AN EVALUATION OF ENTERPRISE RESOURCE PLANNING SYSTEMS IMPLEMENTATION EXPERIENCES FOR SELECTED PUBLIC UNIVERSITIES IN KENYA

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ABSTRACT

Implementation of Enterprise Resource Planning (ERP) Systems has found widespread usage in large and mid-sized institutions worldwide. There has been a rapid increase in implementation of these systems in management and administration of institutions of higher learning. To establish the implementation experience in public universities in Kenya, the research study has used the Diffusion of Innovations Theory and the Information Systems Success Model. The study was carried out on evaluation of implemented integrated enterprise resource planning systems in selected public universities in Kenya. The study sought to investigate existing implementation of enterprise resource planning systems in public university management in Kenya and how they have influenced automation efforts in these institutions. Various challenges are evaluated on the ease of use of integrated systems in administration and management of public universities. Recommendations are drawn on probable ways of utilizing the enterprise systems not only to overcome existing management challenges but also improve service delivery in line with respective institutional strategic objectives. From the findings of the study, most of the implementation projects had been abandoned or stalled altogether. Challenges associated with institutional connectivity and limited skilled expertise to drive the implementation processes were highlighted as leading influencers of implementation processes in respective public universities. The study recommends increased investments towards improvement in institutional connectivity, blending of internal and external skilled expertise to drive implementation initiatives and regular contribution of implementation experiences in internal and external seminars for future studies and contribution to the body of knowledge.

Keywords: ERP Systems, Integrated Information Systems, Implementation Processes, Strategic Objectives, Management Challenges, Skilled Expertise

Background of Study

According to Gupta (2008) ERP systems have gained widespread appeal in the 21st century owing to their "do it all" approach to organizational management. With more users seeking to link application systems to departmental processes, public universities in Kenya are seeking ways to integrate their operations in a bid to cut on operational costs, offer timely response to their clients and interact with their stakeholders in 'real-time'. To meet these requirements, public universities in Kenya have resorted to use of ERP systems to automate their operations on a standardized platform in line with their strategic plans. With past studies laying emphasis on ERP systems in business scenarios in Kenya, the study herein sought to explore implementation of ERP systems in Kenyan public universities in their quest to improve quality of their service to meet regional as well as global standards.

Statement of the Problem

The Implementation experiences as reviewed by Huang and Palvia (2001) vary across different developing countries. In the Kenyan context, much of the literature on ERP systems has centred on manufacturing and business sectors. With a glaring lack of clarity on implementation experiences especially in public universities as they seek to implement ERP systems there was need for a study to unearth implementation experiences for public universities in Kenya. It is on this basis that the study sought to evaluate implementation experiences based on quality of systems used, communication and service delivery functions to public universities in Kenya.

Objectives of the study

The study utilized one main objective with three specific objectives to evaluate implementation experiences in public universities in their use of Enterprise Resource Planning Systems. The main objective of the study was to find out the implementation experiences in public universities in their use of Enterprise Resource Planning Systems

Specific Objectives
The study focussed on the following specific objectives:

   (i)   To examine how ERP systems used affect implementation experiences for public universities
   (ii)   To establish how ERP based communication affects implementation experiences for various public universities in Kenya
   (iii)   To determine how ERP systems in service delivery influence implementation experiences in public universities in Kenya

Research Questions

The research study sought to answer the following questions

   (i) How does ERP systems used affect the implementation experiences for public university in Kenya?
   (ii) How does ERP systems based communication processes affect implementation experiences for public universities in Kenya?
   (iii) How does use of ERP systems affect service delivery in public universities in Kenya?

Scope of the Study

The research study sought to establish the experiences of various public universities in Kenya in their implementation of Enterprise Resource Planning Systems to automate their operations. This included type of system implementation cycles used, benefits realized from the systems and challenges experienced as a result of use of ERP systems in their management processes. In carrying out the study, the target population comprised of 15 (fifteen) ICT administrators and technicians in each of the three public universities in Kenya under study. The choice of ICT administrators and technicians in public universities as target respondents owed to their knowledgeable background on the research problem. This helped to obtain relevant data for use in the research study.

LITERATURE REVIEW

As part of the theoretical framework, the study has been anchored on the Diffusion of Innovations Theory (DOI/DIT) by Rogers, (2003).The theory has been used to provide a theoretical backbone to the study. In addition to the Diffusion of Innovations Theory, the study further utilizes the Information Systems Success (ISS) model to further review the key variables in the research study.

Diffusion of Innovations Theory
Diffusion of Innovations (DOI) Theory was coined by E.M Rogers in 1962 and later revised in 2003. It is a widely used theory in social science disciplines. The theory has its basis in communications and seeks to explain how an idea or product gains momentum and spreads through a specific population or social system. The result of this diffusion is that users take up the new idea or innovation. Adoption as brought out in the theory assumes that users react differently to an innovation compared to previous products or innovations. This facilitates the diffusion process.

Diffusion of Innovations Theory posits that theoretically, 49%-87% of the variance of an innovator's rate of adoption is explained by its perceived attributes, type of innovation decision, and nature of social system which the innovation is diffusing and the extent of the agents' promotion efforts in diffusing the innovation (Nzuki, 2012). The theory is useful to both the developers and users of ERP systems in evaluating how these systems are implemented in various projects. As argued by Rogers (1995), an innovation such as use of Enterprise systems in management of higher education institutions is regarded as a technological innovation. This is realized as a result of paradigm shift from stand-alone information systems to integrated information systems.

As argued by Sahin (2006), the process of implementing new innovations as discussed at length by Rogers (2003) in the book, *Diffusion of Innovations,* the studies cited in the publication border on various disciplines including education and technology. The theory advanced by Rogers (2003) has found widespread usage in understanding technology diffusion and adoption. As cited by Medlin (2001), the theory is useful in investigating implementation of technology in higher education environments. In carrying out the research study, the theory is useful in evaluating the experiences of public universities in Kenya in their implementation of enterprise resource planning systems.

The research study borrows heavily from the third (decision) and fourth (implementation) steps in the DOI theory. With deployment of ERP systems in management of public universities in kenya interpreted as an innovative strategy in the study, various institutions are assumed to have undergone the first, second, and third processes in the diffusion of innovations theory as advanced by Rogers (2003). These include gathering knowledge about the ERP systems, persuading stakeholders to support the selected systems in automating their institutional operations and making the decision to implement the systems.

While guided by the diffusion of innovations theory, the researcher will sought to establish the institutional experiences during the implementation phase of the ERP systems in public universities.

Information Systems Success Model
The research study employed use of the Information Systems Success model. The information systems success model as advanced by Delone & McLean (2003) is based on earlier research in communications by Shannon and Weaver as well Mason's theory on Information Influence. As highlighted in the model, three key pillars of information systems success are advanced. These include System Quality, Information Quality and Service Quality. The theoretical model makes use of a causal relationship to analyse success of implementation of information systems in institutions.

Information Systems Success Model as revised by DeLone and McLean comprises of six interrelated dimensions which influence success in implementation of an information system. These include information quality system quality and service quality as independent aspects. These affect the intention to use, user satisfaction and net benefits derived from implementation of an information system. According to the model, an information system such as an ERP system can be evaluated in terms of information, system and service quality. These subsequently determine system use, intended use, target user satisfaction and net benefits from deployment of the system. Net benefits derived from use of an ERP system can be of either positive or negative influence to satisfaction of users. Net benefits from implementation of an ERP system help to determine feasibility of implemented system (DeLone & McLean, 2003).

The information systems success model was useful in studying integrated institutional management information systems and their usage in public universities in Kenya. By using the model, the objectives of the research study were best addressed to ascertain not only challenges but also benefits of deployment of these systems in management of public universities.

EMPIRICAL REVIEW

ERP systems have found widespread usage in large organizations across various continents. To keep up with the management demands in the 21st century as observed by Nyandiere *et al* (2012), universities have turned to ERPs to replace their legacy systems. Though initial implementation was observed in manufacturing industries, universities have taken up the systems to provide institutional-wide automation for their processes (Ferrell, 2003). This has aided them automate their core business areas in student administration, finance, staffing, client management among others. On implementation, these systems are anticipated to provide increased efficiency and effectiveness of processes, reduce overhead costs in ICT, improve decision making, improve resource management as well as building business innovation while supporting strategic change (Sullivan and Bozeman, 2010).

As argued by Davenport (2003), ERP systems provide seamless integration of all information flowing through a company's departments. With the seamless integration of information within institutions, managers are able to overcome frustrations emanating from incompatible systems and inconsistent operating practices. Acquisition of these systems may be through commercial off-the-shelf systems or custom designed systems in line with a university's needs. Past studies in implementation of ERP systems in educational institutions have focussed more on the benefits that an institution can derive from adopting an ERP system. However, more literature on pitfalls facing these implementation experiences needs to be highlighted to inform current and future adoption of ERP systems in university administration (Yetton and Sharma, 2003)

According to Verville and Halingten (2003), ERP systems are used to connect back-office operations such as manufacturing, financial and human resources into one system. In the current decade, enterprise resource planning has evolved to a suite of application modules that are used to link back-office operations to front-office operation as well as internal and external supply chains. They conjoin functional areas and business processes in a seamless integrated environment. This provides a wider scope for applicability to organizations. Enterprise Resource Planning systems have gained widespread usage in large corporations and institutions across the globe. In contemporary trends witnessed in higher education as pointed out by Zornada (2005), universities have turned to ERP systems as a means of replacing existing management and administration techniques by use of computer systems.

Pollock (2004) in a study aimed on ERP systems use in a UK university points out that the uniqueness of a university set up makes most business ERP systems incompatible with their functions. This necessitates a custom development of a system compatible with the structure and functions of a specific university. The choice of either a custom development or adoption of a readily available system should be informed by informed by a thorough systems analysis and design evaluation while putting the institutional strategic objectives into consideration (Basoglu and Kerimoglu, 2007). This can be achieved by drawing up an elaborate implementation framework to guide the process.

Implementation of ERP systems in institutions is a complex process. A multiplicity of factors influences success rates in implementation of ERP systems from one organization to another. With the current seeking to establish the effect of some of these factors in implementation of ERP systems in public universities in Kenya, earlier studies in developed societies such as Shah *et al.* (2011) cite factors such as top management support, user involvement, vendor support, overlooking of change management aspects, turnover of vendors team member, transfer of top management in beneficiary institutions as key factors affecting successful implementation of ERP systems in organizations. Other factors identified include project cost overruns and delayed project schedules and their effect on user requirements.

Implementation of ERP systems requires drastic change to the existing work processes and such change needs to be managed for its success. Past studies have indicated that successful implementation of ERP systems in institutions is concerned with the degree of mutual fit between an ERP system selected and business processes in an institution (Olson, 2004). Other studies such as Nah *et al.* (2001) identify various challenges that organizations face during ERP implementation. These if reviewed by universities provide useful resources to inform their implementation processes and avoid potential pitfalls. These challenges involve people, processes and technology used in the implementation processes.

Implementation of ERP systems in public universities is not a technology but a people project as argued by Leon (2008). In this regard, preference is given to the role of users in determining the implementation of an enterprise system. Zhang *et al.* (2002) further argues that user involvement at initial stages of ERP system implementation is helpful in understanding a system so as to provide valuable feedback. Hartwich and Barki (2001) explain user involvement as a psychological state of the individual and as the importance and personal relevance of an ERP system deployment to a user. In light of this, user participation in defining needs and implementation of ERP systems in public universities is essential especially in improving service delivery. Matching user needs to choice of system used, service requirements and functional abilities of the chosen system are essential in determining the success in implementation of an ERP system (Motwani *et al*, 2005).

Acquisition of established custom computer systems for institutional information convergence is a popular trend in universities across the global divide. As argued by Pollock, (2004), more and more universities are adapting general solutions to their integrated management information system needs. To

this end, use of generic software systems to meet the widest possible scope of their activities and processes is implemented. This is aimed at providing a host of management solutions which include cost savings, expediting processes and improving access through reliable platforms. However, attainment of these objectives is likely to vary from one institution to another and formed part of the research study in the Kenyan context.

Literature Summary

ERP systems have found widespread usage in large and mid-sized corporations worldwide. In the last decade as argued by Cornford & Pollock (2004), there has been a rapid increase in implementation of ERP systems in management and administration of educational institutions. In this regard, universities have turned to ERP systems to replace existing management and administration computer systems. In analysing rollout of ERP systems in Public Universities, focus has been placed on development, implementation and use of both generic and university specific functionalities. These technologies have been used to improve service delivery in public universities as they claim their footing in the higher education landscape.

With the promise of improved efficiency, reduction of duplication of resources and improvement in process timelines, public universities in Kenya have turned to implementation of ERP systems. These are seen to provide potential solutions to address growing automation requirements for efficiency. Feasibility of these systems against the backdrop of their promise in revolutionizing the higher education landscape in Kenya has been revisited in the research study herein. To achieve this end, the study has utilized the 'Diffusion of Innovations Theory' by Rogers (2003) and the 'Information Systems Success Model' advanced by Delone & McLean (2003) to provide a detailed examination of implementation of ERP systems in Kenyan public universities. The theoretical basis and empirical review brought out in the study also influenced the formulation of the illustrated conceptual framework which guided the entire research study.

RESEARCH METHODOLOGY

The research study adopted a descriptive research design. The choice for use of descriptive research design was to provide a comparative approach to the use of enterprise resource planning systems in integrating management of public universities in Kenya against a backdrop of other success cases in developing and developed nations. This also helped the researcher in using comparative statistical methods to analyse the research subject in the target public universities.

Target Population

The target population comprised of ICT personnel in public universities in Kenya. A sample population was derived from their respective ICT departments. The choice of ICT departments in these institutions owes to their familiarity with the subject of the proposed study.

Sampling and Sampling Design

Purposive sampling was employed in arriving at sample populations that were used in the research study. According to Mugenda & Mugenda (2003), purposive sampling allows a researcher to use cases that have the required information with respect to the objectives of the study. Case subjects can thus be hand-picked since they are informative or have the desired characteristics. The choice of purposive sampling in the proposed study is to ensure that key aspects of the study population such as skill levels and experience in use of ERP systems are taken into consideration. Out of a total population of 45 (Forty

five) ICT technicians and administrators in the three public universities that were studied based on an informal survey by the researcher, a census was carried out to maximize responses to the study.

Data Collection

From the research study, this comprised of gathering responses from the target population for further analysis. Data collection comprised of data sources, research instruments and data collection procedures. The research study relied on both primary and secondary data sources. Primary data was gathered using structured questionnaires. In addition to the primary data, secondary data from journals, white-papers and e-books was also used to provide comparative perspectives to the study. The research study utilized questionnaires as the primary research tools.

Validity and Reliability

According to Mugenda and Mugenda (2003) validity is the accuracy and meaningfulness of inferences based on research results. It comprises of the degree to which results obtained from the data analysis represent the subject of the study. To ensure validity, accuracy of research data has been put into consideration to represent variables of the study. To realize this, all the independent and depend variables were included in the study questionnaire.

Reliability of research as argued by Mugenda and Mugenda (2003) refers to the degree to which a research instrument yields consistent results or data after repeated trials. Reliability in research can be influenced by random error. This may arise from inaccurate coding, ambiguity of instructions to respondents, fatigue on researcher and respondents and bias. To address reliability of the research, pre-testing of the research instruments through a pilot test was done. The test-retest method used as observed by Ngechu (2004) helped in obtaining a coefficient of reliability and suitability of the instrument. If the coefficient is low, a review of the instrument would have been done. If the coefficient was high, which happened to be the case, the study instrument used was deemed to have high test-retest reliability in carrying out the study.

Data Analysis & Presentation

Data collected from the research study was analysed using descriptive statistics, relational statistics, factor analysis and logit regression analysis. This helped in providing a relational summary of findings on the subject across all target populations (Gujarati, 2003). With considerable inferential data obtained from the research study, use of a logit regression model was utilized to analyse the relationships between the independent variables and the dependent variable. The model used was as follows: $P_i = E(Y=1|X_i) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$

Ethical Considerations

Ethical practices that were put into consideration during the research study included confidentiality of responses, anonymity of respondents, honesty in reporting findings from the proposed study and integrity in handling data and information collected from the research study. In addition, the researcher used random identities to ensure privacy of participating institutions. Presentation of findings has been done without disclosure of respondents' identities.

DATA ANALYSIS

The objective of the study was to evaluate the experiences of public universities in their implementation of ERP systems. In evaluating these experiences, the study sought to establish the experiences based on

quality, communication and service delivery aided by use of ERP systems and how they affect the implementation experiences of the selected universities. The study was carried out in three public universities as part of twenty three (23) public universities which were fully accredited by the commission for university education by the end of year 2013.

Response Rate and Reliability of Data

A total of 93 structured questionnaires were distributed in all the three selected universities. These targeted 31 members of ICT directorates in each of the three selected universities. The study collected data from 79 respondents which constituted of a response rate of 84.9%. This was adequate for statistical analysis of findings. As argued by Mugenda and Mugenda (2003), a response rate above 70% is excellent. In this regard, a response rate of 84.9% was adequate for the purpose of this study.

Response Rate	Frequency	Percentage
Response	79	84.9
Non-Response	14	15.1
TOTAL	**93**	**100**

Source: Research Data, 2014

Reliability of Study Findings

Cronbach's Alpha

Variable	Cronbach's Alpha	No. of Items
ERP System Attributes	.834	7
Communication	.793	8
Service Delivery	.802	6

Source: Research Data, 2014

In evaluating reliability of findings through the study instrument used, a pilot study was carried out on 10 respondents. Using Cronbach's Alpha, internal consistency was evaluated. This was aimed at establishing how sets of variables are related in the group. As argued by Nunnally (1994), a construct composite reliability coefficient above 0.7 is considered adequate for reliability of a research tool in carrying out a study.

From the results of the pilot study, 'system attributes' scale had a composite reliability coefficient of 0.834. 'Communication' scale had a composite reliability coefficient of 0.793. 'Service Delivery' had a composite reliability coefficient of 0.802. From the pilot study, the scales measuring the objectives had a very high reliability. This was indicative that the research tool was sufficiently reliable to carry out the study without further amendment.

Inferential Statistics

In analysing inferential data collected from the study, regression analysis was conducted to determine whether ERP system attributes, communication and ERP based service delivery influence implementation of ERP systems in public universities. The following model was used in analysing inferential data:

$$P_i = E(Y=1|X_i) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where Y=1 implies that a public university has implemented an ERP system; X_1 refers to the quality of ERP system implemented at the public university. X_2 refers to the communication function of the ERP system implemented in the institution and X_3 refers to the service delivery component of the ERP system implemented in the institution. These are the independent variables in the study. β_0 is a constant while ε is the error term in the function. The error term ε was computed when checking for reliability of research questionnaires prior to the actual study. $E(Y=1|X_i)$ implies a function with a regressand Y and regressor X_i.

Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.869	.755	.720	.96574

From the model summary in table 4.9 above, there was a very strong positive relationship (R=0.869) between the dependent variable (ERP implementation experience) and the independent variables (system quality, communication and service delivery). The value of adjusted R Square (R^2= 0.720) indicates that 72.0% of ERP implementation experiences in public universities in Kenya could be explained by the independent variables of the study which comprise of ERP system quality, ERP based communication and Service delivery over ERP platforms.

Estimated parameters of variables affecting ERP implementation experiences

Variable	Regression Coefficient (β)	Wald Statistics	t-value	p-value
1. System attributes	0.004	5.552	2.000	0.018
2. ERP based Communication	1.643	1.643	1.269	0.201
3. ERP based service delivery	4.846	1.379	2.211	0.013
Constant	-32.246	4.185	-2.123	0.032

Chi-square (df = 3)   = 54.2
(-2) Log likelihood   = 13.642
Accuracy of prediction overall (%) = 97.90
Nagelkerke R^2 = 0.755

By discriminating predictors on basis of magnitude of Eigen values, the logit model used was run several times until three (3) predictors which had Eigen values higher than 1.532 selected as per table 4.9.2. The predictors were ERP system attributes, ERP based communication, and ERP based service delivery. Regression coefficients reflected standard errors, t-values, Wald statistics and p-values. The logit model generated a chi-square value of 54.2 and p-value 0.000 which was significant since the P-value was less than 0.05. Further to this, the logit model's overall prediction accuracy was 97.9% indicating that the overall fit of the model was good.

The logit model above established that taking all variables at a constant, a unit increase in ERP system attributes results in to a 0.004 increase in ERP implementation experience in public universities. A unit increase in ERP based communication yields 1.643 increase in ERP implementation experience. In addition, a unit increase in ERP based service delivery leads to a 4.846 increase in ERP implementation experience in public universities. From the model above, it is worth noting that ERP based service delivery contributes most to ERP implementation experiences in public universities in Kenya. At 5% level of significance; ERP system attributes had a 0.018 level of significance, ERP based communication had 0.201 level of significance and ERP based service delivery had a 0.013 level of significance. This indicates that ERP based service delivery is the most significant factor affecting ERP implementation experiences in public universities in Kenya.

In addition, the logit model used yielded a Nagelkerke R^2 value of 0.755 meaning that 75.5% of the dependent variable (ERP implementation experience) can be explained by the independent variables; system attributes, ERP based communication and ERP based service delivery. The logit model generated a -2log likelihood value of 13.642, which indicates that the model was appropriate.

RESEARCH FINDINGS

ERP System Attributes

The study established that ERP system attributes have significant influence on implementation experiences of enterprise systems in public universities. Quality and functional attributes of implemented ERP systems have a significant influence on implementation experiences of Kenyan universities. With respect to integration with existing systems prior to ERP implementation, choice of systems by public universities had average effect reflecting significant contribution towards shaping their implementation experiences.

ERP Based Service Delivery

Integration of ERP systems with business software used by public universities, migration of data to ERP platforms and data security over ERP platforms had average effect on implementation experiences for public universities in their quest to automate their operations over an ERP platform. As brought out in the study findings, successful implementation of ERP systems in public universities has been dependent on availability of adequate mix of internal and external human resources. In implementing ERP systems in public universities, the main influential factors affecting implementation strategies undertaken include project cost overruns where initial budgets have fallen short of total implementation costs.

ERP Based Communication

Study findings indicate that performance monitoring information in ERP application management strategies was effective. This is aimed at providing seamless integration of implemented system with institutional functions. In addition, the study findings point out that effective monitoring for availability

in ERP application management is carried out. The challenge remains in uncertainty of communication processes carried out through ERP platforms in public universities. With communication interfaces experiencing frequent problems, this hurts reliability of communication processes over ERP platforms in public universities. The study concluded that successful implementation of ERP systems in public universities requires consideration of system attributes, communication interfaces and service delivery functionalities of deployed enterprise systems.

RESEARCH CONCLUSION

To achieve desired productivity of enterprise systems, technical improvements and reduction of operational costs is required. From the study, this can be done by aligning institutional functions to functionality of enterprise system under implementation. This resonates with observations by Sylvestre, (2004) on the need for examining system characteristics and aligning these with functional areas of the institution in need of automation. From the study, public universities should prepare for implementation of ERP systems by aligning their functional areas to meet ease of automation and integration of their operations with implemented enterprise systems. This would help in choosing an ERP implementation type and customization that not only meets institutional functional needs but also budgetary constraints of the respective institution. In cognizance of recommendations by Pollock (2004), public universities should focus on restructuring their functional elements for ease of implementation of enterprise systems.

To achieve desired levels of service delivery in institutions, use of adequate mix of both internal and external expertise is required in implementation of enterprise systems by public universities. This ensures that ERP projects undertaken are assured of continuity to completion while maintaining desired functionality. As brought out in study findings on table 4.6, need for an adequate mix of both internal and external human resources to lead implementation initiatives is a critical concern. With a mean deviation of 2.3544 which is indicative of a critical success factor for successful ERP system based service delivery, public universities should provide relevant training for their internal staff while sustaining adequate technical support from external staff in implementing their enterprise system. This helps in ease of technology transfer and capacity building for staff tasked with implementation of enterprise systems in respective institutions.

The above findings resonate with arguments by Leon (2008), which indicate that ERP system implementation is a people project and not a technology project. This was evident from the findings of the study where inadequate internal and external human resources were cited as critical factors affecting implementation of enterprise systems in sampled public universities.

From the study, high levels uncertainty in institutional connectivity was decried by most respondents. With a mean deviation of 2.3165 from table 4.7, which is indicative of the high frequency of problems experienced with communication interfaces, institutions need to address connectivity issues to be in a position to provide uninterrupted communication and seamless connectivity over enterprise systems platforms implemented. The above findings fail to meet recommendations by Sullivan and Bozeman (2010) which foresee increased efficiency, process improvements and improved resource management from implementation of enterprise systems in institutions. Despite these setbacks, there have been significant efforts towards seamless connectivity of departments in public universities using enterprise systems.

RECOMMENDATIONS

The study recommends continuous review of ERP implementation efforts in public universities. This should be done to provide up to date literature on progress and experiences in various institutions for

information and contribution to the body of knowledge in use of enterprise systems in higher education in Kenya. Continuous review should be done to avoid stalled as well as abandoned ERP implementation efforts in public universities. This is a worrying trend in implementation of ERP systems in higher education institutions in Kenya. The observations resonate with findings by Huang and Palvia (2001) which point out that literature on use of enterprise systems is lacking in developing countries.

An ERP deployment should be undertaken when sufficient critical success factors are addressed to position an institution favourably in successfully implementing an ERP system. The chosen ERP system by an institution should not only meet present functional requirements of the institution but also provide compatibility with existing systems while providing scalable options for future growth of respective institutions. Use of an adequate mix of internal and external human resources should be taken into consideration to facilitate successful implementation of ERP systems in public universities.

The study further recommends continuous monitoring of communication interfaces conducted over ERP platforms. Preventive maintenance procedures and debugging should be conducted to provide efficiency and reliability and avert would be system downtimes. Implementation of ERP systems should meet improved service delivery needs in respective institutions. Quality of service delivery should be responsive to institutional needs while providing operational advantage to respective institutions.

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