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**DETERMINANTS OF EFFECTIVE IMPLEMENTATION OF FIBER OPTIC CABLE PROJECTS IN KENYA****OCHIENG DANIEL OMENDA <sup>1</sup> DR. KARANJA PATRICK NGUGI <sup>2</sup>**<sup>1,2</sup> Jomo Kenyatta University of Agriculture and Technology**Abstract**

This study examined the determinants of effective implementation of fiber optic cable projects in Kenya. Findings from various sources have indicated that most Telecommunication organizations are slowly embracing fiber optic cable technology, but the implementation process of these projects remains a challenge, due to the failures of well-formulated strategies at critical stages of implementation. To achieve the study's general objective, which was examining the determinants of effective implementation of fiber optic cable projects in Kenya, a descriptive survey sample of 290 approved fiber optic cable projects was undertaken in Kenya by the major Telecommunication Service Providers and the National government shall be carried out and was based on the opinion of sampled key informants in these projects i.e. technical personnel and project managers. To outline the key concepts, the study was based on various theories i.e. resource dependency, stakeholder's theory, Rogers innovation diffusion theory and the theory of constraints. The sampling frame was made of 290 different fiber optic cable projects where random sampling method shall be used. Data was collected using structured questionnaires and analyzed using the SPSS (v.23.0) tool. Statistical inferences were used to analyze the data collected in terms of reliability and validity after a pilot study has been conducted. Both tests of significance using regression and correlation analysis were used to indicate the significance level amongst the independent variables when assessed against the dependent variable. The indicators relating to project team management, budgetary control, communication management and logistics management variables were analyzed to find out if they had a great significance on implementation of these fiber optic cable projects and conclusions were drawn on their effectiveness in the same. The study found that project team management budgetary control, communication management and logistics management is statistically significant to effective implementation. The study concluded that project team management budgetary control, communication management and logistics management is positively related to effective implementation. The study recommends that the project team should have the necessary skills and knowledge required for the project to ensure effective and efficient implementation. The project team should ensure that budget is well set before the start of the implementation. Proper communication channels should be used, the selected channels should ensure that information is delivered at the right time to avoid delay of some activities.

**Keywords:** Effective Implementation, Fiber Optic Cable, Budgetary Control, Logistics, Communication Management and Team Management

## **Introduction**

Fiber optic cable technology has revolutionized the telecommunication industry by forming a major block in the present infrastructure (Jadhav & Shitole, 2013). FOC projects involve a mix of very many complexities in the implementation process and these leads to the dire need for project management professionals to clearly understand and embrace the key determinants that would lead to effective implementation. According to Kramer, Jenkins, & Katz (2007), Information Communication and Technology (ICT) has been one of the key sectors that forms the foundation of our society for socio-political and economic growth. In Kenya's vision 2030, ICT has been included as one of the enablers and macros needed to achieve its three pillars i.e. the Economic, Social and Political pillars, making ICT as one of the largest growing market industries (CA, 2016). With this in mind, there has been a need for faster and safer information dissemination through basic voice communication and broadband internet connectivity. However, the high cost of deploying and maintaining internet facilities, inadequate bandwidth capacity supply to the end users, low penetration of internet, and lack of a pragmatic ICT National Policy especially on infrastructure, amongst other factors has affected broadband penetration. Further the inability of existing satellite communications and microwave systems to provide the needed internet capacity to carry the ever growing traffic demand has necessitated the emergence of the use of fiber optic cable in building communication networks. Thus according to Dahunsi (2015), increasing access to broadband connectivity is emerging as a high priority for development across Kenya.

In this regard, the new technology of fiber optics cable has been introduced to curb these emerging issues. Fiber optics cable is the science of transmitting data, voice, and images by the passage of light pulse through thin, transparent flexible wires made of glass or plastic (Hecht, 2015). Broadband connectivity through the use of fiber optic cable technology is rapidly taking its place in the communication market structure. This is basically due to the need for faster, safer and high capacity transmission of information. Optical fiber through its technology is able to transmit very high bandwidths of data by turning electronic signals into light (Massa, 2000). This transmission occurs with low attenuation characteristics and no electromagnetic interference thus reaching over a long distance. Therefore, FOC benefits in summary include; long distance signal transmission; high bandwidth, light weight, occupy less space and is flexible i.e. bundles freely due to high tensile strength, has low signal attenuation characteristics due to its small diameter; non-conductivity; secure and immune to external noise (Babani, Bature, Faruk, & Dankai, 2014).

According to the Communication Authority of Kenya (CA) 2016 last quarter statistics, the number of internet subscriptions stands now at 24.8 million subscriptions, a number that continues to increase due to the rapid expansion of the 4G and 3G network coverage. On the other hand it is reported that satellite communication subscriptions continue to decrease due to the rise in fiber optic subscriptions i.e. a decline of 38.9 per cent to record 299 subscriptions down from 489 subscriptions recorded during the previous periods. The growth in fiber optic subscriptions has remained steady over time with the quarterly reviews registering 122,437 subscriptions up from 111,354 subscriptions recorded in the last quarter marking an increase of 9.9 per cent during the period under review (CA, 2016).

Due to the benefits of fiber optic cable, it thus becomes paramount to ensure that fiber optic projects are implemented effectively. According to P.Slevin & Pinto (1987), Effective implementation here refers to the execution of projects such that they are completed on schedule,

within the budget, to the clients' satisfaction and basically achieving all the goals and objectives originally set for it. (Wysocki, 2011), further asserts the effective implementation is the improvement in managing projects with the goal of improving delivery on time, within the budget and satisfying all customer requirements. This study therefore seeks to examine the critical determinants of effective implementation of fiber optic cable projects in Kenya, through the case studies of projects done by various Telecommunication service providers. It intends to elaborate on the field gaps relating to the key aspects of time, cost and quality that drive the implementation of fiber optic cable projects. These issues include the following; project team management, budgetary control, communication management and logistics management having a direct impact on project implementation.

### **Statement of the Problem**

The ICT sector is turning out to be an engine for economic growth. In fact broadband infrastructure through fiber optics cable technology has the potential to transform livelihoods economically and socially (Moenga & Moronge, 2016). Universal access has emerged as a key strategy that governments are using to bridge the digital divide within their country and the rest of the world. In doing so, investments worth billions of shillings are being injected into ICT projects by the respective governments. Kenya on its part in bridging the digital gaps has seen a slow but steady adoption of fiber optic cable averaging at 17.1% pa when compared to the global rate of 67.6% pa (Mwangi & Ogollah, 2017). This slow adoption has been due to some considerable upheavals in terms of implementation of FOC projects. Among the major issues has been the high cost of capital expenditure required in the implementation of these projects, which has seen issues to do with allocations and misuse of available funds being exhibited (Ndungu, 2010). KDN Ltd for instance after investing around 50 million US dollars in its fiber project, ended up not achieving its projected return on investments due to budgetary disbursements and costs control issues that eventually led to its takeover by Liquid Telecom Kenya as a recovery measure (Okuttah, 2012).

The logistics and project team management during implementation has also had a considerable impact on these projects. Key to this has been the lack of a specific common regulatory framework to govern the implementation of these projects (Kerretts-Makau, 2012). Regulation is supposed to give guidelines on how fiber infrastructure is to be done, yet different counties happen to have different guidelines. These numerous inhibiting rules, regulations and by-laws end up hindering effective implementation. The deficiency of adequate technical skills and knowledge required has also contributed to the current state (Msimang, 2011). These skills include design, project management and transmission that form the basic foundation of the network. The country ends up bringing in expatriates through international companies such as Huawei and Ericsson and this drives the implementation costs further up. Vandalism and lack of maintenance structure of the infrastructure has also become another headache towards effective implementation of these fiber projects (Mwanzia & Were, 2016). This proposed study therefore sought to examine the determinants of effective implementation of fiber optic cable projects in Kenya, with the aim of formulating a platform for critical considerations before embarking on future projects.

## **Objectives of the Study**

The purpose of this study was to examine the determinants of effective implementation of fiber optic cable projects in Kenya. The specific objectives of this study were;

1. To assess the impact of project team management on effective implementation of fiber optic cable projects in Kenya.
2. To analyze the impact of budgetary control on effective implementation of fiber optic cable projects in Kenya.
3. To examine the impact that communication management has on effective implementation of fiber optic projects in Kenya.
4. To determine the impact of logistics management on effective implementation of fiber optic cable projects in Kenya.

## **Theoretical Review**

A theory is defined as a set of interrelated concepts, definitions, and propositions that present a systematic view of phenomena by specifying relations among variables with the purpose of explaining or predicting the Phenomena (Abok, 2013). Theoretical review therefore connects the researcher to the existing knowledge and concepts of relevance to the proposed study. The review demonstrates an understanding of the theories and concepts that are relevant to the topic of research and relate to broad areas of knowledge being considered (Anfara & Mertz, 2006). Various authors and scholars have demonstrated through their theories and models different aspects on determinants of effective project implementation. These theories will be used to argue and explain such attributes. The research will therefore be based on the following theories postulated by different scholars as discussed.

### **Resource Dependency Theory**

This proposed study will also make reference on the resource dependency theory which was postulated by Dorfman, Hanges, & House (2012). The theory postulates that organizations rely on resources which are obtained from their environment and that the survival of such organizations depends greatly on their ability to acquire and utilize the resources. Pfeiffer & Salancil (1978) states that, the need for resources and an outlet for finished products and services, have forced organizations to depend on their environment. The environment in return has exerted influence on the entities that depend on it. Organizations must therefore develop ways to exploit these resources, which are also being sought by competing organizations in the same environment (Abok, 2013). Hatch (2013) further highlights that such entities cannot survive if they are not guaranteed the continuous supply of the critical resources which can be done by retaining multiple sources of supply, engaging in vertical integration with the suppliers, creating joint ventures, and horizontal integration with competitors.

The FOC project is therefore not an independent entity as it must depend to a large extent on the environment from which it is operating and for which it serves. This argument is reinforced further by the institutional organizational theory which postulates that an organization can have all the resources in form of raw materials, labour and capital from the environment but if it is not accepted by the same society, it cannot succeed. Furthermore, according to the input output

model, an organization's survival depends not only on the availability of resources in the form of raw materials, labour and capital equipment but also social legitimacy for it to thrive (Nguluu, 2003).

### **Stakeholders' Theory**

The proposed study will also refer to stakeholder theory that postulates that the priority of the interests of all legitimate stakeholders is not self-evident (Freeman, 2010). Freeman further argues that, although Stakeholder Theory is descriptive and instrumental, it is more fundamentally normative. Stakeholders are defined by their interests and all stakeholder interests are considered to be intrinsically valuable (Abok, 2013). Stakeholder Theory is managerial in that it recommends attitudes, structures, and practices and requires that simultaneous attention be given to the interests of all legitimate stakeholders. Based on these outlying concepts of the theory, implementation of fiber optic projects is not different at all. These projects require absolute involvement of all stakeholders' right from the initiation stage to the closure stage. During implementation, stakeholder's involvement can be foreseen especially in matters to deal with scope variations, daily reports, access issues, and release of subsequent resources as prescribed under the set milestones. It is therefore very important for project handlers to establish good working relations and a proper communication plan so as to avert any issues that may arise from all key project stakeholders.

### **Rogers Innovation Diffusion Theory**

According to this theory, Rogers (1983) postulates that the process through which new technologies and ideas are spread into a social system is dictated by the uncertainty behavioral changes amongst potential adopters of the innovations. The innovation diffusion theory is therefore a model that provides a framework with which one can make predictions for the time necessary for a technology to be accepted. Here, the concept of a new idea is passed from one member to another in a social system. Rogers (1995), suggests that key characteristics of innovation that influence its adoption include i.e. complexity, observability, demonstrability, compatibility, and trial ability. With inference to the theory, logistics and project team management would to a large extent be dependent on the concepts of the theory. This will basically be based on how the project team responds to the new systems and structure of implementation of a given scope depending on their level of skills and knowledge in the given area. It is therefore clear that for telco organizations to develop more effective way of implementing fiber optic cable projects, they are required to manage the introduction of the fiber optic cable concept to the key stakeholders and personnel involved in a manner that would influence the acceptance and sharing of the technology towards achieving its objectives. The implications of this theory will thus drive a clear process and people handling mechanism that would ensure effective implementation of fiber optic cable projects.

### **Theory of Constraints**

The theory of constraints (TOC) is a systems-management philosophy developed by Eliyahu M. Goldratt (1980). The fundamental thesis of the theory is that constraints establish the limits of performance for any system. Most organizations contain only a few core constraints. TOC

advocates thus suggest that managers should focus on effectively managing the capacity and capability of these constraints if they are to improve the performance of their organization. TOC challenges managers to rethink some of their fundamental assumptions about how to achieve the goals of their organizations, about what they consider productive actions, and about the real purpose of cost management. Emphasizing the need to maximize the throughput, revenues earned through sales, TOC focuses on understanding and managing the constraints that stand between an organization and the attainment of its goals (McNair, 1999). Based on these concepts, effective implementation of fiber projects can be enhanced through optimal use and allocation of available resources. The project managers and project leads need to understand the various constraints by doing pre-implementation assessments, and come up with ways to optimally allocate the available resources. This will in turn enhance effective implementation of the project.

### **Organization Readiness for Change Theory**

Organizational readiness for change theory as postulated by (Weiner, 2009) is a multi-level construct that refers to members' shared resolve to implement a change in a collective capacity. It treats an organization readiness as a shared psychological state in which members feel committed to implementing a task with confidence in their abilities. Implementation as defined by Nutt (1996) is a series of steps taken by an organizational agent to plan change process and elicit the compliance needed to install such planned changes. In line with organizational readiness for change, managers have to use implementation to make planned changes in organizations by creating environments in which changes can survive and be rooted (Nutt, 1996). However, procedural steps in implementation have been difficult to specify because implementation is ubiquitous. Consequently, there are a number of determinants which are capable of affecting project implementation if not handled with care. These include: escalation of costs, disbursement difficulties, administrative policies and bureaucracy, scope variations, and technological changes.

This theory therefore, emphasizes several critical success factors in project implementation. In this case it varies how members favorably appraise three key determinants of implementation capability i.e. task demands, resource availability and situational factors. Further the need for client consultant has been found to be increasingly important in attempting to effectively implement a project. For instance, Anyanwu (2003) found that the degree, to which clients are personally involved in the implementation process, will cause a great variation in their support for that project. Schultz, Pinto and Slevin (1987) warns that, it would be dangerous for the project manager to assume that since client consultant was satisfactory at an early stage, this activity could be ignored for the remainder of the project. Communication is further opined by Pinto and Slevin that it is not only essential within the project team itself, but also between the team and the rest of the organization as well as with the client especially in terms of monitoring and feedback.

These determinants as postulated under the theory are also inherent to fiber optics cable projects. For instance, issues to do with communication and logistics handling, budgetary control and project team management fall under the task demands, resource availability and situational factors. The organizations thus need to ensure all these key aspects are addressed during project implementation. Akin to the emphasis of organizational readiness for change theory, when

change readiness is high, members are more likely to initiate change, exert greater effort, be more co-operative and show persistence resulting to effective implementation.

### Conceptual Framework

A conceptual framework is a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation (Reichel & Ramley, 1987). When clearly articulated, a conceptual framework has potential usefulness as a tool to scaffold research and, therefore, to assist a study to make meaning of subsequent findings (Smyth, 2002). The framework is therefore a research tool intended to assist a study to develop awareness and understanding of the situation under scrutiny (Abok, 2013). Consequently according to Mugenda & Mugenda (2006), a conceptual framework is a hypothesized model identifying the model under study and the relationships between the dependent variable and the independent variables. Therefore the conceptual framework for this proposed study will be based on four independent variables and one dependent variable as shown in Figure 2.1. According to the research study, effective fiber optic cable project implementation will be conceptualized as being dependent on the project team management, communication management, budgetary control and logistics management during delivery of the desired objectives.

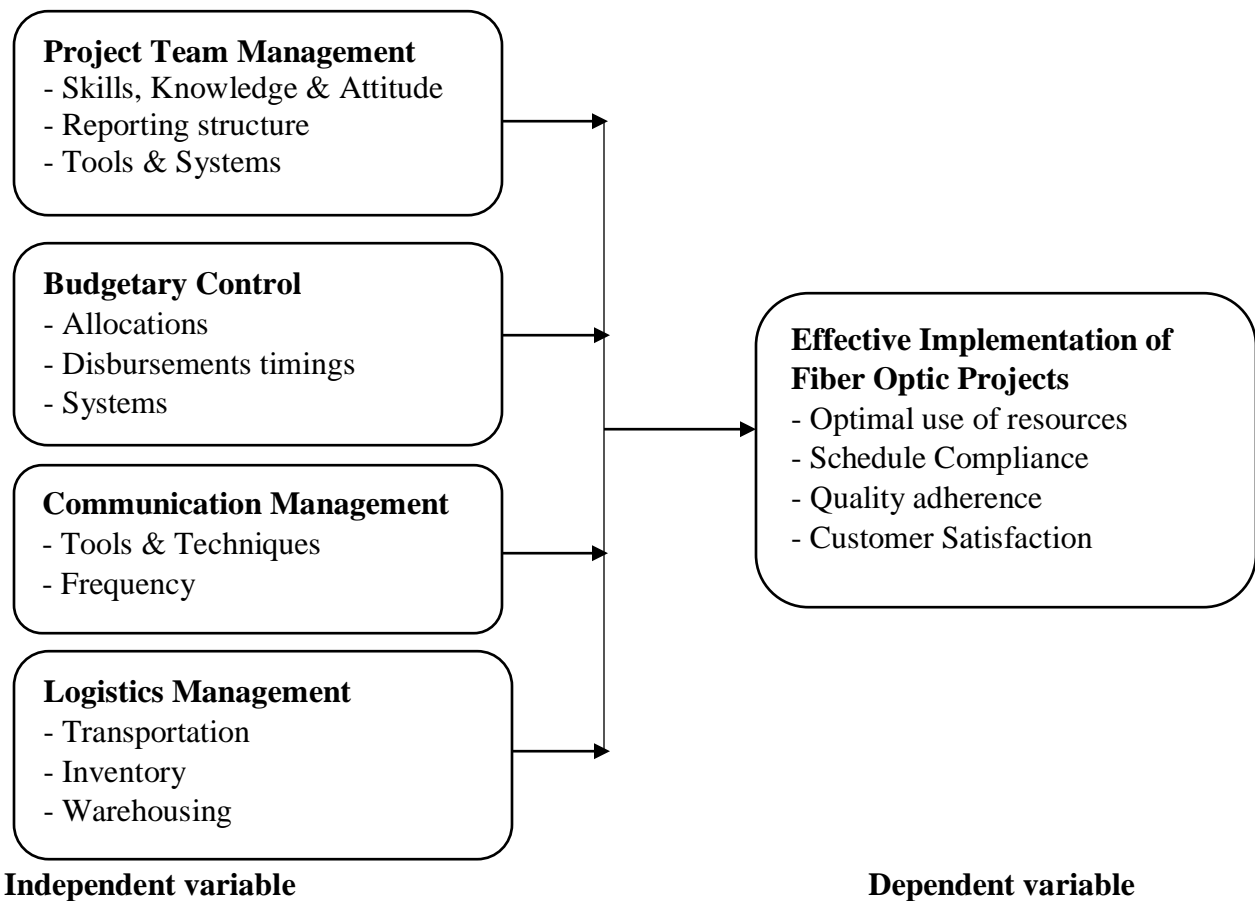


Figure 1: Conceptual Framework

## **Research Gaps**

In Kenya, few studies have been done with regards to the impact of various factors that influence effective implementation of fiber optic cable projects. The focus has mainly been on broadband utilization especially to the end client without due regard on the most critical factor that would drive the effective implementation of such projects. However, on a closer look it is seen that it has become paramount for all stakeholders in the fiber optic cable business to consider these critical factors so as to manage effective implementation of desired projects. This thus necessitates the need to do a study so as to find ways to harmonize the various influencing aspects and finally create an environment that the project will thrive in.

## **Summary of the Reviewed Literature**

The use of broadband connectivity has become a basic requirement in our livelihoods. This has led to an increase in demand that has necessitated the use of fiber optic cable technology due to its benefits of higher bandwidth and long distance connectivity. Therefore effective implementation of the fiber optic cable projects has become a key consideration to all stakeholders involved in the sector. Kenya in particular has not been left out in this bandwagon with Nairobi in particular experiencing this data revolution (Kerretts-Makau, 2012). Not much research has gone into the effective implementation of fiber optic cable projects in Kenya and thus this leaves a research door open for further studies. Therefore, the variables reviewed under the chapter provide a great open area for informative discussions on the effective implementation of fiber optic projects in Kenya. The literature highlighted that there are four independent variables i.e. team management, budgetary control, communication and logistics management. It further explained the indicators for each variable where budgetary control had three indicators which are allocations, disbursements and systems. Communication management will be measured by two indicators; tools & techniques and the frequency. Project team management on the other hand has three indicators which are skills, reporting structure, tools and systems. Finally the logistics management will be measured by the three indicators of transportation, inventory control and warehousing. The study's dependent variable of effective implementation of fiber optic cable projects will be conceptualized using four indicators which are optimal use of resources, schedule compliance, quality assurance and customer satisfaction. This study will thus provide a reference point for future discussions on how to effectively implement fiber projects with the emphasis on the theoretical and empirical studies that have been carried out thus far.

## **Research Methodology**

This study adopted a preliminary approach using a descriptive survey design. The unit of observation was the key informants of these projects i.e. project managers and the technical team leads with a total number of 180 projects. Because the population is vast, the study used a sampling frame of 180 projects from the major broadband service providers companies namely; Safaricom Ltd, Jamii Telecom, Liquid Telecoms, and Wananchi Group, and the National government agencies. The focus of respondents was on the project managers and the technical team leads involved in the project i.e. engineers, accountants, procurement, and administrators.

The study used Stratified Random Sampling technique in coming up with the sample size from the target population. According to Mugenda & Mugenda (2003), a sample size of more than



30% of the target population represents a significant level of analysis of the unit under observation. The study sample size was thus determined by calculating 40% of the target population of 180 projects bringing the sample size to 72 projects.

**Table 1: Sampling Frame and Size**

<b>Population</b>	<b>Category</b>	<b>Sampling Number</b>	<b>40% Sample Size</b>
<b>Telecommunications Companies FOC Projects</b>	Safaricom Limited	53	21
	Jamii Telkom Limited	25	10
	Liquid Telkom Limited	25	10
<b>National Government FOC Projects</b>	Wananchi Group	30	12
	ICT Ministry	47	19
<b>Total</b>		<b>180</b>	<b>72</b>

The study used structured questionnaires as the collection instrument. Data collection is simply how information is gathered. A pilot study was first conducted to test the instrument's reliability and validity, the completeness or responses, and analyze the various measures within the instrument. Data collected was processed using the following steps before being analyzed i.e. data editing, coding, and entry for analysis. The analysis utilized the statistical program for social sciences (SPSS) software version 22 to facilitate all computations and output for interpretation in the study. SPSS is computer software used for statistical analysis and has the ability to handle statistical presentation with an array of formulae for ease of interpretation. The study also used a Likert scale ranging from 1 to 5 for analyzing items that are in nominal scale. Inferential statistics i.e. regression and correlation were used to analyze the relationship between the dependent variable and the independent variables.

### **Research Findings and Presentation**

Descriptive and inferential statistics have been used to discuss the findings of the study. The study targeted a sample size of 72 respondents from which 62 filled in and returned the questionnaires making a response rate of 86.1%. This response rate was satisfactory to make conclusions for the study as it acted as a representative. According to Mugenda and Mugenda (2003) and also Kothari (2004) a response rate of 50% is adequate for a descriptive study. Babbie (2004) also asserted that return rates of 50% are acceptable to analyze and publish, 60% is good whereas 70% is very good. Based on the assertion, the response rate was adequate for analysis.

Reliability analysis was done to determine the reliability of the questionnaire. The study used the Cronbach's Alpha. Gliem and Gliem (2003) established the Alpha value threshold at 0.7, thus forming a benchmark for the study. The Cronbach's alpha was used to determine the reliability of each objective. The findings as shown in table 4.2 indicate that project team management as an alpha of 0.738, budgetary control as an alpha of 0.761, communication management as an alpha of 0.755 and logistics management an alpha of 0.727. This shows that that all the variables are reliable.

Table 2: **Reliability Analysis**

Scale	Cronbach's Alpha	Number of Items
Project team management	0.738	3
Budgetary control	0.761	4
Communication management	0.755	4
Logistics management	0.727	4

### Correlation Analysis

The correlation analysis is used to analyze the association between independent and dependent variables. The study used the Pearson Moment Correlation analysis to determine the association between project team management, budgetary control, communication management, logistics management with effective implementation of fiber optic cable projects in Kenya. The results were as shown in Table 3. The results revealed that there was a strong positive correlation between project team management and effective implementation as shown by  $r = 0.804$ , statistically significant  $p = 0.000 < 0.01$ ; there was a positive correlation between budgetary control and effective implementation as shown by  $r = 0.782$ , statistically significant  $P = 0.002$ ; there was a positive correlation between communication management and effective implementation as shown by  $r = 0.816$ , statistically significant  $P = 0.000$ ; there was a positive correlation between logistics management and effective implementation as shown by  $r = 0.793$ , statistically significant  $P = 0.002$ . This implies that Project team management, budgetary control, communication management, logistics management with effective implementation is related.

Table 3: **Correlations Coefficient**

		Effective implementation	Project team management	Budgetary control	Communication management	logistics management
<b>Effective implementation</b>	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	62				
<b>Project team management</b>	Pearson Correlation	.804**	1			
	Sig. (2-tailed)	.000				
	N	62	62			
<b>Budgetary control</b>	Pearson Correlation	.782**	.433	1		
	Sig. (2-tailed)	.002	.064			
	N	62	62	62		
<b>Communication management</b>	Pearson Correlation	.816**	.521	.543	1	
	Sig. (2-tailed)	.000	.048	.071		
	N	62	62	62	62	
<b>logistics management</b>	Pearson Correlation	.793**	.368	.473	.336	1
	Sig. (2-tailed)	.002	.073	.041	.164	
	N	62	62	62	62	62

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

## Regression Analysis

### Model Summary

Model summary is used to analyze the variation of dependent variable due to the changes of independent variables. The study analyzed the variations of effective implementation due to the changes of project team management, budgetary control, communication management; logistics management Adjusted R squared was 0.656 implying that there was 65.6% variation of effective implementation, due to the changes of project team management, budgetary control, communication management and logistics management. The remaining 34.4% imply that there are other factors that lead to effective implementation which were not discussed in the study. R is the correlation coefficient which shows the relationship between the study variables. From the findings, the study found out that there was a strong positive relationship between the study variables as shown by 0.818.

Table 4: **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.818 <sup>a</sup>	0.669	0.656	0.00462

### Analysis of Variance

The analysis of variance ANOVA is used to determine whether the data used in the study is significant. From the ANOVA statistics, the processed data (population parameters) had a significance level of 0.001. This shows that the data is ideal for making conclusions on the population's parameter as the value of significance (p-value) is less than 5%. The F calculated was greater than F critical ( $30.758 < 2.534$ ). This shows that project team management, budgetary control, communication management; logistics management significantly influences effective implementation FOC.

Table 5: **Analysis Of Variance**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.864	4	4.216	30.758	.009 <sup>b</sup>
	Residual	7.813	57	0.137		
	Total	24.677	61			

### Beta Coefficients of the study Variables

The regression equation was

$$Y = 1.136 + 0.468 X_1 + 0.694X_2 + 0.531 X_3 + 0.626X_4$$

The equation above reveals that holding project team management, budgetary control, communication management; logistics management constant, the variables will significantly influence effective implementation as shown by constant = 1.136 as shown in Table 4.23.

**Project Team Management and Effective Implementation**

Project team management is statistically significant to effective implementation as shown by ( $\beta = 0.468, P = 0.012$ ). This shows that project team management had significant positive relationship with effective implementation. This implies that a unit increase in project team management will result to increase in effective implementation.

**Budgetary Control and Effective Implementation**

Budgetary control are statistically significant to effective implementation as shown by ( $\beta = 0.694, P = 0.000$ ). This indicates that budgetary control had significant positive relationship with effective implementation. This implies that a unit increase in budgetary control will result to increase in effective implementation.

**Communication Management and Effective Implementation**

Communication management is statistically significant to effective implementation as shown by ( $\beta = 0.531, P = 0.004$ ). This shows that communication management had significant positive relationship with effective implementation. This implies that a unit increase in communication management will result to increase in effective implementation.

**Logistics Management and Effective Implementation**

Logistics management is statistically significant to effective implementation as shown by ( $\beta = 0.626, P = 0.004$ ). This implies that that logistics management had significant positive relationship with effective implementation. This shows that a unit increase in logistics management will result to increase in effective implementation.

**Table 6: Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.136	0.187		6.075	0.002
Project team management	0.468	0.102	0.342	4.588	0.012
Budgetary control	0.694	0.091	0.513	7.626	0.000
Communication management	0.531	0.094	0.455	5.649	0.004
Logistics management	0.626	0.105	0.512	5.962	0.004

## **Conclusions**

Project team management is statistically significant to effective implementation. This shows that project team management had significant positive relationship with effective implementation. This implies that a unit increase in project team management will result to increase in effective implementation. The study concludes that project team management is positively related to effective implementation. Budgetary control is statistically significant to effective implementation. This shows that budgetary control had significant positive relationship with effective implementation. This implies that a unit increase in budgetary control will result to increase in effective implementation. The study concludes that budgetary control is positively related to effective implementation.

Communication management is statistically significant to effective implementation. This shows that communication management had significant positive relationship with effective implementation. This implies that a unit increase in communication management will result to increase in effective implementation. The study concludes that communication management is positively related to effective implementation. Logistics management is statistically significant to effective implementation. This shows that logistics management had significant positive relationship with effective implementation. This implies that a unit increase in logistics management will result to increase in effective implementation. The study concludes that logistics management is positively related to effective implementation.

## **Recommendations**

The study recommends that the project team should have the necessary skills and knowledge required for the project to ensure effective and efficient implementation. The project team should work together as one and should avoid conflicts between themselves so that to ensure that they achieve the set objectives. The project team should ensure that they solve their problems amicably to avoid delay on completion of the project. The project team should ensure that budget is well set before the start of the implementation. The budget should be able to meet all the needs of the project to ensure effective implementation. All adjustments should be made to ensure that the budget is cater for everything needed for the project.

Proper communication channels should be used, the selected channels should ensure that information is delivered at the right time to avoid delay of some activities. The project team should ensure proper communication channels for timely and appropriate generation, collection, distribution, storage, retrieval and disposal of project information. The project managers should ensure that they have proper logistics management, which will ensure that the resources needed for the project are delivered at the right time and place. They should also source for reliable suppliers who will ensure consistent supply of materials needed for the project.

## **Areas for Further Research**

The main objective of the study was to examine the determinants of effective implementation of fiber optic cable projects in Kenya. The study recommends that other studies should be carried out in other industries to determine their effective implementation.

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