International Journal of Economics, Commerce and Management
United Kingdom Vol. VI, Issue 5, May 2018
http://ijecm.co.uk/ ISSN 2348 0386

INFLUENCE OF QUALITY INFORMATION OUTPUT ON PERFORMANCE OF CONSTRUCTION PROJECTS IN SOUTH RIFT, KENYA

Kiprotich Elijah Bor
School of Human Resource Management,
Jomo Kenyatta University of Science and Technology, Kenya
elijah_bor@yahoo.com

Abstract

The study sought to establish the influence of quality information output on performance of construction projects in South Rift, Kenya. The study used descriptive survey design. This study accessible population was 95 respondents .The researcher used census inquiry. The study was guided by Technology Acceptance Model (TAM) and DeLone and McLean Information System Success Model (ISSM).Reliability and validity of questionnaire was tested and the analysis of data on hypothesized relationships was done using Multiple Regression Model. Assumptions of analysis model was tested before running analysis and results presented in tables and charts. The findings of this study indicated quality information output had significant relationship with project performance p=0.000 and R=0.20. The study further concluded that quality information output makes significant contribution to project performance and should continue to be subject of further research. The study recommends that, construction companies in South Rift to achieve levels of efficiency and effectiveness in construction projects, the management of the company must ensure adoption of the use of integrated project management information system. Secondly management of South Rift construction companies, to take cognizance of technical training on the I-PMIS software's this will ensure up to date proficiency and productive team; they should also acquire latest information systems infrastructure with web-based utility. This will enable them to benefit from uncorrelated I-PMIS attributes.

Keywords: Project Management, Information System Efficiency, Performance, Kenya

INTRODUCTION

Globalization and internationalization of markets have accelerated aggressive pressures on enterprise establishments. This has led organizations to have critical focus on initiatives that are crucial to their overall performance, if not their survival. The evolution of world competitive markets has led to a fact that projects in a regular commercial enterprise together with engineering, records era; production, and many others, want to be enormously controlled, in terms of planning, scheduling, organizing, tracking, and controlling (Liberatore, 2003).

In order to accomplish this, groups must manage projects within decided time, finances, and in excess of performance even as handling risks. Although project management structures help a business enterprise decrease product and service development time to marketplace, exploit constrained resources and enlarge worldwide marketplace competition, task managers nevertheless need to utilize equipment that allows in overcoming diverse demanding situations such as: uncontrollable time and budget regulations; inconsistent mission groups; unpredictability of corporation's resources; lack of readability in prioritizing tasks; delays in undertaking choice-making; and shortage of clarity in collaboration among task group members (Cavalieri, 2007). Therefore, whilst initiatives managers continue to conflict with these issues, they are obligated on the same time to make choices in one of these manner that chance is managed, uncertainty minimized and in which every selection made by using them will ideally be beneficial to the challenge. This can be accomplished while the organization acquires an Integrated Project Management Information System as a means to offer top managers with the vital tools that are useful for the decision making process on the subject of deciding on making plans, organizing, and controlling projects and portfolios.

The project management systems currently used inside the production enterprise may be divided into two kinds. The first one is off-the-shelf commercial software program, wherein projects are controlled by use of Gantt Charts, the Program Evaluation and Review Technique (PERT) (Kerzner, 2005) and the Critical Path Method (CPM) (Woolf, 2007). These control techniques have speedily unfolded in many private companies. Thus, a variety of the associated business software packages cater for the aforementioned strategies; examples consist of Microsoft Project, Primavera Project Planner and Application Service Provider. The second type of venture management system is custom in-residence software program, when business software program does not meet the precise necessities of an engineering mission or firm; a few companies will develop custom in-house project control software to fulfill their desires. Examples of this encompass Bechtel (Schmitz, 1991, Parsons, 2004, Kajima, 2000).

Traditional project management systems mainly provide text, basic graphs, and complicated network schedules for controlling projects and making decisions. Today's projects

are becoming ever more complex and time driven, especially as the amount of project information and active project participants increases. Thus, we require more effective project tools for integration, management and communication. The question then arises about multi-dimensional information integration, management, and visualization of engineering projects. It therefore follows that an effective project management system should not only provide sufficient and comprehensive information to facilitate project management, but also provide the various visualization tools to assist with information distribution and communication. Among various IT solutions, the internet-based (or web-based) Project Management Information Systems has been highlighted because of its strong advantages such as low cost compared with traditional communication methods, location-free access, speedy and reliable data transfer and storage, and efficient information sharing among parties (Jung, 2011).

In Korea and Japan web based Project Management Information Systems is one of the most widely used tools that supports and enhances the collaboration and communication between construction project participants. The reason for the swift adoption of web-based Project Management Information Systems in the Korean and Japan construction industry closely relates not only to the above-mentioned advantages, but also to the well-established internet infrastructure and users' familiarity with web-based computing environment (Jung, 2011). Besides these technical reasons, the Korean construction management guidebook specifies the use of Project Management Information System by construction managers hired by government or government agencies for efficient information management has strongly facilitated the adoption of web-based Project Management Information Systems in the Korean construction industry.

In England, there are two types of Project Management Information Systems in the construction field: One is that which is developed and used by individual construction companies. The other is the ASP (Application Service Provider)-based Project Management Information System which is developed for general construction projects but can be customized for specific construction projects. The former can be considered as one of the information systems (e.g. MIS and ERP systems, etc.) used in a company exclusively, while the latter are generally used by various project participants such as client, architect, constructor, sub-contractor and construction manager, and their quality is considerably more dependent on the capability of service providers (Stewart, 2004).

In South Africa, ERP systems are being used by construction companies to improve responsiveness in relation to customers, strengthen supply chain partnerships, enhance organizational flexibility, improve decision making capabilities and reduce project completion time and lower costs. These information systems are designed to integrate and partially

automate many of the company's business processes such as human resources, financial management, manufacturing, procurement, construction, operations and maintenance.

In Kenya an Act of parliament , 2011 which established The National Construction Authority in order to streamline ,overhaul and regulate construction industry achieve quality construction , the construction industry is a crucial sector for growth of the economy. According to the Kenya National Bureau of statistics (KNBS; 2015) the construction industry contributed 4.8%, 5.6 %, 5.8% and 6.1 % towards Gross Domestic Product (GDP) for the years 2012, 2013, 2014 and 2015respectively. This is an average of 5.6 % as compared to 10% for the developed economies (Hillebrandt, 2000).

In South Rift, many construction firms have got computer based material management systems (MMS), which stores, sort, combine and print data files pertaining to materials requisition, purchasing, vendor evaluation and warehouse inventories. The use of these systems not only gives the firms competitive edge against their competitors but also enhances the effectiveness of construction projects throughout their life cycle and across the different construction business functions. According to (Kaiser, 2010), the use of Project Management Information System is based on the belief that their cost will be offset by the benefits that come along with it. They continue to say that the broadening of Project Management Information System scope enables organizations to not only manage individual projects but whole project portfolios. In general, Project Management Information System support most of the project life cycle phases from the idea generation, risk management, stakeholder management to the management of knowledge created long after the project completion.

Statement of the Problem

Construction projects are commonly acknowledged as successful when they are completed on time, within budget, and in accordance with specifications and to stakeholders' satisfaction. Many projects exceed the original cost; get cancelled prior to completion, while others fail in terms of the delivered functionality (Burns, 2008). While large amounts of time and resources are dedicated to selecting and designing projects, it remains of paramount importance that projects should be adequately managed in organizations if they are to achieve their performance objectives. For instance according to 2015 report from the Ministry of Public Works, contractors give poor service through poor documentation, poor decision making and extension of time during project implementation leading to stalling of projects or total failure, a case in mind is the management of Thika Super highway project whose construction budget was initially Ksh27 billion eventually consumed Ksh31 billion. A project manager simply cannot make and execute meaningful decisions without relevant and timely information (Cleland, 2004).

Projects need to be effectively managed, that is, they need to be planned, staffed, organized, monitored, controlled, and evaluated (Liberatore, 2004). In order to succeed, companies must deliver projects on time, within budget and meet specifications while managing project risks. Peterson, (1992).Identified that project management has long been considered an important characteristic of successful companies and is more than ever necessary to efficiently and effectively manage these projects and to support project managers in their decision-making. Cleland states that project managers necessitate accurate and timely information for the management of a project. Project planning, organizational design, motivation of project stakeholders, and meaningful project reviews simply cannot be carried out without information on the project together with how it relates to the larger organizational context in which the project is found (Cleland, 2004).

However, with Integrated Project Management Information System being increasingly used by project managers in all types of industry, not much is known on the characteristics of these systems that contribute to project performance. Thus the purpose of this study was to explore the influence of Project Management Information System on performance of projects in construction industry in South Rift with regard to the System, Quality of Information, the System user and the System use during the entire project life cycle to increase project performance rate. With the system, performance rate and success in projects will seamlessly be achieved in Bomet, Kericho and Narok counties.

Objectives of the Study

To establish influence of integrated project management system on performance of construction projects in South Rift construction companies, Kenya

LITERATURE REVIEW

Review of Theories

This section presents a discussion of theories which form a basis for the conceptualized relationship between project management information systems and project performance. The theories are; Technology Acceptance Model and Information System Success Model.

Symbolic Interactionist theory

Technology Acceptance Model (TAM)

The study was guided by Technology Acceptance Model (TAM) byTsai, (2014). who attempted to determine the elements of the success or failure of the introduction of enterprise resource planning (ERP) systems that are widely utilized in construction enterprises with the purpose of

contributing to assessing, planning, and conducting a project for introducing and establishing an ERP in an enterprise. In the research, the success factors of the ERP system are divided into two categories; the first category is user-related variables, including output, job relevance, image and result, demonstrability, compatibility, and system reliability. The second category is project-related variables, including internal support, function, and consultant support. It can be said that this research has a high level of completion in that it suggested a success model for construction ERP systems through extensive data collection and empirical analysis. Nevertheless, the success model suggested has limitations in its application to other types of IS because it was verified by focusing on ERP systems.

Hjelt, (2007) analyzed factors related to end-users' attitudes toward Electronic Document Management (EDM) systems that are used for large-scale construction projects. The research conducted a survey to draw factors that affect acceptance of an EDM system to a construction project. Technology Acceptance Model (TAM) (Davis, Bagozzis and Warshaw 1989). This study was thus founded on the recurrent constructs of antecedents and consequences of IS use developed in DeLone and McLean's IS success model (ISSM) (1992), later updated (2003), technology acceptance model (TAM). The ISSM incorporates information quality and system quality as antecedents of IS use, leading to individual IS impacts, that is, on users and their work (e.g., in regard to their effectiveness), and in turn to organizational impacts (e.g., in regard to business strategy and performance) Raymond, (2007).

While the TAM explains IS use in a similar manner by the system's perceived usefulness and perceived ease of use. Both the ISSM and the TAM offer widely accepted and validated representations and explanations of the IS use phenomenon. The success of IT reforms depends upon the capacity of the organization to change, to manage the change and to survive whilst changing (Peterson, 2008). Resistance to change may come from various stakeholders in the organization, such as individuals with vested interests who benefited from previous methods, civil servants who see it as a threat to their jobs and people who resist change simply for fear of the unknown. Technology acceptance model is relevant to the study as it shows how the success of various IT reforms depends upon the capacity of the organization to change, to manage the change and to survive whilst changing.

DeLone and McLean Information System Success Model (ISSM) (1992)

DeLone and McLean (1992), introduced the first IS success model which was based on Shannon and Weaver's, (1949) model of communication. DeLone and McLean's model present different features differentiated by the two essential concepts: system quality and information qualityby Urbach & Müller, (2011). The utilizing of the system has a clear impact on the way

individuals accomplish their performance. This impact may eventually effect on the organizational performance. It was among the first studies to impose some order in IS researchers' choices of success measures (Seddon, 1999). The model is based on theoretical and empirical research conducted by a number of researchers in the 1970's and 1980's. To construct the model, DeLone and McLean reviewed 100 papers containing empirical IS success measures published in seven publications during 1981-1987. They distilled the resulting huge range of Information system success measures into an integrated view of IS success, represented by the following the six dimensions: System Quality, Information Quality, Information Use, User Satisfaction, Individual Impact and Organizational Impact.

While the model integrates the comprehensive dependent variables used by IS researchers, it received several criticisms. Ten years later, DeLone and McLean presented an updated model reflecting the criticisms by other researchers and the situation at the time. As the service concept was added to IT with the use of the Internet, they increased the number of information system success factors to seven, including service quality, and analyzed the interdependence and correlation of these seven factors. It is relevant in a way that like actual system use, user satisfaction directly influences the net benefits provided by an information system. Satisfaction refers to the extent to which a user is pleased or contented with the information system, and is posited to be directly affected by system use. The net benefit that an information system is able to deliver is an important facet of the overall value of the system to its users or to the underlying organization by Urbach& Müller, (2011). In the IS success model, net system benefits are affected by system use and by user satisfaction with the system. In their own right, system benefits are posited to influence both user satisfaction and a user's intentions to use the system.

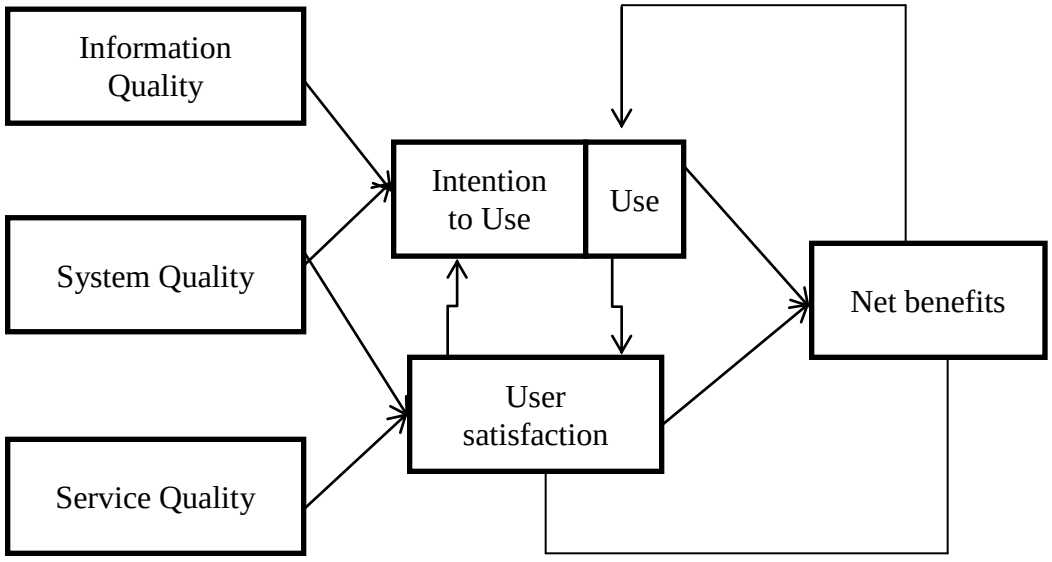

Figure 1 DeLone and McLean Information System Success Model

Quality Information Output

The pleasant of facts that has been used to make choice among other things in a venture can greatly have an effect on the outcome of the challenge; if incorrect/ inadequate statistics is generated it will lead to wrong decisions being made and therefore negatively affect the final results of the challenge. Project Management Information System should offer undertaking crew individuals with useful statistics that may be used in selection making by way of storing, preserving, processing and handling the facts resources (Lee, 2011). According to Swanson (1974, noted in Lee et al., 2011) the necessity of records generated by the Project Management Information System determines the fitness of the gadget itself. Zmud, (1979, cited in Lee et al., 2011) insists that accuracy and timeliness of the statistics are crucial determinants of facts excellent.

Lee, (2006) concludes crucial elements that determine the exceptional of statistics consist of capability to understand, accuracy, availability, particular, conciseness, consistency, interpretation and constancy. Managers can be beaten by means of the amount of records available for decision making which may also lead to them being blind to inaccuracies or dropping sight of relevant statistics hence main to terrible choice making. The use of Project Management Information System is fantastic because it gives relevant and correct data that can be required in the daily strolling of a task.

Information gives the intelligence for handling an undertaking. Information need to be processed so that selections can be made and performed with a high degree of warranty so that the consequences will make a contribution to the challenge's performance. In the venture making plans role, records presents the premise for producing project movement plans, schedules, community diagrams, projections, and different elements of making plans. Information is important to promote understanding; set up venture goals, dreams, and strategies; expand mechanisms for controls; communicate status; forecast destiny performance and sources; apprehend changes; and enhance project techniques. Matthews,(2004) argues that the assignment making plans function establishes a structure and a method for dealing with the statistics assets, which embody defining, structuring, and organizing venture data, waiting for its glide, reviewing statistics pleasant, controlling its use and supply, and offering a focus for the assignment's facts rules (Monch, 2007).

Notwithstanding the theoretical and practical importance of Project Management Information System to the project management field, there have been as of yet few studies on the actual use and impacts of these systems, thus highlighting the need to extend project management theory in relation to the developing practice in this regard (Raymond, 2007). Empirical studies of Project Management Information System have been mostly limited to

describing the demographics of project management software usage and to evaluating specific applications of these systems or software modules to support project management tasks such as planning, communicating and reporting, managing risks, scheduling, estimating costs, and managing documents.

Project management software usage has also been found to have many drawbacks and limitations, both in theory when compared to an ideal Project Management Information System by researchers and in practice as perceived by project managers. An IS-based conceptualization and definition of project management software facilitates the import of knowledge from the IS field or discipline, knowledge that can provide a deeper understanding of the Project Management Information System usage phenomenon and help in answering questions on the factors that explain the use and non-use of Project Management Information System, and on the actual impacts of these systems on project managers and project performance (Ahlemann, 2006).

Mwanzia, (2012) wrote about the construction of the Vice Presidents official residence in Karen that was completed 5 years outside the scheduled completion time and Kshs. 186 Million above the budgeted cost. In recent times, cases of collapsing buildings have been prevalent. Such cases of project failure were witnessed in Kasarani in February 2012 and in Mlolongo in May 2012 (Oyewobi, 2011). There are many stakeholders involved in property development with each having different interests. The ultimate goal in property development is the successful completion of these projects. Stakeholders include the government, developers, financiers, buyers, lessees, consultants, laborers, amongst others. Each party is affected by project failure in different ways. Property development as discussed earlier plays a pivotal role in a country's economy hence its importance.

Each one of the factors, that is, mission control, budget, experts and contractors has an effect on the successful finishing touch of belongings improvement initiatives. Little is referred to as to the volume to which each of those elements in my opinion influences the challenge completion. A quantity of studies have investigated factors which resource a success of entirety of tasks in particular people who have an effect on tasks success greater than others. Becerik, (2004) argued that the fee of bad fine (non-conformance), as measured on-website online has come out to be 10-20% of the total task cost. In an American perspective we observe that several commercial tasks, deviation costs averaged 12.Four% of the entire set up project price. The reasons of these quality troubles are attributed to design, 78%, and to construction at 17%. A look at in Indonesian production industry (Alwi, 2005) discovered that poor quality of labour skills contributed three.2% of the full venture prices.

Seddon & Kiew, (1994) also found indications in literature that information quality is an important determinant of satisfaction. According to (Raymond & Bergeron, 2008) quality of information output has a positive impact on the project manager, since the project manager will feel more professional at work if he or she has access to project information of high quality and uses the system more intensively and more extensively.

RESEARCH METHOD

Target population in statistics is the specific accessible population about which information is desired. According to Denscombe, (2008) a population is a well-defined or set of people, services, elements, and events, group of things or households that are being investigated. The study targeted a population of 95 respondents, who constitute of Resident engineers 12, Assistant Resident Engineers 15, Project Managers 13, Site Engineers 13, Project Supervisors 13 and Section Heads 29. This covered road construction companies currently in Bomet, Kericho and Narok counties. All construction projects are recorded by KeRRA headquarters, Nairobi. This study applied census inquiry due the small number of respondents at ninety five.

The Statistical Package for Social Sciences (SPSS) version 24 was used in the data processing. After data collection, the data was coded, organized and edited to remove any inconsistencies, repetitions or errors that may make the analysis difficult. The cleaned data collected, was analyzed using both descriptive and inferential statistics. Descriptive statistics included frequencies, percentages, charts and tables, while for inferential statistics; Multiple Regression Model was used for comparison of variables. Multiple regression model has the following assumptions; Linearity, Normality, autocorrelation and multicolinearity.

Qualitative data was first organized into themes, and then descriptive statistical method is used to explain the frequencies and percentages calculated from the data obtained in the field. The data was analyzed in the most logical and meaningful way and relevant comments made appropriately. Linear Regression model was used in analysis. Quantitative data was analyzed using descriptive statistics which included mean, standard deviation and frequency distribution. Considering the quantitative nature of the data, descriptive statistics which describes the main features of the data collected (frequency, percent, mean and standard deviation) was used. Tables and bar charts were used to summarize responses for further analysis and to facilitate comparison.

RESULTS AND DISCUSSION

Quality of Information Output

This study examined system integration in order to get an overview of responses.

Table 1 Distribution of Responses on Availability of Information Required For Projects

		Frequency	Percentage (%)
Valid	Strongly disagree	12	12.6
	Disagree	21	22.1
	Undecided	20	21.1
	Agree	28	29.5
	Strongly agree	14	14.7
	Total	**95**	**100.0**

Results shown in Table 1 indicate that 42(44.2%) positively agreed that system enhanced performance .Only 33(34.7%) were of negative response. This implies that I-PMIS enhances quality information output. This agrees with the findings by Mohammad and Saeed, (2016) and Fallah, (2010) in their study of effect of I-PMIS on project managers and project success and The Role of I-PMIS towards project performance respectively that the system avails information to project managers on planning, scheduling , financial, progress reports.

Results of Regression Analysis Assumptions

The study tests for multivariate assumptions which were; linearity, normality, autocorrelation, multicollinearity and homoscedasticity

Linearity Assumption Test

Linearity assumption was evaluated using scatter diagrams and residual plots.

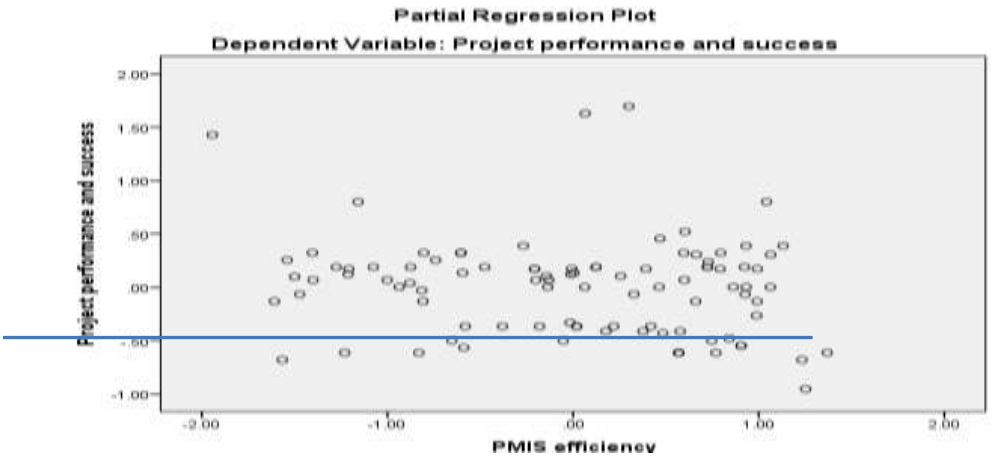

Figure 2 Scatter Plot Project Performance And I-PMIS Efficiency

From the scatter plot (from SPSS) followed a linear pattern above the indicating that there is a linear relationship between information output and project performance.

Homoscedasticity Assumption Test

This was tested by plotting the standardized residuals against the standardized predicted values of the dependent variable using Levene's test of equality of variances was conducted (Table 2).

Table 2 Levene's Test for Equality of Variances

Levene's Test for Equality of Variances		**F**	**Sig.**
Unstandardized Residual (equality of information output)	Equal variances assumed	2.086	.150

The findings in Table 2 indicate that all the four variables statistical significance level ($p>0.05$).Based on this results there was no heterostaticity problem on the data; therefore the homoscedasticity assumption was met.

Normality test

To find out whether residuals follow a normal probability distribution, histograms and normal probability plots were used. The results of graphical analysis are shown in Figure 3.

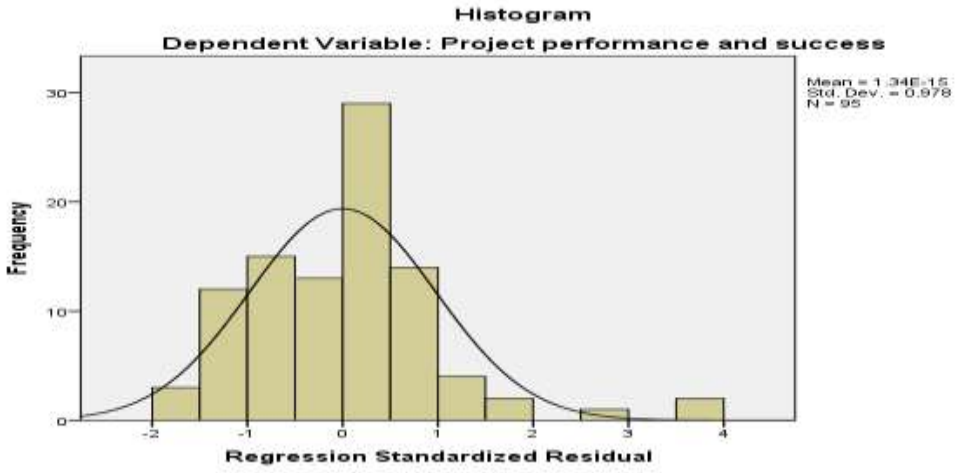

Figure 3 Histogram of Standardized Residual

The black line superimposed on the histogram represents the bell-shape normal curve. There's is symmetry of skewness; it is positively skewed distribution with score clustered to the right with the tail extending to the left as shown on Figure 3.

Normal probability plots were also used to test for normality assumption. The relevant results are shown in Figure 4.

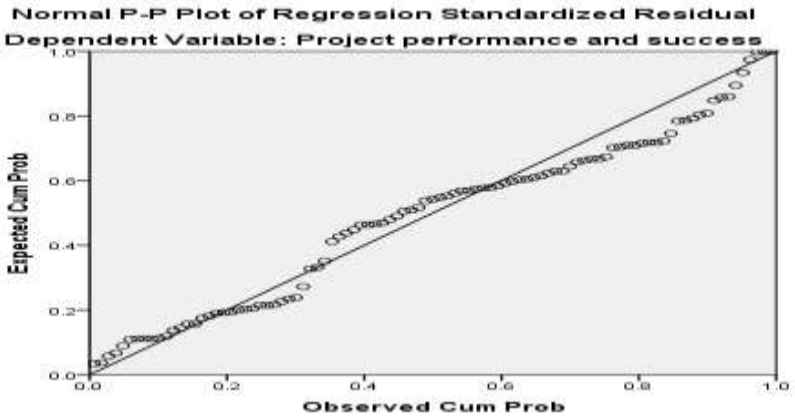

Figure 4 Normal P-P Plot

The findings indicate that points approximately form a straight line in the above Figure 4 shows how closely two data sets agree which plot the two cumulative distributions /probability evaluate skewers of distribution. Deviations from the straight line suggest departure from normality. They are closely related therefore normality test was therefore met on data.

Further, Kolmogorov-Smirnov and Shapiro-Wilk tests were also used. The results are shown in Table 4.

Table 4 Normality tests

	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	df	Sig.	Statistic	df	Sig.
Standardized Residual	.047	95	.071	.992	95	.093

a. Lilliefors Significance Correction

The findings indicate that….Any Kolmogorov-Smirnov value less than 0.035 is not normal. .071>.035 also value for Shapiro-Wilk less than 0.05 indicate non –normality 0.093>.05 therefore data is not different from normal and assumption is met.

Multicollinearity Test Assumption

The assumption of multicollinearity was tested using variance inflation factor and tolerance. The results are shown in Table 5.

Table 5 Collinearity Statistics

Model		Tolerance	VIF
1	(Constant)		
	Quality of information output	.724	1.382

The findings indicate that Quality of information output had variance inflation factor of 1.382, V.I.F < 10, this implies that evaluations of relative strength of predictor variables and their joint effect were reliable. Hence beta weights and R-squares were reliably interpreted.

Autocorrelation Test

Durbin-Watson statistic was used to test for autocorrelation. The value of the Durbin-Watson coefficient was 2.244. This implies that there was negative autocorrelation of error terms as the Durbin-Watson statistic was above 2. According to Garson (2012), this means that it was correct to assume independent observation as it is expected that the value of Durbin Watson statistic should be between 1.5 and 2.5 if the multiple regression model is to be correctly fitted to the data. Hence, the study assumed that residuals were independent.

Inferential Analysis

This section presents the results of correlation and multiple regression analysis in line with the specific objectives of this study. Correlation analysis involves examining the relationship between the dependent variable and independent variables. The influence of independent variables on the dependent variable is depicted in the multiple regression analysis sub-section.

Relationship between Quality of Information Output and Project Performance

The study also analyzed the relationship between quality of information output and project performance of construction companies in Kericho, Bomet and Narok counties. The correlation analysis results are presented in Table 6.

Table 6 Correlation between Quality of Information Output and Project Performance

		Project performance
quality of information output	Pearson Correlation	.383**
	Sig. (2-tailed)	.000
		95

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

As shown in Table 6, the relationship between n I-PMIS information quality and project performance as weak, positive and significant ($r = 0.383$; $p < 0.01$). This means that the more the incorporated risk quality systems the more their project performance improved and vice versa. This implies that the construction companies should enhance quality I-PMIS information outputin order to ensure that projects success is enhanced. These study findings are supported by TAM model and DeLone and Mclean ISSM models in this study. Technology Acceptance Model (TAM), theory consists of relevant constructs the I-PMIS quality information output as a success factor which ties to output, the kind of information and thus better performance.

Test of Hypothesis

In this study, a multiple regression analysis was conducted to test the influence among predictor variables and project performance. To determine the linear statistical relationship between the independent and dependent variables for this study, all the hypotheses were tested using the multiple regression models. For the hypothesis, the regression equation was first obtained using the B coefficients on the line of best fit. The decision rule was that if the p-value is less than conventional 0.05 the null hypothesis is rejected and when its above 0.05 we fail to reject the null hypothesis,

H_{01}: *There is no significant relationship between Quality of Information Output and performance of construction projects in South Rift construction companies, Kenya.*

From the study the independent variable (quality information output) was run to find out its causal effect on the dependent variable project performance. As shown in Table below.

Table 7 Model Summary Quality information output and project performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.141[a]	.20	.09	.67767

a. Predictors: (Constant), Quality information output

Table 7 illustrates the model summary used in this study. Adjusted R squared is coefficient determination of which tells us the variation in the dependent variables of the study due to changes in the independent variables, from the findings , the value of adjusted R squared was 0.2 and indication there was variation of 9 % on project performance due to changes in I-PMIS quality information output, R is correlation coefficient which shows the relationship between the

study variables R indicated a reasonable linear relationship between I-PMIS quality information output and project performance.

Table 8 ANOVA Quality information output and project performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.864	1	.864	1.881	.174[b]
	Residual	42.709	93	.459		
	Total	43.572	94			

a. Dependent Variable: Project performance and success

b. Predictors: (Constant), Quality information output

Table 8 illustrates the Analysis of Variance (ANOVA) which assesses the overall significance of the model. According to the table P>.05, (0.1740), indicating that the regression model was useful.

Table 9 Coefficients Quality Information Output and Project Performance

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.782	.264		14.351	.000
	Quality information output	-.115	.084	-.141	-1.371	.174

a. Dependent Variable: Project performance and success

From the data in the above Table 9 the established regression equation was $Y=3.782 -0.115X_{1.}$ From the above regression equation it was revealed that I-PMIS efficiency quality information output is statically significant in influencing the project performance with p- value less than 0.05 (0.000).Null hypothesis is rejected.

This concurs with findings by Shaddi and Fallah, (2010) who stated that with efficient PMIS organizations and project manager's crucial roles of planning proper scheduling, regulating and controlling the project assurance of project performance and success. Further findings of Phil A, (2017) accurate reliable source data is essential

CONCLUSION

The study concluded that use of I-PMIS is beneficial to construction companies, project managers, engineers. Improvement in productivity, efficiency and effectiveness in terms of; better planning, ease of information acquisition and dissemination, reliable data and

comprehensive data. Further, better forecasting in terms of; risk management, budget and schedule controls. Lastly on I-PMIS operator skills which is vital in integration and meeting project Programme and quality .These systems was found to have direct influence on cost, time quality and risk control management factors that define performing projects. The study concluded that integrated project management information systems efficiency make significant contribution to project performance and should continue to be subject of further research. The study recommends further research on a number of areas. First, the influence of I-PMIS user knowledge should be examined. Secondly, the influence web based integrated project management on performance of construction companies.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made: Construction companies in South Rift to achieve levels of efficiency and effectiveness in construction projects, the management of the company must ensure adoption of the use of integrated project management information system

That management of South Rift construction companies, to take cognizance of technical training on the I-PMIS software's this will ensure up to date proficiency and productive team; they should also acquire latest information systems infrastructure with web-based utility. This will enable them to benefit from uncorrelated I-PMIS attributes.

That management of South Rift construction companies should evaluate performance from the client's perspective, that is, evaluate if the impacts of the Project Management Information System on project outcomes provide an adequate solution to the client's problem, bring true advantages in terms of quality of product/services offered, greater output volume, quicker delivery, and provide tangible benefits such as increased sales and revenues.

REFERENCES

Ahlemann, F. (2009).Towards a conceptual reference model for project management information systems. International Journal of Project Management, 27(1), 19-30.

Amami, M., Beghini, G., & La Manna, M. (1993).Use of project-management information system for planning information-systems development projects. International Journal of Project Management, 11(1), 21-28

Besner, C., & Hobbs, B. (2012).An Empirical Identification of Project Management Toolsets and a Comparison among Project Types. Project Management Journal, 43(5), 24-46.

Bichanga, W. O., & Karani, S. R. (2012). Effects of Total Quality Management implementation on business performance in service institutions: A case of Kenya Wildlife Services. International Journal of Research Studies in Management, 1(1).

Brady, M. (2008). The Good Research Guide: For Small-Scale Social Research Projects Martyn Denscombe The Good Research Guide: For Small-Scale Social Research Projects Open University Press Edition:. Nurse Researcher, 15(2), 88-88.

Cavalieri, S., Terzi, S., & Macchi, M. (2007). A Benchmarking Service for the evaluation and comparison of scheduling techniques. Computers in Industry, 58(7), 656-666.

Cheung, S. O., Suen, H. C., & Cheung, K. K. (2004). PPMS: a Web-based construction Project Performance Monitoring System. Automation in Construction, 13(3), 361-376.

Cleland, D. I., & King, W. R. (n.d.).Project Owner Strategic Management of Projects. Project Management Handbook, 165-188.

Dang, C. N., Le-Hoai, L., & Lee, Y. (2012). Critical Success Factors of Large Design-Build Projects in Vietnam. Journal of Construction Engineering and Project Management, 2(3), 30-39.

Executive Project Management Structure and the Challenges Facing its Adoption in the Nigerian Construction Industry.(2013). International Journal of Architecture, Engineering and Construction, 2(3).

Fugar, F. D., &Agyakwah-Baah, A. B. (2010).Delays in Building Construction Projects in Ghana. Construction Economics and Building, 10(1-2), 103.

Gelbard, R., Pliskin, N., &Spiegler, I. (2002).Integrating system analysis and project management tools. International Journal of Project Management, 20(6), 461-468.

Hair, J. F. (2007). Research Methods for Business. New York, NY: Wiley 2007.

Hall, M., & Tomkins, C. (2001). A cost of quality analysis of a building project: towards a complete methodology for design and build. Construction Management and Economics, 19(7), 727-740.

Han, S. H., Kim, D. Y., Kim, H., & Jang, W. (2008).A web-based integrated system for international project risk management. Automation in Construction, 17(3), 342-356

Havelka, D., & Rajkumar, T. M. (2006).Using the Troubled Project Recovery Framework: Problem Recognition and Decision to Recover. e-Service Journal, 5(1), 43-73.

Herroelen, W. (2009).Project Scheduling-Theory and Practice. Production and Operations Management, 14(4), 413-432

Hillebrandt, P. M. (2000). Economic Theory and the Construction Industry.

Hillman, A. J., & Keim, G. D. (2001). Shareholder value, stakeholder management, and social issues: what's the bottom line? Strategic Management Journal, 22(2), 125-139.

Hjelt, M., &Björk, B. (2007). End-User Attitudes toward EDM Use in Construction Project Work: Case Study. Journal of Computing in Civil Engineering, 21(4), 289-300.

Iyer, K. C., & Banerjee, P. S. (2016). Measuring and benchmarking managerial efficiency of project execution schedule performance. International Journal of Project Management, 34(2), 219-236.

Kahura, M. N. (2013). The Role of Project Management Information Systems towards the Success of a Project: The Case of Construction Projects in Nairobi Kenya. International Journal of Academic Research in Business and Social Sciences, 3(9).

Karani, S. R., &Bichanga, W. O. (2012). Effects of Total Quality Management implementation on business performance in service institutions: A case of Kenya Wildlife Services. International Journal of Research Studies in Management, 1(1).

Khazanchi, D., & Reich, B. H. (2008). Achieving IT project success through control, measurement, managing expectations, and top management support. International Journal of Project Management, 26(7), 699.

Lategan, L., Lues, L., & Friedrich-Nel, H. (2011).Doing Research.

Lee, S., & Yu, J. (2011).Critical Success Factors for Project Management Information System in Construction. Journal of Construction Engineering and Project Management, 1(1), 25-30.

Liberatore, M., & Pollack-Johnson, B. (2003).Factors influencing the usage and selection of project management software. IEEE Transactions on Engineering Management, 50(2), 164-174.

Lind, A.D., Marchal, G.W., &Wathen, A.S. (2012).Statistical techniques in business & economics (15th Ed.). New York, USA: McGraw-Hill/IrwinLocke, E.A., & Latham, G.P (2006). New directions in goal-setting theory. RetrievedOctober 27, 2016,

Lunenburg, F.C. (2011). Goal-setting theory of motivation.International Journal of Management, Business, and Administration, 15(1), 1-6.

Lunsford, R.T., & Lunsford, R.B. (1995). The research sample, part 1: Sampling. Journal of Prosthetics and Orthotics, 7(3), 105-112.

Lupaşc, A. (2017). Project Management Information System Based on Web Technologies.

Martinelli, R. J., & Milosevic, D. Z. (2015).Project Management Toolbox.

Mönch, L. (2007). Simulation-based benchmarking of production control schemes for complex manufacturing systems. Control Engineering Practice, 15(11), 1381-1393.

Mudzana, T., &Maharaj, M. (2015).Measuring the success of business-intelligence systems in South Africa: An empirical investigation applying the DeLone and McLean Model. SA Journal of Information Management, 17(1).

Nel, D., Van Heerden, G., Chan, A., Ghazisaeedi, M., Halvorson, W., &Steyn, P. (2011). Eleven years of scholarly research in the Journal of Services Marketing. Journal of Services Marketing, 25(1), 4-13.

New Products, New Solutions: Making Portfolio Management More Effective. (2001). Journal of Product Innovation Management, 18(1), 52-53.

Ng, S., Palaneeswaran, E., & Kumaraswamy, M. M. (2002).A dynamic e-Reporting system for contractor's performance appraisal. Advances in Engineering Software, 33(6), 339-349.

Nitithamyong, P., & Skibniewski, M. J. (2004). Web-based construction project management systems: how to make them successful? Automation in Construction, 13(4), 491-506.

Oke, A. E., &Ugoje, O. F. (2013). Assessment of rework cost of selected building projects in Nigeria. International Journal of Quality & Reliability Management, 30(7), 799-810.

Pillai, A., Joshi, A., &Rao, K. (2002). Performance measurement of R&D projects in a multi-project, concurrent engineering environment. International Journal of Project Management, 20(2), 165-177.

Rajapakse, R. (2017). Construction Management. Construction Engineering Design Calculations and Rules of Thumb, 411-428.

Raymond, L., & Bergeron, F. (2008). Project management information systems: An empirical study of their impact on project managers and project success. International Journal of Project Management, 26(2), 213-220.

Riņģis, M., & Bērziša, S. (2016).Efficiency Measurement of Project Management Software Usage at State Social Insurance Agency. Information Technology and Management Science, 19(1).

Saurin, T. A. (2017). Removing Waste While Preserving Slack: The Lean and Complexity Perspectives. 25th Annual Conference of the International Group for Lean Construction.

Sibiya, M., Aigbavboa, C., &Thwala, W. (2015). Construction Projects' Key Performance Indicators: A Case of the South African Construction Industry. ICCREM 2015.

Software Project Management: Methods and Techniques. (2004). IEEE Transactions on Engineering Management, 51(3), 375-375.

Theory-Generating Methods.(2011). Statistics in Psychology Using R and SPSS, 471-519.

Tsai, C. (2014). Integrating Social Capital Theory, Social Cognitive Theory, and the Technology Acceptance Model to Explore a Behavioral Model of Telehealth Systems. International Journal of Environmental Research and Public Health, 11(5), 4905-4925.

Ugwu, O., & Haupt, T. (2007).Key performance indicators and assessment methods for infrastructure sustainability—a South African construction industry perspective. Building and Environment, 42(2), 665-680.

Urbach, N., & Müller, B. (2011).The Updated DeLone and McLean Model of Information Systems Success. Information Systems Theory, 1-18.

Wang, E. T., Chang, J. Y., Jiang, J. J., & Klein, G. (2011).User advocacy and information system project performance. International Journal of Project Management, 29(2), 146-154.

Wang, Y., & Liao, Y. (2008).Assessing eGovernment systems success: A validation of the DeLone and McLean model of information systems success. Government Information Quarterly, 25(4), 717-733.

Ward, R. (n.d.). Engineering management: past, present, and future. Technology Management : the New International Language.

Xiao, H., & Proverbs, D. (2012). An Investigation into Factors Influencing Construction Costs Based on Japanese, UK and US Contractor Practice. Australasian Journal of Construction Economics and Building, 2(2), 27.

Zarei, B., &Naeli, M. (n.d.). Critical Success Factors in Enterprise Resource Planning Implementation. Enterprise Information Systems and Advancing Business Solutions, 74-85.