

Implementation of Enterprise Resource Planning Systems in Kenyan Public Universities, A Case of Masinde Muliro University of Science and Technology

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Abstract

Due to market competition and continuous pressure on businesses, there is always a need to adopt innovative tools and techniques, to reduce waste and concentrate on value adding activities. Universities are under pressures from every direction, from reduced government funding to expectations by students and parents to deliver ever-higher quality services for lower costs. ERP systems can help university leaders to face these challenges by, aligning their business processes and providing essential information to facilitate timely more-informed decision-making. Implementation of ERP systems is costly as revealed in the study of Ohio States University and University of Minnesota where the budgeted cost increased by 62% and do not produce returns immediately. This raises concern on implementation of ERP in Kenyan Universities. The purpose of this study was to examine the implementation of ERP system in Kenyan public Universities. The research designs used was descriptive survey designs. The target population was 115 staff and the study sample consisted of 60 staff. The study used questionnaires and interview schedules as research instruments. Reliability of the instruments was ensured by piloting the questionnaire. Validity of the research instruments were ensured through the advice of the specialist in the Department of Business Management in the School of Human Resource Development whose views were incorporated in redrafting the final instruments. Both qualitative and quantitative data were collected and analysed. Analysis of data collected was done using regression, correlation and descriptive statistics. The study findings revealed that 85% of implementation of ERP system is accounted for by integration of Human Resource, Finance, Procurement, Students Affairs and Computer Science. Also Gender and duration of use of ERP system were significant to ERP systems implementation where 28.8% of implementation of ERP system was accounted for by gender and duration of use.

Key words: ERP, Implementation, Masinde Muliro, Universities

1. Introduction

Management of information in the current business environment has become a powerful driver in performance of business processes as it determines organizational growth and sustainability (Siriginidi, 2007). With increased globalization, firms are facing unprecedented competition since they operate in a dynamic environment (Watanabe, Hobo 2003). This has seen them invest heavily in information systems in the effort of integrating and coordinating their activities for efficiency and effectiveness. As a result, most western countries around the world have implemented integrated information systems known as Enterprise Resource Planning. Information in business organizations is usually spread across a number of home grown computers with different information systems that house different organizational functions (Zhang, Lee, Huang, Zhang & Huang, 2005); these form information islands that can hardly support business processes in a coherent manner (Hendrickson 2010). For this reason, organizations that need to manage their processes well require enterprise wide systems that are capable for integrating enterprise business functions (Watanabe and Hobo 2003). Therefore, Enterprise Resource Planning systems were developed to address this problem.

Enterprise Resources Planning (ERP) system is a commercial and configurable software package that manages and integrates all the information flowing through the functional areas in the organization (Chen 2011). These include financial, accounting, supply chain and customer information, sales and distribution, production planning, materials management and human resources management. ERP system consists of software support modules where information is flowing between them and they share a central database (Clemmons, Simon 2001).

ERP system has its roots in the 1990s manufacturing industry, where earlier forms of the applications were used for manufacturing resource planning (MRP) and computer integrated manufacturing (CIM).

Regionally most business organizations have also embraced ERP systems to automate their business processes in order to decrease costs, enhance efficiency and gain competitive position over their competitors (Nour and Mouakket, 2011). With the advent of electronic business and increased importance to leveraging of various sources of information within an organization, Enterprise Resource Planning software has come out as a major area of interest to most organizations (Hendrickson, 2010). Successfully implemented ERPs can benefit an organization tremendously even though expensive to acquire (Simon 2010). For instance, an organization benefits from it by having increased customer service and reduced manufacturing or production costs (Hendrickson 2010). However, ERP implementation rate of success is quite low since only 33% of those implemented become successful (Chen, 2011). The integrated nature and modular architecture of ERP makes it more flexible for dynamic modifications and expansions (Watanabe and Hobo 2003). This provides opportunities for improving the original ERP system by integrating different enterprise systems with it. The systems may include customer relationship management systems (CRM), Knowledge management systems (KMS) and decision support systems (DSS) such as the advanced planning and scheduling systems (APS) and the online analytical processing systems (OLAPS). This attribute makes ERP systems to be more efficient and effective whenever they are implemented successfully.

Nationally most societies have not been left behind in the ERP implementation example the Kenya Revenue Authority has established the online filing of returns, the central Government of Kenya has established online application of jobs, birth certificates and identification cards. The ERP systems experience a lot of resistance associated with its massive and fundamental changes to organizational processes since it affects the way different stakeholders do their work (Hendrickson, 2010). Therefore, it can be implemented successfully from a technical perspective but not from an end user perspective (Chen, 2011). This is so since the success depends on users' willingness to operate with the new ERP system.

Kenyan universities began implementing ERP systems to replace their legacy systems. This integrated information solutions give higher education institutions competitive advantages, and that institutions, which are unlikely to switch to integrated information solutions, will find it difficult to retain their market share of students hence students will, sooner or later demand services, offered by other institutions (Ahmad, 2009; Murphy, 2004). Currently most universities are embracing the technology (Kenyatta University implemented UNIPLUS and SAGE Accpac (www.ku.ac.ke), while Egerton and Maseno universities have partially implemented).

2. ERP system implementation

The term ERP describes an emerging category of hardware and software solutions that expanded upon and extended the scope of traditional manufacturing resource planning (MRP) systems (Ahmad A. 2009; Al-Mashari, 2003). Whereas the focus of MRP is on manufacturing processes, ERP systems look at a much broader integration of information or data management functions within the organisation. An ERP system is an attempt to create an integrated tool that manages different functions within an organisation. A comprehensive definition adopted was that Enterprise Resources Planning (ERP) system is a commercial and configurable software package that manages and integrates all the information flowing through the functional areas in the organization (Chen 2011). They can link different areas of an organisation, such as manufacturing, order management, financial systems, human resources, suppliers and customers, into a tightly integrated system with shared data and visibility (Chen, 2001). The reliance and dependence on ERP systems have grown substantially since the early 1990s, and the purchase and implementation of ERP systems continues to be one of the fastest growing segments of the information technology (IT) sector (Lou and Strong, 2004). According to Luo and Strong postulates that the reason behind this phenomenal growth is the promise that ERP systems can provide an integrated business computing solution and improve a company's ability to compete in the marketplace. During the mid to late 1990s, emphasis was placed on ERP systems to address the real and perceived problems of Year 2000(Y2K) (Kvavik and Katz, 2002).

ERP systems hold the promise of improving business processes and decreasing costs (Ahmad 2009; Beheshti, 2006), as these systems facilitate communication and coordination, centralize administrative activities, improve ability to deploy new information system functionality, and reduce information system maintenance costs (Siau, 2004). A successfully implemented ERP system can be the backbone of business intelligence for an organisation, by giving managers an integrated view of the business processes (Parr and Shanks, 2000; Nash 2000). ERP systems provide seamless integration of processes across functional areas with improved workflow, standardisation of various business practices and access to real-time up-to-date data (Chen, 2011; Ehie and Madsen, 2005

The main advantages of ERP for Higher Education Institutions (HEI) are improved information access for planning and managing the institution, improved services for the faculty, students and employees, lower business risks, and increased income and decreased expenses due to improved efficiency (King 2002). The implementation of ERP systems in HEIs has been described as a challenging undertaking hence prompting the researcher to study the implementation of ERP systems in Masinde Muliro University of Science and Technology

An ERP system in institutions of higher learning refers to the use of commercial solutions for both administrative and academic purposes by universities (Chen 2011). Typical administrative functions may include human resources, accounting, payroll, and billing. Academic functions include recruitment, admissions, registration, and all aspects of student records. The main aim of ERP system implementations in HEIs has been to integrate different administrative functions into a more systematic and cost effective approach to gain a strategic advantage. The integration of administrative functions in the higher education sector spans the integration of student administration, human resource management, facilities management, and financial systems that have in the past been supported by separate legacy systems (Zornada and Velkavrh, 2005). The integration of information solutions gives higher education institutions competitive advantages. The institutions, which are unlikely to switch to integrated information solutions, will find it difficult to retain their market share of students. Students will, sooner or later demand services, offered by other institutions (Ahmad A. 2009; Murphy, 2004) hence prompting the researcher to establish the implementation of ERP systems in Kenyan Universities through a case of Masinde Muliro Univeristiy of Science and Technology.

3. Research Methodology

The researcher employed descriptive survey and correlation design. The survey method is relevant to the study, since, the design enables the researcher to observe and measure the variables needed (Fraenken&Wallen, 2009) and correlation design was appropriate for this study because it enabled researchers to analyze the relationships among a large number of variables in a single study (Borg and Gall, 1983). This study was conducted through a case study of Masinde Muliro University of Science and Technology. The target population was 115 staff. The study sample consisted of 60 staff using simple random sampling technique. The study used questionnaires and interview schedules as research instruments. Reliability of the instruments were ensured by piloting the questionnaire. Validity of the research instruments were ensured through the advice of the specialist in the Department of Business Management in the School of Human Resource Development whose views were incorporated in redrafting the final instruments. Both qualitative and quantitative data were collected and analysed. Analysis and discussion of data collected was done using regression, correlation and descriptive statistics leading to drawings of summaries and conclusions.

The following was the research question used in the study:-

- i. To what extent has the ERP system in Masinde Muliro University of Science and Technology

4.0 Results

The findings of this research was guided by the objective:

To establish Implementation of ERP in Masinde Muliro University of Science and Technology

4.1.1 Demographic Information

The demographic information of respondents presented and discussed based on departments they belonged, gender, possibility of having used modules of ERP system like Finance Management module, Academic Management Information systems (AMIS) before, duration of use for each respondent interviewed. This information presented tables and figures. Close observation showed the respondents to belong to five departments Computer Science and ICT, Finance, Procurement, Student Affairs and Human Resource as shown in Table 4.1

Table 4.1 Respondents Department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Finance	12	29.3	30.0	30.0
	Procurement	4	9.8	10.0	40.0
	Student affairs	4	9.8	10.0	50.0
	Computer Science or ICT	12	29.3	30.0	80.0
	Human resource	8	19.5	20.0	100.0
	Total	40	97.6	100.0	
Missing	99	1	2.4		
Total		41	100.0		

Findings in Table 4.1 reveals that, 29.3% of the respondents were from both Computer Science and Finance department, 9.8% of the respondents were from Procurement and Student Affairs, 19.5% of the respondents was from Human resource. This may imply that the targeted functional areas were represented.

Table 4.2: Respondents' gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	25	61.0	61.0	61.0
	Female	16	39.0	39.0	100.0
	Total	41	100.0	100.0	

Findings in table 4.2 reveals that, male respondents were 61% and female respondents were 39%. This means that male were majority.

Table 4.3: Use of Enterprise Resource Planning Systems

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	21	51.2	53.8	53.8
	no	18	43.9	46.2	100.0
	Total	39	95.1	100.0	
Missing	99	2	4.9		
Total		41	100.0		

Findings of table 4.3, 51.2% indicates that they had used ERP systems before compared to 43.9% who indicated that they have not. This finding suggests that majority of the staff of MasindeMuliro University of Science and Technology have not used the system and therefore they may be new to technology.

Table 4.4: Duration of use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 1 year	5	12.2	20.8	20.8
	1-2 years	14	34.1	58.3	79.2
	3-4 years	3	7.3	12.5	91.7
	Over 5 years	2	4.9	8.3	100.0
	Total	24	58.5	100.0	
Missing	99	17	41.5		
Total		41	100.0		

The findings in Table 4.4 revealed that 12.2% of the respondents had used modules of ERP systems like Finance Management and Academic Management Information systems (AMIS) for less than one (1) year, 34.1% of the

respondents had used ERP systems between one and two years, 7.3% of the respondents had used ERP system had used the system between three and four years while 4.9% of the respondents had used the systems for more than five years.

Table 4.5: Effect of the demographic factors ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.747	2	2.873	4.246	.028(a)
	Residual	14.212	21	.677		
	Total	19.958	23			

a Predictors: (Constant), Duration of use, gender

b Dependent Variable: Success in use of ERP

	B	Std. Error	Beta		
(Constant)	3.641	.622		5.849	.000
gender	-.167	.360	-.087	-.465	.647
Duration of use	-.581	.209	-.517	-2.779	.011

a Dependent Variable: Success in use of ERP

Multi regression was calculated predicting the effect of gender and duration of use on the ERP systems implementation in institutions of higher learning. A significant regression equation was found $F(2, 21) = 4.246$, $p < 0.05$ with $R^2 = 28.8\%$. Success in use of ERP in MMUST is equal to $3.641 - 1.67(X_1) - 0.581(X_2)$, where duration of use of ERP was coded 1=less than one year, 2=1-2 years, 3 = 3-4 years, 4= over 5 years and coding for gender were 1 = male and 2 = female respectively. From table 4.5 the success in use of ERP reduced by -0.581 of duration of use, which was supported by table 4.4, 46.3% of the respondents, had used the ERP systems within less than 2 years. From table 4.3, 48.8% of the respondents indicated not to have used the system before which implied that the technology was new. These findings agree with Ujunju (2012) who alluded that MMUST staff had used ICT tools like computers and not ERP systems. From table 4.5 the success in use of ERP reduced by -1.67 of gender, which indicated that when male staff are engaged in implementation process it has significant impact compared to female. From table 4.2, where 61% of respondents were male while 39% were female. These findings agree with Ujunju, (2012) that there is a gender gap between women users of ICT and men, and that women are not well accessible to ICTs as compared to men.

4.1.2 Integration of ERP systems in MMUST

Table 4.6 Integration of ERP in human resource department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fully integrated	7	17.1	17.1	17.1
	Partly integrated	10	24.4	24.4	41.5
	Not really	18	43.9	43.9	85.4
	not sure	2	4.9	4.9	90.2
	99	4	9.8	9.8	100.0
Total		41	100.0	100.0	

Findings of table 4.6 indicates that; 17.1% of the respondents shows that the human resource department is fully integrated, 24.4% of the respondents indicated that it is partly integrated, 43.9% indicated that the department is not integrated while 4.9% of the respondent were not sure. These findings imply that, human resource department is not yet implemented.

Table 4.7 Integration of ERP in Finance department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	fully integrated	5	12.2	12.2	12.2
	partly integrated	21	51.2	51.2	63.4
	not really	8	19.5	19.5	82.9
	not sure	1	2.4	2.4	85.4
	99	6	14.6	14.6	100.0
	Total	41	100.0	100.0	

Findings of table 4.7 shows that; 12.2% of the respondents indicated that the finance department is fully integrated, 51.2% of the respondents indicated that the department is partly integrated, 19.5% of the respondents indicated that the department is not integrated shows 2.4% of the respondents were not sure. The findings imply that the finance department is partly integrated.

Table 4.8 Integration of ERP in Procurement department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fully integrated	3	7.3	7.3	7.3
	Partly integrated	9	22.0	22.0	29.3
	Not really	19	46.3	46.3	75.6
	not sure	4	9.8	9.8	85.4
	99	6	14.6	14.6	100.0
	Total	41	100.0	100.0	

Findings of table 4.8 shows that; 7.3% of the respondents indicate that the procurement department is fully integrated, 22% of the respondents indicate that department is partly integrated, 46.3% indicates that the department is not really integrated while 9.8% of the respondents were not sure. This implies that the department is not integrated.

Table 4.9 Integration of ERP in Student affairs department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	fully integrated	5	12.2	12.2	12.2
	partly integrated	21	51.2	51.2	63.4
	not really	7	17.1	17.1	80.5
	not sure	3	7.3	7.3	87.8
	99	5	12.2	12.2	100.0
	Total	41	100.0	100.0	

Findings of table 4.9 shows that; 12.2% of the respondents indicate that the Student Affairs department is fully integrated, 51.2% of the respondents indicate that department is partly integrated, 17.1% indicates that the department is not really integrated, 7.3% of the respondents were not sure while 12.2% of the respondents were missing. This implies that the department is partly integrated.

Table 4.10 Integration of ERP in computer science and ICT departments

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	fully integrated	6	14.6	14.6	14.6
	partly integrated	20	48.8	48.8	63.4
	not really	6	14.6	14.6	78.0
	not sure	3	7.3	7.3	85.4
	99	6	14.6	14.6	100.0
	Total	41	100.0	100.0	

Findings of table 4.9 shows that:14.6% of the respondents indicated that the department was fully integrated, 48.8% of the respondents indicated that the department was partly integrated, 14.6% of the respondents shows that the department is not integrated while 7.3% of the respondents' were not sure. This implies that the department is partly integrated.

Table 4.11 Regression for integrations within MMUST ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9258.446	5	1851.689	2575.520	.000(a)
	Residual	25.164	35	.719		
	Total	9283.610	40			

a Predictors: (Constant), Integration of ERP in Student affairs department, human resource department, computer science and ICT departments, Finance department, Procurement department

b Dependent Variable: Implementation of ERP in MMUST

Coefficients (a)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1(Constant)	1.577	.189		8.342	.000
Integration of ERP in human resource department(X1)	.006	.008	.012	.781	.440
Integration of ERP in Finance department (X2)	.737	.199	1.676	3.705	.001
Integration of ERP in Procurement department(X3)	-.048	.221	-.109	-.217	.829
Integration of ERP in computer science and ICT departments(X4)	.307	.219	.698	1.401	.170
Integration of ERP in Student affairs department(X5)	-.997	.010	-2.098	-98.968	.000

a Dependent Variable: Implementation of ERP in MMUST

A multiple linear regression was calculated predicting subjects' implementation of ERP in MMUST based on integration of ERP in Finance (FM module), Human resource (HR module), and Procurement, Student Affairs (AMIS) and Computer science departments. A significant regression equation was found $F(5, 35) = 2575.520$, $p < 0.001$ with $R^2 = 0.850$. Implementation of ERP in MMUST is equal to $1.577 + 0.006(X_1) + 0.737(X_2) - 0.48(X_3) + 0.307(X_4) - 0.997(X_5)$. where integration of ERP in human resource, Finance, Procurement, computer science and Student Affairs departments were coded 1=strongly disagree, 2=disagree, 3 = neutral, 4 Agree and 5= strongly agree. From table 4.11 Implementation of ERP in MMUST improved by 0.737 of Finance showing

a strong positive relationship that was supported by table 4.7, 51.2% of the respondents indicated that the department was partly integrated. The part integration implies that the organization has not fully embraced ERP in finance department. From table 4.11 implementation of ERP in MMUST improved by 0.006 of Human Resource department showing a weak positive relationship that was supported by table 4.6 where majority agreed the Human Resource department is not integrated. From table 4.11 implementation of ERP in MMUST reduced by (0.48) of Procurement department showing a strong negative relationship that was supported by table 4.8, 46.3% indicated that the department was not integrated. From table 4.11 implementation of ERP in MMUST increased by 0.307 of Computer Science showing a positive relationship where findings of table 4.10, 48.8% of the respondents agreed that the department was partly integrated. Finally, from table 4.11 implementation of ERP in MMUST reduced by (0.997) of Student Affairs showing a strong negative relationship. This implies that any slight mess in the academic affairs module affects the implementation process terribly because it generates information to be used by other departments. From Table 4.9, 51% of the respondents agreed that the department is partly integrated. Other researchers support that; integration of several functional departments forms commercial solutions for both administrative and academic purposes by Universities (Chen, 2011). ERP systems provide seamless integration of processes across functional areas with improved workflow, standardization of various business practices and access to real time up-to-date data by Universities (Chen 2011; Ehie and Madsen, 2005)

5. Conclusion

Implementation of ERP in MMUST improved by 0.737 Integration of ERP in Finance department, 0.006 Integration of Human Resource department, reduced by (0.48) Integration of Procurement department, increased by 0.307 of Integration of Computer Science department and reduced by (0.997) Integration of Student Affairs department. 85% of implementation of ERP system is accounted for by integration of Human Resource, Finance, Procurement, Students Affairs and Computer Science. This implies that departmental integrations of compatible modules within a university are necessary in order to achieve a well implemented ERP system. It further indicates that the involvement of male in the implementation process gives the organization a competitive edge. The institution should in its subsequent implementations involve female since they are a minority group and their influence might be fully captured in that process. Gender and duration of use of ERP system were significant to ERP systems implementation but only contributed 28.8%. The findings also indicated that ERP system's technology was still new since it has been in operation for less than two years.

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