

### 4.3 Background Information

The background information represented in this section forms the characteristics of the key respondents who participated during the study. The section has highlighted the gender, level of education, experience and their age to enable the researcher to make valid conclusions about the data collected from the respondents.

### 4.3.1 Gender of the Respondents

The respondents participated in the study were requested to indicate their gender as shown in Table 4.2. It was revealed that majority of the respondents were male (70%) while 30% of the respondents stated that they were female. This implied that there was a fair representation of both gender who participated during the study. Therefore, the views of both genders were represented and not biased to make valid conclusion about the study problem (project planning practices and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya).

**Table 4.2: Gender of the Respondents**

| Gender Categories | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Male | 76 | 70 | 70 | 70 |
| Female | 33 | 30 | 30 | 100.0 |
| **Total** | **109** | **100.0** | **100.0** | |

### 4.3.2 Age of the Respondents

The study went further to establish the age of the respondents who participated and the results are presented in Table 4.2. It was established that majority of the respondents (46.46%) of the respondents indicated that they were between 36-54 years, 34.34% stated 26-35 years, 7.07% stated they were less than 25 years, finally 12.12% indicated above 55 years. The findings indicated that majority of respondents were between 35- 55 years. This age is regarded to be youthful and energetic with adequate experience. Thus, the research problem (project planning practices and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya) information provided by the respondents could be relied upon to make valid conclusions.

**Table 4.1: Age of the Respondents**

| Age | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| < 25 years | 8 | 7.07 | 7.07 | 707 |
| 26-35 years | 37 | 34.34 | 34.34 | 41.41 |
| 36-54 years | 51 | 46.46 | 46.46 | 87.87 |
| 55 + years | 13 | 12.12 | 12.12 | 100.0 |
| **Total** | **109** | **100.0** | **100.0** | |

### 4.3.3 Respondents' Experience

The study requested the respondents to indicate the period they have worked in various infrastructure projects in the public hospitals and as illustrated in Table 4.3, it is indicated that 52.52% of the respondents indicated to have worked for a period of less than 3 years, 33.33% of the respondents indicated 3 to 4 years, 9.09% of the respondents stated between 5 to 6 years while 5.05% of the respondents posited to have worked for more than 6 years. This indicates that over 80% of the respondents had more than 3 years working experience in the implementation of the infrastructure projects in the public hospitals. Thus, the information provided by the

respondents on effect of project planning practices on the implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya could be relied upon.

**Table 4.3: Respondents Work Experience**

| Tenure | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| < 3 years | 57 | 52.52 | 52.52 | 52.52 |
| 3 to 4 years | 36 | 33.33 | 33.33 | 85.85 |
| 5 to 6 years | 10 | 9.09 | 9.09 | 94.94 |
| More than 6 years | 6 | 5.05 | 5.05 | 100.0 |
| **Total** | **109** | **100.0** | **100.0** | |

### 4.3.4 Respondents' Level of Education

It was necessary to investigate the level of education of the respondents since it enables an individual to explain and provide information about a problem effectively. Following the study results presented in Table 4.4, it was established that majority of the respondents (58.58%) had bachelor's degrees, 26.26% of the respondents stated that they had diploma certificates. In addition, the study established that 15.15% stated that they had achieved a post graduate level of education. This implied that respondents had adequate level of education to provide and understand the study problem and could provide reliable information and skills to translate about project planning practices and implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya.

**Table 4.4: Respondents Level of Education**

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Diploma | 26 | 26.26 | 26.26 | 26.96 |
| Bachelors | 58 | 58.58 | 58.58 | 84.84 |
| Post graduate | 15 | 15.15 | 15.15 | 100.0 |
| **Total** | **99** | **100.0** | **100.0** | |

### 4.4 Pilot Test Results

The study sought to establish the reliability of the questionnaire and results are presented in Table 4.5. This study adopted the alpha coefficients ranges in value from 0 (no internal consistency) to 1 (complete internal consistency) to describe reliability factors extracted from formatted questionnaires on Likert scale (rating from scale 1 to 5). The study used alpha value of 0.70 as the minimum acceptable. The results for all the variables are above the 0.70 threshold from these results, it is inferred that the measurement items for each variable are internally consistent.

**Table 4.5: Internal Consistency Reliability**

| Variable | Cronbach's Alpha | Remark |
|---|---|---|
| Project Designing | .876 | Reliable |
| Project Scheduling | .991 | Reliable |
| Project Resource Planning | .832 | Reliable |
| Participatory Planning Process | .920 | Reliable |
| Project Implementation | .829 | Reliable |

### 4.7 Descriptive Analysis

The study variables descriptive results have been represented by the use of mean and standard deviation to make conclusions of the results. The independent variables of the study include project designing, scheduling, resource planning and participatory planning process. The dependent variable of the study was implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya.

### 4.7.1 Descriptive Statistics for the Construct Project Designing

The first study objective was to establish whether project designing influence implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya. Table 4.6 presented the percentages, means and standard deviation statistics relating to the information measuring the respondents' level of agreement as to how the given indicators of project designing influenced implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya. The value that had the highest frequency scores among the respondents was the occurrence, agree (value of 4.00 on the monadic scale), as all the indicators for project designing under this column had high numbers of respondents. This implied that most respondents were in agreement that the indicators listed for project designing influenced implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya.

In addition, Table 4.6 study considered a one-dimensional construct measured by the five study items; Design process usually ensure that there is user inputs (PD1); Design process ensure that there is preparation of design

intent or ideology (PD2); There is site analysis from design and context perspective (PD3); Design reviews consider the comments by the corresponding consultants (PD4); Design reviews ensure that there is constructability and maintenance related reviews (PD5); Design improvisation enhance inputs from material suppliers (PD6); There is adequate creativity, prototype and design standardization (PD7). Therefore, the rrespondents were requested to indicate their level of agreement with various statements on aspects of project procurement planning. From the findings in Table 4.6, majority of the respondents agreed that the ddesign process usually ensured that there was user inputs (M=4.128, SD=0.654); Design process ensured that there was preparation of design intent or ideology (M=4.098, SD=0.321), There was site analysis from design and context perspective (M=3.908, SD=0.328), Design reviews considered the comments by the corresponding consultants (M=3.876, SD=0.543), Design reviews ensured that there was constructability and maintenance related reviews (M=4.119, SD=0.876); Design improvisation enhanced inputs from material suppliers (M=3.876, SD=0.543), There was adequate creativity, prototype and design standardization (M=4.329, SD=0.876). This implies that project designing influence implementation of infrastructure e projects in the public hospitals in Kenya.

The study findings are in agreement with the literature review by Williams and Johnson (2014) that project design plays an important role in construction projects. Performance of design process influences the performance of activities in subsequent phases and overall project performance. Quality of designs has direct impact on project success. Project failure occurs when technical issues are overlooked by management during design process. However, not enough emphasis is laid on design management processes. Josephson and Hammerlund (20166) have shown that delays, cost overrun and quality problems in construction projects are attributable to poor design management practices.

**Table 4.6: Descriptive Statistics for the Project Designing**

|  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Mean | Std. Deviation |
|---|---|---|---|---|---|---|---|
| PD1 | 0.0 | 2.5 | 19.8 | 11.6 | 66.1 | 4.128 | .654 |
| PD2 | 0.0 | 5.1 | 21.9 | 17.8 | 55.2 | 4.098 | .321 |
| PD3 | 1.9 | 6.9 | 26.9 | 22.9 | 41.4 | 3.998 | .328 |
| PD4 | 3.8 | 35.8 | 9.9 | 17.9 | 32.6 | 3.876 | .543 |
| PD5 | 3.2 | 17.6 | 17.3 | 20.9 | 59.0 | 4.119 | .876 |
| PD6 | 0.0 | 7.2 | 1349 | 34.3 | 33.4 | 3.876 | .098 |
| PD7 | 0.8 | 4.3 | 30.9 | 22.2 | 45.9 | 4.000 | .395 |

**4.7.2    Descriptive Statistics for the Construct Project Scheduling**

The second study objective was to establish whether project scheduling influence implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya. Table 4.7 presented the percentages, means and standard deviation statistics relating to the information measuring the respondents' level of agreement as to how the given indicators of project scheduling influenced implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya. The value that had the highest frequency scores among the respondents was the occurrence, agree (value of 4.00 on the monadic scale), as all the indicators for project designing under this column had high numbers of respondents. This implied that most respondents were in agreement that the indicators listed for project scheduling influenced implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya.In addition, Table 4.7 study considered a one-dimensional construct measured by the five study items; The project managers observe definition of activities before any project takes off (PS1); Sequencing of activities is normally conducted for all the projects and activities so that they are performed in an order of priority (PS2); Activity duration is normally estimated during the planning process to ascertain time required for every task (PS3); Activity resources estimation is usually a key item in schedule management of project activities (PS4); The schedule is normally developed prior to any project activity (PS5); Controlling schedule is considered a key activity to ascertain variations between planned versus actual in terms of time management (PS6).

Respondents were requested to indicate their level of agreement with various statements on aspects of project scheduling and implementation of infrastructure projects in the public hospitals within Nairobi City County, Kenya. From the findings in Table 4.7, majority of the respondents agreed that the project managers observed definition of activities before any project takes off (M=4.128, SD=0.654); Sequencing of activities was normally conducted for all the projects and activities so that they were performed in an order of priority. (M=4.098, SD=0.321), Activity duration was normally estimated during the planning process to ascertain time required for every task (M=3.908, SD=0.328), Activity resources estimation was usually a key item in schedule management of project activities (M=3.876, SD=0.543), The schedule was normally developed prior to any project activity (M=4.119, SD=0.876); Controlling schedule is considered a key activity to ascertain variations between planned versus actual in terms of time management (M=3.876, SD=0.543). This implies that project scheduling influence implementation of public hospitals in Nairobi City County, Kenya. The study findings are in agreement with the findings by Halpin (2016) that the main objective of scheduling is to produce time tables for

individual activities following the plan. There are numerous possible plans available for any given project hence evolving different schedules. While past experience is a good guide to construction planning, each project is likely to have special problems or opportunities that may require considerable ingenuity and creativity to overcome or exploit. Unfortunately, it is quite difficult to provide direct guidance concerning general procedures or strategies to form good plans and schedules in all circumstances.

**Table 4.7: Descriptive Statistics for the Project Scheduling**

|  | S.Disagree | Disagree | Neutral | Agree | S. Agree | Mean | Std. Dev |
|---|---|---|---|---|---|---|---|
| PS1 | 3.6 | 5.8 | 21.9 | 11.8 | 56.9 | 4.231 | .328 |
| PS2 | 5.4 | 3.9 | 17.9 | 18.9 | 53.9 | 4.654 | .741 |
| PS3 | 5.4 | 8.7 | 15.9 | 21.9 | 48.1 | 4.212 | .327 |
| PS4 | 6.9 | 23.8 | 16.9 | 19.1 | 33.3 | 3.657 | .865 |
| PS5 | 3.8 | 17.9 | 16.9 | 21.9 | 39.5 | 3.778 | .168 |
| PS6 | 5.4 | 8.7 | 15.9 | 21.9 | 48.1 | 4.871 | .627 |

**4.7.3     Descriptive Statistics for the Construct Project Resource Planning**

The third study objective was to establish whether project resource planning influence implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya. Table 4.8 presented the percentages, means and standard deviation statistics relating to the information measuring the respondents' level of agreement as to how the given indicators of project resource planning influenced implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya. The value that had the highest frequency scores among the respondents was the occurrence, agree (value of 4.00 on the monadic scale), as all the indicators for project resource planning under this column had high numbers of respondents. This implied that most respondents were in agreement that the indicators listed for project resource planning influenced implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya.

In addition, Table 4.8 study considered a one-dimensional construct measured by the five study items; There are enough workers in the projects (PRP1); There is no limited number of skilled labour (PRP2); There is adequate expertise supervisors and technical officers (PRP3); The workers health and safety conditions are always taken into consideration (PRP4); The project managers ensures that there is no shortage of the construction materials (PRP5); There are sufficient storage facilities (PRP6); The financial capacity of the contractor to maintain a smooth cash flow (PRP7); There is no conflict in payment for the sub-contractor and suppliers (PRP8).

Respondents were requested to indicate their level of agreement with various statements on aspects of project resource planning and implementation of infrastructure projects in the public hospitals within Nairobi City County, Kenya. From the findings in Table 4.8, majority of the respondents agreed that the there were enough workers in the projects (M=4.128, SD=0.654); There was no limited number of skilled labour (M=4.098, SD=0.321); There was adequate expertise supervisors and technical officers (M=3.908, SD=0.328);  The workers health and safety conditions were always taken into consideration  (M=3.876, SD=0.543); The project managers ensured that there was no shortage of the construction materials (M=4.119, SD=0.876); There were sufficient storage facilities (M=3.876, SD=0.543); The financial capacity of the contractor to maintain a smooth cash flow (M=4.119, SD=0.876); There is no conflict in payment for the sub-contractor and suppliers (M=3.876, SD=0.543).  The study results imply that  ptoject resource planning is key for implementation of infrastructure projects in the public hospitals in Nairobi City County, Kenya.

The study findings are in tandem with the literature review by Owino (2016) that a resource planning is an entity that contributes to the accomplishment of project activities. Time and cost are directly dependent on the availability of resources. The time required maybe determined by dividing the productivity associated with the resources used on the activity into the defined quantity of work for the activity. Each activity is allocated with a specific resource and must be completed within the time limit, otherwise it may adversely affect the overall duration of the project. Therefore, the best combination of resources to use for performing a construction activity is required to manage the success of the project. Resource scheduling, availability and optimization are considered key to project success implementation. Allocation of limited resources is based on the priority given to each of the project activities. To implement a project means to carry out activities proposed in the application form with the aim to achieve project objectives and deliver results and outputs. Its success depends on many internal and external factors. Some of the most important ones are a very well organized project various resources (Kagendo, 2013).

**Table 4.8: Descriptive Statistics for the Project Resource Planning**

|      | S. Disagree | Disagree | Neutral | Agree | S. Agree | Mean | Std. Dev |
|------|-------------|----------|---------|-------|----------|------|----------|
| PRP1 | 1.8 | 4.8 | 19.9 | 17.9 | 55.6 | 4.218 | 1.908 |
| PRP2 | 1.6 | 5.9 | 18.7 | 18.9 | 54.9 | 4.291 | 1.009 |
| PRP3 | 3.8 | 11.9 | 19.8 | 21.9 | 42.6 | 3.979 | 1.974 |
| PRP4 | 2.8 | 17.8 | 17.3 | 21.8 | 40.3 | 3.907 | 1.649 |
| PRP5 | 1.6 | 5.9 | 18.7 | 18.9 | 54.9 | 4.291 | 1.009 |
| PRP6 | 3.8 | 11.9 | 19.8 | 21.9 | 42.6 | 3.979 | 1.974 |
| PRP7 | 2.8 | 17.8 | 17.3 | 21.8 | 40.3 | 3.907 | 1.649 |
| PRP8 | 2.8 | 10.9 | 12.8 | 16.9 | 56.6 | 3.876 | 1.214 |

**4.7.4    Descriptive Statistics for the Construct Participatory Planning Process**

The fourth study objective was to establish whether participatory planning process influence implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya. Table 4.9 presented the percentages, means and standard deviation statistics relating to the information measuring the respondents' level of agreement as to how the given indicators of participatory planning process influenced implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya. The value that had the highest frequency scores among the respondents was the occurrence, agree (value of 4.00 on the monadic scale), as all the indicators for participatory planning process under this column had high numbers of respondents. This implied that most respondents were in agreement that the indicators listed for participatory planning process influenced implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya.

In addition, Table 4.9 study considered a one-dimensional construct measured by the five study items; Stakeholders participate in the development of project plans (PP1); There is transparency of committee operations which is important for project success and overall project effectiveness (PPP2); Project resources are obtained from the stakeholders (PPP3); Stakeholders are consulted on the project resources needed (PPP4); The stakeholders are involved in decision making role in the projects (PPP5);

Respondents were requested to indicate their level of agreement with various statements on aspects of participatory planning process and implementation of infrastructure projects in the public hospitals within Nairobi City County, Kenya. From the findings in Table 4.9, majority of the respondents agreed that  the stakeholders participated in the development of project plans (M=4.128, SD=0.654); There was transparency of committee operations which was important for project success and overall project effectiveness (M=4.098, SD=0.321); Project resources were obtained from the stakeholders (M=3.908, SD=0.328);  Stakeholders were consulted on the project resources needed  (M=3.876, SD=0.543); The stakeholders were involved in decision making role in the projects (M=4.119, SD=0.876). The study findings imply that participatory planning process influence implementation of infrastructure projects in the public hospitals in Nairobi City County, Kenya. The study findings are in agreement with the findings by Ben-Meiyer (2017) the implications on the role of planners and facilitators of participatory social change are considered, as well as how they are effectively trained. Although the study does not discuss the difficulties in order successfully implement participatory development, the opportunities that it does afford are just as real, and it therefore offers a potentially viable approach for government and nongovernment agencies to advance projects of a specific sector (housing) as well as other sustainable projects that meet the essential needs of local communities.

**Table 4.9: Descriptive Statistics for the Participatory Planning Process**

|      | S. Disagree | Disagree | Neutral | Agree | S. Agree | Mean | Std. Dev |
|------|-------------|----------|---------|-------|----------|------|----------|
| PPP1 | 1.9 | 7.3 | 11.8 | 16.9 | 62.1 | 4.198 | .897 |
| PPP2 | 2.5 | 3.9 | 12.8 | 15.9 | 64.9 | 4.098 | .432 |
| PP3  | 2.1 | 4.9 | 17.3 | 21.8 | 53.9 | 3.989 | .323 |
| PPP4 | 2.2 | 13.9 | 19.9 | 15.9 | 48.1 | 3.768 | .321 |
| PPP5 | 2.7 | 8.8 | 13.9 | 19.8 | 54.8 | 3.727 | .376 |
| PPP6 | 1.6 | 4.9 | 17.8 | 22.9 | 52.8 | 3.699 | .003 |

**4.7.5    Descriptive Statistics for the Implementation of Projects**

The study sought to establish level of implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya. Table 4.10 presented the percentages, means and standard deviation statistics relating to the information measuring the respondents' level of agreement as to how the given indicators of implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya. The value that had the highest frequency scores among the respondents was the occurrence, disagree (value of 2.00 on the monadic scale), as all the indicators for implementation of infrastructure projects in the public hospitals under this column had high numbers of respondents. This implied that most respondents were in disagreement that the indicators listed for implementation of infrastructure projects in the public hospitals in Nairobi County, Kenya.

Respondents were requested to indicate their level of agreement with various statements on aspects of implementation of infrastructure projects in the public hospitals. The results were as shown in Table 4.10.

According to the findings, the respondents disagreed that Projects implemented are normally done within the planned scope (M=2.498, SD=1.492); The respondents also disagreed that there was always a higher percentage in achieving the project milestones (M=2.355, SD=1.370); The respondents disagreed that projects delivered normally satisfy our clients/customer (M=2.498, SD=1.492); The respondents also disagreed that before the beginning of any project, all stakeholders must agree on the inputs and outputs of the projects (M=2.355, SD=1.370); All projects delivered by the public hospitals keep the stipulated hours of work(M=2.355, SD=1.370). The study results imply that there is poor implementation of infrastructure projects in Kenya.

**Table 4.10: Descriptive Statistics for the Implementation of Infrastructure Projects**

|  | S.Disagree | Disagree | Neutral | Agree | S. Agree | Mean | Std. Dev |
|---|---|---|---|---|---|---|---|
| PI1 | 59.6 | 14.9 | 18.9 | 1.9 | 4.7 | 2.213 | .984 |
| PI2 | 54.7 | 21.3 | 17.6 | 1.4 | 5.0 | 2.351 | .092 |
| PI3 | 46.0 | 22.9 | 21.9 | 2.3 | 6.9 | 2.987 | .243 |
| PI4 | 37.5 | 14.8 | 12.6 | 12.5 | 22.6 | 2.327 | .487 |

**4.8     Inferential Analysis**

**4.8.1     Correlation Analysis**

Correlation is a bivariate analysis that measures the magnitude of linear association between two variables and the direction of the association. Gogtay and Thatte (2017),  states that *(r)* that is Pearson correlation is widely the correlation statistic adopted to measure the extent (degree) of the association between the linearly related variables. Normally, *(r)*  is between positive one (+1) and negative one (-1). As the *(r)* value goes towards 0, the relationship between the two variables will be weaker. Pearson correlation *(r)* was used to show the relationship between project planning and projects implementation. The study results are illustrated in  Table 4.11:

**Table 4.11: Correlation Matrix for Independent and Dependent Variables**

|  |  | PD | PS | PRP | PPP | PI |
|---|---|---|---|---|---|---|
| P.Designing | Pearson Correlation | 1 |  |  |  |  |
|  | Sig.(2-tailed) |  |  |  |  |  |
|  | N | 109 |  |  |  |  |
| P.Scheduling | Pearson Correlation | .435** | 1 |  |  |  |
|  | Sig.(2-tailed) | .000 |  |  |  |  |
|  | N | 109 | 109 |  |  |  |
| P.R.Planning | Pearson Correlation | .435** | .376** | 1 |  |  |
|  | Sig.(2- | .000 | .007 |  |  |  |
|  | N | 109 | 109 | 109 |  |  |
| Participatory P. | Pearson Correlation | .332** | .418** | .528** | 1 |  |
|  | Sig.(2- | .005 | .012 | .004 |  |  |
|  | N | 109 | 109 | 109 | 109 |  |
| Project Implementation | Pearson Correlation | .367** | .463** | .421** | .341** | 1 |
|  | Sig.(2- | .000 | .000 | .000 | .000 |  |
|  | N | 109 | 109 | 109 | 109 | 109 |

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

PI = Project Implementation; PD= Project Designing; PS= Project Scheduling; PRP = Project Resource Planning; PI= Project Implementation;

The study sought to establish the relationship between project designing and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. A Pearson Correlation was performed and the result of the Pearson correlation test as presented in Table 4.11 show a correlation (r 109) = 0.367; p<0.05) between project designing and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. This implies that the project designing is positively correlated to the implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. In addition, the correlation between these two variables was significant, that is p<0.5 implying a linear relationship between project designing and implementation of

infrastructure projects in public hospitals in Nairobi County, Kenya. This shows that project designing significantly influenced implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. The study findings are in agreement with the literature review by Williams and Johnson (2014) that project design plays an important role in construction projects. Performance of design process influences the performance of activities in subsequent phases and overall project performance. Quality of designs has direct impact on project success. Project failure occurs when technical issues are overlooked by management during design process. However, not enough emphasis is laid on design management processes. Josephson and Hammerlund (20166) have shown that delays, cost overrun and quality problems in construction projects are attributable to poor design management practices.

In addition, the study sought to establish the relationship between project scheduling and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. A Pearson Correlation was performed and the result of the Pearson correlation test as presented in Table 4.11 show a correlation (r 109) = 0.463; p<0.05) between project scheduling and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. This implies that the project scheduling is positively correlated to the implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. In addition, the correlation between these two variables was significant, that is p<0.5 implying a linear relationship between project scheduling and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. This shows that project scheduling significantly influenced implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. The study findings are in agreement with the findings by Halpin (2016) that the main objective of scheduling is to produce time tables for individual activities following the plan. There are numerous possible plans available for any given project hence evolving different schedules. While past experience is a good guide to construction planning, each project is likely to have special problems or opportunities that may require considerable ingenuity and creativity to overcome or exploit. Unfortunately, it is quite difficult to provide direct guidance concerning general procedures or strategies to form good plans and schedules in all circumstances.

Further, the study sought to establish the relationship between project resource planning and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. A Pearson Correlation was performed and the result of the Pearson correlation test as presented in Table 4.11 show a correlation (r 109) = 0.421; p<0.05) between project resource planning and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. This implies that the project resource planning is positively correlated to the implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. In addition, the correlation between these two variables was significant, that is p<0.5 implying a linear relationship between project resource planning and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. This shows that project resource planning significantly influenced implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. The study findings are in tandem with the literature review by Owino (2016) that resource planning is an entity that contributes to the accomplishment of project activities. Time and cost are directly dependent on the availability of resources. The time required maybe determined by dividing the productivity associated with the resources used on the activity into the defined quantity of work for the activity. Each activity is allocated with a specific resource and must be completed within the time limit, otherwise it may adversely affect the overall duration of the project.

Lastly, the study sought to establish the relationship between participatory planning process and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. A Pearson Correlation was performed and the result of the Pearson correlation test as presented in Table 4.11 show a correlation (r 109) = 0.341; p<0.05) between participatory planning process and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. This implies that the participatory planning process is positively correlated to the implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. In addition, the correlation between these two variables was significant, that is p<0.5 implying a linear relationship between participatory planning process and implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. This shows that participatory planning process significantly influenced implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. The study results are in tandem with the findings by Usadolo and Caldwel (2016) that the participative approaches planning in projects rely on people and success is determined by their involvement and cooperation. Several projects have collapsed due to lack of significant participatory processes involving people and hence project management gaps emerge and this threatens the survival and success of these projects (Mulwa, 2008).Evidence has shown that funds availability does not guarantee project success and sustainability. However, stakeholder participation in management, monitoring, and evaluation is essential.

**Multiple Regression Analysis**

A multiple regression analysis was conducted to investigate the joint causal relationship between the independent (project planning) and dependent variables (implementation of infrastructure projects in public hospitals). In Table 4.12, the correlation coefficient (R) of 0.887 shows that there is a positive joint correlation between project planning (project designing, scheduling, project resource planning and participatory planning

process) with implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya. From the study findings, it is notable is notable that correlation determination of by $R^2$ value (0.787). The study results imply that project designing, scheduling, project resource planning and participatory planning process jointly accounted for 78.70% of the implementation of infrastructure projects in public hospitals as represented by the $R^2$. This therefore means that other factors not studied in this research contribute 21.30% to the implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya. This implies that these variables are very significant and need to be factored to implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya.

**Table 4.12: Model Summary (Combined Effect)**

| R | R-Square | Adjusted R Square | Std. Error Estimate |
|---|---|---|---|
| .887 | .787 | .761 | .14532 |

a. Predictors: (Constant), Project designing, Scheduling, Project Resource Planning and Participatory Planning Process

Further, the analysis of variance was used to examine whether the regression model was a good fit for the data. The F-critical (4, 104) was 1.765 while the F-calculated was 96.066 as shown in Table 4.13. This shows that F-calculated was greater than the F-critical and hence linear relationship between the project planning and implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya. In addition, the p-value was 0.000, which was less than the significance level (0.05). Therefore, the model can be considered to be a good fit for the data and hence it is appropriate in predicting the influence of the four independent variables (project planning) on the dependent variable (implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya).

**Table 4.13: ANOVA[a] Statistics (Combined Effect)**

| Model | | Sum of Squares | d.f | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1146.650 | 4 | 286.662 | 96.066 | .000[b] |
| | Residual | 310.339 | 104 | 2.984 | | |
| | Total | 1456.989 | 108 | | | |

a. Dependent Variable: Y

b. Predictors: (Constant), $X_1, X_2, X_3, X_4$

Further, the study ran the procedure of obtaining the regression coefficients, and the results were as shown on the Table 4.14. The coefficients or beta weights for each variable allows the researcher to relative importance comparatively of the project planning. In this study the unstandardized coefficients and standardized coefficients are given for the multiple regression equations. However, discussions are based on the unstandardized coefficients.

**Table 4.14: Regression Coefficient Results (Combined Effect)**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | P-value. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | B | | |
| 1 | (Constant) | 10.987 | 1.324 | | 8.279 | .000 |
| | Project Designing | .623 | .199 | .555 | 3.128 | .003 |
| | Project Scheduling | .789 | .168 | .676 | 3.687 | .000 |
| | Project Resource Planning | .715 | .198 | .599 | 3.611 | .002 |
| | Participatory Planning Process | .601 | .234 | .525 | 2.568 | .004 |

The Multiple regression model equation would be ($Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$) becomes: Y= $10.987 + 0.623X_1 + 0.789X_2 + 0.715X_3 + 0.601X_4$. This indicates that Implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya = 10.987 + 0.623 (Project Designing) + 0.789(Project Scheduling) + 0.715(Project Resource Planning) + 0.601(Participatory Planning Process). According to the regression equation established, taking all factors into account project designing, scheduling, project resource planning and participatory planning process constant at zero, implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya was 10.987.

Findings in Table 4.14 showed that project designing had coefficients of estimate which was significant basing on $\beta_1 = 0.623$ (p-value = 0.003 which is less than $\alpha = 0.05$). Also, the influence of project designing is more than the influence attributed to the error and supported by the t values whereby $_{t\,cal=\,3.218\,>\,t\,critical\,=1.96}$ at a 5 percent level of significance, thus we conclude that project designing significantly influence implementation of infrastructure

projects in public hospitals in Nairobi City County, Kenya. The study findings are in agreement with the literature review by Williams and Johnson (2014) that project design plays an important role in construction projects. Performance of design process influences the performance of activities in subsequent phases and overall project performance. Quality of designs has direct impact on project success. Project failure occurs when technical issues are overlooked by management during design process.

In addition, the findings in Table 4.14 indicates that project scheduling had coefficients of estimate which was significant basing on $\beta_2 = 0.789$ (p-value = 0.000 which is less than $\alpha = 0.05$). Also, the effect of project scheduling is more than the effect attributed to the error and supported by the t values whereby $_{t\ cal= 3.687\ >\ t\ critical\ =1.96}$ at a 5 percent level of significance,, thus we conclude that project scheduling significantly influence implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya. The study findings are in agreement with the findings by Halpin (2016) that the main objective of scheduling is to produce time tables for individual activities following the plan. There are numerous possible plans available for any given project hence evolving different schedules. While past experience is a good guide to construction planning, each project is likely to have special problems or opportunities that may require considerable ingenuity and creativity to overcome or exploit. Unfortunately, it is quite difficult to provide direct guidance concerning general procedures or strategies to form good plans and schedules in all circumstances.

Further, the findings in Table 4.14 indicates that project resource planning had coefficients of estimate which was significant basing on $\beta_3 = 0.715$ (p-value = 0.002 which is less than $\alpha = 0.05$). Also, the influence of project resource planning is more than the effect attributed to the error and supported by the t values whereby $_{t\ cal= 3.611\ >\ t\ critical\ =1.96}$ at a 5 percent level of significance, thus we conclude that project resource planning significantly influence implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya. The study findings are in agreement with the findings by Owino (2017) that the planning processes comprises the task of identification and determination of required materials, set up and maintain the materials records, determines target inventory levels, delivery frequency including materials logistic planning such as temporary facilities, access roads and storage area. Apparently, the planning process is also integrated with other processes. Financial planning is the process of estimating the capital required and determining it's competition.

The findings in Table 4.14 indicates that participatory planning process had coefficients of estimate which was significant basing on $\beta_4 = 0.601$(p-value = 0.004 which is less than $\alpha = 0.05$). Also, the effect of participatory planning process is more than the effect attributed to the error and supported by the t values whereby $_{t\ cal= 2.568\ >\ t\ critical\ =1.96}$ at a 5 percent level of significance, thus we conclude that participatory planning process significantly implementation of infrastructure projects in public hospitals in Nairobi City County, Kenya. The study results are in tandem with the findings by Mulwa (2012) that the participative approaches planning in projects rely on people and success is determined by their involvement and cooperation. Several projects have collapsed due to lack of significant participatory processes involving people and hence project management gaps emerge and this threatens the survival and success of these projects.

**CONCLUSION**

The main purpose of this study was to examine the relationship between project designing and implementation of infrastructure in public hospitals in Nairobi City County, Kenya. The results showed that project designing have a positive and statistically significant influence on implementation of infrastructure in public hospitals in Nairobi City County, Kenya. The study concluded that the improvement in project designing leads to improvement implementation of infrastructure in public hospitals in Nairobi City County, Kenya. The study results indicated that design process, review and improvisation implementation of infrastructure in public hospitals in Nairobi City County, Kenya.

The study results showed that the relationship between project scheduling and implementation of infrastructure in public hospitals in Nairobi City County, Kenya was positive and significant. The results showed that project scheduling have a positive and statistically significant influence on implementation of infrastructure in public hospitals in Nairobi City County, Kenya. The study concluded that the improvement in project scheduling leads to improvement implementation of infrastructure in public hospitals in Nairobi City County, Kenya. The study results indicated that the project managers defined activities, estimated activity duration and sequencing activities and tasks for smooth implementation of infrastructure in public hospitals in Nairobi City County, Kenya.

The study results showed that the relationship between project resource planning and implementation of infrastructure in public hospitals in Nairobi City County, Kenya was positive and significant. The results showed that project resource planning have a positive and statistically significant influence on implementation of infrastructure in public hospitals in Nairobi City County, Kenya. The study concluded that the improvement in project resource planning leads to improvement implementation of infrastructure in public hospitals in Nairobi City County, Kenya. The study results indicated that lack of adequate human resource planning, financial planning and material usage planning hindered smooth implementation of infrastructure in public hospitals in Nairobi City County, Kenya.

The study results showed that the relationship between participatory planning process and implementation of infrastructure in public hospitals in Nairobi City County, Kenya was positive and significant. The results showed that participatory planning process have a positive and statistically significant influence on implementation of infrastructure in public hospitals in Nairobi City County, Kenya. The study concluded that the improvement in participatory planning process leads to improvement implementation of infrastructure in public hospitals in Nairobi City County, Kenya. The study results indicated that participation in the development of project plans, consultation on resources needed and decision making role to improve smooth implementation of infrastructure in public hospitals in Nairobi City County, Kenya

## RECOMMENDATIONS

The study recommends that there is need to enhance project designing to improve implementation of infrastructure in public hospitals in Nairobi City County, Kenya. The project design plays an important role in construction projects. Performance of design process influences the performance of activities in subsequent phases and overall project performance. Quality of designs has direct impact on project success. The project designs occur when technical issues were overlooked by management during design process.

The study established that project scheduling influence implementation of infrastructure in public hospitals in Nairobi City County, Kenya. Attitudes toward the formal scheduling of projects are often extreme. Many owners require detailed construction schedules to be submitted by contractors as a means of monitoring the work progress. The actual work performed is commonly compared to the schedule to determine if construction is proceeding satisfactorily. After the completion of construction, similar comparisons between the planned schedule and the actual accomplishments may be performed to allocate the liability for project delays due to changes requested by the owner, worker strikes or other unforeseen circumstances.

The study established that project resource planning influence of implementation of infrastructure in public hospitals in Nairobi City County, Kenya. Human resource capacity, technical and financial feasibility need to be carried out prior to implementation of projects to avoid project from stalling midway by ensuring there is adequate funds and sufficient personnel. Material investigation, traffic survey, engineering survey, and hydrological be carried out by separate teams who will consolidate their report and offer a preliminary design that can be used as a benchmark for implementation.

Participatory planning process is very crucial for implementation of infrastructure projects requires abandoning the comfortable paradigm of an expert/designer in favor of a more challenging one in which there are no longer clients, but people and duties. In order to succeed, all actors must be well informed, know how to interact, and have the time in which to do it. This time must not be at the expense of other activities, and participation must not be a waste of time. There is need to enhance participatory planning process to improve implementation of infrastructure projects in the public hospitals in Kenya.

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