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Project Communication and Road Construction Projects Performance in Kenya

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Abstract
The purpose of the study is to assess the effect of project communication on road construction projects performance in Kenya, The study used the following theories as per the variables; Communications theory relevant to the study variable. The study adopted a mixed research design with a target population of 475 and a sample size of 143. Data collection instrument was questionnaire. Piloting was done to test the validity and reliability of the data collection instrument. Data was analyzed using a Statistical Package of Social Sciences (SPSS) Version 27.0. The multiple regression analysis models was developed to establish the relationship between dependent and independent variable. The Analysis of Variance (ANOVA) was used to test significance of variance of one variable over the other. On the prediction that Project communication did not have significant relationship with the road construction projects performance in Kenya. A p value of 0.000 was less than 0.05 implying rejection of the null hypothesis in favour of the alternative. Therefore, project communication had a significant relationship with road construction projects performance in Kenya. Based on the findings, the study recommended that communication is one of the most fundamental skills for construction project managers and that considering the vast number of employees working on different tasks throughout a project, confident, clear, and reliable communication are crucial to the success of the project for all parties involved – and it starts with you as the PM. The management should provide a two-way communication that includes sharing information with stakeholders, allowing sufficient opportunities to appeal and building trust with stakeholders to improve teamwork and lead to better project collaboration as poor communication result in misunderstandings, delays, and issues down the road. The finding of the study was important because: it was to assist the government in strengthening the policy framework and enact laws to govern the road construction industry, Road Construction firms will use the findings of this study to enhance their Total Quality Management (TQM) and hence be able to deliver Road projects on time and within budget, Road Construction professionals like Project Managers(Civil & Structural Engineers) and Road Construction Companies will use the findings of this study in their day to day Road construction project management.
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1.0 Introduction

The business of the twenty first century irrespective of its size is going to be part of the global business community affecting and being affected by social change, events and pressures from around the world. This is so because the business environment is changing, dynamic, turbulent, discontinuous and highly competitive. The construction industry is a key industry in the economy of any country worldwide. It is one of the biggest industries in the world contributing to around 10% of the global GDP (Nguyo, 2012) and one of the major industries contributing significantly to the socio-economic development growth (Choge & Muturi, 2014).

Project management emerged because of the growing demand for complex, sophisticated, customized goods and services and the exponential expansion of human knowledge (Bakouros & Kelessidis, 2000).Standish (2013), according to a recent Standish Group survey report, 61% of the projects either failed or was challenged to meet success criteria; and 74% faced schedule overruns. The resources utilized in this industry add to 20% of the world resources (Economy Watch, 2010). With such an impact on the world economy and resources, it is prudent that activities within this industry are efficiently and effectively planned. Cost and schedule performance are the primary measures of a projects success. A project is said to be successful if it is completed within the planned cost and time. Developing countries are faced with the problem of scarce financial resources. Road Construction projects comprises of five major phases namely planning, programming and design, procurement, construction and project closure.

Globally, project management practices have a great impact on performance of road construction projects. It has been revealed that project planning input factors affect project performance (Hamrd, 2016) and it was estimated that about 38% of global project fail due to poor scheme design phase. Road Construction Projects

failure costed the European Union countries an estimated 142 billion in the year 2012 (Mcmanus & Wood-harper, 2018).In the study conducted in Pakistan exploring how project planning affect project success mediated by with mediating role of risk management and moderating the impact of executive customs regressions and correlations indicated a significant correlation between designing of project and organizational advancement (Naeem et al.,2018) and the study concluded that project planning influences project success and recommended for more focus on planning phase during project implementation. A study conducted by Tesfaye et al., (2017) in USA findings revealed that project planning procedures are very impervious to man's issues and project cost, time and threats being linked with performance of the project. The study concluded that in order to have project success, project planning procedures must be given attention and it was recommended that project managers should focus on initial stages of project planning.

Successful Road construction projects are those delivered safe and sound to the required quality standards, on time, within budget and desired scope (Nibyiza, 2015; & Siguroarson, 2011). The effective management of costs is a vital element in achieving these objectives. Clients rightly expect that the final cost of their projects should not exceed the approved budget, and indeed for some, cost control and certainty is their main priority (Zenger, 2017). The underlying challenge in controlling costs stems from the fact that many clients have limited funds, and budgets are often set at the limit of what is affordable (Margoluis, R. & Salafsky, N. 2010). Cost overruns during the construction phase may seriously over-extend the client financially, to a point where the project may not be finished to the expected standards or may even have to be abandoned (Cunningham, 2017).

Construction industry plays a major role in development and achievement the goals of the society. Construction is one of the largest industries and contributes to about 10% of the gross national product (GNP) in industrialized countries (Navon, 2005). Construction industry has complexity in its nature because it contains large number of parties as clients, contractors, consultants, stakeholders, shareholders and regulators. The performance of the construction industry is affected by national economies (Navon, 2005). In Palestine, efficient construction projects can provide a solid platform for reviving the Palestinian economy and for building a more balance and independent economy during stable political conditions. In 1993, neglect of such systems, services, and institutions, however, has harmed the quality of life of Palestinians and their health and environment. However, project performance in Palestine has suffered since conflict erupted in September 2000 after the breakdown in Israel-Palestinian negotiation on permanent-status issues. This has led to closures and tight restrictions on movement of people and goods in West Bank and Gaza resulting in a dramatic decline in trade, investment, and employment. In addition, this has prevented the planned implementation and has caused problems in performance of projects (World Bank, 2004).

Donor funded projects in developed nations explicitly, have had upwards of over two decades of involvement with Monitoring and Evaluation, conversely with the many third world nations which are just inaugurating the use of monitoring and evaluation. The results have been acknowledged by developed nations as informative giving significant astute exercises to developing nations (World Bank, 2012).

Globally, significant tools for project management towards objectives, impacting policy and practices have been used in determining performance criteria and indicators for M&E (Khandker, Koolwal & Samad, 2010). According to Margoluis and Salafsky (2010) the scales of monitoring and evaluation are significant in surveying project performance which can be distinguished as an instrument in helping the management in project planning for Non-Government Organizations, public and private Projects.Uneb & Raza (2018) conducted a study dedicated towards finding out the perceptions regarding factors related to project failures in the construction industry of Pakistan. It was observed that organizational structure plays a lot. Sarfo (2007) in his study reported that the organizational structure adopted for management of building projects is an important area to consider for the success of projects.

In Malaysia, to control construction costs in projects, various procurement strategies are commonly adopted (Bakhshi, P., & Touran, A. 2014). Many factors are responsible for cost overruns such as underestimation of costs, addition of scope during later stages of project planning and even during construction, and changed conditions (Vandevoorde & Vanhoucke, 2016). One of the most important contributing factors to the magnitude of cost overruns in construction projects is the project schedule. Besides, the project size and time length of project development phase from planning to construction seems to be a major factor in the extent of cost overrun (Markenson, 2016). The problem of cost overruns is critical in both developing and developed countries and should be mitigated courtesy of construction cost control (Sundarasen, P. 2013).

Over the years, project management practices have emerged as an important aspect in determining the project success or failures. About 47% of sub-Saharan African project failures have been attributed to poor project planning practices as most projects have been reported to fail. In Ghana project planning process was found to significantly impact project performance (Amponsah, 2012). A study by Gbahabo and Ajuwon, (2017) conducted about effects of project cost and delays on project performance revealed that project expenditure and schedules delays road construction procurement processes that have detrimental effects on utilization of resources. The study concluded that project procurement processes should be streamlined. In Nigeria, Adeyemi,

(2013) results revealed that project planning had significant relationship with project quality, success and technical success. The study concluded that project planning must be number one phase undertaken to enable any project to succeed and it was recommended that project managers should majorly focus on this phase.

Rwanda has seen a significant rise in infrastructure developments in the recent past, especially in the fields of road development. However, many road construction projects have failed to achieve project success due to increase risk and uncertainty (Njagi, Mbabazi, & Kibachia, 2016). There are also various failed or abandoned road projects which have denied beneficiaries envisaged facilities and services.

In Zimbabwe, the construction industry is key to economic growth, providing shelter for economic and social activities including on-site and off-site infrastructure to facilitate the smooth functioning of these activities. The industry does not only touch on the lives of virtually everyone on a daily basis; it occupies a fundamental position in many national economies - the bellwether of economic growth (Clough, Sears & Sears, 2015). As a result of the sizeable nature of projects executed; the industry requires substantive injection of capital and any loss through failure or abandonment has a crippling effect on the capabilities of the investors and financiers (Nkwachuku, Ibeawachi & Okoli, 2016). Notwithstanding, the complex nature of the work undertaken by the construction industry, cost and time need to be effectively monitored and controlled if the anticipated profit margin has to be realized for the contractor and, for the project to be completed within the budget cost of the client (Gyadu-Asiedu, W. 2013). To this end, financiers and executors (contractors) of construction works are bound to be cost conscious if their business objectives are to be realized from the project. Irrespective of the economics generated through effective cost management, most road projects are delivered over-budget. Nine out of ten projects faced cost overrun in the range of 50 to 100%. The problems of project cost overrun are considered to be more severe in developing countries where they sometimes exceed 100% of the anticipated cost of projects, thus, the need for cost control (Momon, Rahma & Azis).

In Northern Uganda, Project Manager Competence, community involvement, coordination and effective project implementation influence project performance ($r = 0.70$, $p < 0.01$ & $r = 0.57p < 0.01$) respectively. In Rwanda, Shukla, (2015) revealed that human resource and financial planning were found to affect the performance of Agaseke project. In summary the reviewed studies have concentrated on agricultural farm access road projects and specifically on Africa project hence the validity of this research.

The total annual cost of worldwide project failures alone is $7.5 trillion dollars, according to Maylor, (2019). A government report from the Ministry of Roads & Public Works (GoK, 2019) identified eight main reasons for the failure of government projects: inadequate planning; insufficient buy-in by senior management; failure to engage effectively with key stakeholders; a lack of technical skills; poor project monitoring and review; inadequate initial evaluation of the project; poor networking skills; and failure to integrate the disparate parties needed to deliver project success. All are issues that can be improved through training and development. Moreover, these reasons apply equally to projects in public and private sector organizations.

In Kenya, the number of public roads construction projects is increasing from time to time, (Kenya Roads Board - KRB, 2019). However, it becomes difficult to complete projects in the allocated cost budget. Considering the scarce resources of the country, cost control is one of the major problems in Kenya (Dillon, 2018). Statistics from the Republic of Kenya report show that KeNHA has been experiencing cost overruns in its roads projects. For instance, in the construction of Thika super highway, the cost escalated from Kes.26.44 billion to Kes.34.45 billion. In addition, the initial deadline of the Thika super highway project was July 2011, which was later revised to July 2013 (World Bank, 2014).

The study conducted in Kenya by Amadi, (2017) revealed the planning of projects, evaluation and monitoring, effective communication and engagement of stakeholders possessed a significant association with community livelihood improvement programs. The research conducted in Nairobi City County by Muute, (2019) results indicated that the planning of human resources, management of project time and resource utilization contributed significantly to the success of construction projects.

Risk monitoring and control is often poorly implemented in road construction projects because of a failure to manage and monitor risks that have been identified (Chapman, 2019). A risk is an uncertain event that can negatively or positively affect project goals like cost, quality, scope, and time (Project Management Institute [PMI], 2017). Project risk monitoring and control is a process of tracking identified risks, identifying and analysing new risks, monitoring the implementation of risk response plans, and assessing the effectiveness of risk management processes throughout a project (PMI, 2017).

A risk is likely to occur during a construction project's lifecycle, resulting in reduced project performance (Obondi, 2020). The Road construction industry is subject to a higher risk level than other industries because of the complex and dynamic character of construction activities. External and internal factors like project budget and schedule constraints, complexity, complicated procedures, hostile environments, scope changes, and technical difficulties are among the primary risk sources in road construction projects (Alashwal and Al-Sabahi, 2018). Construction companies often suffer significant losses because project managers do not adequately engage in risk monitoring and control in construction projects that they oversee (Obondi, 2020). These losses can

amount to up to 85% of the total cost of a project (Senesi et al., 2015). Construction project managers often use improper risk management methods when dealing with risks. Frequently, rather than following proper risk management processes, project managers utilize personal instincts for both managing and mitigating risks (Qazi et al., 2016).

Since risks impact project performance, risks must be adequately controlled, monitored, and handled to ensure successful project delivery. Unmonitored or uncontrolled risks could cause cost overruns, scheduling delays, inferior project performance, and, ultimately, project failure (Khan & Gul, 2017).

The failure of a project is harmful to the bottom-line performance, reputation of a construction organization, its share price, the confidence of stakeholders, and the achievement of an organization's strategic objectives (Chapman, 2019). Risks like accidents, design errors, poor safety records, and structural and equipment failures plague the construction industry, which has resulted in reduced customer satisfaction (Khan and Gul, 2017). Additionally, the Construction Industry Institute (2014) reported that merely 5% of projects were on budget, were completed within the correct time frame, and met quality requirements, which resulted in low construction performance. In turn, low road construction performance was associated with the failure to monitor and manage risks appropriately (Chapman, 2019).

According to National Construction Authority (NCA), 2021) The Contractors registration establishment in Kenya has 8 distinct categories ranging from NCA1 (Highest) to NCA8 (Lowest) with most of the contractors doing more than one class of work. The main classes of work include Roads, Water, Building, Electrical and Mechanical. There are over 18,000 contractors registered by NCA with over 22,400 licenses in the above classes of work. Building works has the highest proportion of licensed contractors at 43% followed by Roads at 34%. Water and Electrical works have proportions of 10% and 9% respectively. Mechanical has a paltry 3%. The sector is dominated by small and medium enterprise contractors which account for 79% with NCA5 11%, NCA6 22%, NCA7 31% and NCA8 15%. Large establishment contractors account for 21% with NCA4 13%, NCA3 4%, NCA2 2% and NCA1 3%. Men own 72% of the construction firms whilst 21% have joint ownership of both men and women. Women owned companies account for only 7%.

Projects play an important role in an organization's overall success. With the increased competition in modern industries, companies expect project teams to perform consistently and at a rapid pace (Obondi, 2020). The project management practices have to be put into consideration for high performance or success of road construction projects. As risks in road construction projects persist, so too does the necessity to embrace reasonable risk management practices. Risk monitoring and control practices should be emphasized and implemented in every construction project to ensure the achievement of project goals (Obondi, 2020). Project managers should be aware of risk monitoring and control practices that include change control, risk audits, risk reassessment, risk status meetings, risk trend analysis, risk matrices, contingency reserves analysis, and technical performance measurement. These practices minimize the negative impacts of risk if performed regularly and adequately (Didraga, 2013). There are instances when a project will experience delays. A delay is a situation whereby an act or event that extends the time required performing the tasks under the contract (Sambasivan, 2007). It is the postponement of time from the original estimated completion time, which might be caused by the contractor, owner or consultant as well as external factors (Koushki and Kartam, 2004). The major impact of delays is increase in project cost, which causes the drain in project budget.

Chism and Armstrong (2010), state that in construction, time is money. If the contractor exhausts the project budget and is unable to make profit in the project, he may abandon the project and allow the client to attach the performance security. This will in turn cause major losses in multiple fronts from the client. This scenario will include uncontrollable other variations, disputes, bludgeoning project budget claims and often a painful end to the client whose dream may end up in abandonment.

Sambasivan and Soon (2019) identified causes of delays in the completion of construction projects, including contractor's improper planning, poor site management, inadequate experience, inconsistent flow of payments for completed work, poor management of sub-contractors, inconsistent communication between parties, as well as shortage of materials, equipment, and labor. In South Africa, a government report linked infrastructural project delays with changes in project design, inconsistent flow of financial resources, and contractor's lack of capacity to deliver (Government of South Africa, 2019). In Ghana, delay in payments, poor contractor management, delays in material procurement, poor technical performances, and escalation of material prices were identified as key factors accounting for about 80% of delays in the completion of infrastructural projects (Frimpong, Olowoye, & Crawford,2013).

As evidenced from the critical review of the literature, projects are continuing to fail (Flyvbjerg et al., 2013; Kutsch& Hall, 2015; Kutsch et al., 2021; Mulcahy, 2018; Raz et al., 2022; Success in road construction projects is indicated by its performance in the achievement of project time, cost, quality and environmental sustainability objectives (Zhou et al 2017). Despite the efforts of all players in the road construction industry, generally, many road construction projects in Kenya run a high risk of poor performance by wellbeing over the budget and significantly late. The construction industry has a reputation for time and cost overruns. One of the reasons of the

bad performance is that the construction industry is one of riskiest of all business types (Clough et al 2005). Within the sphere of a given project there are several project management activities. Several ways of carrying out these activities emerge and become accepted as day to day practices. Personnel involved in project management may also adopt certain PM practices and stick to them for purposes which may however not relate to the project success. Several practices are therefore carried out in the management of projects but not recognized as PM practices. The need to obtain successful projects calls for the need to also undertake optimum PM practices. Knowing the success, or outcome or performance of a project has a great deal of relevance to knowing the optimum practices. The effort put into the measurement of project performance in the country has portrayed little or no help in this direction. The possible, simple and most understanding way of measuring project performance with hard data is therefore needed in this regard. Performance of group of projects managed by an organization may differ from performance of another group of projects with similar characteristics but managed by another organization. The kind of PM practices carried out by the different organizations for achieving project success may also influence variation in the performance of the projects. The significance of such differences in performance of the groups of projects is therefore necessary for determination of the characteristics of influential PM practices.

Empirical data (Chamoun, 2011) and (World Bank, 2009) shows project management skill as having the most significant impact on achieving project success which is equated to achieving project objectives. Cooke-Davies, (2010) consistently shows well-trained teams deliver more benefit to project management than undertrained teams. There is a relationship between project management and construction project performance (Ramabadron et al., 2010). Certain PM practices adopted do not necessarily have a significant satisfactory influence on projects performance whilst some have. There would therefore be the need to promote optimum practices and a second look taken at others that confront the success of road construction projects. Thus, clearly there are PM practices which play into account to affect completion of road construction projects. This is because it is a global phenomenon that construction projects have not enjoyed a smooth implementation all the way to completion. On the contrary many projects have been affected by various challenges greatly affecting their completion. It is a major concern for every stakeholder in a project to understand these factors. Therefore, this research study assessed the effect of project communication on Road construction projects performance in Kenya.

2.0 Models and Elements of Communication Theory

One key activity in communication theory is the development of models and concepts used to describe communication. In the **Linear Model**, communication works in one direction: a sender encodes some message and sends it through a channel for a receiver to decode. In comparison, the **Interactional Model** of communication is bidirectional. People send and receive messages in a cooperative fashion as they continuously encode and decode information. The **Transactional Model** assumes that information is sent and received simultaneously through a noisy channel, and further considers a frame of reference or experience each person brings to the interaction.

2.1 Project Communication

People in the construction industry are often known for having strong work ethic and excellent technical skills, but due to this, the development of soft skills can often be overlooked. In reality, communication is one of the most fundamental skills for construction project managers. Considering the vast number of employees working on different tasks throughout a project, confident, clear, and reliable communication are crucial to the success of the project for all parties involved – and it starts with you as the Project Manager. Practicing effective communication skills will not only improve your overall effectiveness in your role, but generally make life easier for you, your team members, and stakeholders.

Communication is a leading key to maintaining project parties well-informed of the progress, as well as to keep them on track to achieve project objectives (Muszynska 2015). It was confirmed by many researchers that communication plays a major role for projects, and effective communication is an essential factor of project success (Zulch 2014). Effective communication and a clear definition of the project are other important factors in the Strategic Management framework (Park et al., 2017). Two-way communication, minimization of dissatisfaction and active stakeholder participation are the main factors comprising effective communication (Park et al., 2017). Two-way communication includes sharing information with stakeholders, allowing sufficient opportunities to appeal and building trust with stakeholders. Minimization of dissatisfaction includes compromising to overcome conflicts among stakeholders, keeping balance among stakeholders and reasonable compensation for private loss. Active stakeholder participation includes operating communication system, operating governance system and monitoring, evaluation and feedback. Effective communication is vital to the successful completion of any construction project. Good communication can improve teamwork and lead to better project collaboration. Poor communication can result in misunderstandings, delays, and issues down the

road (Kendall 2021). Communication within the confines of a construction project can prove to be decisive on whether the project is successful or not. Construction consists of many different elements. These include different roles, tasks and collaborations throughout the course of the project. To make sure that this all comes together smoothly, clear and effective communication is key. Poor communication can cause a snowball effect. A simple misunderstanding could cause many more as the project progresses. Ultimately, this will lead to mistakes and rework, which can waste many valuable resources. This is why clear, well defined communication paths and workflows are so important (Kendall 2021).

Construction projects follow a chain of communication from one person to the next, from one party to another party. For example, between the architect providing drawings to the contractor and the type of approval that is required in selecting and applying the final coat of paint to a building, there is a very long chain of processes and tasks that need to be clear and precise in order to make these types of decisions quick and accurate. Different people in various roles carry out these types of processes, hence the importance of good communication. If there are any miscommunications or incorrect briefings in the chains of communication between the contractor to subcontractors, architect to the builders, etc. then projects, tasks and activities stand the chance of being completed incorrectly.

Effective communication is to assure the previously mentioned four elements of the communication process are well-functioned (Van der Walt et al. 1996), the message is well- understood by the receiver (Talukhaba, Mutunga, and Miruka 2011), and the required needs and results are eventually met (Norouzi et al. 2015). This is also applicable to the construction industry's projects, as it highly depends on the crucial component of effective communication between project participants (Coughlan and Macredie 2002). Folland (1983) demonstrated that effective communication is the result of all project participants being aware and efficiently accomplishing their tasks and responsibilities to meet project goals. Applying active and effective communication skills by project managers is a well-established manner to overcome issues and tough junctures during the project. According to Dinsmore and Cabanis-Brewin (2014), it is the project manager's responsibility to specify what the messages to be sent properly and to whom, and to interpret these messages in an understandable language for the receiver are. If this occurs, it would require some expensive rework to fix things. This will involve re–planning and rebuilding – something that consumes more time and money. As a result, the entire construction project will be thrown off track, with resources being unnecessarily used to mitigate and correct the mistakes that have been made. With profit margins being tight within the construction industry, the cost of rework can quickly whittle these away. To avoid going over budget and over schedule, it's crucial to put clear communication and collaboration systems in place right from the outset of a project. Teams need to be able to communicate seamlessly from the very first planning stages right through to the end. This will not only enhance the construction management process, but it will keep the entire project on track and importantly, indirectly, improve productivity and mitigate possible delay claims(Ursela 2022).

In the construction industry, project information is extensively and inclusively exchanged throughout the duration of project planning and executing. It was outlined that communication is highly required whenever a project is implemented by and involves humans. Studies confirmed that project managers spend about 90% of their time communicating with the involved parties to the project (Čulo and Skendrović 2010). To Dinsmore and Cabanis-Brewin (2014), the project's final results are directly affected by the communication and coordination of the project processes that seek to meet client's expectations, cost resources and completion date. Thus, PMI (2013) indicated that 55% of project managers identifies effective communication as the main pivotal factor for project success. Therefore, it is a major need to manage and coordinate the exchange of this information among participants (Melzner et al. 2015). Additionally, is it critical to improve communication in the construction industry to increase innovation and positive decision making Hoezen, Reymen, and Dewulf 2006), and to avoid misunderstanding that causes conflicts of incorrect messages exchanged that result in project failure (Zulch 2014).

Communication management is this substantial area of project management, as it designates the heart of project management that has been emerging notably due to the significant effect on the projects, including construction projects. PMI (2013) defined it as the fundamental knowledge area of project management that determines the required processes to be carried out to properly generate, collect, distribute, store and retrieve the project information in a timely manner. Prior to that, Van Riel and Blackburn (1995) outlined the communication management as an instrument of managing all the harmonized forms for internally and externally communicating, used altogether to achieve effective results. Literature indicated the nature of project communication management as a systematic process, while it systematically performs, controls and reviews the used communication channel of the project, and it accurately organizes and distributes the instructions of communication (Elving et al. 2012).

Project performance metrics focuses on the impact of the project at a point in time or over a fixed timeframe (Njogu, 2016). The value of the impact of the project should supersede the cost of the intervention. Project performance is directly related to the project potential success. A project is considered to be successfully

implemented if it is carried on schedule; realizes the purpose the project was designed through achieving the goals and objectives identified; the project is completed within the budgets commonly known as the project Triangle (Hammad, 2013). Despite the many literatures educating the project managers on the various tools and techniques aimed at increasing the likelihood of the success of a project, 7 out of 10 projects are considered unsuccessful (Kelbessa, 2016). These projects are considered unsuccessful either because they were not completed or they are not seen as successful even though they were rolled-out as planned (Ayatah, 2012).

Project performance is evaluated differently by various stakeholders of the project based on their expectations in relation to the actual quality, cost and time. Project performance can be measured in terms of the qualitative value the project has to the implementing organization or quantitative in terms of the earned value systems for utility and large government projects (Kelbessa, 2016). For any of the approach used small elements of the project to indicate progress are identified and monitored throughout the project life cycle. The key project indicators should be pre-established. Involvement of the key project stakeholders in the identification and selection of the indicators to monitor increases the likelihood of smooth running and implementation of the project and hence success.

Gyadu-Asiedu (2018) indicated that the overall success of a construction project is affected by the contractor's ability to effectively plan resources, estimate, budget and control cost. Swan and Khalfan (2017) posited that time is regarded as major factor that is used to determine the project success. Furthermore, bureaucratic hindrance and resource availability as planned affects the early completion of construction projects. Egemen and Mohamed (2005) were of the view that undertaking a project to meet the required quality and standard is a major factor in determining project success. The quality of a project is achieved when the legal, aesthetic and functional needs of the project customers or beneficiaries are achieved (Lau and Tang, 2009).

Projects are very sensitive to decision and actions taken by any stakeholder (Aaltonen, 2010). Almost all the projects operate in a context where its respective stakeholders play a primary role in the accomplishments of tasks (Hammad, 2018). According to PMI, 'Project stakeholders is any individual, organization or group who may affect, be affected by or perceive to be affected by a decision, activity, or outcome of a project' (Project Management Institute, 2014). Project stakeholders may be within or outside the organization. Stakeholders of a particular project will vary during the life cycle of the project in terms of needs, numbers and influence. The interests, perception as well as the motivation of all the project stakeholders that have an influence on the success of the project should not be ignored. Stakeholder review and identification should be conducted throughout the project life cycle (Njogu, 2016).

Project Management literatures have discussed widely the subject of project success and no consensus has been reached on the project success criteria. According to PMI, the project success indicators include time, scope, cost and quality (PMI, 2008). These parameters relate such that if scope, time or cost changes then at least one of the other parameters will be also be affected. The Iron triangle in project management has been criticized by researchers (Sundarasen, 2018; Shenhar & Dvir, 2017) citing insufficiency in defining project success. The iron triangle also referred to as project management triangle or the triple constrain omits the key dimension of success such as user satisfaction, impact of intervention to stakeholders as well as the learning.

The project management diamond framework has recently overtaken the iron triangle. The project management diamond has four vertices (time, cost, quality and scope) and customer expectations at the central focus of the intervention. According to (Shenhar& Dvir, 2017) meeting the customers' needs and expectation is more important than mere meeting the project deadlines or budget. According to (Olander, 2006) any intervention attracts a vast number of interested parties. These interested parties in a project have different needs, expectations, motivation, power, influence, behaviours, traits, literacy levels etc. (Sankaran, Haslett, & Sheffied, 2010). Projects are all about communication (Alatalo, 2012). According to (Alatalo, 2012) Communication should be enough but not too much nor too little. Communication can either ruin or save a project according to (Wang & Qiang, 2012). Researchers have acknowledged stakeholder participation in any intervention as important to achieve sustainable developments, project success, and or positive impact (Agyei, 2019; Chambers, 1983; Donaldson, 1990; Emilie, 2014; Komalawati, 2008).

Construction projects are considered successful when delivered within scheduled duration, allocated budget, and specified quality (Majid, 2006; Owolabi et al., 2014). Delay in the completion of construction facilities is a critical challenge with a global dimension, often leading to increased costs due to time extension or acceleration as well as loss of productivity, disruption of work, loss of revenue through lawsuits between contractual parties, and project abandonment (Sambasivan& Soon,2017; Owolabi et al., 2014). Many Sub Sahan Africa economies experience losses amounting to billions of dollars, as a result of delayed completion of infrastructural projects, which undermines the noble goal of poverty reduction (Gutman et al., 2015). Delay in the completion of infrastructural projects has significant cost implications, which in turn bears far-reaching consequences in the lives of citizens, especially in developing countries like Kenya. Studies conducted in various contexts have deduced that although delay in the completion of construction projects is a global phenomenon, it appears to be more common in developing than in developed countries (Sambasivan& Soon, 2017;Alaghbari et al., 2007; Aziz,

2013). Among the developed countries, delay in the completion of infrastructural projects has been reported in Canada, the United States, Australia, and Britain, among others.

In Canada for instance, De Souza (2019) attributed delays in the completion of infrastructural projects to various factors, including reduced funding by sponsors, communication breakdown, delayed disbursement of funds, poor site management by contractors, and tedious legislative procedures. In the United States, SNL Financial (2010) reported delay in the completion of a pipeline project connecting Florida State and Bahamas, particularly due to design changes.

In Kenya, delays in the completion of infrastructural facilities have been associated with factors, such as poor financial management by government agencies, inadequate designs, and poor management of the construction process by contractors (Talukhaba, 2009). Arguably, these factors are compounded by secondary factors, such as poor management of materials and equipment by contractors, inadequate recognition and response to risks emanating from the physical and socio-economic environments, as well as inadequate regard for stakeholders' needs (Talukhaba, 2009). Another study conducted by Ondari and Gekara (2018) reported significant correlation between project delays and factors, such as management support, design specifications, contractor's capacity, and supervision capacity.

3.0 METHOD

This study adopted a mixed methods research. Mixed methods research combines elements of qualitative and quantitative research approaches for the purposes of the breadth and depth of understanding and collaboration (Creswell 2014). This research study was guided by epistemological research philosophy which relates to acquisition, development and nature of that knowledge. The target population was 475 registered professionals in road construction projects in Kenya. The study used a stratified sampling technique. Each strata will be treated as a separate population and simple random sampling will be used to draw a sample of Road Construction Project, which is homogeneous for analysis. To effectively arrive at the right sample for this study, stratified random sampling will be used. The sampling frame was 143 registered professionals in road construction projects in Kenya. The respondents were the Registered and practicing road Engineers (Project Managers/Consultants in civil and structural engineering field) and The Heads of the Road Construction companies registered under NCA 1 in Kenya. Data collection instruments were structured questionnaires. Piloting was done to test the validity and reliability of the data collection instruments. Once data for the study was collected from the population, It was then be coded, entered and analyzed descriptively using IBM Statistical Package for Social Sciences (SSPS 26). Pearson correlation analysis was used to test the relationship between variables in the study hypotheses. ANOVA multiple linear regression analysis was adopted computed to determine the statistical relationship between the independent variable and the dependent. All diagnostic tests were done.

4.0 DISCUSSION

Communication is a leading key to maintaining project parties well-informed of the progress, as well as to keep them on track to achieve project objectives (Muszynska 2015). It was confirmed by many researchers that communication plays a major role for projects, and effective communication is an essential factor of project success (Zulch 2014). Effective communication and a clear definition of the project are other important factors in the Strategic Management framework (Park et al., 2017). Two-way communication, minimization of dissatisfaction and active stakeholder participation are the main factors comprising effective communication (Park et al., 2017). Two-way communication includes sharing information with stakeholders, allowing sufficient opportunities to appeal and building trust with stakeholders. Minimization of dissatisfaction includes compromising to overcome conflicts among stakeholders, keeping balance among stakeholders and reasonable compensation for private loss. The study sought to determine the effect of project communication on Road construction projects performance in Kenya. The findings are presented in a five point Likert scale where SA=strongly agree, A=agree, N=neutral, D=disagree, SD=strongly disagree and T=total.

From table 4.7 below, the respondents were asked whether communication is one of the most fundamental skills for construction project managers. The distribution of findings showed that 32.0 percent of the respondents strongly agreed, 35.0 percent of them agreed, 15.0 percent of the respondents were neutral, 13.0 percent disagreed while 5.0 percent of them strongly disagreed. These findings implied that communication is one of the most fundamental skills for construction project managers.

The respondents were also asked whether considering the vast number of employees working on different tasks throughout a project, confident, clear, and reliable communication are crucial to the success of the project for all parties involved – and it starts with you as the PM .The distribution of the responses indicated that 33.0 percent of the respondents strongly agreed to the statement, 16.0 percent of them agreed, 28.0 percent of them were neutral, 16.0 percent of them disagreed while 8.0 percent of them strongly disagreed to the statement. These findings implied that considering the vast number of employees working on different tasks throughout a

project, confident, clear, and reliable communication are crucial to the success of the project for all parties involved – and it starts with you as the PM.

The respondents were also asked whether communication is a leading key to maintaining project parties well-informed of the progress, as well as to keep them on track to achieve project objectives. The distribution of the responses indicated that 25.0 percent of the respondents strongly agreed to the statement, 42.0 percent of them agreed, 29.0 percent of them were neutral, 4.0 percent of them disagreed while 0 percent of them strongly disagreed to the statement. These findings implied that communication is a leading key to maintaining project parties well-informed of the progress, as well as to keep them on track to achieve project objectives.

The respondents were further asked whether good communication can improve teamwork and lead to better project collaboration and poor communication result in misunderstandings, delays, and issues down the road. The distribution of the responses indicated that 5.0 percent of the respondents strongly agreed to the statement, 50.0 percent of them agreed, 28.0 percent of them were neutral while 9.0 percent and 8.0 percent of them disagreed strongly and disagreed to the statement respectively. These findings implied that good communication can improve teamwork and lead to better project collaboration and poor communication result in misunderstandings, delays, and issues down the road.

Also, the respondents were asked whether two-way communication includes sharing information with stakeholders, allowing sufficient opportunities to appeal and building trust with stakeholders. The distribution of the responses indicated that 27.0 percent of the respondents strongly agreed to the statement, 53.0 percent of them agreed and 20.0 percent of them were neutral. None of the respondents disagreed or strongly disagreed to the statement respectively. These findings implied that two-way communication includes sharing information with stakeholders, allowing sufficient opportunities to appeal and building trust with stakeholders.

Further, when respondents were asked whether if there are any miscommunications or incorrect briefings in the chains of communication between the contractor to subcontractors, architect to the builders, etc. then projects, tasks and activities stand the chance of being completed incorrectly, 25.0 percent of the respondents strongly agreed, 41.0 percent of the respondents agreed on the statement, 10.0 percent of the respondents were neutral while 12.0 percent disagreed, 20.0 strongly disagreed. This implied that majority agreed that if there are any miscommunications or incorrect briefings in the chains of communication between the contractors to subcontractors, architect to the builders, etc. then projects, tasks and activities stand the chance of being completed incorrectly.

Again, when respondents were asked whether effective communication is the result of all project participants being aware and efficiently accomplishing their tasks and responsibilities to meet project goals, 26.0 percent of the respondents strongly agreed, 38.0 percent of the respondents agreed on the statement, 6.0 percent of the respondents were neutral while 21.0 percent disagreed, 20.0 strongly disagreed. This implied that majority agreed that effective communication is the result of all project participants being aware and efficiently accomplishing their tasks and responsibilities to meet project goals.

Finally, when respondents were asked whether project's final results are directly affected by the communication and coordination of the project processes that seek to meet client's expectations, cost resources and completion date, 28.0 percent of the respondents strongly agreed, 41.0 percent of the respondents agreed on the statement, 7.0 percent of the respondents were neutral while 14.0 percent disagreed, 10.0 strongly disagreed. This implied that majority agreed that project's final results are directly affected by the communication and coordination of the project processes that seek to meet client's expectations, cost resources and completion date.

Table 4.7: Effect of Project Communication on Road Construction Projects Performance in Kenya

Statements on Project Communication		SA	A	N	D	SD	Mean	Std. Dev
Communication is one of the most fundamental skills for construction project managers	%	32.0	35.0	15.0	13.0	5.0	4.7	0.6
Considering the vast number of employees working on different tasks throughout a project, confident, clear, and reliable communication are crucial to the success of the project for all parties involved and it starts with you as the PM	%	33.0	16.0	28.0	15.0	8.0	4.3	0.9
Communication is a leading key to maintaining project parties well-informed of the progress, as well as to keep them on track to achieve project objectives	%	25.0	42.0	29.0	4.0	0	4.6	0.6
Good communication can improve teamwork and lead to better project collaboration and poor communication result in misunderstandings, delays, and issues down the road	%	5.0	50.0	28.0	9.0	8.0	4.5	0.9
Two-way communication includes sharing information with stakeholders, allowing sufficient opportunities to appeal and building trust with stakeholders	%	27.0	53.0	20.0	0	0	3.7	1.4
If there are any miscommunications or incorrect briefings in the chains of communication between the contractor to subcontractors, architect to the builders, etc. then projects, tasks and activities stand the chance of being completed incorrectly	%	25.0	41.0	10.0	12.0	12.0	4.2	1.2
Effective communication is the result of all project participants being aware and efficiently accomplishing their tasks and responsibilities to meet project goals	%	26.0	38.0	6.0	21.0	9.0	4.6	0.6
Project's final results are directly affected by the communication and coordination of the project processes that seek to meet client's expectations, cost resources and completion date	%	28.0	41.0	7.0	11.0	13.0	4.5	0.7
Aggregate mean							**4.4**	**0.9**

4.6 Diagnostic Tests

Prior to conducting inferential statistics, a number of diagnostic tests were checked. This was aimed at ensuring that the study data was not biased, which would result to inaccurate estimations. The tests included: multicollinearity, normality, and auto-correlation and linearity tests.

4.6.1 Multicollinearity Test

Multicollinearity is the occurrence of high interrelations among two or more interdependent variables in a multiple regression model. The test is used to check whether there is correlation among independent variables which results in less reliable statistical inferences. Therefore, the purpose of using multicollinearity test was to safeguard the study from using independent variables that were not correlated or repetitive when building multiple regression models that use two or more variables.

The study tested multicollinearity between independent variables using VIF. According to (Field, 2009), multi-collinearity is said to exist if there is a strong correlation between two or more independent variables in a model. The results indicate that all the variables had VIF values less than 10 and tolerance levels more than 0.1 implying that there was no multicollinearity among the independent variables. The results are shown in Table 4.12.

Table 4.12: Multicollinearity test using VIF

Variables	Tolerance	VIF
Project communication	.512	1.952

4.6.2 Normality Test

Normality test is used to determine whether sample data has been drawn from a normally distributed population (within some tolerance). Normality is important for data since it provide simple summaries about the sample and the measures. Measures of the central tendency and dispersion are used to describe the quantitative data (Anaesth, 2019). Normality of data was tested using the Shapiro-Wilk test. The rule of thumb is that when the P value (Sig) is greater than 0.05, the null hypothesis of normal distribution is not rejected. The findings (Table 4.13) indicate that all the variables had P values (Sig) greater than 0.05 implying that the data was normally distributed.

Table 4.13: Normality Test using Shapiro-Wilk

Variables	Statistic	df	Sig.
Project communication	0.945	143	.065
Road construction performance	0.912	143	.112

4.6.3 Auto-correlation Test

Auto-correlation refers to the degree of correlation of the same variables between two successive time intervals. It measures how the lagged/protected version of the value of a variable is related to the original version of it in a time series (Scott, 2020). The test of auto-correlation was done using the Durbin-Watson test. This was done to check that the residuals of the model are not correlated since independence of the residuals is one of the basic hypotheses of regression analysis. Durbin Watson test reports a test statistic, with a value from 0 to 4, where; 2 is no autocorrelation, 0 to <2 is positive autocorrelation, >2 to 4 is negative autocorrelation. The rule is that test statistic values in the range of 1.5 to 2.5 are relatively normal, while values outside of this range could be cause for concern. The results (Table 4.14) indicate a Durbin-Watson value of 1.852 implying that the residuals were not auto-correlated.

Table 4.14: Durbin-Watson test of autocorrelation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.656a	0.426	0.418	0.37565	1.852

a. Predictors: (Constant), X2,

b. Dependent Variable: Y

4.6.4 Linearity Test

A linear function is a function where graph lies on a straight line, and which can be described by giving the slope and y intercept of that line. Linearity is most simply thought of as data that is a straight line when graphed. It is characterized by an ordered and predictable system not commonly seen in nature (Chegg, 2003). Linearity test was done using scatterplots. It was expected that the relationship between the independent variables and dependent variable would be linear before the regression models was applied. Results (Fig. 4.5, 4.6, 4.7 and 4.8) indicate that there exists linear dependence between the independent variables (X2) and dependent variable (Y). This was demonstrated by the line of fit.

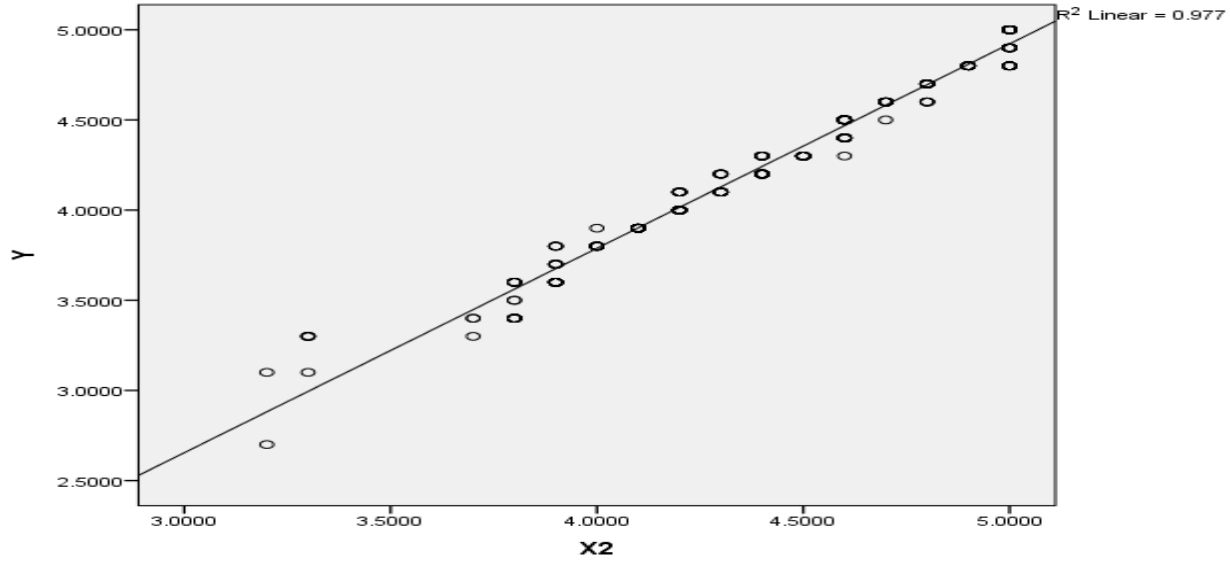

Figure 4.6: Linearity Between Project Communication on Road Construction Projects Performance

4.6.5 Heteroscedasticity Test

Heteroscedasticity means equal scatter. In regression analysis, we talk about heteroscedasticity in the context of

the residuals or error term. Specifically, heteroscedasticity is a systematic change in the spread of the residuals over the range of measured values (Jim, 2021). Heteroscedasticity is usually defined as some variation of the phrase non-constant error variance or the idea that once the predictors have been included in the regression model, the remaining residual variability changes as a function of something that is not in the model (Cohen, West & Aiken, 2007; Field, 2009; Kutner & Nater, 2004).

Levene's test of equality of error variances was used to conduct the heteroscedasticity test. The probability value in Table 4.15 is greater than 0.05, indicating that the null hypothesis of constant variance of error terms was accepted. As a result, the residuals' variance was homoscedastic.

Table 4.15: Levene' s Test of Equality of Error Variances

Dependent Variable: Y

F	df1	df2	Sig.
6.042	110	178	.070

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

4.7 Correlation Analysis

This section provides results on the relationship between the independent and dependent variables.

The results also indicate that project communication [X2] had a positive and significant relationship with road construction projects performance in Kenya (r =.567, p = 0.000<0.05). This implies that both project communication and road construction projects performance in Kenya move in the same direction. As such, an increase in project communication is accompanied by increase in road construction projects performance in Kenya.

Table 4.16: Correlation Matrix; Project communication on Road Construction Projects Performance in Kenya.

		Y	X2
Y	Pearson Correlation	1	
	Sig. (2-tailed)		
X2	Pearson Correlation	.567**	1
	Sig. (2-tailed)	.000	

4.8 Univariate Regression Analysis

Univariate linear regression focuses on determining relationship between one independent (explanatory variable) variable and one dependent variable. Regression comes handy mainly in situation where the relationship between two features is not obvious to the naked eye. Regression analysis is a type of statistical evaluation that enables three things; firstly, description of relationships among the dependent variables and the independent variables can be statically described by means of regression analysis. Secondly, estimation of the values of the dependent variables can be estimated from the observed values of the independent variables. Thirdly, prognostication/prediction of risks factors that influence the outcome can be identified, and individual prognoses can be determined (Fahrmeir, 2009). This section provides regression results on the separate effect of project communication on road construction projects performance in Kenya.

4.8.2 Effect of Project Communication on Road Construction Projects Performance in Kenya

The study sought to determine the effect of project communication on road construction projects performance in Kenya. The regression results (Table 4.18) indicate that project communication explains 32% (R2=.319) of total changes in road construction projects performance in Kenya. An F statistic of 132.343 and reported p value of 0.000<0.05 imply that project communication is a significant predictor of road construction projects performance in Kenya. The results further indicate that project communication had a positive and significant effect on road construction projects performance in Kenya (β=.634, P <.000). This implied that an increase in project communication by one unit would lead to increase in road construction projects performance in Kenya by 0.634 units.

Estimated model;

$Y = 1.408 + 0.646X2$

Where; Y- project communication; X2- road construction projects performance in Kenya

Table 4.18:Regression Model; Project Communication and Road Construction Projects Performance in Kenya

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.412	.241		5.440	.000
	Project communication	.634	.056	.562	11.523	.000
	R Squared	.319				
	Adjusted R Squared	.317				
	F statistic	132.343				
	P value	.000				

a Dependent Variable: Road Construction Projects Performance in Kenya

4.9 Multiple Regression Analysis without Moderation

Having separately established the effect of each independent variable on dependent variable, it was imperative to determine the combined effect of all the independent variables on Road construction projects performance in Kenya. A multiple regression model was therefore, used to establish the effect of project management on road construction projects performance in Kenya.

The findings indicate that project communication (β3= .357, P =.000); had a positive and significant effect on road construction projects performance in Kenya. Based on the coefficients (β), when all the independent variable are combined, project communication best explains road construction projects performance in Kenya.

Model without moderation

Y =0.854+.357X2

Where;

Y= Road Construction Projects Performance in Kenya

X_2 = Project Communication

Table 4.21: Multiple Regression Model without moderation

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.854	.254		3.311	.004
	X2	.336	.073	.285	4.513	.000
	R Squared	.424				
	Adj. R Squared	.418				
	F statistic	54.582				
	P value	.000				

a Dependent Variable: Y

4.10 Hypothesis Testing

The second null hypothesis (H_{02}) predicted that project communication did not have significant relationship with the road construction projects performance in Kenya. A p value of 0.000 (Table 4.17) was less than 0.05 implying rejection of the null hypothesis in favour of the alternative. Therefore, project communication had a significant relationship with road construction projects performance in Kenya.

Table 4.23: Hypotheses Testing Results

	Hypothesis	P value	Decision
H02	Project communication does not have significance effect on road construction projects performance in Kenya.	0.000<0.05	Reject

5.0 Conclusion and Recommendation

The study sought to determine the effect of project communication on Road construction projects performance in Kenya. The findings indicated that communication is one of the most fundamental skills for construction project

managers and that considering the vast number of employees working on different tasks throughout a project, confident, clear, and reliable communication are crucial to the success of the project for all parties involved – and it starts with you as the PM together with communication being a leading key to maintaining project parties well-informed of the progress, as well as to keep them on track to achieve project objectives. These findings implied that good communication can improve teamwork and lead to better project collaboration and poor communication result in misunderstandings, delays, and issues down the road and that two-way communication includes sharing information with stakeholders, allowing sufficient opportunities to appeal and building trust with stakeholders. Further, findings agreed that if there are any miscommunications or incorrect briefings in the chains of communication between the contractors to subcontractors, architect to the builders, etc. then projects, tasks and activities stand the chance of being completed incorrectly and that effective communication is the result of all project participants being aware and efficiently accomplishing their tasks and responsibilities to meet project goals. In conclusion basing on the findings, on the prediction that Project communication did not have significant relationship with the road construction projects performance in Kenya. A p value of 0.000 was less than 0.05 implying rejection of the null hypothesis in favour of the alternative. Therefore, project communication had a significant relationship with road construction projects performance in Kenya.

The study came up with a number of recommendations. Communication is one of the most fundamental skills for construction project managers and that considering the vast number of employees working on different tasks throughout a project, confident, clear, and reliable communication are crucial to the success of the project for all parties involved – and it starts with you as the PM. The management should provide a two-way communication that includes sharing information with stakeholders, allowing sufficient opportunities to appeal and building trust with stakeholders to improve teamwork and lead to better project collaboration as poor communication result in misunderstandings, delays, and issues down the road and that any miscommunications or incorrect briefings in the chains of communication between the contractors to subcontractors, architect to the builders, etc. then projects, tasks and activities stand the chance of being completed incorrectly.

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