The influence of top management support on the extent of PMIS uptake in disaster management projects in fire stations in Kenya

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Abstract: *Technology adoption in most sectors is usually pegged on how the top management supports the adoption process. In disaster management technology is steadily playing a key role in ensuring there is high standards of implementation of disaster management projects and that the top management continuously being blamed for the low levels of technology uptake as experienced and confirmed by various authors and reports from various fire stations. This study looks into the factors of top management support that are considered to greatly influence the levels of uptake of Project Management Information Systems (PMIS) in disaster management projects at the fire stations in Kenya. The study specifically looked into the influence of perceived PMIS usefulness, Key-Staff involvement, and communication as the core factors related to top management support. A review of relevant literature revealed that top management to a significant level have an influence on the level of PMIS uptake and the study applying mixed method approach and concurrent design to the study came up with candid findings. From the findings it was concluded that the top management factors have a significant influence on the level of uptake of PMIS in fire stations and recommends that both the station managers and policy makers should consider abridging these factors so that they are in line with the immediate needs of the fire station in terms of PMIS adoption and improvements and that policies should be developed that encourages high levels of PMIS uptake supported by the top level management.*

Key Words: *Project Management Information Systems; Disaster Management Projects; Top Management Support; Technology Adoption; Fire Stations.*

INTRODUCTION

The global rise in disasters whether natural, human-induced and technological is high and continuing according to the World Disaster Report (2004:161) as reported by IFRC (2010). From 1994 to 1998 the reported major disasters averaged 428 per year and from the year 1999 to 2003, the figures rose up by two thirds to an average of 707 disasters per year and the biggest increase was in development countries like Kenya where the increase

was reported at 142 per cent (IFRC, 2010). This increase has raised international concerns on the Fire Stations disaster preparedness and their abilities to quickly respond to disasters in order to limit their impact on the population. Failure to adequately use technologies in disaster management departments in a timely manner may results in increased number of causalities (IFRC, 2010). According to US congressional investigation on Hurricane Katrina that hit the southern US coast in 2005, the federal, state and city agencies did not plan and allocate the resources using the available Project Management Information System (PMIS) adequately to ensure decisive response actions. It was also noted that many disaster management procedures and plans generated by the PMIS for disaster management were improperly implemented. Despite the shortcomings, PMIS have gained much attention globally for their applications in resource allocation and are increasingly being utilized throughout the disaster management cycle as a tool to support decision making. PMIS tools have been recognized as a key support tool for disaster management (Mileti, 1999). The reporting capabilities of these systems have almost become synonymous with policy makers, disaster managers and the general public. PMBOK (2004) define PMIS as the coherent organization of the information required for an organization to execute projects successfully and is usually typically one or more software applications and a methodological process for collecting and using project information to help plan, execute and close project management goals.

Mintzberg (1983) theorizes therefore that most of the emergent organization including fire stations, since the second world war are projects intensive and that the widespread use of projects in these fire stations demands an approach that can efficiently manage the temporary endeavours which are critical to the fire stations strategic objectives. In 1980s, the use of automated data processing and later new techniques were developed to influence better investment implementation (PMBOK, 2004). The concept of management of projects and management by projects clearly, according to Soderlund (2004), points to the requirement of PMIS as a candid tool and its uptake by fire stations would certainly determine the level of success of these projects. Most countries in the Eastern Africa region are categorized by the United Nations Development Program (UNDP, 2013) as category of low human development. Although Kenya is best ranked among the East African countries at 145 out of 186 countries of which data is available, disaster emergencies will still erode the development gains. The East African region is prone to both natural and man-made disasters hence important considerations should be made on the preparedness of its fire stations in utilization of technologies like PMIS in managing disasters during the pre- and post- occurrence of these disasters. According ISDR (2013) the disaster scenarios, across the region, ranges from civil strife, population movement, terror attacks, earth tremors, cyclones, flooding, droughts and epidemics with various countries exhibiting varying degrees of exposure. Of importance is fire related emergencies which makes up to 60% of disasters experienced in the region (Chatora, 2005). Disaster response to these situations in the region often becomes desperate due to the inadequate state of disaster management

resources coupled with poor planning, allocation and lack of support within the governments to inadequate preparedness; insufficient contingencies; delays in emergency response; inadequate and uncoordinated information flow; poor institutional arrangements; and inadequate systems and procedures for emergency risk management (Chatora, 2005). In Kenya lessons learnt from the fire disasters which includes Nakumatt fire on 28 January 2009 which had 29 fatalities with 47 reported missing, the Nairobi pipeline fire on 12 September 2011 with 100 fatalities and 116 other hospitalized with varying degrees of burns, and the most recent Jomo Kenya International Airport (JKIA) fire on August 2014 which had no fatalities but resulted in losses estimated at Kshs.300 million according to the Kenya Airport Authority status report (2014), have all shown the level of lack of preparedness and insufficient and ineffective application of technologies like PMIS in planning and allocation of emergency management resources (IFRC, 2014). As a result of the recent disasters there have been increased activities in contingency planning, provision of early warning systems to the fire stations and increased preparedness through hiring of more fire station service men and women however the impact was minimal according IFRC (2014) as it did not take into consideration the extent of management information system (MIS) technologies role.

Emergency Management Theory

Formulated by Drabek (2005) emergency management theory provides impetus to the study of factors of adoption of technology such as PMIS in disaster management projects. According to Drabek, the theory of emergency management focuses on the top management support as the core center of operations in an institution or organization involved in disaster projects like fire stations. Scholars in the field of disaster management contend that emergency management theory well explains the role top management play in the success of a project and further asserts that the success of disaster management projects depend on the top management of the fire station which is essentially outlined by the topology of the fire station (Granito, 2014; Philip, 2014; Drabek, 2005; Raymond & Bergeron, 2008). This topology according to the scholars includes the site specific disaster project arrangements, the crisis involved, the station's response patterns, and finally the fire stations improvisation in disaster management projects. Emergency management theory, therefore according to Drabek (2005) relates to how people create, interact and cope with hazards, risks, vulnerabilities and management support with relation to implementation.

Further Drabek (2005) notes that in order to support technology uptake in disaster management projects in fire stations, the focus should be on four structural components which are the domains, tasks, resources and the activities of the project. The domains is a function of a well-organized response while the tasks are how the domain is accomplished and the resources are the fire stations capacity availability which includes the resources

like PMIS with their modern capabilities, commodities and equipment. Activities on the other hand are the teamwork policies which are interdependent actions of fire station stakeholders in the allocation of the available resources. In order for this relationship to be bridged Njoki (2013) states that PMIS is essential in ensuring success of the disaster management project. This theory in essence provides understandings of the factors are of great importance when studying the extent of uptake of PMIS in disaster management projects in fire stations. Barney (1991) and Bissell (2005) on the other hand, contend that emergency management theory focuses on the resources and capacity availability at the fire station with respect to disaster management projects. This perspective therefore advocates that fire stations' resources and capacity availability should be consistent with other aspects of the station which can only be managed by a technology based system like PMIS. This aspect of the theory is further proved by a number of studies such as Philip (2014) studying efficient allocation of fire department resources in California and Granito (2014) studying evolution and planning of public fire protection. Technology based innovation PMIS therefore is a necessary component in the management of disaster projects and specific to every fire station. The major criticism of this theory as suggested by McEntire (2004) is the shared nature of the subject matters with other disciplines. In essence, this theory over generalizes disaster management projects as part of other projects at the fire station. In attempting to focus on four structural components of domain, tasks, resources and the activities in supporting technology uptake, the theory assumes that the relationship between technology uptake and these components is linear and non-problematic. McEntire further contends that part of the weaknesses of this theory is the failure to provide a coherent system that merges the welter of the components in PMIS uptake that also plays a bigger role in disaster management projects

at the fire stations. Top management support, capacity availability, teamwork policies and stakeholder involvement associated with these functional components of disaster management projects also plays a bigger role but the theory fails to take this into account. Kapucu and Van Wart (2006) also agrees with the deficiencies in the theory stating that it is limited by the impossibility of modelling all contingent variables considered in uptake of technology like PMIS hence the difficulties in showing how the factors which are the components influences the extent of uptake of technology adoption like PMIS. Kapucu (2009) brings to attention that a theoretical model should incorporate the role played by the other varying factors to simultaneously promote a general fit in extent of PMIS uptake in disaster management projects and cope with future projects.

Conceptual Framework

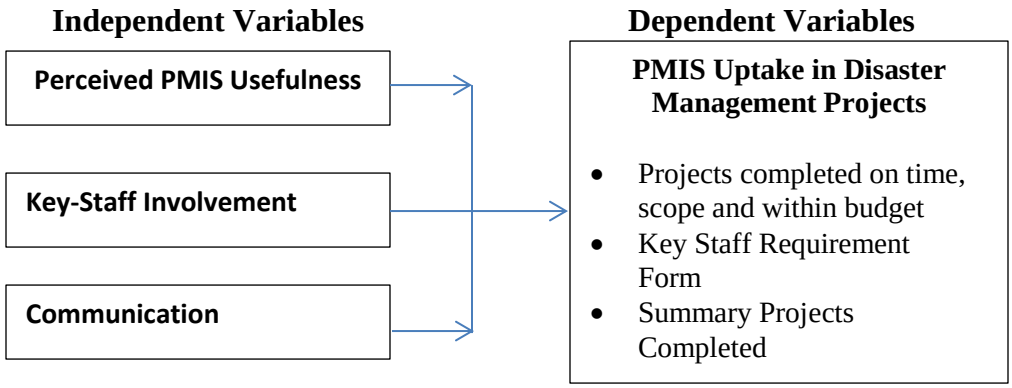


Figure 1: Conceptual Framework on Top Management influence on PMIS uptake

The conceptual framework of the study was based on perceived PMIS usefulness, Key-staff involvement, and communication. This was the researchers interpretations of how the variables relate and the figure therefore implies that there exist an influence and relationship between the independent variables and the dependent variables.

Review of Related Literature

Technology adoption is a result of a decision by top management to accept a given innovation and Feder, Just and Zilberman (1985) citing work done by Roger (1962) define technology adoption and level of uptake as the top management mental process of accepting the technology from the first hearing about it to the final utilization. From this definition it is then believed that the top management interest in technology adoption and uptake falls into two categories: rate of adoption, and the intensity of adoption. Feder, Just and Zilberman define rate of adoption as the relative speed with which fire stations adoption PMIS innovation and taking into consideration the element of time. On the other hand, intensity of adoption refers the level of use of PMIS technology in any given time. Top management, according to Young and Jordan (2008), can influence the implementation and use of new technologies like PMIS by devoting their time to the technology in proportion to its costs and the potential, additionally reviewing plans, monitoring results and facilitating the management of problems that are arising during the integration of the technology to the disaster management project life cycle. Feder and Slade (1984) cited by Njoki (2013) notes that the top management support encourages technology usage, better performance, positive user perception influence, and improvement in the overall technology adoption uptake. Top management team in any fire station therefore determines the technological implementation success or failure. Furthermore, Dong et al. (2009) argue that effective top management support is one of the strongest enablers of PMIS implementation in fire stations as it is view as a clear commitment and allocation of sufficient resources to the PMIS and involvement in managing change that comes with the

technology uptake. The UTAUT model which has been touted as the model for technology adoption does not specifically measure top management support in its constructs. Neufield et al. (2007) additionally points out that the top management support as a factor in technology adoption has not been sufficiently integrated into existing user adoption theories and neither does it have literature that is specific to top management behaviours that are associated with the success in technology implementation.

Other authors have also concluded in their findings that perceived usefulness of technology has a bearing on the extent of its uptake. Lewis, Agarwal & Sambamurthy (2003) examined the simultaneous effects of influences that emanated from the individual, institutional and social context in which they interacted with information technology. Their findings suggested that beliefs about technology usefulness can be influenced by top management commitment to the new technology and the individual factors of personal innovativeness and self-efficacy further stating that social influences from multiple sources did not exhibit any significant effects. Davis, Bagozzi and Warshaw (1989) in their longitudinal study of 107 technology users concluded that perceived usefulness of technology by the top management had the possibility of guiding managerial interventions aimed at ensuring there is full uptake of technology.

A comparative study in construction industries in Nigerian however indicated that the successful completion of these projects were dependent on technological changes in project management which includes the uptake of PMIS noting that a low uptake leads to lower number of projects completed (Karodia, Cowden & Magaba, 2014). A benchmarking framework by Ahuja, Yang and Shankar (2010) revealed also that ICT including PMIS adoption by small and medium fire stations must take into consideration understanding of processes, project success indicators and measures in order to achieve high turnover in completed projects. Similarly Barki and Huff (2005) concludes that the success in the number of disaster management projects completed relies heavily on the level and extent of uptake of the technology in the project itself and indicates that the higher the level of uptake, the higher the number of projects completed as enabled by the technology. Other authors are however of the opinion that the greatest role in uptake of technology like PMIS is in top management communication in support of the technology itself. Pan and Jang (2008) in their study of 99 firms in Taiwan's communication industry developed the technology-organization-environment (TOE) framework and concluded that communication leaning towards top management support of the technology being adopted to be of great importance. For a technology to succeed in its uptake, the top management must have a system of communicating directly with the fire stations involved and Premkumar and Roberts (2009) while analysis data collected from 78 organizations concluded that top management communication on technology uptake is vital and the form of communication used by managers includes telephone, e-mail, and

meetings. Oliveira and Martins (2011) on the other hand view technology as a universally accepted essential tool in enhancing competitiveness of the fire station and notes that a consensus must be created on the type of communication to be made by the top management in support of the technology being adopted. Further they note that the type of communication chosen by the top management is to enable in the diffusion of the PMIS in disaster project management at the fire station level.

METHODOLOGY

Research Design

According to Kothari (2004), a research design is a framework that guides the collection and analysis of the data and is a detailed plan for how research study is conducted according to data required and in the order of research questions investigations in an economical manner. This study therefore adopted the mixed method research approach and employed the concurrent design. Creswell (2005) describes the research approach as involving philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing of both approaches in a study. On the other hand, concurrent design of this approach allowed the researcher to converge qualitative and quantitative data to enable comprehensive analysis of the research problem. According to Bwisa (2015b) in his guide to research methods and while elaborating on the common methods and types of social science research, notes that qualitative research is primarily an exploratory research and enables the research gain understanding of the underlying opinions, reasons, and motivations while providing insight into the problem for potential qualitative research. Further that quantitative research on the other hand, is formal, objective; systematic processes in which the numerical data are used to obtain information about the world and enables the researcher examine the relationships among variables.

Target Population

According to Raymond and Bergeron (2011), target population is the larger population to which the researcher ultimately would like to generalize the results of the study. Nairobi vision 2030 metropolitan report (2008) lists constituents to include Nairobi, Kiambu, Machakos and Kajiado counties. In order to realise its seventh key result area (KRA) of a safe and secure region, the report identifies fourteen sub county fire stations within the listed counties as area of focus. These stations are listed as: Nairobi; Kiambu; Olkejuado; Thika; Machakos; Ruiru; Limuru; Masaku; Kikuyu; Githunguri; Kiambaa; Kajiado; Mavoko; and Kang'undo. Out of the fourteen listed only six fire stations located in Nairobi and Kiambu counties have embraced PMIS technology in various forms according the reviewed report 2010 (Nairobi vision 2030 report review, 2010). These six stations include: Nairobi; Thika; Machakos; Limuru; Kikuyu; and Kiambu. Thus these six fire stations have been proposed to qualify as the target fire stations for the study.

The six fire stations identified above allow the researcher to define the target respondents of the proposed study. The researcher identified six categories of the target respondents, namely, directors, fire station commander, head of departments, ambulance attendants, first aiders, and lead firemen. In addition, there were 119 Nairobi county fire station personnel, 27 for Machakos county and 88 for Kiambu county and hence the total target population was 234 comprising of 3 directors, 8 fire station commanders, 22 heads of departments, 26 ambulance attendants, 28 first aiders, and 147 lead firemen. The target populations were then stratified as shown in Table 1 below.

Table 1: Target Population

No.	Strata	Nairobi	Thika	Kiambu	Machakos	Limuru	Kikuyu	Total
1	Directors	1	1	-	1	-	-	3
2	Fire Station Commander	3	1	1	1	1	1	8
3	Head of Departments	9	3	2	2	2	4	22
4	Ambulance Attendants	12	3	2	4	3	2	26
5	First Aiders	20	2	1	3	1	1	28
6	Lead Firemen	74	27	12	16	14	4	147
	TOTAL	**119**	**37**	**18**	**27**	**21**	**12**	**234**

Source: Kenya Fire Brigade Association (KENFIBA, 2015)

Census Study

The actual respondents for the research were made up of 234 fire station personnel from the fire stations in Nairobi Metropolis, Kenya that comprised the target population. Since the population is small, a census method was applied to consider all the respondents in the survey. This was therefore a census survey encompassing all the directors, station commanders, head of departments, ambulance attendants, first aiders, and lead firemen. Pilot census was conducted at Kericho County Fire Station which is under the Kisumu Metropolis, Kenya.

Research Instruments

Quantitative data was collected from the fire stations through administering a questionnaire while qualitative data was collected through application of interview guide and use of observation guide to compliment the qualitative data. The questionnaire was applied to collect primary data. Creswell (2005) indicates that the questionnaire as an instrument has the advantage of reaching out to large numbers of respondents within a short time; is able to give the respondents adequate time to respond to the items; offers a sense of security in terms of

confidentiality to the respondents; and finally notes that it is an objective method since there is no bias resulting from the personal characteristics as in an interview.

Reliability of the Instruments

According to Njoki (2013) reliability refers to the consistency of measurements in that it is the degree to which the instruments gives similar results over a number of repeated trials. Njoki further notes that in social science research, reliability is frequently assessed using the test – retest reliability method and that reliability is increased by including as many similar items on a measure, by testing a diverse sample of individuals and by using uniform testing procedures. The researcher selected a pilot group comprising of 10% of the population under study to test the reliability of the research instruments (Creswell, 2004). The main aim was to correct inconsistencies arising from the instruments, which ensured that they measure what is intended. The research instruments were subjected to overall reliability analysis using the split half method. This was done by collecting data from a given number of the respondents into two halves (often odd-even). The two halves were then correlated using Pearson's correlation. A coefficient of 0.7 or more implied that there is a high degree of data reliability (Lim & Mohamed, 2000).

Data Processing and Analysis

Data analysis involves getting the feel for the data, testing the goodness of the data and finally testing the hypothesis developed for the research with the main aim being making sense out of text and image data (Creswell, 2003). Data processing therefore involves preparing data for analysis, moving deeper into understanding it, presenting it and making interpretation for a larger meaning. Creswell further notes that data analysis first involved coding the responses, tabulating the data, and performing several statistical computations which relates mostly to averages, frequencies, percentages, and regression coefficients.

On top management support, the researcher shall collect both qualitative and quantitative data. For the qualitative data, thematic areas were identified and the responses placed into particular themes, each of which were coded as standalone variables. From these descriptive statistics was generated and thereby creating a platform for linkage with literature and hence some inference. The researcher has also asked for the number of disaster management response projects that the stations were able to handle before the implementation of the form of PMIS in place and the number thereafter. Such data was analysed using the t-test to evaluate existence of any significant impact(s) of PMIS. Finally, the researcher constructed a likert scale for the sub-variables that ensued from this specific objective and for this data was analysed using the ordinal regression model.

Statistical Measurement Model

According to Kothari (2004) and Creswell (2003), multiple regression analysis attempts to determine whether a group of variables when combined together can predict a given dependent variable and in essence attempt to increase the accuracy of the estimate. The general multiple regression models for this study was:

$$\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon}$$

Where: **Y** = is the dependent variable uptake of PMIS

$\boldsymbol{\beta_0}$ is the constant

$\boldsymbol{\beta}$ is the coefficient of $\mathbf{X_i}$ for i = 1, 2, 3

$\mathbf{X_1}$ is the Percieved PMIS Usefulness

$\mathbf{X_2}$ is the Key-Staff Involvement

$\mathbf{X_3}$ is the Communication

$\boldsymbol{\beta_1}$, $\boldsymbol{\beta_2}$, $\boldsymbol{\beta_3}$, are the regression coefficients

$\boldsymbol{\varepsilon}$ is the error term brought about by the environment.

RESEARCH FINDINGS AND DISCUSSIONS

Descriptive Analysis on General Characteristics

In order to describe the demographic characteristics of the study respondents and assess whether there is any influence on the research findings, the study analyzed the demographic characteristics of the demographic data which includes the fire station departments, respondent experience at the station, respondent age, respondent gender, and PMIS implemented at the station.

When descriptive statistics was done on the demographic statistics it was found that, respondent station had a mean of 3.293 and a standard deviation of 0.984, fire station departments had a mean of 5.608 and a standard deviation of 1.968, respondent experience at the station had a mean of 2.506 and a standard deviation of 1.419, respondents gender had a mean of 1.458 and a standard deviation of 0.4990, fire station's PMIS implemented had a mean of 4.070 and a standard deviation of 1.183, while the dependent variable, PMIS uptake, had a mean of 2.383 and a standard deviation of 0.777. The results of this analysis are shown in table 2 below.

Table 2: Descriptive Analysis on Demographic Characteristics

	N	Mean	Std. Deviation
Respondent Station	228	3.293	.984

Fire Station Departments	228	5.608	1.968
Respondent Experience at the station	228	2.506	1.419
Respondents Gender	228	1.458	.4990
Fire Stations' PMIS implemented	228	4.070	1.183
PMIS Uptake	228	2.383	.777

Source: SPSS Ver. 21 Generated analysis for the study

A similar study by Mabry *et al.* (2013) also found out that the various departments within the fire station plays a big role in the uptake of technology like PMIS. Further they note that it is important the fire stations' PMIS implemented is one that is universally accepted by the members of the various fire station departments. Otieno *et al.* (2010) and Njoki (2010) also found out that the implementation of technology is not very dependent on experience at the station and certainly not dependent on gender of the personnel. These findings gives an indication that the uptake of PMIS in disaster management project at the fire stations is more dependent on the fire stations departments, the fire station's PMIS implemented and to a small extent the station itself in how it handles the uptake. However it also indicates that the uptake is not necessarily dependent on the gender and experience at the fire stations.

A regression analysis was then used to test if there was a significant influence of the demographic factors (Respondent station, fire station departments, respondent experience at the station, respondent gender, fire stations' PMIS implemented) on the extent of PMIS uptake in disaster management projects in fire stations in Nairobi Metropolis, Kenya. Since p (0.000) is less than alpha (.05), the research concluded that with the obtained data, there was evidence of a significant effect of demographic factors on the PMIS uptake in disaster management projects at the fire stations in Nairobi Metropolis, Kenya (F20.421, Df=9, and P<0.05). The result of this analysis is presented in table 3 below.

Table 3: ANOVA results showing the effect of demographic characteristics on the extent of PMIS uptake in Disaster Management Projects in Nairobi Metropolis, Kenya

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	71.100	9	7.910	20.421	.000[a]
	Residual	161.865	218	.378		
	Total	232.965	227			

a. Predictors: (Constant), Respondents Gender, Fire Station Departments, Respondent Experience at the station, Respondent Station
b. Dependent Variable: PMIS_Uptake

Source: SPSS Ver. 21 Generated analysis for the study

Regression analysis was done to determine the influence of demographic characteristics on the extent of PMIS uptake in disaster management projects in fire stations in Nairobi Metropolis, Kenya. The analysis of the demographic factors obtained an adjusted R^2 of 0.360. This implies that the simple linear model with demographic factors as the independent variables explains 36.0% of the variations in the extent of PMIS uptake in fire stations projects. This explains further that with the demographic factors as the only independent variables, the extent of PMIS uptake in fire stations projects will change by 36.0%. These results are shown in table 4 below.

Table 4: Model summary showing demographic characteristics of respondents

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.614(a)	.378	.360	.62400

a. Predictors: (Constant), Respondents Gender, Fire Station Departments, Respondent Experience at the station, Respondent Station

Source: SPSS Ver. 21 Generated analysis for the study

This finding is similar to that of Geist and Lambin (2002) who found out that demographic factors contributed to an additional 61% of the economical and statistical analysis factors that influence the uptake of technology in fire stations. Also a study by Green, Grace and Gleser (1985) opined in the similar that demographic factors which included the fire departments and the type of technology implemented contributed to 14% of the prediction measures on the final result. These indications are also confirmed by Casner, Andersen, and Isaacs (2005) who concluded that demographic characteristics have an impact on the spontaneous circulation of a technology device called CPR assist in the management of disasters at the hospitals. This is can be concluded that demographic characteristics at the fire stations across the country have a significant influence on the extent of Uptake of PMIS in disaster management projects.

The researcher conducted a correlation analysis to investigate the existence and nature of relationship between demographic characteristics and PMIS uptake in disaster management projects in fire stations in Nairobi Metropolis, Kenya. From the correlation analysis it was noted that fire stations' PMIS implemented had the highest positive relationship with PMIS uptake with a Beta value of 0.252, the second highest score was the respondents experience at the station with a Beta value of 0.187 while respondents station and respondents gender had low positive Beta values of 0.009 and 0.017 respectively. This shows therefore that there is some minimal positive relationship between demographic characteristics and the extent of PMIS uptake in disaster

management projects in fire stations in Nairobi Metropolis, Kenya. Fire station departments had a negative Beta value of 0.051 indicating a negative relationship with extent of PMIS uptake in disaster management projects in fire stations in Nairobi Metropolis, Kenya. Respondents stations explains a 0.8% variance in PMIS uptake, respondents experience at the station explains 10.2% variance in PMIS uptake, respondents gender explains 2.6% variance in PMIS uptake, and fire station's PMIS implemented explains 1.67% variance in PMIS uptake. This variance therefore showed that there is a positive relationship between the demographic characteristics and extent of PMIS uptake in disaster management projects, Kenya. Fire station departments explains a -2.1% variance in PMIS uptake indicating that there is a negative relationship with PMIS uptake in disaster management project in fire stations in Nairobi Metropolis, Kenya. The results of this analysis are shown in table 5 below.

Table 5: Coefficient results showing the relationship between the demographic characteristics and PMIS uptake

Coefficients (a)

Model	**Unstandardized Coefficients**			**Standardized Coefficient**	
1	B	Std. Error	Beta	T	Sig.
(Constant)	1.166	.477		2.433	.015
Respondent Station	.008	.045	.009	.152	.876
Fire Station Departments	-.021	.026	-.051	-.758	.459
Respondents Experience at the station	.102	.049	.187	2.085	.039
Respondents Gender	.026	.083	.017	.303	.762
Fire Stations' PMIS Implemented	.167	.048	.252	3.619	.000

a. Dependent Variable: PMIS Uptake

Source: SPSS Ver. 21 Generated analysis for the study

The study also conducted a correlation analysis to investigate if there is a significant relationship between the demographic factors (Respondent Station; Respondent Experience at the station; Respondent Gender; Respondents Department; and PMIS implemented) and the extent of PMIS uptake in disaster management projects in fire stations in Nairobi Metropolis, Kenya. From the analysis it was found that there is a significant positive relationship between PMIS uptake and respondent station, significant relationship between respondent experience at the station and PMIS uptake, and significant relationship between PMIS implemented and PMIS uptake. However it was also noted that the relationship between the respondents' gender and PMIS uptake and the relationship between the fire station's departments and PMIS uptake were not significant.

From the analysis it was also evident that there was a significant positive relationship between respondent fire station and fire station department; respondent fire station and respondent experience at the station; and respondent fire station and fire station's PMIS implemented. However there was a significant negative relationship between the respondent station and respondent gender. It was also observed from the analysis that there was a significant relationship between fire station department and the respondent experience at the station; fire station department and respondent gender; and finally fire station department and the fire station's PMIS implemented. There was also a significant positive relationship between respondent experience at the station and fire station's PMIS implemented while the relationship between respondent experience at the station and respondent gender was negative. Finally it was also established that there exist a significant positive relationship between respondent gender and the fire station's PMIS implemented. The results is as indicated in table 6 below.

Table 6: Correlations coefficients on demographic characteristics and extent of PMIS uptake in Disaster Management Projects in Fire Stations in Nairobi Metropolis, Kenya

			1	2	3	4	5	6
1	Respondent Station	Pearson Correlation	1					
		Sig. (2-Tailed)						
		N	228					
2	Fire Station Department	Pearson Correlation	.311**	1				
		Sig. (2-Tailed)	.000					
		N	228	228				
3	Respondent Experience at station	Pearson Correlation	.368**	.387(**)	1			
		Sig. (2-Tailed)	.000	.000				
		N	228	228	228			
4	Respondent Gender	Pearson Correlation	-.061	.309(**)	-.121*	1		
		Sig. (2-Tailed)	.292	.000	.032			
		N	228	228	228	228		
5	Fire Station's PMIS Implemented	Pearson Correlation	.570(**)	.372(**)	.577(**)	.174(**)	1	
		Sig. (2-Tailed)	.000	.000	.000	.002		
		N	228	228	228	228	228	
6	PMIS Uptake	Pearson Correlation	.228**	.030	.378**	.139*	.332**	1
		Sig. (2-Tailed)	.000	.610	.000	.015	.000	

N	228	228	228	228	228	228

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

Source: SPSS Ver. 21 Generated analysis for the study

This analysis is also confirmed by Casner, Andersen and Isaacs who found out that there is a significant relationship between technology like PMIS uptake and the experience and type of technology being implemented further confirming that there is relatively low if not negative relationship when it comes to gender of the employees where the technology is implemented. Assertions by Njoki (2010) and Malcolm (2010) also confirms the high dependence of technology implementation with experience of the station members. This is a clear manifestation that for a technology to be implemented, the demographic factor that considers experience of the station members, the type of PMIS in place at the station, and the fire station department should be put into consideration for it to be a success.

Top Management Support and Extent of PMIS Uptake

This section analyses and presents factor analysis on top management support and the extent of PMIS uptake in disaster management projects in fire stations in Nairobi Metropolis, Kenya. The research section focused on the core variables of top management support which were: Perceived usefulness; key-staff involvement; and communication.

a) Top management perceived usefulness and extent of PMIS uptake

From the analysis majority of the respondents at 77.2% (176) were not aware whether a contract between the fire station and PMIS service provider existed for the PMIS implemented at the station while minority representing 2.6% (6) gave an indication that there was an existing contract for the PMIS implemented at the station which is an indication that the contract existence is only known by the station's top management. Also 20.2% (46) of the respondents indicated that there was no existence of a contract for the PMIS implemented. The results of this analysis is indicated in table 7 below.

Table 7: Contractual agreement with the service provider on PMIS implemented at the stations.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	6	2.0	2.6	2.6
	No	46	19.7	20.2	22.8
	Don't Know	176	68.9	77.2	**100**
	Total	**228**	**90.6**	**100.0**	
Missing	0	6	9.4		
Total		**234**	**100.0**		

Source: SPSS Ver. 21 Generated analysis for the study

These findings are similar with those of Lewis, Agarwal and Sambamurthy (2003) whose findings indicated that beliefs about technology usefulness are influenced by top management commitment to the uptake process. Further Davis, Bargozzi and Warshaw (1989) findings that top management perceived usefulness of a technology had the guiding factor in its implementation, is also attested by these results. The findings therefore affirms that top management support plays a significant role in perceived usefulness of PMIS uptake in disaster management projects in fire stations.

When factor analysis was conducted on the perceived usefulness and top management support only one component was extracted for the 11 items. However from the analysis two items were suppressed and dropped from further analysis because they had a loading of lower than 0.4. Analysis of the factors loading revealed that the contract ensures that fire personnel have skills required to use PMIS had the highest loading value of 0.757. The other variables had loading values as follows: Contract ensures each fire personnel using the PMIS goes through training yearly had a loading value of 0.738; PMIS service contractor will conduct extensive training in aspect PMIS quality had a loading value of 0.734; New PMIS knowledge impacted periodically as per contract as they work in squads had a loading value of 0.714; Contract enables employees to take more responsibilities using the PMIS had a loading value of 0.651; Contract performance appraisal enable identification of PMIS training needs had a loading value of 0.647; PMIS contract ensures real-time support to fire personnel in the field had a loading value of 0.602; Contract training agreement leads to improved fire personnel performance using PMIS had a loading value of 0.574; and finally PMIS contract ensures continuous maintenance to the system to reduce downtime had a loading value of 0.555. The following items were suppressed and dropped from further analysis because they had loading values of less than 0.4: PMIS contract is an indication of modernization of the fire station had a loading value of 0.180; and PMIS contract has a great effect on the performance of fire personnel had a loading value of 0.164. These results are presented in table 8 below.

Table 8: Factor analysis showing perceived usefulness and top management support of PMIS at the fire stations

Component Matrix[a]	Component 1
Contract ensures that fire personnel have skills required to use PMIS	.757
Contract ensures each fire personnel using the PMIS goes through training yearly	.738
PMIS service contractor will conduct extensive training in aspect PMIS quality	.734
New PMIS knowledge impacted periodically as per contract as they work in squads	.714
Contract enables employees to take more responsibilities using the PMIS	.651
Contract performance appraisal enable identification of PMIS training needs	.647
PMIS contract ensures real-time support to fire personnel in the field	.602
Contract training agreement leads to improved fire personnel performance using PMIS	.574
PMIS contract ensures continuous maintenance to the system to reduce downtime	.555
PMIS contract is an indication of modernization of the fire station	**.180**
PMIS contract has a great effect on the performance of fire personnel	**.164**

Note: the bolded items were dropped from further analysis.

Source: SPSS Ver. 21 Generated analysis for the study

When reliability test was done using the Cronbach's Alpha for the items, before removing and after removing the inadequate indicator, it was found that the value was 0.762 before removing and it increased to 0.815 after removing the inadequate indicator. According to Ngui (2014) while quoting Creswell (2003) notes that the closer the Cronbach's alpha is to one, the higher the internal consistency reliability. Therefore the results of this analysis indicates that the data collected was reliable since the alpha coefficient values of 0.762 and 0.815 were very close to one as obtained from the research variables. These were above 0.75 and an alpha coefficient of higher than 0.75 signifies that the data gathered has a relatively high internal consistency and therefore can be generalized to the respondents' opinion on the study problem. The results of this analysis are as presented in table 9 below.

Table 9: Reliability analysis for perceived usefulness and top management support of PMIS at the fire stations

Cronbach's Alpha	Cronbach's Alpha Before Extracting a	Number of Items
Before removing the inadequate indicator	0.762	11
After removing the inadequate indicator	0.815	9

Source: SPSS Ver. 21 Generated analysis for the study

b) Top management key staff involvement support and extent of PMIS uptake

The study conducted an analysis on the number of disaster response projects the fire stations can handle without the application of any form of technology management system at the the fire stations at Nairobi Metropolis,

Kenya. Majority of the respondent at 82.0% (187) indicated that the response would be less than 20 disaster response projects, with 17.1% indicating a response of between 20 and 50 disaster response projected while only 0.9% (2) was of the view that the disaster response projects will be over 50. This finding is consistent with the findings of International Federation of the Red Cross (IFRC, 2014) report on global disaster occurrences. IFRC (2014) notes that on average there were 8869 disasters worldwide in the year 2014 and out of this figure Africa had 1522 and while Kenya contributed an average of 342 disasters to the African figure. This is an indication that technology has not been fully embraced to combat disasters. The result of the analysis is as presented in table 10 below.

Table 10: Fire stations' annual disaster response projects without use of any form technology.

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Less than 20	187	79.9	82.0	82.0
	Between 20 to 50	39	16.8	17.1	99.1
	Over 50	2	0.6	0.9	**100**
	Total	**228**	**97.3**	**100.0**	
Missing	0	6	2.7		
Total		**234**	**100.0**		

Source: SPSS Ver. 21 Generated analysis for the study

The above findings are consistent with the view of various authors (Karodia, Cowden & Magaba, 2014; Ahuja, Yang & Shankar, 2010; Barki and Huff, 2005) whose opinions were that technology aids in the implementation of projects such as disaster management projects and the failure to use PMIS in form would eventually lead to low number of projects completed in a given year. This therefore indicates that a failure by top management to support the uptake of PMIS in disaster management projects in fire stations in Nairobi Metropolis, Kenya would eventually lead to low number of projects completed within a given period of time.

The research also analyzed responses of the respondents on the number of disaster response projects where technology was to be applied in any form. From the analysis it was noted that majority of the respondents at 89.9% (205) were of the view that the disaster response project will be above 50 were technology to be applied in any form while 6.1% (14) were of the view that the response project will be between 20 and 50 and minor 4.0% (9) indicated that the disaster response projects will be less than 20 were technology to be applied in any form.

Table 11: Fire stations' annual disaster response projects where technology is applied in any form

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 20	9	3.9	4.0	4.0
	Between 20 to 50	14	5.8	6.1	10.1
	Over 50	205	87.6	89.9	**100**
	Total	**228**	**97.3**	**100.0**	
Missing	0	6	2.7		
Total		**234**	**100.0**		

Source: SPSS Ver. 21 Generated analysis for the study

This findings is similar to that done by several authors whose findings opined that the use of technology in projects within an organization or company increases the number of projects completed within a given period of time and therefore the support of top management on technology implementation reflects directly on the number of projects completed (Karodia, Cowden & Magaba, 2014; Ahuja, Yang & Shankar, 2010; Barki and Huff, 2005). This therefore concludes that top management support of technology uptake in disaster management projects in fire stations is a receipt to high number of projects completed within a period of time.

c) Top management communication support and extent of PMIS uptake

In analyzing communication channel used by top management the study considered the means as telephone, e-mail, memos, meetings, and letters. From the analysis it was evident that majority of the respondents at 42.5% (97) were of the opinion that telephone is mostly used followed by meetings at 24.5% (56) and memos at 23.6% (54). However the respondents had a lower considerable opinion on the usage of e-mail and letters at 2.1% (5) and 7.3% (16) respectively. Malcom (2010) notes that it is standard practice for disaster management project response apparatus to have radio telephone. The analysis is presented in table 12 below.

Table 12: Communication channel used by top management in communicating with fire team involved in disaster management projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Telephone	97	41.8	42.5	42.5
	E-Mail	5	1.9	2.1	44.6
	Memos	54	23.3	23.6	68.2
	Meetings	56	24.1	24.5	92.7
	Letters	16	6.9	7.3	**100**

	Total	**228**	**98.0**	**100.0**
Missing	0	6	2.6	
Total		**234**	**100.0**	

Source: SPSS Ver. 21 Generated analysis for the study

This finding is consistent with those of other authors who opined that communication plays an important role in PMIS uptake in disaster management projects in fire stations and that it helps in diffusing the acceptance to the lowest levels of the station (Pan and Jang, 2008; Oliveira and Martins, 2011). Further Premkumar and Roberts (2009) findings concur with the findings above that top management support through communication is commonly done through telephone, e-mail and meetings with the stakeholders involved in PMIS uptake in disaster management projects. These assertions therefore mean that the major component of communication by the top management in support of PMIS uptake is the use of telephone, meetings and memos at the fire station in Nairobi Metropolis, Kenya.

The research also seek to establish whether the communication channels used by the top management in communicating with fire team involved in disaster management projects was part of a reporting standard requirement at the station. From the analysis it was found that majority of the respondents at 68.8% (157) indicated in the affirmative while 18.8% (43) indicated no. Of the 228 respondents that answered the question, 12.4% (28) did not know whether the communication channel used by the top management was part of a standard procedure or not. The result of this analysis is presented in table 13 below.

Table 13: Top management communication part reporting standards at the fire station

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Yes	157	67.5	68.8	68.8
	No	43	18.2	18.8	87.6
	Don't Know	28	11.7	12.4	**100**
	Total	**228**	**97.4**	**100.0**	
Missing	0	6	2.6		
Total		**234**	**100.0**		

Source: SPSS Ver. 21 Generated analysis for the study

Kaiser and Ahlemann (2010) in their study dubbed *measuring project management information systems success* notes that information technology has been embraced in major organizations including fire stations and its use embedded in daily operational policies and standards. The analysis of this study therefore confirms the study in retrospect as it defines the usage of technology at the fire stations. Oliveira and Welch (2013) further confirms

that local governments which includes fire department which are part of the local governments use technology aided communication strategies as part of standard reporting procedures and PMIS generated reports from disaster management projects forms part of the standard reports.

PMBOK (2008) outlines specific variables that are strategically considered to aid the uptake of any technology in an organization PMIS included. Malcom (2010) and Njoki (2013) also provide preliminary variables considered to be perceived as of importance when implementing technology that includes PMIS in an organization. It is for this particular reason that the research sort to find out the influence of top management support variables on the extent of PMIS uptake in disaster management in fire stations in Nairobi Metropolis, Kenya. Majority of the respondents at 48.6% were not sure whether the station management has a solid contract with the PMIS software providers while 44.2% did not agree with the statement and only 7.2% agreed with the statement. Majority of the respondents (60.9%) agreed that station management has involved key staff to handle the processes, schedules and reporting of PMIS in disaster management projects implementation, also large majority at 70.3 agreed that station management involves PMIS in all the phases of fire station projects. Only a small percentage of the respondents (8.6%) agreed with the statement that station management keeps pressure on the fire station team to use PMIS in all the phases of disaster management project but majority of the respondents at 78.3% agreed that fire station management considers PMIS as a strategic resource. The following statement had an agreement rate as follows: Reports are generated using PMIS for presentation to the station management at the county office had an agreement rate of 76.7%; station chief officer is involved as key authorization officer during the start of any project and PMIS use is part of the authorization had an agreement rate of 99.6%; Station management organizes on-going training on the use of the indicated PMIS had an agreement rate of 7.3%; The PMIS reporting requirement has enabled the station managers to put in place communication plan had an agreement rate of 62.9%; The performance contracts are based on progress reports generated using PMIS in every phase of the disaster management project had an agreement rate of 48.5%; Top management has supported new IT systems and technologies in disaster project management to enhance fire service delivery had an agreement rate of 71%; and the statement the most important phases of disaster project management supported by top management includes: conception; design; response operation; and recovery & reporting had an agreement rate of 12.4%. The result of this analysis is presented in table 14 below.

Table 14: Top management support factors and extent of PMIS uptake

Indicators	SD %	D %	N %	A %	SA %	Total %
Station management has a solid contract with the PMIS software providers.	18.6	25.6	48.6	7.2	0.0	100.0
Station management has involved key staff to handle the processes, schedules and reporting of PMIS in disaster management projects implementation.	8.6	3.6	26.9	48.2	12.7	100.0
Station management involves PMIS in all the phases of fire station projects.	11.3	5.5	12.9	58.1	12.2	100.0
Station management keeps pressure on the fire station team to use PMIS in all the phases of disaster management project.	75.3	9.7	6.4	8.6	0.0	100.0
Fire station management considers PMIS as a strategic resource.	5.9	3.7	12.1	49.7	28.6	100.0
Reports are generated using PMIS for presentation to the station management at the county office.	2.8	16.2	4.3	62.4	14.3	100.0
Station chief officer is involved as key authorization officer during the start of any project and PMIS use is part of the authorization.	0.4	0.0	0.0	71.5	28.1	100.0
Station management organizes on-going training on the use of the indicated PMIS.	8.2	48.2	36.3	3.3	4.0	100.0
The PMIS reporting requirement has enabled the station managers to put in place communication plan.	6.7	2.3	28.1	58.7	4.2	100.0
The performance contracts are based on progress reports generated using PMIS in every phase of the disaster management project.	32.1	11.3	8.1	45.4	3.1	100.0
Top management has supported new IT systems and technologies in disaster project management to enhance fire service delivery.	11.2	7.3	10.5	70.5	0.5	100.0
The most important phases of disaster project management supported by top management includes: conception; design; response operation; and recovery & reporting.	7.5	0.3	79.8	11.6	0.8	100.0

SD =strongly disagree: D = disagree: N= neutral: A =agree: SA =strongly agree

Source: SPSS Ver. 21 Generated analysis for the study

d) Regression analysis of top management support and extent of PMIS uptake

The researcher conducted a regression analysis to determine the significant relationship of top management support against the extent of PMIS uptake. Table 15 shows that the coefficient of determination is 0.569 therefore this means that about 56.9% of the variation in the extent of PMIS uptake is explained by top management support. The regression equation appears to be relatively useful for making prediction since the values of R^2 is slightly more than a half.

Table 15: Model summary for top management support

Model	R	R Squared	Adjusted R Square	Std. Error of the Estimate
1	.757[a]	.572	.569	.603

a. Predictors: (Constants), Top management support

Source: SPSS Ver. 21 Generated analysis for the study

Table 16 presents the results of the Analysis of Variance (ANOVA) on the top management support versus the extent of PMIS uptake. The ANOVA results for regression coefficients indicate that the significance of the F is 0.00 which is less than 0.05. This indicates that the regression model statistically predicts the outcome variable hence meaning it is a good fit for the data. Therefore from the results there is a significant relationship between top management support and the extent of PMIS uptake

Table 16: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.179	1	18.179	50.336	.000[a]
	Residual	13.725	227	.363		
	Total	31.904	228			

a. Predictors: (Constant), Top management support
b. Dependent Variable: Extent of PMIS uptake

The ANOVA results are corroborated by the findings of Young and Jordan (2008) and Feder and Slade (1984) who concluded that top management support has a significant relationship with technology uptake and further suggesting that the top management support encourages technology usage, better performance, and heightens the uptake levels within the organization.

The research also sort to determine the beta coefficients of top management support verses the extent of PMIS uptake in disaster management projects at the fire stations. Table 17 show that there was a positive relationship since the coefficients of top management support was 0.808 which is significantly greater than zero. The t statistic (7.097) was also greater than zero hence demonstrating that the top management support had a positive influence on the extent of PMIS uptake. With the significance coefficient value of 0.000 which is less than the

p-value of 0.05, we reject the null hypothesis that there is no significance relationship between top management support and the uptake of PMIS in disaster management projects in fire stations in Nairobi Metropolis, Kenya.

Table 17: Coefficients

Model		Unstandardized coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	.609	.414		1.480	.150
	Top management support	.808	.116	.757	7.097	.000

a. Dependent Variable: Extent of PMIS Uptake

The *t- statistical* analysis concurs with the studies done by several authors that top management support contributes a significant positive influence on the uptake on PMIS in disaster management projects in fire stations and confirmed also as the guiding managerial intervention aimed at ensuring that there is full uptake of the technology and its applications (Malcolm, 2010; Davis, Bagozzi & Warshaw, 1989; Lewis, Agarwal & Sambamurthy, 2013; Karodia, Cowden & Magaba, 2014; Ahuja, Yang & Shankar, 2010).

Aggregate of the Independent Variables

Top management support was considered by the research as the dimension/component of the independent variable of the study on the dependent variable which was the uptake of PMIS. With regard to top management support the finding revealed that it had a mean of 3.6618 and a standard deviation of 0.77222 with the respondents comprising those disagreed to those strongly agreeing. These assertions are presented in table 18 below:

Table 18: Summary of mean and standard deviation of technology uptake factors

Technology Uptake Factors	Mean	Std. Dev.	Min.	Max.
Top Management Support	3.6618	.77222	2.00	5.00

Ranked on a scale: 1 – 1.8 (strongly disagree): 1.8 – 2.6 (disagree):
2.6 – 3.4 (neutral): 3.4 – 4.2 (agree): 4.2 – 5.0 (strongly agree)

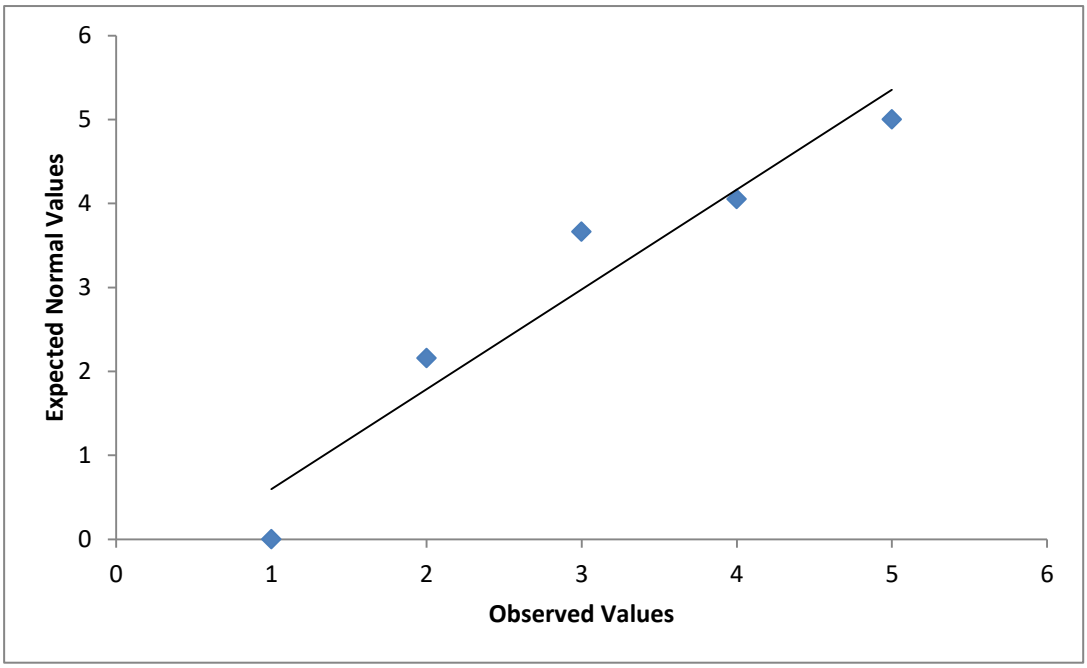
Source: SPSS Ver. 21 Generated analysis for the study

Normality Test

Park (2015) while studying univariate analysis and normality test using SAS, Stata and SPSS notes that for a model to fit to some given data, the dependent variable in this case the uptake of PMIS has to be normality distributed.

Q-Q Plot

For a normally distributed data Wang *et al.* (2011, December) opined that the observed values should be spread along a straight diagonal line in a plotted graph. From figure 1 below most of the observed values are spread very close to the straight line and some falling within the line. This therefore shows that there is a highly likelihood that the data is normally distributed. This finding therefore confirms the Q – Q plot below.



Source: SPSS Ver. 21 Generated analysis for the study

Figure 1: Normal Q – Q Plot of Uptake of PMIS

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary of Findings

From this research, it was found that top management support have a positive influence on the extent of PMIS uptake in disaster management projects in fire stations in Kenya. From the study it was also found out that the demographic characteristics have a significant effect on the extent of PMIS uptake. With demographic factors as the only independent variables of the study the uptake of PMIS will change by 36.0%. From the study it was found that respondent experience at the station and fire stations' PMIS implemented had the highest positive relationship with the extent of PMIS uptake in disaster management projects while fire station departments had a negative relationship with the extent of PMIS uptake. However the relationship between respondent station and respondent gender and the extent of PMIS uptake were considered as not significant. Therefore as the percentage of respondents experience at the station and fire stations' PMIS implemented increases, it is expected that there will be a change in the extent of PMIS uptake in disaster management projects in fire stations in Nairobi Metropolis, Kenya.

From the research it was found out that there is a significant relationship between top management support and the extent of uptake of PMIS in disaster management projects in fire stations in Nairobi Metropolis, Kenya. It was also found that top management factors have a positive effect on the extent of PMIS uptake. In general, this study found that three sets of top management support factors – top management perceived usefulness, top management key staff involvement support, and top management communication support contributed significantly to extent of PMIS uptake in disaster management projects in fire stations in Nairobi Metropolis, Kenya. When all these factors were applied, it was found that the extent of PMIS uptake in disaster management projects in fire stations in Nairobi Metropolis, Kenya will improve by 56.9%. This finding is consistent with those of Young and Jordan (2008) who suggests that top management support is the most important and critical success factor for a project success and justifies this in the context of project management as not one of the many factors but a technology uptake factor to significantly consider during technology implementation in projects. The study also corroborates the findings of Zwikael (2008) and Kwak and Anbari (2009) who opined that top management support highly influences the extent the tools of project management which includes PMIS are procured and used in a given project and the extent of the use of the tool is wholly dependent on the support given to the fire stations by their top management.

Conclusions

From the study it is concluded that top management support have a significant positive influence on the extent of uptake of PMIS in disaster management in fire stations in Nairobi Metropolis, Kenya. When top management factors (perceived PMIS usefulness, key-staff involvement, and communication) were used, it was found out that there was a 56.9% variance in extent of PMIS uptake in disaster management projects in fire stations in Nairobi Metropolis, Kenya. Among the three factors of top management, perceived PMIS usefulness and key-staff involvement are considered highly significant factors which influence uptake of PMIS. However communication has the least influence on the uptake of PMIS.

Therefore top management support influences the extent of PMIS uptake to a very great extent. Based on the results of the study, it is concluded that using only perceived PMIS usefulness and key-staff involvement is not sufficient to improve the uptake of the PMIS. If all fire stations in Nairobi Metropolis use all the top management support factors together, they will increase the uptake of PMIS. This is because there is a strong positive correlation between top management support and extent of PMIS uptake. From this study it is also concluded that demographic characteristics have a significant influence on the extent of PMIS uptake in disaster management projects in fire stations in Nairobi Metropolis, Kenya. With demographic factors as the only

independent variables, the extent of uptake of PMIS in disaster management projects in fire stations will change by 36.0%. From the obtained data it was concluded that there is a significant influence of respondent station, respondent experience at the station, and fire stations' PMIS implemented on the perception of the fire station about top management support on the extent of uptake of PMIS in disaster management projects in fire stations in Nairobi Metropolis, Kenya.

This study therefore generally concludes that top management support is one of the most critical components of PMIS uptake across all fire stations in disaster management projects. Implementation of top management support factors results in greater uptake of technology-based uptake in disaster management projects in fire stations in Kenya.

Recommendations

Based on the findings and conclusions of the study, the researcher provides the following recommendations aimed at ensuring that the factors of PMIS uptake adopted by fire stations in Kenya plays a positive impact in ensuring improvement levels on the uptake of technology in disaster management projects.

1. The results of this study have helped to determine the crucial factors of PMIS uptake in disaster management projects in fire stations and recommend that fire stations focus on the application of these factors to ensure level of PMIS uptake are successful. In addition, this study recommends that fire stations increasingly recognise the role played by the Key-Staff Involvement, Percieved PMIS Usefulness, and Communication as they are key to achieving the other factors.
2. These findings recommend that fire stations should carefully consider the alignment of PMIS uptake to the disaster management project being implemented and factors of importance consideration so that they support and supplement one another. In addition, it is proposed that in light of these findings, the fire station policy makers evaluate technology adoption practices and levels of uptake of technology and specifically PMIS to ascertain the degree to which they are aligned to the factors of PMIS uptake.
3. From the study it is recommended that scholars and practitioners in project management and disaster management should actively engage in joint research that will be used to assist fire station managers to effectively understand the link between factors of technology uptake and the success of technology uptake in disaster management projects. The academic research will be a foundation in ensuring that there is consistency between the theory of PMIS uptake and its practice. Training institutions including universities and colleges should work together with project management professionals to develop curriculum for teaching students taking disaster management and projects management to ensure a proper link between theory and practice. It should also be made mandatory for students to attend internships or industrial

attachment before they graduate in order to apply the learned theories in class in practical fire station environment. This will ensure that the graduate leaving the training institutions have the pre-requisite orientation skills in technological application in disaster management projects and that the factors of uptake are clear and candid.

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