

# PROJECT MANAGEMENT INFORMATION SYSTEM INTEGRATION AND PERFORMANCE OF PUBLIC SCHOOL CONSTRUCTION PROJECTS IN KAJIADO COUNTY

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**Abstract:** Globalization and global competition have put tremendous pressure on organizations, institutions, governments, and businesses in order to control cost, improve productivity, increase profits, to remain relevant and competitive in the rapidly changing environment due to the use of technology. The use of PMIS in project-based industries has helped to improve performance due to high quality decision-making in project management. Globally, project management processes have been continuously automated due to increasingly reliance on software applications. The main objective of the study is to investigate the influence of Project management Information System Integration on the performance of public-school construction projects in Kajiado County, Kenya. Specifically, the study sought to establish the influence of: PMIS capacity; PMIS stakeholder management; PMIS cost management; and PMIS monitoring on performance of public-school construction projects in Kajiado county. The study was underpinned by a number of theories including: Technology acceptance Theory, Stakeholders Theory, DeLone and McLean information Success Model and System Theory. The study used descriptive survey design and questionnaires were the main data collection instrument. The target population was 50 public school development projects in Kajiado County. A sample of 44 projects was used and the questionnaire was administered to project managers, project supervisors, and contractors. The study used both descriptive and inferential statistics. The response rate was 90.9% where 120 questionnaires were returned out of the 132 distributed. The descriptive statistics showed the independent variables to have some influence on performance of public-school construction projects in Kajiado county. The inferential statistics showed a positive correlation between PMIS capacity; PMIS stakeholder management; PMIS cost management; and PMIS monitoring and performance of projects. The regression results showed that all the independent variables (PMIS capacity; PMIS stakeholder management; PMIS cost management; and PMIS monitoring) had positive significant influence on performance of projects in Kajiado county. The independent variables explained 79.2% change in performance of construction projects in Kajiado County. The study recommends integration of PMIS in public-school construction project to help improve on performance. The study will be useful to the county government, engineers, contractors and even academic researchers.

**Keywords:** PMIS Integration, PMIS Capacity, PMIS stakeholder management, Performance of Construction Projects.

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## I. INTRODUCTION

Globalization and global competition have put tremendous pressure on organizations, institutions, governments, and businesses in order to control cost, improve productivity, increase profits, to remain relevant and competitive in the rapidly changing environment due to the use of technology. As for the organizations that engaged in projects, the performance of those projects is critical for their survival. Regardless the industry the projects are involved in, they all need to be managed, planned, monitored, evaluated and controlled. Thus, the organizations need to deliver the projects within budget, on time and as per agreed specifications [1]. Large amounts of resources are dedicated to projects during selection and designing however, it is crucial for the projects to be adequately managed in those organizations to ensure objectives are met. For example, the Athens Olympic Games was first estimated to cost 3 billion Euros and the finally cost was 12 billion Euros. The Boston Big Dig which was the central Artery Tunnel project had 275% cost overrun for the project to cost 11 billion US dollars in 2006 [1]. Information illiteracy and the digital divide have declined and as a result increased competition in local and international businesses. There is a paradigm shift as organizations try to come up with new strategies and techniques for capturing and maintaining market share. There is an increase in the adoption of Project Management Information Systems (PMIS) in industry-based projects including production, communications, construction, software development, and even defence [2]. In the information Technology industry (IT) 75% of large IT projects that are managed with the help of PMIS succeed while 75% of the same projects that are not managed with PMIS support failed. The use of PMIS may not be sufficient to ensure the success of project, but it is necessary for effective and efficient management of those projects and also help in decision making and thus, PMIS has a significant contribution to project management [3]. According to [2] PMIS is a special purpose IS that provides useful information to project managers and other project stakeholders to help them make effective and efficient decisions during project time. The use of PMIS in project-based industries has helped to improve performance due to high quality decision-making in project management. PMIS is defined as an IS that contains the tools and techniques used to collect, compile, and disseminate the results of project management processes [4]. The implementation of PMIS varies in each case depending on the scope, features and designs however, the Software program is an integral part of each application [5].

Globally, project management processes have been continuously automated due to increasingly reliance on software applications. [5] opine that, more emphasis is placed on data accuracy based on key performance indicators and reports produced. With the right application, it is easy to fulfil major project management responsibilities such as documentation of lessons learned. In the European, Middle East, and Africa (EMEA) regions, the project management software market has found intense competition with other software such as Oracle, Aconex, and Microsoft. The organization invests in complex and sophisticated programs in an effort to direct project management processes. The world's tallest building, Burji Khalifa, is an example of a project that branded solutions companies have provided for those projects [5]. In terms of the construction industry, major applications include Oracle Primavera P6, RIB TWO, Autodesk Constructware, Aconex, and Meridian Proliance [5]. According to [6] PMIS is one of the most widely used tools in Korea and Japan to support and improve communication and collaboration in construction projects. Korea's construction management manual clarifies the use of PMIS by construction managers employed by government agencies to manage information effectively using the web-based PMIS in the Korean construction industry. In England the construction industry uses a PMIS-based Active Service Provider (ASP) which is a special development of common construction projects and can be easily customized to suit specific construction projects [7]. African countries acknowledge the use of ICT as a critical component in management of projects. Thus, some African countries have developed policies and strategies to align the use of ICT with their national strategies and economic growth. For instance, in South Africa, construction companies use PMIS to improve responsiveness to their customers, strengthen partnerships in supply chain, improve decision making, reduce project completion time and cost, and improve on organizational flexibility[8]. To add on that, Enterprise Resource Planning (ERP) programs are used by construction companies in South Africa to improve decision-making skills, accountability, manage project completion time, and reduce project costs. Systems are designed to be integrated and automated in a number of business process organizations such as manufacturing, construction, financial management, and personnel [9].

## II. STATEMENT OF THE PROBLEM

The Kenya National Bureau of Statistics of 2012 reported that the construction industry contributed to 3.8% in 2008, 4.1% in 2009, 4.3% in 2010, and 4.1% in 2011 towards the Gross Domestic Product. Use of information systems in construction projects not only gives the companies competitive advantage but also enhances the effectiveness of the construction projects[10]. Project managers obliged to utilize tools that are useful in overcoming demanding situations that have tight budget regulations, uncontrollable timings, resources that are unpredictable, tasks that need to be prioritize, delays in

decision making, and lack of collaboration among project members doing given tasks [6]. According to a report from the ministry of public works there is poor documentation, poor decision making, poor project time management and cost management of construction projects with a good example being the Thika super highway that had a cost overrun of approximately Ksh 4 billion. Project managers need accurate and timely information in order to manage the project. For project planning, stakeholders' management, and project monitoring and evaluation to be effective, accurate and timely information is necessary. Thus, integrating PMIS in construction will help improve performance of projects [6]. According to Kajiado county progress report of 2021, many of the school projects are faced with many challenges in technical capacity in dealing with projects, poor project governance and leadership, lack of stakeholder participation, poor information quality produced during project implementation, poor report and communication, lack of stakeholder ownership and commitment leading to project failure, coupled by poor project design, planning, implementation, monitoring and action taken. Various studies have been done on PMIS and performance in Kenya and across the globe. [6] studied the influence of PMIS user knowledge on performance of construction projects in South Rift, Kenya. Thought the studies are important they did not address the issue understudy. Thus, this study seeks to fill the gap by focusing on PMIS integration public-school construction projects in Kajiado County.

#### **A. General Objective**

To investigate the influence of Project management Information System Integration on the performance of public-school construction projects in Kajiado County, Kenya.

#### **B. Specific Objectives**

The following specific objective guided the study:

- 1) To examine the influence of PMIS capacity on the performance of public-school construction projects in Kajiado County.
- 2) To determine the influence of PMIS Stakeholder management on the performance of public-school construction projects in Kajiado County.

### **III. THEORETICAL REVIEW**

In this study, the theoretical framework included the principles and models that underpin it. They include: Technology acceptance Theory and Stakeholders Theory. The Technology Acceptance Model was introduced by F. Davis in 1989 [11]. The model proposed that ease of use and usability can be used to predict how people react to technology and, thus, affect behavioural intent as well as systems at large. It affected how users interact and relate to the system. Usefulness is defined as the degree to which a person believes that a given IS will help enhance job performance or ease the work done [12]. An information system (IS) would be successful only if both PU and PEOU are achieved in a given system [13]. This theory stated that the use of PMIS was determined by the intention to use the system, where the intention of use was jointly determined by an individual's attitude towards using the system and its perceived usefulness was determined [14]. As per theory, PMIS gives project managers the opportunity to enhance the performance of the projects they are undertaking and this has a direct impact on the success of the project. In this study, this principle focused on the adoption of PMIS for project success and enhancing project quality. A good PMIS quality would enhance the quality of information and subsequently influence project decision making. This theory was useful in explaining the variables of PMIS capability and its impact on the performance of construction projects.

Stakeholders Theory was developed by Professor Edward Freeman [15]. Stakeholder theory is a managerial concept of organizational strategy and ethics [15],[16]. The central idea was that an organization's success in its project initiatives depends on how well it managed relationships with key groups such as customers, employees, suppliers, communities, financiers, and others that serve its purpose. Stakeholder involvement refers to the act of engaging in various aspects and phases of the project or program management cycle through material contribution and mentorship [16]. Stakeholder participation included the process or activity of informing the public and inviting them for input in decisions that affect them. While minor options and emergency situations were generally not suitable for stakeholder participation, complex situations with far-reaching implications warranted stakeholder participation and, when done proactively in response to a problem, helped avoid problems in the future. The focus of public participation was usually to share information and gather input with members or other stakeholders who may be interested in a project [17]. This theory was useful in explaining how PMIS stakeholders' management influences the performance of construction projects.

#### IV. CONCEPTUAL FRAMEWORK

This study's conceptual framework sought to demonstrate the relationship between PMIS integration and Performance of public-school construction projects in Kajiado County, Kenya. The conceptual framework is illustrated in figure I below.

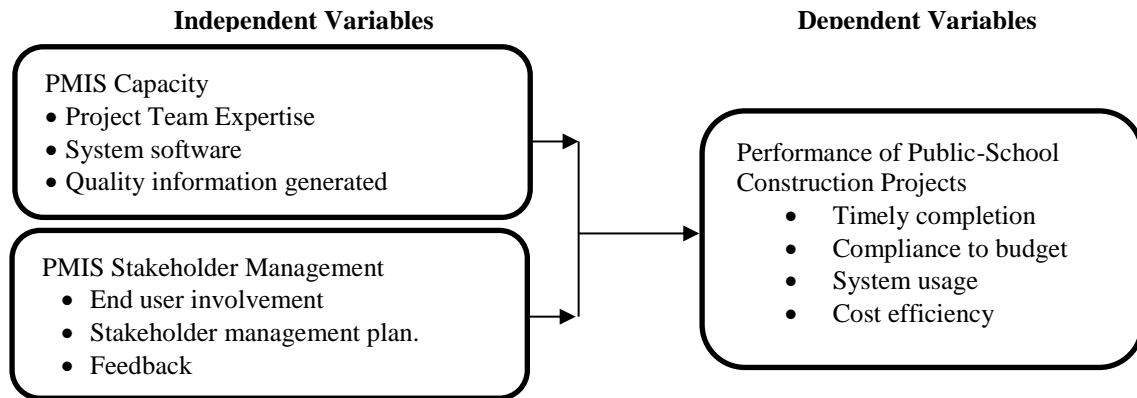


Figure I: The Conceptual Framework

##### A. PMIS Capacity

The quality of the PMIS software significantly affected how individuals accept the system, the efficiency as well as the effectiveness of its organizational performance. A system that is assumed to be easy to use and learn will with no doubt produce information that is relevant to the project. For the acceptance of any IS, system software quality and the information quality are key determinants. Project management software that are powerful have become a prerequisite in managing projects more effectively and efficiently as they assist project managers in the important function of decision making [18]. The opportunity to use a PMIS is significantly affected by the quality of information generated by the PMIS. PMIS quality information output gives the advantage to project manager as a professional. Projects managers are willing to embrace the use of PMIS on the basis of the quality of information generated and are likely to use the software provided it gives appropriate project details fitting the project work requirements [19]. PMIS provides basic information about the project cost, time, and their relationships to the project managers. PMIS is beneficial to project managers as it ensures timely decision making and ensures project success. Project managers are able to estimate project costs, budget, and profits using PMIS. PMIS is useful in collecting financial and non-financial information, materials management, and storage information [20]. In a study by [10] on influence of PMIS adoption on construction project performance in Nairobi County, the system quality and use significantly affected construction project performance despite the project specifications, time, and budget. According to [1] PMIS is measured by establishing the degree of various systems functionality and associated tools. The function tools include: reporting, evaluation, monitoring, planning, and controlling which all contribute to system use. The quality of information generated by a PMIS determined the quality of the system. This is because the PMIS provided useful information to the project team to assist in decision making.

##### B. PMIS Stakeholder Management

Project success was directly related to the value created by the project as perceived by the stakeholders and how they relate with the project team. Appropriate involvement of project stakeholders helped significantly in contributing to project success. Thus, the project manager ought to carefully monitor the stakeholder's relationship and ensure their participation in the project political environment. Attention should be accorded to project stakeholder management to ensure there is honest, meaningful and productive engagement to minimize the threat posed by these stakeholders. Through stakeholder analysis, those who may not be obvious but there is a moral obligation to be involved and included in the engagement strategy were identified and involved. Stakeholder's impact must be continuously monitored to ensure project success whilst the project manager should be influential to attempt the stakeholders to support the project [21]. According to [13] the design and development of a PMIS is driven by the information requirements of all project stakeholders. The PMIS provides the framework for collecting information that is needed for planning, organizing evaluating and controlling the resources used in the project. [22] identify the factors related to information quality including: accuracy, timeliness,

reliability, availability, and relevance. User satisfaction is the result evaluating of the outcomes of individual undertaking in a continuum of being pleasant or unpleasant.[19] explain that studies used the factors identified by [22] to measure the degree of user satisfaction with a given system's performance found that information quality greatly affected the use of the PMIS. According to [23] project scheduling forms the basis for control of the project and was communicated to the various stakeholders to ensure continuous measurement. The software scheduling tools in a PMIS were an essential component to allow efficient and quick performance of the scheduling function since it is very rare that project success is not influenced by project schedule.

### ***C. Performance of Public-School Construction Projects***

[24] opined that project performance is a comprehensive collection of: attainment of project objectives; flexible and easy management of projects in terms of planning, controlling, scheduling and communication; timeliness; cost alignment to the estimated budget; integration of stakeholders and implementation of all activities in harmony; and high yields of anticipated benefits. Project performance is a major concern for clients in both public and private sectors. For project success to be attained, a well-planned project schedule and understanding of the key success factors is required to help the project manager and the project stakeholders in taking the right decisions towards achieving project success. Project performance is helpful to project managers in tracking and monitoring the schedule that related to the overall performance of the project. Project performance is perceived in the areas related to cost, earned value, efforts and profitability [25]. According to [1] a project can be successful if the objectives attained though it fails in integration of considerations such as cost, time management demands and manpower that were required before the project became successful. Thus, besides considering or seeing a project as successful, it is crucial to consider the other project management factors and integration of the considerations to form one attribute for each and every project. The comprehensive attribute is project performance in the perspective of project manager, project controller, project implementer, and the project planner. Construction projects need a tool for complex project and thus, PMIS has just become a very essential tool for contemporary 21st century project managers to ensure minimal delays, disappointments, and losses resulting from projects that are redundant [24].

## **V. RESEARCH METHODOLOGY**

This study used descriptive survey study design. Descriptive research is guided by research questions and focuses on the frequency with which something occurs or the relationship between variables. The descriptive research helped to probe specific aspects of study variables by collecting the information of a set of parameters known beforehand that was desirable to collect data about [25]. Since the study focused on government projects specifically in the last 10 fiscal years, this study was applicable. The population for this study included 50 public school development projects undertaken by the county government, NG-CDF, and Ministry of Education in Kajiado in the last 10 fiscal years i.e., from 2013-2022. The respondents of the study were project managers (44), contractors (44), and project supervisors (44). Thus, a total of 132 respondents were administered with questionnaires. A sample of 44 projects was used for the study. The research data was collected by the use of primary data. Primary data was collected through questionnaires using a nominal scale. Most of the questions are structured on an agreement continuum using a 5-point Likert-type scale

## **VI. RESEARCH FINDINGS AND DISCUSSION**

### ***A. Response Rate***

A sample of 132 was administered with questionnaire for the study. Out of the 132 respondents 120 were returned giving a response rate of 90.9%. According to [26] it's sufficient to give reliable results.

### ***B. Descriptive Statistics***

With the help of SPSS (26) the study analysed the descriptive statistics which include frequencies, percentages, measure of central dispersion, and measure of central tendency of the study variables. The 5 point Likert Scale was used where; 1-strongly disagree (SD), 2-disagree (D), 3-Neutral (N), 4-agree (A), 5-strongly agree (SA). The results per variable are as shown below.

#### ***i. Performance of Public-school Construction Projects***

The main objective of the study was to investigate the influence of Project Management Information System Integration on the performance of public-school construction projects in Kajiado County, Kenya. The descriptive statistics in Table I below show the status of performance of construction projects in Kajiado County.

**TABLE I: PERFORMANCE OF PUBLIC-SCHOOL CONSTRUCTION PROJECTS**

Item	Mean	Std Dev.
PMIS has helped improve the quality of decisions made.	3.27	1.280
PMIS has helped to ensure project meet deadlines.	3.73	1.100
With the help of PMIS the project specifications are easily developed	3.40	1.298
PMIS has helped ensure there is client satisfaction.	3.27	.884
PMIS has ensured adherence to project budget.	3.80	1.014
The projects are of high quality.	3.47	1.125
PMIS has ensured reduction of cost.	4.07	1.486
<b>Average Performance of Public-School Construction Projects</b>	<b>3.57</b>	<b>1.169</b>

The respondents moderately agreed that PMIS has helped improve the quality of decisions made (Mean = 3.27, Std dev = 1.280). PMIS is beneficial to project managers as it ensures timely decision making and ensures project success [20]. However, respondents agreed that PMIS has helped to ensure project meet deadlines (Mean = 3.73, Std dev = 1.100). According to [6] in South Rift Kenya, many construction companies use computerized Material management systems (MMS) to filter, compile and generate material demand reports, supplier assessments, and asset management. Therefore, companies using these systems have a competitive advantage and improve the efficiency of construction projects. There was a moderate agreement that with the help of PMIS the project specifications are easily developed (Mean = 3.40, Std dev = 1.298). In a study by [10] on influence of PMIS adoption on construction project performance in Nairobi County, the system quality and use significantly affected construction project performance despite the project specifications, time, and budget. Respondents moderately agreed that PMIS has helped ensured client satisfaction (Mean = 3.27, Std dev = .884). In South Africa, construction companies use PMIS to improve responsiveness to their customers, strengthen partnerships in supply chain, improve decision making, reduce project completion time and cost, and improve on organizational flexibility [8].

Respondents also agreed that PMIS has helped ensured adherence to project budget (Mean = 3.80, Std dev = 1.014). Project managers are able to estimate project costs, budget, and profits using PMIS. PMIS is useful in collecting financial and non-financial information, materials management time, and reduce project costs. In Tanzania, organizations use PMIS as repository too for project information to ensure its availability to project stakeholders, enhance budgetary control, and assist in meeting deadlines [27], and storage information [20]. There was a moderate agreement that the projects are of high quality (Mean = 3.47, Std dev = 1.125). Finally, the respondents agreed that PMIS had ensured reduction of cost (Mean = 4.07, Std dev = 1.486). Sibiya et al (2015) posit that, ERP programs are used by construction companies in South Africa to improve decision-making skills, accountability, manage project completion. The average Performance of Public-school Construction Projects was 3.57 and a standard deviation of 1.169. Thus, there was a general moderate agreement that PMIS integration to some extent influenced performance of public-school construction projects in Kajiado County. According to [2] PMIS is a special purpose IS that provides useful information to project managers and other project stakeholders to help them make effective and efficient decisions during project time. The use of PMIS in project-based industries has helped to improve performance due to high quality decision-making in project management. PMIS provides important information to the project team so that they have a common understanding of project facts and is actually a cheap way to gather important and valuable information for the project.

**ii. PMIS Capacity**

The first specific objective of the study was to examine the influence of PMIS capacity on the performance of public-school construction projects in Kajiado County. Table II below shows the descriptive results.

**TABLE II: PMIS CAPACITY**

Item	Mean	Std Dev.
PMIS generates timely quality information	3.80	1.014
PMIS generates relevant information	3.60	1.121
Accurate information is generated	3.93	1.335
The PMIS software is adaptable	3.80	1.114
PMIS has ensured information is available throughout the project	3.80	1.320
PMIS is user friendly	3.67	.900
The project team are well trained in using the PMIS	3.13	1.457
The project team have the necessary skills needed to use the PMIS in their daily project activities.	3.00	1.414
<b>Average PMIS Capacity</b>	<b>3.59</b>	<b>0.929</b>

Respondents agreed that PMIS generates timely quality information (Mean = 3.80, Std dev = 1.014). [18] posit that for the acceptance of any IS, system software quality and the information quality are key determinants. The opportunity to use a PMIS is significantly affected by the quality of information generated by the PMIS. Further, [19] add that Projects managers are willing to embrace the use of PMIS on the basis of the quality of information generated and are likely to use the software provided it gives appropriate project details fitting the project work requirements. However, there was a moderate agreement that PMIS generates relevant information (Mean = 3.60, Std dev = 1.121). [18] opine that the quality of the PMIS software significantly affects how individuals accept the system, the efficiency as well as the effectiveness of its organizational performance. A system that is assumed to be easy to use and learn will with no doubt produce information that is relevant to the project. Respondents agreed that accurate information is generated by PMIS (Mean = 3.93, Std dev = 1.335). According to Lee et al (2011) the quality of information generated by a PMIS determines the quality of the system. This is because the PMIS provides useful information to the project team to assist in decision making. Further, the respondents agreed that the PMIS software is adaptable (Mean = 3.80, Std dev = 1.114). According to [1] PMIS is measured by establishing the degree of various systems functionality and associated tools. The function tools include: reporting, evaluation, monitoring, planning, and controlling which all contribute to system use. To add on that, respondents also agreed that PMIS has ensured information is available throughout the project (Mean = 3.80, Std dev = 1.320). Though respondents moderately agreed that PMIS was user friendly (Mean = 3.67, Std dev = .900). The system's ease of use, flexibility, response time, learning ease and system integration play an important role in producing quality information, as perceived by the project team [1].

Respondent moderately agreed that the project team are well trained in using the PMIS (Mean = 3.13, Std dev = 1.457). In relation to the same, the respondents moderately agreed that the project team has the necessary skills needed to use the PMIS in their daily project activities (Mean = 3.00, Std dev = 1.414). [28] argue that, much of the PMIS involves the application of ICT knowledge; personnel who do not have formal ICT training would not be very effective in implementing the system. Hence training and re-skilling managers and other administrators in ICT facilities are paramount for an effective PMIS application (Munene, Namusonge, & Iravo, 2014)[28]. The average Mean of 3.59 on PMIS Capacity indicated a moderate agreement that to some extent PMIS Capacity influenced performance of public-school construction projects in Kajiado County. [22] identify the factors related to information quality including: accuracy, timeliness, reliability, availability, and relevance. User satisfaction is the result evaluating of the outcomes of individual undertaking in a continuum of being pleasant or unpleasant. [19] explain that studies used the factors identified by [22] to measure the degree of user satisfaction with a given system's performance found that information quality greatly affected the use of the PMIS.

### iii. PMIS Stakeholder Management

The second specific objective of the study was to determine how PMIS Stakeholder management affects performance of public-school construction projects in Kajiado County. The results from the descriptive statistics are as in Table III below.

**TABLE III: STAKEHOLDER MANAGEMENT**

Item	Mean	Std Dev.
Project stakeholders are involved in implementation of the PMIS	3.07	1.387
PMIS has helped to ensure timely communication of project status	3.00	.926
The PMIS has been useful in identifying the stakeholders and their interest.	3.87	1.552
With the use of PMIS the stakeholder is always available as and when needed.	4.07	1.335
The PMIS has played a great deal in ensuring the stakeholder management plan is readily available.	4.13	1.356
The PMIS provides relevant feedback on the project status to project stakeholders.	4.07	1.486
The PMIS provides a platform where all stakeholders can provide their feedback on the status of the project.	3.53	1.302
<b>Average Stakeholder Management</b>	<b>3.68</b>	<b>1.363</b>

The respondents moderately agreed that project stakeholders are involved in implementation of the PMIS (Mean = 3.07, Std dev = 1.378). According to [19], though the project manager and project team are the primary users of the system, other stakeholders need to be considered including customers, senior management, and functional managers. Further, there was a moderate agreement from respondents that PMIS has helped to ensure timely communication of project status (Mean = 3.00, Std dev = 0.926). The PMIS provides the framework for collecting the information needed for managing the project,

organizing the project background information, efficient interchange of information, processing and sorting the project information [19]. However, the respondents agreed that the PMIS has been useful in identifying the stakeholders and their interest (Mean = 3.87, Std dev = 1.552). According to [13] PMIS used in construction are of three categories: self-developed and used in construction firms; specialized systems used in capital projects; and system based on ASP. Information has been emphasized to enhance communication while efficient management of construction information has emerged as an element that determines success of project. The information requirements for project stakeholders are the major factor that drives the development and design of the PMIS in terms of content and requirements. The design and development of a PMIS is driven by the information requirements of all project stakeholders [13].

Further, the with the use of PMIS the stakeholder are always available as and when needed (Mean = 4.07, Std dev = 1.335). Respondents also agreed that the PMIS has played a great deal in ensuring the stakeholder management plan is readily available (Mean = 4.13, Std dev = 1.356). In addition to that the respondents also agreed that the PMIS provides relevant feedback on the project status to project stakeholders (Mean = 4.07, Std dev = 1.486). Finally, the respondents moderately agreed that the PMIS provides a platform where all stakeholders can provide their feedback on the status of the project (Mean = 3.53, Std dev = 1.302). Average Stakeholder Management (3.68) indicates respondents' agreement that the Stakeholder Management influences performance of public-school construction project in Kajiado County. According to [23] project scheduling forms the basis for control of the project and is communicated to the various stakeholders to ensure continuous measurement. The software scheduling tools in a PMIS are an essential component to allow efficient and quick performance of the scheduling function since it is very rare that project success is not influenced by project schedule. According to [21] project success is directly related to the value created by the project as perceived by the stakeholders and how they relate with the project team. Appropriate involvement of project stakeholders helps significantly in contributing to project success. Thus, the project manager ought to carefully monitor the stakeholder's relationship and ensure their participation in the project political environment.

**C. Inferential Statistics**

Inferential statistics in the current study focused on Correlation, Analysis of Variance (ANOVA) and regression analysis.

**i). Correlation Test**

Correlation analysis was used to determine the magnitude, significance, and direction of the relationship. Pearson correlation analysis (r) was used to determine the strength of association between independent variables (PMIS Capacity, PMIS Stakeholder Management, PMIS Cost Management, and PMIS Monitoring) and the dependent variable (Public-school Construction Project Performance). Pearson correlation coefficient range between zero and one, where by the strength of association increase with increase in the value of the correlation coefficients. A negative correlation indicates an inverse relationship where an increase in one variable decreases the other while a positive correlation indicates a direct relationship where an increase in one variable increases the other [26]. Table IV below shows the results.

**TABLE IV: CORRELATION MATRIX**

		Correlations				
		Public School Project Performance	PMIS Capacity	PMIS Stakeholder Mgt	PMIS Mgt	PMIS Cost Monitoring
Public School Project Performance	Pearson Correlation	1	.298*	.773**	.426*	.685**
	Sig. (2-tailed)		.028	.001	.011	.005
	N	120	120	120	120	120

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

PMIS Capacity (r = .298, P-value = .028) the variable had a weak correlation with public-school construction project performance as the r (.298) nears zero. However, the relationship was significant as the P-value = .028 < 0.05. Further, PMIS Capacity was directly related to public-school construction project performance and thus, a unit increase in PMIS Capacity will lead to an increase in project performance too. [29] in their study of the effect of PMIS attributes on performance of ICT projects in Nairobi City County found that PMIS quality software significantly affects the performance of ICT projects. Information and service quality have a significant relationship with system effectiveness. Information quality has a great effect on the project success. [22] in their model of information success showed that user satisfaction as the mostly widely used measure of information system success. PMIS Stakeholder Management (r=. 773, P-value = .001)



the variable had a strong correlation with public-school construction project performance as the  $r (.773)$  approaches 1. The relationship was also significant as the  $P\text{-value} = .001 < 0.05$ . Further, PMIS Stakeholder Management was directly related to project performance and thus, a unit increase in PMIS Stakeholder Management would lead to an increase in public-school construction project performance too. [30] in the study of the use of PMIS in the monitoring of projects accurate and timely report of projects is crucial to ensure project success.

**ii). ANOVA**

The ANOVA was used to determine whether the model was a good fit for the data. The  $p\text{-value}$  of the  $F\text{-ratio}$  generated should be less than 0.05 for the equation to be statistically significant at 5% level of significance. If the  $p$  value is greater than that, then the equation is not statistically significant. For the individual variables,  $p$  values of coefficient generated in the regression analysis must be less than 0.05 for their relationship to be concluded significant at 5% level of significance. Table V below shows the results.

**TABLE V: ANOVA TEST**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	138.472	4	34.618	9.505	.002 <sup>b</sup>
	Residual	418.83	115	3.642		
	Total	557.302	119			

a. Dependent Variable: Performance of construction projects

b. Predictors: (Constant), PMIS Capacity, PMIS Stakeholder Management, PMIS Cost Management, and PMIS Monitoring.

At least one of the predictor variables in: PMIS Capacity, PMIS Stakeholder Management, PMIS Cost Management, and PMIS Monitoring is significant and fit to estimate or explain Performance of public-school construction projects. From Table V above the  $F\text{-Statistics} (4, 115) = 9.505$   $p\text{-value} = 0.00 < 0.05$ . The  $F\text{-Critical} (4, 115) = 2.451$ .  $F\text{-Statistics} (9.505) > F\text{-Critical} (2.451)$  this implies that at least one of the predictor variables in: (PMIS Capacity, PMIS Stakeholder Management, PMIS Cost Management, and PMIS Monitoring) is fit and significant to explain the change in Performance of public-school construction projects in Kajiado.

**iii). Regression Analysis**

Multiple regression analysis was preferred for this study because the dependent variable was used to test significance of the independent variables.

**a) Model Summary**

The model for the study was summarized as shown in Table VI below.

**TABLE VI: MODEL SUMMARY**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.890 <sup>a</sup>	.792	.708	.20616

From Table VI above the coefficient for determination ( $R^2$ ) is 0.792 or 79.2%. The Pearson coefficient ( $r$ ) explains the relationship between the independent variable and the dependent variable (0.89). Thus, PMIS integration (PMIS Capacity, PMIS Stakeholder Management, PMIS Cost Management, and PMIS Monitoring) can explain 79.2% Performance of construction projects in Kajiado County.

**b) Regression Results**

**TABLE VII: REGRESSION RESULTS**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.595	.416		3.830	.003
PMIS Capacity (PMIC)	.041	.079	.089	.524	.012
PMIS Stakeholder Management (PMISM)	.312	.095	.812	3.269	.008

a. Dependent Variable: Performance of public-school construction projects

From Table above PMIS Capacity p-value (0.012) and PMIS Stakeholder Management p-value (0.008). All the predictor variables had their p-values less than the threshold of 0.05 this implies that they are significant in the model. The beta coefficients of the variables were: PMIS Capacity ( $\beta = 0.041$ ) and the value of the constant is 1.595.

From the table above, PMIS Capacity influence performance of project by 0.089 and PMIS Stakeholder Management by 0.812. From this, PMIS Stakeholder Management had the highest influence on construction project performance followed by PMIS Capacity while PMIS Monitoring.

## VII. CONCLUSION

PMIS Capacity significantly influenced Performance of public-school construction projects. The quality of the PMIS software significantly affected how individuals accept the system, the efficiency as well as the effectiveness of its organizational performance. A system that is assumed to be easy to use and learn will with no doubt produce information that is relevant to the project. The acceptance of any IS, system software quality and the information quality are key determinants. Project management software that are powerful have become a prerequisite in managing projects more effectively and efficiently as they assist project managers in the important function of decision making. PMIS Stakeholder Management significantly influenced performance of public-school construction projects. Project success was directly related to the value created by the project as perceived by the stakeholders and how they relate with the project team. Appropriate involvement of project stakeholders helped in significantly contributing to project success. Attention should be accorded to project stakeholder management to ensure there is honest, meaningful and productive engagement to minimize the threat posed by these stakeholders. Through stakeholder analysis, those stakeholders who are not obvious but there is a moral obligation to be involved and included in the engagement strategy are identified and involved. Stakeholders' impact must be continuously monitored to ensure project success whilst the project manager should be influential to attempt the stakeholders to support the project.

The use of PMIS is on the belief that the benefits exceed the cost with widening of the scope, to manage not only individual projects but portfolios. PMIS have become comprehensive systems that support project portfolios, project programs, and the entire project life cycle. A good PMIS forms an integral part of an organization approach to help manage construction costs by providing information about quality costs. It does this by collecting, measuring, and analysing quality. A PMIS with quality costing provides the project team and other stakeholders with information relating to quality failures as well as the activities that need redesigning to ensure such do not reoccur in future. The study recommends the integration of PMIS in public-school construction project to get important information to the project team so that they have a common understanding of project facts and is actually a cheap way to gather important and valuable information for the project. The county government should train, upskill and sensitize its staff on the use of PMIS for the management of public-school construction projects. Developers and content creators should make intuitive system to promote adoption and ease of integration in to already existing systems in the public-school construction management industry

## REFERENCES

- [1] Raymond, L., & Bergeron, F. (2018). 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. doi:10.1016/j.ijproman.2007.06.002
- [2] Park, S., Lee, A., & Kim, S. (2021). Examining the PMIS Impacts on the Project performance, user satisfaction and reuse intention among the project based industries. *Journal of the society of Korea Industrial and Systems Engineering*, 44(3), 276-287.
- [3] Hasan, Y., Shamsuddin, A., & Aziati, N. (2013). The Impact of Management Information Systems adoption in Managerial Decision Making: A review. *The International Scientific Journal of Management Information Systems*, 8(4), 10-17.
- [4] PMI. (2017). *A Guide to the Project Management Body of Knowledge (6th ed.)*. Newtown Square, Pennsylvania: Project Management Institute.
- [5] Ilyas, M. A., Hassan, M. K., & Ilyas, M. U. (2013). PMIS: boon or bane? Paper presented at PMI. Global Congress 2013—EMEA. Istanbul, Turkey: Newtown Square, PA: Project Management Institute.
- [6] Bor, K. E., & Chepnoen, K. E. (2018). Influenc eof PMIS user knowledge on performance of construction projects in South Rift KEnya. *International Journal of Economics, Commerce and Management*, VI(5), 311-329..
- [7] Borštinar, i. K., Kobal, V., & Ilijaš, T. (2013). Impacts of implementation of project management information system in a small R&D company. A case study. *ResearchGate*, 1-9.

- [8] Owino, F., Keraro, N., & Wanjiku, B. (2015). Factors that influence the performance of ICT projects in Kenya. *International Journal of Innovative Social Sciences & Humanities Research*, 3(2), 127-135..
- [9] Sibiya, M., Aigbavboa, C., & Thwala, W. (2015). Construction Projects' Key Performance Indicators: A Case of the South African Construction Industry. *ICCREM 2015*..
- [10] Ogero, D. K. (2015). Influence of PMIS on project performance in the construction industry: A case of Nairobi County, Kenya. M.A.thesis in Project planning and management, University of Nairobi..
- [11] Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance. *MIS Quarterly*, 319-340.
- [12] Al-Emran, M. (2018). Technology Acceptance Model in M-learning context: A systematic review. *Computers & Education*, 125, 389-4112..
- [13] Al-Mamary, Y. H., Shamsuddin, A., & AbdulHamid, N. A. (2013). MIS adoption and managerial decision-making. *Management Information Systems*, 8(4), 10-17..
- [14] Nguyen, T. D., Nguyen, T. M., & Cao, T. H. (2016). A conceptual framework for IS project. In *International Conference on Context-Aware Systems and Applications*, 142-154..
- [15] Freeman, R. E. (1984). *Strategic Management: A Stakeholder Approach*. New York:NY: Harpercollins College Div..
- [16] Freeman, E., Harrison, Wicks, Paramar, & Colle, D. (2011). *Stakeholder Theory, the state of the art*. Cambridge University Press..
- [17] Donald, T., & Preston, L. (1995). The Stakeholder Theory of the Corporation: Concepts, Evidence and Implications. *Academy of Management Review*, 20, 66-67.
- [18] Ngari, C. W., & Ndiritu, A. (2017). Influence of project management information systems attributes on project performance: A case of youth polytechnic development projects in Embu County, Kenya. *International Academic Journal of Information Sciences and Project Management*, 2(2), 135-152.
- [19] Ali, A., Anbari, F., & Money, W. (2016). Impact of Organizational and Project Factors on Acceptance and Usage of Project Management Software and Perceived Project Success. *Project Management Journal*, 39(2), 5-33.
- [20] Ahlemann, F. (2019). PMIS conceptual reference model. *International Journal of Project Management*, 27, 19-30.
- [21] Manyara, E. M. (2020). The influence of project planning, stakeholder engagement and project monitoring and control on the delivery of projects at Kenya Airports Authority. M.Sc inn management and organizational development, United States International University -Africa.
- [22] DeLone, W., & McLean, E. (1992). Information system success: The Quest for the Dependent Variable. *Information Systems Research*, 3(1), 60-95.
- [23] Roseke, B. (2019). Eight functions of PMIS. Retrieved April 2022, from Project Engineer: <http://projectengineer.net/8-functions-of-project-management-information-systems>
- [24] Obeidat, M. A., & Aldulaimi, S. H. (2016). The Role of Project Management Information Systems towards the Project Performance: The Case of Construction Projects in United Arab Emirates. *International Review of Management and Marketing*, 6(3), 559-568.
- [25] Thomas, L. (2021). Cross-Sectional Study | Definitions, Uses & Examples. Retrieved 03 2022, from scribbr: <https://www.scribbr.com/methodology/cross-sectional-study/>
- [26] Kothari, C., & Garg, G. (2014). *Research Methodology*, (3rd ed.). New Delhi: New Age International Publishers.
- [27] Kombe, C. (2015). Impact of PMIS on project success. Unpublished project, Open University of Tanzania..
- [28] Munene, I. W., Namusonge, G., & Iravo, M. (2014). Factors affecting the implementation of management information system in selected financial cooperatives in Nairobi. *International Academic Journal of Information Sciences and Project Management*, 1(2), 44-58.
- [29] Peninnah, T. W., & Samson, N. P. (2021). Effect of PMIS system attributes on performance of ICT projects in Nairobi county. *International Journal of Project Planning and Management*, 5(2), 147-161.
- [30] George, C. (2020). The Use of Project Management Information Systems in the Monitoring of Projects. *International Journal of Scientific Research and Engineering Development*, 3(1).