

INFLUENCE OF ORGANISATIONAL STRUCTURE ON IMPLEMENTATION OF ELECTRONIC PROJECT MONITORING INFORMATION SYSTEM IN PUBLIC TERTIARY INSTITUTIONS IN KENYA

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ABSTRACT *The purpose of this article is to explore the influence of organisational structure on implementation of electronic project monitoring information system (e-ProMIS) in public tertiary institutions. It is based on literature review and filed research by employing cross-sectional survey research design. Questionnaire was used to collect data from 30 tertiary institutions and a sample size of 162 members of staff selected through stratified random sampling technique. Null hypothesis was tested using regression analysis at 0.05 confidence interval. The results indicate that all the three types of structure: formalization; complexity; and centralization were statistically significant with coefficients ($\beta=0.238$, $t=3.167$, $p=0.002<0.05$), ($\beta=0.204$, $t=2.777$, $p=0.006<0.05$) and ($\beta=0.317$, $t=4.574$, $p=0.000<0.05$) respectively. Specifically one unit change in implementation of e-ProMIS was associated with 23.8% changes in formalization structure, 20.4% changes in complexity structure and 31.7% change in centralization structure. The overall F statistics was $(3,158) = 23.760$ at level of significance $p = 0.000<0.05$ suggesting that there was a statistically significant relationship between organisational structure and implementation of electronic project monitoring information system in public tertiary institutions in Kenya. These study findings imply that for successful implementation of e-ProMIS and other e-government systems, organisational structure is imperative. In this era of digital systems public and private institutions that intend to implement ICT based technologies should ensure that their organisations adopted the right structure that is well aligned to supporting e-government systems.*

Key words: Organisational structure, Implementation, Electronic project monitoring information system, Tertiary Institutions.

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Introduction

Today's rapid technological advancement of Information Technology (IT) industries and globalization has led to increased demand of project management solutions throughout the world as a fundamental force to complete projects within a defined scope, time, and within cost constraints. Most modern project systems deliver innovative solutions and its management process has the latest tools, techniques, systems, and schemes in use. One of these systems is Electronic Project Monitoring Information System (e-ProMIS), which is a Web-Based Project Management System (WPMS) introduced in the mid-1990s. A WPMS is conducted through extranet, which is a private network using internet protocols to transmit information and only accessible by authorised users at different predefined levels (Nitithamyong&Skibniewski, 2011). Project data are stored on centralised servers and a standard web browser is used as a gateway to access, exchange, and share information from remote locations at any time, eliminating the problems that occur in linear communication schemes (Thorpe& Mead, 2001). A basic WPMS is typically aimed at supporting project collaboration and information sharing, but advanced WPMSs also enhance users in searching for specific information or conducting business transactions completely online.

Web-Based Project Management System has been in use in developed countries like United Kingdom (UK), Unites States of America (USA) and Sweden among others. A study conducted in UK revealed that 44 per cent of users were satisfied with WPMS experience but undecided whether to adopt a

WPMS on every project; 3 per cent were essentially unsure whether WPMSs are worthwhile, and 1 per cent were unsatisfied and rejected any future use (Nitithamyong and Skibniewski, 2011). AUSA-based survey also revealed that the application of WPMSs had been limited to commercial (41 per cent) and retail projects (31 per cent) (Becerik&Pollalis, 2006). In Sweden, Samuelson (2008) reported in his survey that the majority of practitioners only used WPMSs occasionally although the usage had increased considerably since the year 2010. Nitithamyong and Skibniewski (2011) observed that regardless of the proven advances in technology and the downward trend in the price charged by providers, the slow uptake may be because of unclear understanding among practitioners on how to successfully integrate the WPMS concept in their processes. The above studies show usage of WPMS in developed countries but with varying rates of adoption.

The web-based project management system in Kenya is in form of Electronic Project Monitoring Information System for the Government of Kenya. This is an automated information management system designed to improve efficiency and transparency of national development planning and coordination of reconstruction activities within the country. It is also a powerful tool for tracking and analysing aid flows. The system serves as the main database and reporting system for the government of Kenya, donor and NGO community as it ensures effective access to development data. The main objective of the e-ProMIS Kenya is to serve as a reliable and credible source of information on overall donor

contributions to Kenya's reconstruction, economic recovery and socio-economic development, as well as to support the Government in effectively managing development assistance and promoting the accountable and transparent use of resources (GOK, 2001-2012). E-ProMIS Kenya is a powerful tool that allows the user to view project data organized into lists, reports, charts, and maps. In e-ProMIS Kenya, the user is able to present the project data in the form of list, chart and map reports, memorize/save the reports, print them, and export them into PDF, MS Word and MS Excel format files. The developments of E-ProMIS Kenya was completed in December 2009 by Synergy International Systems Inc. and from 2010 over 150 trainers and users were trained to spearhead mainstreaming in the ministries. Between 18th and 23rd February 2013, training of Ministry monitoring and evaluation, project officers and committee members was conducted. The Ministry of Education, Science and Technology conducted training of three officers from each tertiary institution in Kenya to be the lead persons in the implementation of the system. The implementation process involves uploading information in the e-ProMIS for monitoring, analysis and reporting on the projects being implemented in these institutions.

Circulars from the National Treasury and the Ministry of Education, Science and Technology have indicated low uptake and implementation of e-ProMIS in public institutions. In view of this, it is necessary to investigate the influence of organisational structure on the implementation of the e-ProMIS. Most of the ICT related studies

conducted in Kenya especially in the education sector have focussed on adoption of eLearning in universities and secondary schools. These studies have also mainly focussed on influence of variables such as staff attitude, human resource capacity, personal characteristics, school environment and availability of ICT infrastructure (Gakuu, 2006; Gakuu&Kidombo, 2010; Keiyoro, 2010; Mbwesa, 2010; Mulwa, 2012). There appears to be limited focus on the organisational factors or corporate level factors and how they influence adoption and implementation of ICT based technologies. This study therefore, deviated from this research trend by seeking to establish the influence of organisational structure on the implementation of e-ProMIS in public tertiary institutions in Kenya.

Theoretical Perspective

Organizational structure is defined as the set of all the ways in which the work is divided into different tasks, achieving coordination (Mintberg, 1983). Child (1972) defined this term as the formal allocation of work roles and the administrative mechanisms to control and integrate work activities including those which cross formal organizational boundaries. The structure reflects the formal scheme of relationships, communications decision processes, procedures and systems which allow an organization to develop its functions and achieve its objectives (Leon and Garcia, 2011). Organizational structure also reflects the way in which information and knowledge is distributed within an organization, which affects the efficiency of their utilization. Consequently it substantially influences the distribution and coordination of the company's resources, the

communication processes and the social interaction between organizational members (Leon and Garcia, 2011). Therefore, configuration of organizational structure impedes or facilitates the capacity of the company to adapt to change, to learn, to innovate or to improve its ability to generate added value for its customers.

The objectives of the organizational structure are to coordinate different parts of the organization and different areas of work; provide flexibility in order to respond to changing environmental demands; monitor the activities of the organization; provide social satisfaction to members of the organization; ensure effective and efficient organizational performance, including the utilization of resources; and provide accountability of areas of work undertaken by groups and individual members of the organization (Malan, 2003). Enock (2001) suggest six major dimensions as components of organizational structure; formal reporting relationship level of authority and span of control; motivation of employees through systems of performance appraisal; systems for communication of information, integration of effort and participation in organizational activities; delegation of authority and providing procedures for monitoring and evaluating the action; allocation of individual tasks and responsibilities, job specialization and definition and grouping together of sections, departments, divisions and larger units.

Researchers have operationalized organizational structure using differing typology and dichotomy. Burns and Stalker (1961) developed a dichotomy of

organizational structures corresponding to differential abilities to process information, which distinguished between mechanistic and organic structure. Bureaucratic and mechanistic structures were well suited for mass production in a stable environment and were based on the belief that organizations are rational entities whose design is a science and where people are considered economic components. They are characterized by different hierarchy levels, where organizational vision emanates from the top, and through a long process of downwards communication reaches the employees; intense work division, which generates high work specialization; high degree of horizontal differentiation, with specialized role responsibilities which implies functional grouping and rigid departmental separation; high formalization derived from the strict adherence to formal rules and regulations; and high centralization and relational complexity resulting from the managers' need to coordinate the organizational activities required to develop the vision of their planning control and continuous intervention in problem resolution, decision making and management (Leon and Garcia, 2011). These organizational forms develop a considerable hierarchical control while the managers are the key agents responsible for establishing organizational hierarchy and creating highly formalized groups of rules, protocols and formal procedures that hide information flows through the functional and hierarchical frontiers.

Organic and decentralized structures perceive organizations as complex and social entities, where individual and social

forces compete and interact. Their main characteristics are; their flat structures, formed by top managers, strategic groups and multidisciplinary team work, where vertical decision making is replaced by horizontal collaboration; narrow horizontal differentiation based on expertise and knowledge specialization rather than an operative specialization, where departmental barriers disappear and multidisciplinary work teams are formed, made up of experts from different areas who integrate their specialized knowledge in the design and production of complex products; low vertical differentiation, as a consequence of workers participating in their management and control; little formalization of behavior, ensuring information distribution and effective coordination; and decentralization of power and control, resulting in proactive employee participation, organizational management, and an open and trust-based culture (Leon and Garcia, 2011). These organizational forms have a flat and horizontal shape, with only three layers of management between the top and the front line.

A review of the literature on organizational structure (Mintberg, 1983; Child, 1972; Leon and Garcia, 2011; Kandie, 2009; Ronoh, 2013) has identified several design variables proposed by different authors; however, although the content is the same, there can be alternative forms for expressing the same content. The hierarchical dimensions of structure such as complexity, formalization and centralization have received more attention than any other (Kandie, 2009). Each of these dimensions is also the dominant characteristics of a well-

known structural type. Complexity refers to the degree of differentiation that exists within an organization. Formalization refers to an organization where there are explicit job descriptions, lots of organizational rules and clearly defined procedures covering process. Centralization refers to the degree to which the right to make decision and evaluate activities is concentrated. This study took this approach in investigating the influence of organizational structure on the implementation of e-ProMIS.

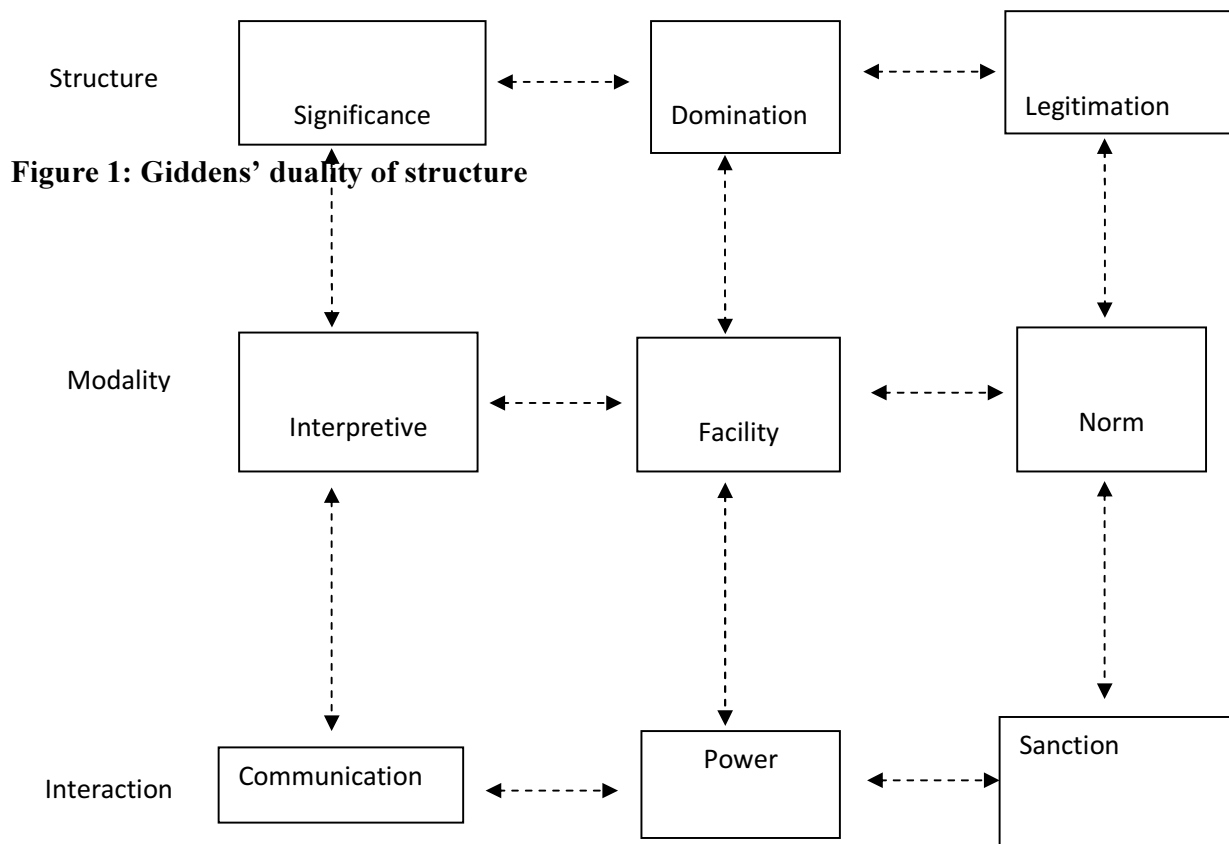
Studies conducted on the relationship between organizational structure and implementations of technologies have mainly concentrated on effect of IT implementations on organizational structure (Doherty, Champion and Wang, 2010). These studies have indicated that information technologies are likely to change the role and scope of middle managers and encourage large organizations to recentralize (Doherty et al, 2010). Another reasonably common theme in the organizational literature has been the impact that new technologies might have on the standardization and formalization of working practices and procedures (Spanos et al, 2002). A study by Danerty et al. (2010) on a holistic approach to understanding the changing nature of organizational structure revealed that there is a relationship between success of IT implementation and the re-shaping of organizational structure. The study further indicated that IT systems would only deliver benefits in circumstances in which the host organization's structure is already well aligned, with the structural models and assumptions that are embedded within IT System. Singh and Hardeker

(2011) while studying the adoption and diffusion of eLearning in UK Universities revealed that the locus of control played a significant part in the adoption of eLearning. These studies have focused on how implementations of IT have influenced organizational structure. Other studies have looked at influence of organizational structure on adoption of eLearning. This study sought to investigate the influence of organizational structure based on; formalization, complexity and centralization structure, on implementation electronic monitoring system which has received little attention.

This study was guided by the Theory of Structuration developed by Giddens. In order to examine and understand the role of the individual (agency) and institution mechanisms (structure) that influence the implementation of e-ProMIS, Giddens' theory of structuration was considered to offer considerable analytic advantages. The main aim of structuration theory according to Giddens is to reconcile two long standing divisions between two differing perspective held by social theorists (Hardaker and Sigh, 2011). The first usually associated with

approaches such as functionalism, emphasizes structural aspects but ignores the role of agents. The second, for example ethnomethodology and action related research, emphasizes the role of individuals, but minimizes structural aspects (Manson et al., 2001). In structural theory, agents' actions are considered to take a place within a structural framework but at the same time it is these actions that reproduce the structures, possibly in a changed form. The notion of action taking place within a set of structures is termed the duality of structure. It is this reality that ensures continuity of social practices across time and space (Manson et al., 2001).

Giddens' contribution has been to attempt to link structure with agency. He does this by refining structure as consisting of rules and resources that are drawn on by agents in their actions. Structure for Giddens consists of three aspects, signification, domination and legitimation. These are linked to interaction through modalities. The relationships between these are shown in figure 1.



Source: Manson et al., 2001

From the diagram it can be seen that these systems are related to interaction through the modalities of the interpretive scheme, facility and norms. Signification refers to the system of semantics rules or conventions, domination to systems of resources and legitimation to systems of moral rules. The modalities serve as a bridge between the knowing and purposeful agent and the three categories of structure. Interpretative schemes are the stocks of knowledge that agents draw on when they make sense of what other agents say or how they act. Thus interpretative schemes involve giving meaning, not only to ways of talking or specific modes of discourse, but also the interpretation of actions. These interpretative

schemes will be historically informed and will be dependent on both local and more general communities (Manson et al., 2001).

Technology does not feature explicitly in Giddens' structuration paradigm; however, structuration theory has been employed to technology-induced organizational change. Orliowski's structuration model utilizes that as three components; human assets, technology (material artifacts that mediates work tasks if the individuals) and institutional properties of organizations (such as structural arrangements, business strategies, culture, control mechanisms, division of labour, expertise, communication patterns) (Hardaker and Singh, 2011).

Hardaker and Singh (2011) used the structuration theory to provide a sensitizing framework for understanding the dialectical nature of adoption of eLearning within five universities in the UK. In their study the tensions between institutional structures such as strategies, training, access to technology, technical support and time resources and level of adoption were captured by dialectic of control in Giddens's theory of structuration. Their findings indicated that the locus of control played a significant part in the adoption of eLearning. They also have shown that the individuals are more likely to adopt eLearning if they have control over their academic roles in teaching and learning. Simply communicating strategies, policies or directives from the top through formal channels or via emails are unlikely to influence lecturers. Senior management need to engage staff who they rely on to implement their initiatives by appreciating that the drivers for eLearning are significantly different from the institutional pressures (Hardaker and Singh, 2011). Allocating of resources, such as training IT support, time allowance, access to technology have no structural relevance unless they are instantiated in situations through structural principles. Simply making these available using central institution systems is not enough. Material allocative of resources might have a "real existence" but which "become resources only when incorporated within the processes of structuration" (Hardaker and Singh, 2011). The duality of structure as expressed in the theory was used to link organizational structure to the implementation of e-ProMIS.

Methodology

The study employed a mixed mode approach to conduct cross sectional descriptive survey. This approach was chosen because of its suitability for obtaining robust data set and results (Kothari, 2004). The population of the study was all public tertiary institutions implementing e-ProMIS which included Technical Training Institutes, Institutes of Technology and National Polytechnics in Kenya. The unit of analysis for the study was the institutions. Information from the Ministry of Education, Science and Technology showed that there were thirty five (35) tertiary institutions implementing e-ProMIS. Three members of staff from each tertiary institution who had been trained and given passwords by the Ministry of Education, Science and Technology so as to access and upload data into the e-ProMIS system formed part of the target for this study. The study also targeted Deputy Principals, Registrars and Heads of Department. The total target population of the study was 460 members of staff from the 35 tertiary institutions made up of 105 e-ProMIS trained staff and 355 deputy principals, registrars and HODs. Considering that the unit of analysis was the institution, a census of all 35 tertiary institutions implementing e-ProMIS was taken in this study because their number is small. The sample size of respondents from the tertiary institutions was calculated using the formula suggested by Krejcie and Morgan (1970), as indicated below;

$$s = \frac{x^2 NP(1 - P)}{d^2 (N - 1) + x^2 P(1 - P)}$$

Where:

s=required sample size

x^2 =the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841)

N= the population size

P= the population proportion (assumed to be 0.50 since it would provide the maximum sample size).

d= the degree of accuracy expressed as a proportion (0.05)

Therefore $s = \frac{3.841(460)(.50)(1 - .50)}{0.05^2 (460 - 1) + 3.841(.50)(1 - .50)} = 209.5671$ approximately 210 respondents. This sample size corresponds with sample size given by the Krejcie and Morgan (1970) table.

The study employed a combination of stratified and simple random sampling techniques. All the three members of staff trained on e-ProMIS were sampled in the study because of their knowledge on implementation of e-ProMIS in the institutions. Considering that the tertiary institutions have almost the same number of deputy principals, registrars and heads of departments, three were sampled from each of the thirty five institutions. The sample size was 210 members of staff made up of 105 e-ProMIS trained staff and 105 deputy principals and HODs was selected.

Data was collected using questionnaires. To ensure reliability of the research instrument self-administered approach was used in data collection and Cronbach coefficient Alpha

was determined so as to measure internal consistency of the research instrument. This results of the Cronbach coefficient Alpha were 0.764 on the section of implementation of e-ProMIS and 0.755 on the organizational structure section of the questionnaire. According to the rule of the thumb provided by George and Mallery (2003) coefficients greater than $\alpha > 0.7$ are acceptable. Data was analysed through data clean up, data reduction, data differentiation and data explanation. Parametric testes were used because they are more powerful and able to reduce chances of committing type II error, less likely to not reject a null hypothesis which should be rejected. Hypothesis was tested using correlation and regression analysis.

Findings and Discussion

In this section descriptive and inferential statistics of the influences of organisational structure on implementation of e-ProMIS is presented.

Descriptive Analysis of Influence of Organisational Structure on Implementation of e-ProMIS

In this study formalization, complexity and centralization were taken as the indicators of organisational structure.

Formalisation structure

Respondents were requested to indicate how often formalisation structure was applied in their institutions. They were given three items rated on a five point Likert scale ranging from: Never; Rarely; Occasionally; Frequently and Always from which to choose. Table 1

Table 1: Means and Standard Deviations for Formalization Structure

Statement	N	Min	Max	M	SD
Codified job descriptions are used by our organization.	162	1.00	5.00	2.83	0.87
Rules and procedures govern decisions and working relationship.	162	1.00	5.00	2.90	0.89
Ranges of variation are allowed within jobs in our organization.	161	1.00	5.00	2.71	1.02
Extent to which formalisation structure was utilised				2.81	0.63

The research findings in Table 1 indicate that tertiary institutions occasionally (M=2.83, SD=0.87) have codified job descriptions used by their organisations and that rules and procedures govern decisions and working relationship in their institutions occasionally (M=2.90, SD=0.83). It was further established from that ranges of variation were allowed within jobs in the institutions occasionally (M=2.71, SD=1.02). In overall, the surveyed institutions utilised the formalisation structure occasionally (M=2.81, SD=0.63).

This implies that public tertiary institutions occasionally have explicit job descriptions, lots of organisational rules and clearly defined procedures covering process.

Complexity structure

Respondents were requested to indicate how often complexity structure was applied in their institutions. They were given two items rated on a five point Likert scale ranging from: Never; Rarely; Occasionally; Frequently and Always from which to choose. Table 2 presents the findings.

Table 2: Means and Standard Deviations for Complexity Structure

Statement	N	Min	Max	M	SD
Specialist (e.g. lawyers, engineers, IS experts) are employed by our organization...	162	1.00	5.00	2.81	0.96
The level of training required for our lowest level managers and each succeeding level varied considerably	162	1.00	5.00	3.05	0.86
Extent to which complexity structure was utilised				2.93	0.75

The research findings in Table 2 indicated that specialists were employed by the organisations occasionally (M=2.81, SD=0.96) and that the level of training

required for their lowest level managers and each succeeding level varied considerably occasionally (M=3.05, SD=0.86). In overall, the surveyed institutions occasionally

(M=3.29, SD=0.24) utilised complexity structure.

Centralisation structure

Respondents were requested to indicate how often centralization structure was applied in

their institutions. They were given two items rated on a five point Likert scale ranging from: Never; Rarely; Occasionally; Frequently and Always from which to choose. Table 3 presents the findings.

Table 3: Means and Standard Deviations for centralisation structure

Statement	N	Min	Max	M	SD
Lines of communication and responsibilities are clear	162	1.00	5.00	3.27	0.92
Decisions are made by top managers and delegated to middle and low level managers	162	1.00	5.00	3.12	0.96
Extent to which centralisation structure was utilised				3.19	0.88

The research findings in Table 3 indicate that tertiary institutions occasionally (M=3.27, SD=0.92) have clear lines of communication and responsibilities and that to occasionally (M=3.12, SD=0.96) decisions were made by top managers and delegated to middle and low level managers. In overall, the surveyed institutions

occasionally (M=3.19, SD=0.88) utilised the centralisation structure.

Overall analysis on Organisational Structure

The overall findings on the extent to which tertiary institutions utilise organisational structure are shown in Table 4.

Table 4: Means and Standard Deviations organisational structure

Type of Structure	N	Min	Max	M	SD
Formalization structure	162	1.00	4.00	2.81	0.63
Complexity structure	162	1.00	4.50	2.93	0.75
Centralization structure	162	1.00	4.50	3.19	0.88
Organizational structure	162			2.96	0.54

Table 4 shows that the overall mean for organisational structure in public tertiary institutions was 2.66, and standard deviation of 0.55. Majority of them applied centralisation structure (M=3.19, SD=0.88) followed by complexity structure (M=2.93,

SD=0.75) and formalization structure (M=2.81, SD=0.63). This implies that in most tertiary institutions the right to make decisions and evaluate activities is concentrated to the top level hence little flexibility for staff at the lower level.

Correlational Analysis of Organisational Structure and Implementation of e-ProMIS

Correlational analysis using Pearson’s Product Moment technique was done to determine the relationship between indicators of organisational structure and

implementation of e-ProMIS. It was meant to identify the strength and direction of the association between the indicators of organisational structure and implementation of e-ProMIS. Table 5 summarizes the results.

Table 5: Correlation Matrix for organisational Structure and implementation of e-ProMIS

		Formalization structure	Complexity structure	Centralization structure	Composite organizational structure
Implementation of e-ProMIS	Pearson Correlation	.417**	.372**	.428**	.554**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	162	162	162	162
**. <i>Correlation is significant at the 0.01 level (2-tailed).</i>					

The correlation results in Table 5 indicate positive and significant coefficients between the indicators of organisational structure and implementation of e-ProMIS. Centralization structure and Formalization structure had a moderate and significant relationship with implementation of e-ProMIS (r=428, p-value<0.01) and (r=417, p-value<0.01) respectively. Complexity structure had a weak and significant relationship with e-ProMIS (r=372, p-value<0.01). Composite organisational structure had moderate and significant relationship (r=497, p-value<0.01) with implementation of e-ProMIS.

Inferential Analysis of Organisational Structure on Implementation of e-ProMIS in Public Tertiary Institutions in Kenya

The objective of the study was to establish the influence of organisational structure on implementation of Electronic Project Monitoring Information System (e-ProMIS). The literature and empirical evidence had suggested that organisational structure would be associated with implementation of e-ProMIS. Organisational structure was an independent variable in the study and was measured using indicators on three types of organisational structure namely; centralization, complexity and formalisation. Data was collected using 7 items, each consisting of a statement that was measured on a five point Likert-type scale. Composite index for each of the three types of organisational structure were computed and

used in testing the hypothesis. To satisfy the objective, the following hypothesis was tested using simple linear regression model.

Hypothesis

H₀: Organisational structure has no significant influence on the implementation of Electronic Project Monitoring Information System in Public Tertiary Institutions in Kenya.

H₁: Organisational structure has a significant influence on the implementation of Electronic Project Monitoring

Information System in Public Tertiary Institutions in Kenya.

The hypothesis was tested using the following linear regression model: $y = a + \beta_2 X_2 + e$

y= Implementation of E-ProMIS

a=constant

β_2 = Beta coefficient

X₂= Organisational structure

e= error term

The results are presented in Table 6.

Table 6: Regression Results of Influence of Organisational structure on implementation of e-ProMIS

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	t	P-Value
	B	Std. Error	Beta		
(Constant)	1.503	.135		11.105	.000
Formalization structure	.139	.044	.238	3.167	.002
Complexity structure	.101	.036	.204	2.777	.006
Centralization structure	.133	.029	.317	4.574	.000
Predictors: (Constant), Formalisation structure, complexity structure, centralization structure					
Dependent Variable: Implementation of e-ProMIS					
R= 0.558					
R square=0.311					
F(3,158)=23.760 at level of significance p = 0.000<0.05					

The study findings on Table 6 indicate that r is equal to 0.558 meaning that organisational structure has a strong influence on implementation of e-ProMIS. The value of R squared is 0.311, indicating that organisational structure explains 31.1% of the variation in the implementation of electronic project monitoring information

system in public tertiary institutions in Kenya. The β coefficient of formalisation structure is 0.238 that of complexity structure is 0.204 while for centralisation structure is 0.317. These results indicate that all the three types of structure: formalization; complexity; and centralization were statistically significant

with coefficients ($\beta=0.238$, $t=3.167$, $p=0.002<0.05$), ($\beta=0.204$, $t=2.777$, $p=0.006<0.05$) and ($\beta=0.317$, $t=4.574$, $p=0.000<0.05$) respectively. Specifically one unit change in implementation of e-ProMIS is associated with 23.8% changes in formalization structure, 20.4% changes in complexity structure and 31.7% change in centralization structure.

The overall F statistics was $(3,158) = 23.760$ at level of significance $p = 0.000<0.05$ suggesting that there was a statistically significant relationship between organisational structure and implementation of electronic project monitoring information system in public tertiary institutions in Kenya. This study therefore rejects the null hypothesis at 5% level of significance that organisational structure has no significant influence on the implementation of Electronic Project Monitoring Information System in Public Tertiary Institutions in Kenya. Using the statistical findings the regression model can be substituted as follows;

$$y = 1.503 + 0.238F + 0.204C + 0.317CE$$

Where y =Implementation of e-ProMIS

F = Formalization structure

C = Complexity structure

CE = Centralization structure

Findings from this study agree with Pimtong et al (2012) that organisational structures whether mechanistic or organic in nature have a relationship with organisational performance. Findings from this study also support Ouchi (1977) who argued that organisational structure is not isomorphic with its control system but that structure is related to control. In a bid to reinforce Pimtong et al (2012), Ronoh (2013)

confirmed that organisational structure has a moderate effect on both human resource strategic orientation and performance of an organisation. He further found out that a mechanistic management system was appropriate to stable conditions whereas an organismic form is appropriate to changing conditions.

The findings further agree with those of Kandie (2009) that centralization was the most widely used type of structure. However this study found complexity to come second followed by formalization. It further reinforces Kandie (2009) findings that structure has a powerful influence on performance of an organisation including in the implementation of ICT based technologies like e-ProMIS. This implies that for effective implementation of e-ProMIS and other ICT based systems an appropriate organisational structure is necessary. The new system should be properly aligned to the structure in the organisation.

Conclusion

The research objective in this study was to examine the extent to which organisational structure influenced the implementation of electronic project monitoring information system in public tertiary institutions in Kenya. Based on the review of literature, organisational structure was categorized into formalization, complexity and centralization. Indicators for each category were included into the research instrument. Descriptive analysis indicated that majority of the public tertiary institutions in Kenya applied centralisation structure followed by complexity and formalization structure. This

implies that in most tertiary institutions the right to make decisions and evaluate activities is concentrated to the top level hence little flexibility for staff at the lower level. Organisational structure was found to have a strong influence on the implementation of e-ProMIS. Specifically, formalization structure had more influence on implementation of e-ProMIS than centralization. Complexity structure was found to have no statistically significant influence on implementation of e-ProMIS. It can therefore be concluded that although organisational structure strongly influence implementation of e-ProMIS, organisations that have formalized or centralized structure tend to implement e-ProMIS better. Further it can be concluded that complexity organisational structure is not ideal for implementation of e-ProMIS. Other variables could have an influence on the implementation of e-ProMIS but this study was delimited on the influence of organisational structure.

Implication of the study

Considering that the Government of Kenya is moving towards implementation of e-government in various aspects of service delivery including e-ProMIS, e-procurement and filling of tax through itax among others, this study has implications to the government, implementing agencies and citizens. The study findings have indicated that organisational structure has a statistically significant influence on implementation of e-ProMIS. This implies that for successful implementation of e-ProMIS and other e-government systems organisational structure is imperative. In this era of digital systems public and private institutions that intend to

implement ICT based technologies should ensure that their organisations adopted the right structure that is well aligned to supporting e-government systems.

References

- Bhat, A. B., Verma, N., Rangneka, S., & Barua, M. K. (2012). Leadership style and team processes as predictors of Organisational learning. *Team Performance Management*, Vol. 18 No. 7/8, pp. 347-369.
- Child, J. (1975), "Managerial and organizational factors associated with company..... a contingency analysis", *Journal of Management Studies*. Vol. 12 Nos 1-2, pp. 12-27.
- Cochran, W. G. (1977). *Sampling techniques (3rd ed.)*. New York: John Wiley & Sons.
- Gakuu, C.M. (2006). *Analysis of the factors and attitudes that influence lecturers' readiness to adopt Distance Education and the use of ICT in teaching: The case of the University of Nairobi*. An unpublished PhD thesis of the University of Nairobi.
- Gakuu, C.M., & Kidombo, H.J., (2010). Pedagogical integration of ICT in selected Kenyan secondary schools. *Journal of Continuing, Open and Distance Education*. University of Nairobi. Vol.1 pp. 73-95.
- George, D., & Mallery, P., (2003) *SPSS for Windows Step by Step: A Simple Guide and Reference 11.0 Update (4th Ed.)*. Boston; Allyn & Bacon.
- GOK, (2001-2012). *Electronic Project Monitoring Information System for Kenya: Analytical Interface User Manual Version 2.2*
- Hardaker, G. & Singh, G. (2011). The adoption and diffusion of eLearning in UK universities A comparative case study using Giddens's Theory of Structuration, *Campus-Wide Information Systems* Vol. 28 No. 4, pp. 221-233
- Kandie, P. Y. (2009). *The influence of organisational strategy, institutional factors and performance of Small and Medium Enterprises (SMEs) in Kenya*. Unpublished PhD thesis, School of Business, University of Nairobi.

- Keiyoro, P.N. (2010). *Factors influencing the effective use of ICT in teaching and learning science curriculum in Kenyan secondary schools: The case of Cyber and NEPAD e-schools*. An unpublished PhD thesis of the University of Nairobi.
- Kothari, C. K. (2004). *Research Methodology Methods and Techniques, Second Revised Edition*. New Delhi. New Age International (P) Limited Publishers.
- Krejcie, R. V. & Morgan, D. W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*. Vol. 30, pp 607-610.
- Leon, I.M. & Garcia M.A. (2011). The influence of organizational structure on organizational learning. *International Journal of Manpower*, Vol. 32 No. 5/6, pp. 537-566
- Mansor, N. N., Chakraborty, A. R., TayKe Yin, T. K., & Mahitapoglu.Z. (2012) Organizational Factors Influencing Performance Management System in Higher Educational Institution of South East Asia. *Procedia - Social and Behavioral Sciences* 40, 584 – 590.
- Mbwesa, J. K. (2010). Faculty perception on the effectiveness of Wedusoft as a learning management system. *Journal of Continuing, Open and Distance Education*. University of Nairobi. Vol.1 pp. 25-42.
- Milan, A. (2003). *Applying McKinsey's 7S model within healthcare system (MHS) to assess the organisation's effectiveness and ability to adapt*. Faculty of economics and management science, Rand Afrikaans university. Downloaded of 12th February 2014.
- Mintzberg, H. (1983), *Structure in Fives: Designing Effective Organizations*. Prentice Hall, Englewood Cliffs, NJ.
- Mulwa, A. S. (2012). *The influence of institutional and human factors on readiness to adopt. E-Learning in Kenya: The case of secondary schools in Kitui district*. An unpublished PhD thesis of the University of Nairobi.
- Nitithamyong, P., & Skibniewski, M. J. (2011). Success factors for the implementation of web based construction project management systems; A cross-case analysis. *Construction Innovation* Vol. 11 No. 1, pp. 14-42
- Ouchi W.G. (1977). The relationship between organisational structure and organisational control. *Administrative science quarterly* 22(1) 95-113
- Pimpong, T., Hangin. Q. Z., & Hailin, Q. (2012). The effect of competitive strategies and organizational structure on hotel performance. *Emerald* 24, 100-114
- Ronoh J.B. (2013). *Business strategy, organizational structure, human resource strategic orientation and performance of large private manufacturing firms in Kenya*. An unpublished PhD thesis of the University of Nairobi.
- Samuelson, O. (2008), "The IT-barometer – a decade's development of IT use in the Swedish construction sector", *Journal of Information Technology in Construction*, Vol. 13, pp. 19.
- Saunders M., Lewis P., Thornhill A. (2003) *Research methods for business students*. Prentice
- Singh, M. K., Gupta, A. K., & Sharma, S. A. (2011) Web Based Project Monitoring system CPWD. Info Jyothi Software Consultancy, Chennai
- Sivagnanasothy, V. (2007). *Institutionalization of Monitoring and Evaluation System in Sri Lanka – Lessons learnt, Best practices, Issues, Challenges and the Way Forward*. Ministry of Plan Implementation
- Thorpe, T. and Mead, S. (2001), "Project-specific web sites: friend or foe?" *Journal of Construction Engineering and Management*, Vol. 127 No. 5, pp. 406-13.