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DETERMINANTS OF PROJECT MANAGEMENT INFORMATION SYSTEMS ADOPTION IN THE STATE DEPARTMENT FOR PUBLIC WORKS PROJECTS, KENYA

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ABSTRACT

This study examined the determinants of PMIS adoption in SDOPW projects in Kenya by analyzing the factors of Project top management support, project capacity availability, Project team Capability and Project stakeholder involvement. The Target population of this study was 207 with a sample size of 136 as determined by the Yamane's formulae of sample size determination. The study adopted a descriptive research design. A modified Likert scale questionnaire was developed and divided into three parts. A pilot study was carried out to refine the instrument. The quality and consistency of the study was further assessed using Cronbach's alpha. Data analysis was performed on a computer using Statistical Package for Social Science (SPSS Version 25) for Windows. Data was presented in form of means, standard deviation, percentages and tables. The findings of this study considered correlation and regression analysis. The regression analysis showed that adoption of PMIS in SDOPW projects was influenced by the determinants of project top management support, project capacity availability, Project stakeholder involvement and Project team capability. The correlation analysis however indicated that Project stakeholder involvement had a negative influence on the adoption of PMIS while the correlation analysis on Project top management support, Project Capacity Availability and Project Team Capability showed strong to moderate positive correlation. The recommendations of this study were that the SDOPW focus on these determinants by realigning the priorities of the top management, streamlining project decision making and developing technological and staff capacity that is capable of reinforcing the efforts of rolling out a PMIS system.

Key Words: *Top Management, Capacity Availability, Project Team Capability, Stakeholder Involvement*

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INTRODUCTION

The advent and penetration of IT and the subsequent ease of access and interconnectivity since the early 2000's, has necessitated adoption of information systems' in the management of decision making in various organizations globally. This is because management of information has ensured better planning and allocation of resources and an efficient monitoring and evaluation process while enhancing accessibility to process and project information (Sanchez & Terlizzi,2017) . Large organizations that work on improving organizational efficiencies like PWC have all time and again employed the use of information management systems to streamline organizational outcomes (Ul Musawir, Serra, Zwikael & Ali, 2017).

In the US, the general services administration of the US government has rolled out Smartsheet, a project management software, as its online collaborative project management tool to streamline the role out of information projects and ensure that project managers and key stakeholders are up to date with the progress of projects and thus ensure diligent management of cost and schedule delivery (Daradkeh, 2019). Furthermore, the state government has also adopted the concept of using information technology in managing projects and this has seen increased development and implementation and completion of various state projects (Quinn & Bederson, 2014).

Nigeria however has yet to adopt a PMIS in the management of its project in the public works departments, both federal and state. Akade et al 2018 observe in their research that there is no demonstrable use of the application of computer software/package for project planning and project information access. This indicates the low adoption of information and communication technologies (ICT) by BEPs for project planning and management. Manze & Bustani 2004 concludes that project contractors are incompetent of delivering their contractual obligation.

PMIS is a commonly used tool with construction companies within Nairobi in Kenya. According to a study done by Kahura (2013), PMIS was found to be an effective tool in management of information as well as being a positive influence in the decision-making process that has been key in the quality construction projects that the managers have undertaken. Lango (2018) in his study of the factors influencing adoption of PMIS in disaster management projects notes that fire stations as installations of the government have had challenges in employing PMIS in its disaster management operations due to the levels of top management support , capacity viability to enable roll out, the policies on teamwork that are resident within the disaster management organizations within Nairobi and how stakeholders are involved in the process of adopting PMIS.

The government of Kenya through the national treasury is advocating for e-ProMIS as its main platform for monitoring the performance and implementation of development projects and programs. The e-ProMIS automates the collection, reporting, and analysis of data for over 2000 projects by the Ministry of Finance, the donor community, 41 line ministries, provincial governments, project monitoring units, and other budgetary units across the country (Ngari, 2017).There is no literature however that the state department for public works has rolled out the e-ProMIS and reports of auditor general point to low project success rate due to lack of project information coordination.

Statement of Problem

In Kenya, SDOPW is responsible for the construction and maintenance of government buildings and other public works (BOOM, 2010). At inception, SDOPW implemented its mandate well because the government comprised of few ministries and departments. The state department was thus endowed with resources in terms of human, capital and technological know-how equal to the task. But today, the government has seen growth in terms of the number of ministries and departments, translating to high demand to accommodate the new Ministries and departments. This high demand

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is however not proportional to resources both financial, human, plant and equipment available to SDOPW. According to the Auditor general report of 2018, SDOPW sub-contracted 225 stalled projects and 1450 economic stimulant projects all over the country to private consultants. This has led to increased costs of implementing these budgets and in instances where the additional cost requirements have not been met; these projects have remained permanently stalled or cancelled altogether. The OAG notes that the SDOPW incurred Kshs.2.5 billion, and Kshs.1.2billion extra cost on the stalled Lamu police station and management housing and construction of Mathare, Nyayo hospitals in Nairobi due to inefficient project management and supervision as information to progress reports were lacking and payments done to uncertified completion of works.

With the advent of technology and technological means of managing project information, it is becoming highly important that government departments of the public sector adopt these new more organized information management infrastructures to ensure that projects are done in an efficient and cost effective manner so as to achieve better levels project success. In as much as the many various departments of government have adopted information management systems to streamline their operations and projects, the state department for public works still remains one of those sections that are yet to adopt information management systems and enable better information safe keeping and access. This has led to over reliance on private consultants to help manage these projects and in the instances that the projects are managed by SDOPW,projects remain slow to implement in adherence to time, cost and quality baselines due to the manual and slow nature that project information is managed between project teams ,supervisors and project owners.

In recent years, public sector project management has attracted much attention in the literature. However, almost all papers that have been published in academic journals focus on the public sector in European, North American countries, Australia or New Zealand. Project management information systems have also led many organizations to become more effective and efficient in project delivery. However, implementation of project management tools and techniques in SDOPW is still at its early phases of development. This study therefore found out the various factors that have hindered the adoption levels of project management information systems within the state department for public works in Kenya.

Objectives of the Study

The general objective of this study was to examine the determinants of project management information system adoption in the State Department for Public Works projects in Kenya. The specific objectives were;

- To determine the influence of Project Top Management Support on the adoption of PMIS in the state department for public works projects in Kenya.
- To examine the influence of Project Capacity Availability on the adoption of PMIS in the state department for public works projects in Kenya.
- To analyze the influence of Project Teamwork Capability on the adoption of PMIS in the state department for public works projects, Kenya.
- To examine the influence of Project Stakeholders Involvement on the adoption of PMIS in the state department for public works projects in Kenya.

The study was guided by the following research hypothesis;

- $\mathbf{H_{01}}$ There is no significant influence of top management support on the adoption of PMIS in the state department for public works projects in Kenya.
- $\mathbf{H_{02}}$ There is no significant influence of capacity availability on the adoption of PMIS in the state department for public works projects in Kenya.
- $\mathbf{H_{03}}$ There is no significant influence of teamwork capability on the adoption of PMIS in

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the state department for public works projects in Kenya.

- **H_{04}** There is no significant influence of stakeholder influence on the adoption of PMIS in the state department for public works projects in Kenya.

LITERATURE REVIEW

Theoretical Framework

Technology Acceptance Model (TAM)

Wallace and Sheetz (2014) in an effort to establish availability of capacity in various organizations advanced the theory of technology acceptance model (TAM) and suggest that an individual's perception of a technology adoption affects the level of use of that technology. In this theory therefore according to Davis there are only two factors considered relevant and these are the perceived usefulness and the perceived ease of use as the major factors that contribute to the level of technology adoption. Davis (1989) defines perceived usefulness as the probability of the user to using specified system such as PMIS to enhance their work during a disaster management project implementation. According to this theory therefore, the perceived ease of use and perceived usefulness are the most important determinant of the level of adoption of a system. However, this theory has been modified by various studies over time to include other variables that directly incorporates perceived ease of usefulness and ease (Agarwal and Prasad, 1998; Lim, 2000).

Universal Theory of Acceptance and Usage of Technology

This theory was developed by Venkatesh et al. (2007) and is based on a review of extant literature to provide completely synthesized factors for consideration in accepting technology. The key contributing constructs in this theory are touted as social influence, performance expectancy, conditions facilitation and effort expectancy . Venkatesh and others notes that these constructs influence the behavioral intentions to use technology. Gupta, Dasgupta and Gupta (2008) noted that the factors that relates to performance expectance are those that provide some degree of benefits to the users in executing certain actions while effort expectancy factors are those that are associated with the degree of ease of use of the technology. Social influence factors that relate to the level with which users of technology perceive its importance include belief of family friends and colleagues in technological progress. Social influence in correlated to conditional factors that refer to the perception of users of technology resources and accompanying support availed to perform a behavior (Venkatesh et al. 2007; Hong, Thong & Tam, 2006; Igbaria et al., 1997). According to UTAUT model therefore, effort expectancy, performance expectancy and social influences behavioral intention on the adoption and the application of technology such as PMIS. Behavioral intention and the facilitating factors, therefore, determine the level of technology adoption in every sector, disaster management included. These relationships, according to Venkatesh et al. (2007) are then moderated by individual variables which includes age, gender, voluntariness, and experience.

Thompson Model

This model came up in 2007 from L.L. Thompsons. The model is based on the assumption that team performance is affected by the essential conditions and team contexts. They are the motivation, ability and strategy that exists .In terms of the team context, there are issues such as organizational context, the information system, rewards system and the educational system. Thompson (2007) also notes that for a team to perform well, there must be enough numbers with the ability to carry out all the tasks that they have been given in order to achieve all the goals that the team has been given. Additionally, the team has to be motivated to carry out the task that they have been given and also to achieve the goals that the team has. However, there is need to ensure that within the organization, there is an environment that ensures that the team is in a position to perform optimally. They include issues such as a satisfying work environment,

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positive culture, positive values and well-defined job description.

Stakeholder Theory

The stakeholder theory by Freeman (2010) indicates that in organizations, managers have various networks of relationships that they serve that include employees, suppliers, government agencies, and business partners. The theory argues that when the relevant stakeholders are not incorporated in the decision-making, the management faces huge challenges since the stakeholders do not own the ideas fronted to them by the management. This is because their interests are not incorporated in the decision that affects them (Lee, 2008).

Stakeholders influence the decisions of the organization and whose interest the company strives to meet. According to Mersland (2009), employees and board diversity ensures that members are able to bring various experience, expertise and prospections to the firm with the aim of aiding better strategic decisions. The proponents of the theory reveal that having the representative of the stakeholders onboard is key in showing the relationship that they have with the organization. According to Elbanna and Younies (2008) having the stakeholders involved in the process of making decisions is based on intuition, public behavior and rationality.

Conceptual framework

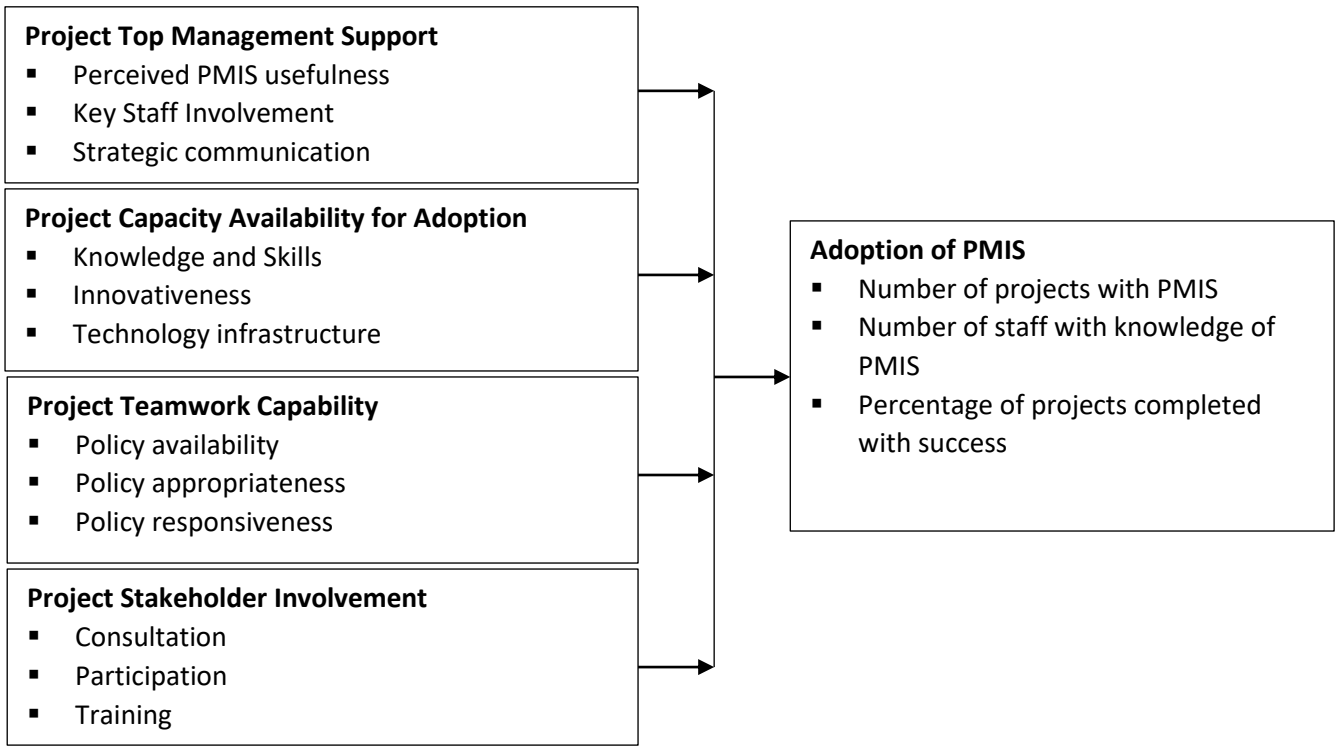

Figure 1: Concept framework

Empirical Review

Ngari and Ndiritu(2017) in their study examined the influence PMIS attributes on project performance and they focused their study on youth polytechnics in Embu county. In their findings, they noted that the deployment of software to generate quality information to be used by project managers assisted in reinforcing professionalism in a way that boosted the chances of project success. They also noted that the quality of the project management software had a serious effect on the acceptance of the PMIS and the organizations project efficiency and effectiveness. The study therefore recommends that youth polytechnics adopt the use of PMIS in

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their development projects as the quality of project information and its management had a direct impact on the success rate of these organizations projects.

Kyalo(2017) focus his study on the use of PMIS in CBOs and the factors that influence its use. In her study, she finds that factors to do with finance, leadership, culture, technical predisposition, user attitude and skill level affected the uptake of PMIS within CBOs with financial factors being more significant than any other factor. The study recommendation focuses on prioritizing budget allocation for project implementation while offering staff training on the use of PMIS and providing a criterion for management motivation for technology adoption.

Lango (2018) in an effort to understand why PMIS is not widely used in disaster management especially within Nairobi fire stations undertook a study to determine the factors contributing to that scenario. The study in its finding notes the influence of Top Management, Stakeholder Involvement and Team Work Policy within the disaster management organizations as having significant effect on the use of PMIS and recommends that fire stations should develop dynamic strategies to match operational environment and model practical solutions with realistic outcomes and bottom-line with guaranteed chances of success.

Ndagi (2019) in her research on project performance in State Departments in Kenya finds that high Stakeholder Involvement negatively affects project performance with Staff Competency and Project Planning having significant effects on the parameters of Project Performance. The study also notes that process automation had no effect on Project Performance and proceeds to recommend formulation of proper policies and procedures to control the effect of these factors and that stakeholder should be involved right from the project conception to actualization while managing the level of their influence in the execution phase of the project. Additionally, the study recommends the use of PMIS so as to enable seamless information sharing between stakeholders and the project teams so as to guarantee high levels of project satisfaction and success

Akinyi and Kisimbi (2020) in their study while evaluating the success factors of M&E in county government projects find that there is a significant relationship between budget, culture, staff competency and management structure on the ability of these local government units to employ monitoring and evaluation tools. The foundational principle of this study is that county government projects lack a project information system to track and appraise projects and thus there is compromise in project targets on quality, cost and schedule. The study recommends that county government should include in the project budget provisions for operationalization of a PMIS tool to aid in M&E .Additionally, staff training to be carried out periodically to develop and refresh project staff on the use of PMIS as a project management tool.

Bor and Chepnoen (2018) take a specific look into capacity availability in their study on user knowledge of PMIS in performance of construction projects in south rift. Their study avers that the contribution of user knowledge of PMIS is significant on how a project performs and recommends that construction companies adopt an integrated project information management system in order to realize higher level of project success and that these companies prioritize technical training to their staff in order to guarantee proficiency and efficiency in the execution of these construction projects.

METHODOLOGY

Descriptive research design was used in this study. The design was considered appropriate because it enabled the study to evaluate the state of the subject of the study, as opposed to the causal approach that seeks to determine correlations. This study involved 50 construction projects of State Department for Public Works because these were the number of projects that had been undertaken between the financial years 2015/16 to 2018/19

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and fully supervised from design to commissioning. This study targeted SDOPW project managers, project engineers and quantity surveyors to form Units of analysis totaling to 207. The sampling frame for this study consisted of a list of construction Project Managers, Project Engineers, Project Accountants, Project Auxiliary Staff and Project Quantity Surveyors. Stratified random sampling method was used to select relevant respondents from the State Department for Public Works projects teams and stakeholders. The sample size for the study was 136 as per the Yamane's formulae for sample size determination. The primary data was collected using a structured questionnaire. Secondary data was obtained from literature sources through review of published literature such as journals, articles, published theses and textbooks. These sources were reviewed to give insight in the search for the primary information. Secondary data was collected from SDOPW and various state corporation reports on project construction completion.

Qualitative and quantitative methods of data analysis were used to analyze the research variables. The descriptive statistical tools help in describing the data and determining the respondents' degree of agreement with the various statements under each factor. Data analysis was done with the help of SPSS version 25.0. The multiple regression analysis was used to explore the interrelationships of the support of project top management towards adoption of PMIS, the available capacity in terms of staff skills and infrastructure to roll out PMIS, the policies that govern teamwork and the level of stakeholder involvement as the independent variables and adoption of PMIS in SDOPW projects as the dependent variable. Pearson's product moment correlation analysis was also utilized and it's a powerful technique for exploring the relationship among variables. Correlation coefficient was used to analyze the closeness of the relations between variables.

FINDINGS AND DISCUSSION

Descriptive Statistics

In the research analysis this study used a 5-point likert scale; where 5 was the highest and 1 the lowest. Opinions given by the respondents were rated as follows, 5= Strongly Agree, 4= Agree, 3= Neutral, 2= Disagree and 1= Strongly Disagree. The analysis for mean, standard deviation was based on this rating scale.

Table 1: Project Top Management Influence

	N	Mean	Std. Dev.
The Management of SDOPW regards PMIS as a strategic resource	125	2.57	1.032
SDOPW insists on the involvement of PMIS in all projects	125	1.67	0.998
There exists a policy framework for the implementation of PMIS in SDOPW projects	125	3.73	1.318
Management provides for the training of the use of PMIS in project implementation	125	2.09	1.001
There exists a PMIS software contract/License with SDOPW and Software service providers.	125	1.61	0.924
Key SDOPW staff are involved in handling the project processes, schedules and project reporting in PMIS by top management	125	3.92	1.219
There exists a project communication plan as a result of PMIS project reporting	125	1.84	0.827
Top management has supports new project information systems and technologies in SDOPW projects to improve service delivery.	125	2.12	1.152
Top management ensures that PMIS adoption is the top priority	125	2.02	1.208

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The first goal of the study was to examine the effect of project Top Management Influence on the adoption of PMIS in SDOPW projects in Kenya. Respondents were allowed to respond to the questionnaire and records were as follows: The statement that Top management of SDOPW regards PMIS as a strategic resource had a mean score of 2.57 and a standard deviation of 1.032.The statement that SDOPW insists on the involvement of PMIS in all projects had a mean score of 1.67 and a standard deviation of 0.998.The statement that there exists a policy framework for the implementation of PMIS in SDOPW projects had a mean score of 3.73 and a standard deviation of 1.318. The statement that management provides for training of the use of PMIS in project implementation had a mean score of 2.09 and a standard deviation of 1.001. The statement that there exists a PMIS software contract/License between SDOPW and Software Service providers had a mean score of 1.61 and a standard deviation of 0.924. The statement that key SDOPW staff are involved in handling the project processes, schedules and project reporting in PMIS by top management had a mean score of 3.92 and a standard deviation of 1.219. The statement that there exists a project communication plan as a result of PMIS project reporting had a mean score of 1.84 and a standard deviation of 0.827.The statement that top management has supports new project information systems and technologies in SDOPW projects to improve service delivery had a mean score of 2.12 and a standard deviation of 1.152. The statement that Top management ensures that PMIS adoption is the top priority had a mean score of 2.02 and a standard deviation of 1.208.

Project Capacity Availability for Adoption

Table 2: Project Capacity Availability

	N	Mean	Std. Dev.
SDOPW have the required skills to work with emergent technologies	125	4.01	0.940
There is relevant technical skills among staff on project management information systems	125	3.86	1.164
There is Initial and refresher trainings on PMIS for the SDOPW staff for all the facets of project management process	125	1.93	1.181
The department has an annual capacity and budgetary allocation	125	3.77	1.039
SDOPW has a functioning IT infrastructure	125	2.01	1.152
All SPOPW staff have access to the department IT infrastructure	125	1.73	0.945
Available IT encourages new knowledge and skills in implementing SDOPW projects.	125	3.43	1.470
There is social influence at work on the adoption of the PMIS	125	3.35	1.193
Employees have the knowledge and skills to implement PMIS	125	3.97	1.269

The second objective of the study was to examine the influence of capacity availability on the adoption of PMIS in the state department for public works projects in Kenya. Respondents responded to the questionnaire and records as follows: The statement that SDOPW have the required skills to work with emergent technologies had a mean score of 4.01 and a standard deviation of 0.940. The statement that there are relevant technical skills among staff on project management information systems had a mean score of 3.86 and a standard deviation of 1.164. The statement that there are Initial and refresher trainings on PMIS for the SDOPW staff for all the facets of project management process had a mean score of 1.93 and a standard deviation of 0.181. The statement that the department has an annual capacity and budgetary allocation had a mean score of 3.77 and a standard deviation of 1.039. The statement that SDOPW has a functioning IT infrastructure had a

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mean score of 2.01 and a standard deviation of 1.152. The statement that All SPOPW staff have access to the department IT infrastructure had a mean score of 1.73 and a standard deviation of 0.945. The statement that the available IT encourages new knowledge and skills in implementing SDOPW projects had a mean score of 3.43 and a standard deviation of 1.47. The statement that there is social influence at work on the adoption of the PMIS had a mean score of 3.35 and a standard deviation of 1.19.The statement that employees have the knowledge and skills to implement PMIS had a mean score of 3.97 and 1.269.

Project Teamwork Capability

Table 3: Project Teamwork Capability

	N	Mean	Std. Deviation
Project teams have team building sessions	125	1.58	1.272
Team composition is developed based on PMIS	125	3.81	0.761
Project teams define the strategies of implementation through PMIS	125	1.65	1.306
Project managers and departmental management promptly address conflicts due to PMIS process	125	2.33	1.732
SDOPW forms project teams for every task or project been undertaken	125	4.05	1.163
Review of teamwork policies is dependent on reports and schedules generated from PMIS	125	1.89	0.889
There is interdependence of project teams within project phases to ensure project success	125	4.10	1.041
There is emphasis on inter-team and intra-team communication with communication channels and process available.	125	3.57	1.19
Team goals are set regarding the use of PMIS	125	1.67	0.868

The third objective of the study was to analyze the influence of teamwork on the adoption of PMIS in the State Department for Public Works projects, Kenya. Respondents responded to the questionnaire and records as follows: The statement that Project teams have team building sessions had a mean score of 1.58 and a standard deviation of 1.272. The statement that Team composition is developed based on PMIS had a mean score of 3.81 and a standard deviation of 0.761. The statement that Project teams define the strategies of implementation through PMIS had a mean score of 1.65 and a standard deviation of 1.306. The statement that Project managers and departmental management promptly address conflicts due to PMIS process had a mean score of 2.33 and a standard deviation of 1.732. The statement that SDOPW creates project teams for every task or project been undertaken had a mean score of 4.05 and a standard deviation of 1.163. The statement that Review of teamwork policies is dependent on reports and schedules generated from PMIS had a mean score of 1.89 and a standard deviation of 0.889. The statement that there is interdependence of project teams within project phases to ensure project success had a mean score of 4.10 and a standard deviation of 1.041. The statement that there is emphasis on inter-team and intra-team communication with communication channels and process available had a mean score of 3.57 and a standard deviation of 1.19.The statement that Team goals are set regarding the use of PMIS had a mean score of 1.67 and 0.868.

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Project Stakeholder Involvement

Table 4: Project Stakeholder Involvement

	N	Mean	Std. Dev.
Stakeholders ideas are incorporated into PMIS design conceptualization	125	3.78	2.203
There are tasks assigned to stakeholders in PMIS	125	3.89	1.867
Several stakeholders are incorporated in the operationalization of PMIS in SDOPW project activities	125	4.01	1.133
Stakeholders have a relationship officer	125	3.52	1.749
Stakeholders express satisfaction with project implementation process	125	2.05	1.376
The influence of stakeholders are managed in project information systems	125	4.23	1.23
Stakeholder communication with regards to projects process is captured by PMIS in SDOPW projects	125	3.43	1.104
The behaviour of stakeholders is assessed using PMIS in the SDOPW projects	125	3.35	1.199
PMIS enables swift compromise of stakeholder conflicts	125	4.17	1.121

The final objective of the study was to examine the influence of stakeholders' involvement on the adoption of PMIS in the state department for public works projects in Kenya. Respondents responded to the questionnaire and records as follows: The statement that Stakeholders ideas are incorporated into PMIS design conceptualization had a mean score of 3.78 and a standard deviation of 2.203. The statement that there are tasks assigned to stakeholders in PMIS had a mean score of 3.89 and a standard deviation of 1.867. The statement that several stakeholders are incorporated in the operationalization of PMIS in SDOPW project activities had a mean score of 4.01 and a standard deviation of 1.133. The statement that stakeholders have a relationship officer had a mean score of 3.52 and a standard deviation of 1.749. The statement that Stakeholders express satisfaction with project implementation process had a mean score of 2.05 and a standard deviation of 1.376. The statement that the influences of stakeholders are managed in project information systems had a mean score of 4.23 and a standard deviation of 1.23. The statement that Stakeholder communication with regards to projects process is captured by PMIS in SDOPW projects had a mean score of 3.43 and a standard deviation of 1.104. The statement that the behaviour of stakeholders is assessed using PMIS in the SDOPW projects had a mean score of 3.35 and a standard deviation of 1.19.The statement that PMIS enables swift compromise of stakeholder conflicts within SDOPW projects had a mean score of 4.17 and 1.12.

Adoption of PMIS

Table 5: Adoption of PMIS

	N	Mean	Std. Dev.
Projects are delivered as per the schedule	125	2.92	0.996
Projects are delivered as per the budget	125	2.10	1.104

Correlation Analysis

To establish the relationship between the independent variables and the dependent variable the study conducted correlation analysis which involved coefficient of correlation and coefficient of determination.

Coefficient of Correlation

Pearson Bivariate correlation coefficient was used to compute the correlation between the dependent variable (Adoption of PMIS) and the independent variables (Project Top Management Support, Project Capacity Availability, Project Teamwork Capability and Project Stakeholder Involvement). According to Sekaran, (2015), this relationship is

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assumed to be linear and the correlation coefficient ranges from -1.0 (perfect negative correlation) to +1.0 (perfect positive relationship). The correlation coefficient was calculated to determine the strength of the relationship between dependent and independent variables (Kothari & Gang, 2014).

In trying to show the relationship between the study variables and their findings, the study used the Karl Pearson's coefficient of correlation. This is as shown in Table below. According to the findings, it was clear that there was a positive correlation between the independent variables, Project Top Management Support, Project Capacity Availability, Project Teamwork Capability and Project Stakeholder Involvement and the dependent variable Adoption of PMIS in SDOPW projects. The analysis indicates the coefficient of correlation, r equal to 0.520, -0.1, 0.615 and 0.555 for Project Top Management Support, Project Capacity Availability, Project Teamwork Capability and Project Stakeholder Involvement respectively. This indicates positive relationship between the independent variable namely Project Top Management Support, Project Capacity Availability and Project Teamwork Capability and the dependent variable Adoption of PMIS in SDOPW projects. The study results show that there was a negative correlation between the independent variable Project Stakeholder Involvement and the dependent variable Adoption of PMIS in SDOPW projects.

Table 6: Coefficients of Correlation

	Adoption of PMIS	Project Top Management Support	Project Stakeholder Involvement	Project Capacity Availability	Project Teamwork Capability
Adoption of PMIS	1				
	125				
Project Top Management Support	.520**	1			
	.000				
	125	125			
Project Stakeholder Involvement	-.100	-.006	1		
	.322	.952			
	125	125	125		
Project Capacity Availability	.615**	.332**	.226*	1	
	.000	.001	.023		
	125	125	125	125	
Project Teamwork Capability	.555**	.617**	.076	.638**	1
	.000	.000	.453	.000	
	125	125	125	125	125

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Coefficient of Determination (R^2)

To assess the research model, a confirmatory factors analysis was conducted. The four factors were then subjected to linear regression analysis in order to measure the success of the model and predict causal relationship between independent variables (Project Top Management Support, Project Capacity Availability, Project Teamwork Capability and Project Stakeholder Involvement), and the dependent variable (Adoption of PMIS in SDOPW projects).

The model explains 53.7% of the variance (R Square = 0.518) on adoption of PMIS in SDOPW projects. Clearly, there are factors other than the four proposed in this model which can be used to predict adoption of PMIS in SDOPW projects. However, this is still a good model as Bryman and

Bell, (2018) pointed out that as much as lower value R-square 0.10-0.20 is acceptable in social science research. This means that 53.7% of the relationship is explained by the identified four factors namely Project Top Management Support, Project Capacity Availability, Project Teamwork Capability and Project Stakeholder Involvement. The rest 46.3% is explained by other factors in the adoption of PMIS in SDOPW projects not studied in this research. In summary the four factors studied namely, Project Top Management Support, Project Capacity Availability, Project Teamwork Capability and Project Stakeholder Involvement determines 53.7% of the relationship while the rest 46.3% is explained or determined by other factors.

Table 7: Coefficient of Determination (R^2)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.733[a]	.537	.518	1.75857

a. Predictors: (Constant), Project Top Management Support, Project Capacity Availability, Project Teamwork Capability and Project Stakeholder Involvement

Regression Results

Analysis of Variance (ANOVA)

The study used ANOVA to establish the significance of the regression model. In testing the significance level, the statistical significance was considered significant if the p-value was less or equal to 0.05. The significance of the regression model was as per Table below with P-value of 0.001 which is less than 0.05. This indicates that the regression model is statistically significant in predicting factors of adoption of PMIS in SDOPW projects. Basing the confidence level at 95% the analysis indicates high reliability of the results obtained. The overall ANOVA results indicates that the model was significant at F = 34.819, p = 0.001.

Table 8: ANOVA results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	340.955	4	85.239	34.819	.001
	Residual	293.795	120	2.448		
	Total	634.750	124			

a. Dependent Variable: Adoption of PMIS in SDOPW projects

b. Predictors: (Constant), Project Top Management Support, Project Capacity Availability, Project Teamwork Capability and Project Stakeholder Involvement

Coefficients

The researcher conducted a multiple regression analysis as shown in Table 9 to determine the relationship between adoption of PMIS in SDOPW projects and the four variables under investigation in this study.

Table 9: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	10.577	1.767		5.987	.000
	Project Top Management Support	.236	.066	.321	3.602	.001
	Project Stakeholder Involvement	-.280	.091	-.222	-3.087	.792
	Project Capacity Availability	.404	.070	.540	5.771	.000
	Project Teamwork Capability	.030	.114	.229	3.265	.003

a. Dependent Variable: Adoption of PMIS in SDOPW projects

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The regression equation was:

$$Y = 10.577 + 0.236X_1 - 0.280X_2 + 0.404X_3 + 0.030X_4 \quad [2]$$

Where;

Y = Adoption of PMIS in SDOPW projects;

X_1 = Project Top Management Support ;X_2 = Project Capacity Availability;X_3 = Project Stakeholder Involvement ;

X_4 = Project Teamwork Capability

The regression equation 2 established that taking all factors into account constant at zero Adoption of PMIS in SDOPW projects will be 10.577. The findings presented also showed that taking all other independent variables at zero, a unit increase in Project Top Management Support would lead to a 0.236 increase in the scores of adoption of PMIS in SDOPW projects; a unit increase in project stakeholder involvement would lead to a negative 0.280 increase in adoption of PMIS in SDOPW projects; a unit increase in Project Capacity Availability would lead to a 0.404 increase the scores of adoption of PMIS in SDOPW projects and a unit increase in Project Teamwork Capability would lead to 0.030 increase the scores of adoption of PMIS in SDOPW projects. The analysis had an intercept of 5.987.

Table 10: Hypothesis

Hypothesis Statement	Hypothesis Test	Decision Rule & Anticipated Model
H_{01}: There is no significant influence of Project Top of Management Support on the adoption of PMIS in the state department for public works projects, Kenya	t = 3.602 P = 0.001	Reject H_1 null hypothesis Project Top Management Support has a significant influence on the adoption of PMIS in the SDOPW projects in Kenya
H_{02}: There is no significant influence of Project Stakeholder Involvement on the adoption of PMIS in the state department for public works projects, Kenya.	t = -3.087 P = 0.792	Do not Reject H_2 null hypothesis Project Stakeholder Involvement has a significant influence on the adoption of PMIS in the SDOPW projects in Kenya
H_{03}: There is no significant influence of capacity availability on the adoption of PMIS in the state department for public works projects, Kenya.	t = 5.771 P = 0.000	Reject H_3 null hypothesis Project Capacity Availability has a significant influence on the adoption of PMIS in the SDOPW projects in Kenya
H_{04}: There is no significant influence of teamwork policies on the adoption of PMIS in the state department for public works projects, Kenya.	t = 3.265 P = 0.003	Reject H4 null hypothesis Project Teamwork capability has a significant influence on the adoption of PMIS in the SDOPW projects in Kenya

Discussion of the Findings

The study was on the determinants of project management information systems adoption in the state department for public works projects, Kenya. The study was based on the objectives of Project Top Management Support, Project Stakeholder Involvement, Project Capacity Availability and Project Teamwork Capability.

On Project Top Management Support the study showed that the perceived usefulness of PMIS by the top management affected the roll out of PMIS in SDOPW projects and that the level of involvement by key staff in designing and implementing a PMIS framework also influenced the policy position on the use of PMIS in managing SDOPW projects. Additionally, strategic communication by top management to project teams and staffers had an effect on how the department valued the use of PMIS in executing projects .This finding are supported by xyz (123) who in their study show that the support of senior management in an organization towards the implementation of management information systems had a significant impact in the success of the roll outs.

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On Project Stakeholder Involvement, the study demonstrates that stakeholder consultation did not affect the implementation of PMIS in SDOPW projects with the effect of participation remaining minimal on the study outcomes. Stakeholder training also had a marginal effect on the adoption of PMIS. The findings on correlation showed that there was a negative correlation with the dependent variable adoption of PMIS.

On Project Capacity availability, the study showed that the level and knowledge and skills with regards to PMIS played a major role in providing the technical capacity that facilitates the roll out of PMIS in SDOPW projects. The innovativeness of project personnel also is a contributing factor towards adoption with the level of technology infrastructure showing a positive correlation with the dependent variable.

Finally, this study showed that aspects of team policies such as policy availability, policy appropriateness and policy responsiveness have a positive correlation with the adoption of PMIS in SDOPW projects.

CONCLUSIONS AND RECOMMENDATIONS

The hypothesis test for project top management support showed that the t-value was 3.602 with a significance value of 0.01. The threshold for accepting or rejecting a null hypothesis recommended a t- value of 2.0 and above. Therefor the t-value being above the threshold, the study results rejected the null hypothesis that Project Top Management Support has no significant effect on the adoption of PMIS in SDOPW projects in Kenya. The study concluded that Project Top Management Support has a significant effect on the adoption of PMIS in the projects of SDOPW.

The hypothesis test for project stakeholder involvement showed that the t-value was -3.087 with a significance value of 0.05. The threshold for accepting or rejecting a null hypothesis recommends a t-value of 2.0 and above. Therefore the t-value being below the threshold, the study results does not reject the null hypothesis that there is a significant influence of Project Stakeholder Involvement on the adoption of PMIS in the state department for public works projects, Kenya. The study concludes that there is no significant influence of Project Stakeholder Involvement on the adoption of PMIS in the state department for public works projects, Kenya.

The hypothesis test for project capacity availability for adoption showed that the t-value was 5.771 with a significance value of 0.05. The threshold for accepting or rejecting a null hypothesis recommends a t- value of 2.0 and above. Therefore the t-value being above the threshold, the study results rejected the null hypothesis that there is no significant influence of capacity availability on the adoption of PMIS in the state department for public works projects, Kenya. The study concluded that there is a significant influence of capacity availability on the adoption of PMIS in the state department for public works projects, Kenya.

The hypothesis test for project team work capability showed that the t-value was 3.265 with a significance value of 0.05. The threshold for accepting or rejecting a null hypothesis recommends a t- value of 2.0 and above. Therefore the t-value being below the threshold, the study results rejects the null hypothesis that there is no significant influence of teamwork policies on the adoption of PMIS in the state department for public works projects, Kenya. The study concludes that there is a significant influence of teamwork policies on the adoption of PMIS in the state department for public works projects, Kenya.

The study recommended the following:

The support of Top management of the SDOPW is among the significant determinants of adoption of PMIS in the departments projects. Facets of top management include perceived usefulness of PMIS by the management and the priority with which issues to do with the efficient administration of projects, the involvement of key staff in designing and rolling out an appropriate PMIS and lastly the level of strategic communication from the top

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management to the rest of project teams. Top management should therefore be critical in reviewing the adoption of technology in the management of projects by developing and spearheading implementation of progressive policy geared towards the improvement of technology infrastructure and acquisition of requisite licenses that support the roll out of PMIS.

The results of this study identified the determinants of adoption of PMIS in SDOPW projects and recommended that the state department of public works focuses on the application of these determinants to guarantee the success of implementation of PMIS. Additionally, the study recommended that there is recognition of the role played by the determinants and in particular key staff involvement.

Involvement of Stakeholders in projects is an important tenet that project managers should deploy in the management of projects; however, this study has determined that it does not have a positive significant effect on the adoption of PMIS by the project organization. The inference is hence such that there is need for streamlined decision making with regards to the adoption of PMIS in SDOPW departments. The aspect areas of consultation, participation and training for stakeholders especially the external stakeholder's leads divergence of focus and given the nature of government organizations implementation requires a streamlined decision making process based on a policy frame work with a top-bottom approach. This study therefore recommended that SDOPW develops an appropriate policy that addresses the position of external stakeholders in its projects so that the design and implementation of a rightly tailored PMIS.

The capacity for adoption is a major area of focus and a key driver in the implementation of PMIS. This capacity encompasses the existence of a technological infrastructure that creates the roll out platform, the knowledge and skills of project staff of emerging technologies and the utilization of the technological infrastructure and platforms and the innovativeness with which the platforms are employed. This study therefore recommends that SDOPW carry out an audit of their technological infrastructure that includes computing hardware, network capabilities and the reach of access by project staff. Additionally, a skill matrix analysis of project staff should be carried out so as to identify the skill gaps in the use of the requisite technology infrastructure necessary for the deployment of a PMIS system. The findings of the audit and analysis should be used to upgrade/update the existing infrastructure to the appropriate levels and ensure that there is adequate training for project staff to match up their competencies.

This study recommended that SDOPW develops and streamline policies and working guidelines that promote project team development and cohesiveness. This will anchor the importance of PMIS in the management of projects by consolidating efforts towards adoption.

Suggestions for Further Research

Despite the contribution of this study towards the understanding of the determinants of PMIS adoption in the projects of SDOPW, a few areas for further study were identified in order to provide a wholesome picture of the problem under investigation.

Conclusive adoption of PMIS is largely dependent on the level of the technology infrastructure that can support rollout for the integrated function of communication, tracking analysis and record keeping. This infrastructure is specifically aligned to information technology and involves the implementation of a secure internet network, availability of tools of communication and analysis such as computers.

The factors that influence the upgrade of technological infrastructure to levels that can support the rollout of PMIS therefore form part of the moderating variables to this study. This study however did not consider these factors and thus a research into determining these factors and the

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effective mitigation measures would be a positive improvement into this study in future.

The State Department for Public Works majorly focuses on building services with an indirect project financing as the Clients determine project budgets without much consultations with the Project Managers (SDOPW). This study did not look at the effect of this financing model on the adoption of PMIS. Further research should therefore interrogate the influence of the current regime of financing on how project information is managed.

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