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Applications of ERP and Timely Data Management in Selected Public Universities in Kenya

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Abstract: ***The application of ERP is a great consideration that universities in Kenya should put into consideration in their management of academic affairs. Despite the difficulties involved in using the system, Enterprise Resource Planning (ERP) systems promise multidimensional benefits and competitive leadership in managing information if integrated in academic affairs. Grounded in systems theory, this empirical study aimed at providing a roadmap for holistic examination of the efficiency of integrating ERP systems in the management of academic affairs in universities. The objectives of this study were to; determine the effect of the application of ERP on timely management of data. The study adopted descriptive cross sectional survey research design. The target population was 22 Deputy Vice Chancellor Academic affairs and Registrar Academic affairs, 286 Deans of Faculty / Schools and chairmen of Department, 11 IT Personnel and 1100 Lecturers. Proportionate Stratified random sampling and purposive sampling were used to select respondents for the study. Questionnaires, interview schedules were used to collect quantitative and qualitative data respectively. A sample of 16 DVCs and academic Registrars, 8 IT technicians, 120 Deans of faculties/schools and CODs and 320 lecturers were selected for the study from 8 universities. A total of 464 respondents participated in the study.***

Keywords: ERP, Application and Universities

1. Literature Review

The purpose of ERP is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders. This software, used by many enterprises, particularly by multinational corporations, had a critical role in ensuring increased efficiency. The application of ERP within higher education is a notable departure from traditional computer system strategies that are easily threatened. In order to carry out basic administrative functions institutions have typically relied on small systems which were often developed in an ad-hoc manner and maintained by in-house specialists. Sometimes such configurations were supplemented with the 'bolting on' of other packaged software purchased from software houses but these tended to be relatively small and inconsequential and usually remained well within the control of the technical for the safe keeping of information.

Before ERP systems were implemented each department in an organization would most likely have their own computer system, data and database. Unfortunately, many of these systems would not be able to communicate with one another or need to store or rewrite data to make it possible for cross computer system communication. For instance, the finances of a company were on a separate computer system than the HR system, making it more intensive and complicated to process certain functions. Once an ERP system is in place, usually all aspects of an organization can work in harmony instead of every single system needing to be compatible with each other.

Rudy (2010) in his study reported that Enterprise Resource Planning (ERP) Systems had the potential to streamline Information flow processes but the costs of implementation were high. Despite the high costs the benefits of efficient flow of data and reporting functions were considered more valuable to commit the costs. The study focused on success factors that are

The research employed a survey research method using a questionnaire designed through a documentary study on literature of ICT application in higher education. The study reported that web-based presentation of curriculum before and during the semester was done using email in teaching and learning activities, Web-based diagnostic, formative and summative assessments, using supplementary software for effective teaching and learning, designing a dynamic feedback system, Producing digital unlimited leaning materials (e-books, handouts) were some of the activities of ICTs. Using digital libraries and internet-based information for enrichment of curriculum content and process, Sharing and exchanging learning's and experiences among university professors working inside and outside the university, including students' interests and needs in curriculum decision-making through web based needs assessment. The research overlooked the implementers of the curriculum and did not clarify on the types of ICTs applied. No clear information was given on how the ICTs facilitated information flow in the university. The study focused on teaching and learning and was silent on the management of academic affairs using technologies.

Kajuna (2009) conducted a study on the university or Dar es Salaam and purposed to investigate and evaluate the nature of technology implementation in classroom practices at the UDSM, which is the major center of higher education in Tanzania. The research looked at what technologies were available, strategies that were employed to implement the integration of technology in the university curricula (teaching and learning processes), the stakeholders' perception of their knowledge and skills of technology use, training programs and technology plans. The research also used Stages of Development technology model to generally determine the stage of technology integration at UDSM.

There is potential of technology had indicated by numerous people, Valdez (2004) observed that technology

offers many opportunities to improve learning and that it has the potential to provide people in their own homes and work settings with access to knowledge and learning resources possible until recently only in very large universities. Furthermore, he argued that technology had the potential to make everyone a producer of original knowledge that can be shared with the world at very little cost. On its effectiveness in classroom practices, Franklin (2000), Blankson (2004) observed that technology in education promote new learning environments in which enquiry and problem solving increase student achievement. Hansen (2003) highlights the importance of technology in teacher preparation, pointing out three benefits. Firstly, technology can be a powerful tool for helping individuals achieve personal and shared goals. Secondly, technology alleviates human suffering and promotes social justice to help people make a difference in their worlds. Thirdly, people must have knowledge and skills to evaluate and decide appropriate courses of action when confronted with problems.

According to Barron (2003), technology provides an excellent avenue for student motivation, exploration, and instruction in a multi sensory diverse world. They further argued that technology touches more aspects of our daily lives. They observed that the integration of technology into the school curriculum was no longer a luxury, rather "it is a means to survival in the future that will be driven and supported by technology"

The findings in this study revealed that there was no doubt that integrating technology is very valuable in the process of learning and appeals to many aspects of students' learning. In short, technology integration in education provides students with ample opportunities to benefit from and manage their learning while it facilitates the teaching process. The benefit can be looked at from a wider perspective outside classroom situations. These from the teachers' perspectives, the benefits were that the use of technology saves time, enables good storage of knowledge, makes students understand better, makes learning interesting, gives wide knowledge on many subject matters, makes teaching effective, enhances instructional presentation, and makes it easier to deliver knowledge toa large number of students. These conceptual beliefs were obtained from the written interviews. From the telephone interviews, the responses were almost the same except that they were more elaborate.

Leena (2008) focused on improving internal information flow in the case company. He examined the possibilities of improving the internal information flow, the current and improvements. She reported that organizational communication and efficient information flow are a crucial part of any organization's operational process without information flow no financial or material flow can exists and having a well organized information flow provided a competitive advantage to an organization through reduced costs, improved service and more efficient processes. Computer based information systems such as ERP facilitate the information flow. The software integrates data and process into a unified data base which contains information from top managed, financial, academic, administrative and human resource and decisions support systems, ERP enabled real time sharing of information throughout the organization and support its process. Several ways in which the information can move in an organization with the most important route for communication being vertical flow, there is also horizontal and free flowing communication. The information needs to travel efficiently between departments in order to facilitate planning coordinating and managing the processes such as communication and flow of information are made efficient within the application of ERP in university were mentioned. The study used case study approach that allowed the use of both qualitative and quantitative information however the study lacked clear sample and clear methods of data collection and the case study approach was restrictive on the data. Also the study mainly emphasized on data flow in the case company and failed to show whether it was efficient.

Studies have shown that Kenyan universities, just like other institutions elsewhere in the world, are implementing various information systems to facilitate their operations. They include ERP systems which are implemented to enhance institutional management given their abilities to standardize, streamline operations, and integrate business processes (Nyandiere, Kamuzora, Lukandu & Omwenga, 2012). In their study, Nyandiere (2012) established that Kenyan universities had mainly implemented systems for finance and accounting, student admissions, examinations management, and library services to promote data flow. The authors also established that there were no significant differences in information systems needs among Kenyan universities, but there were significant differences in strengths and weaknesses among the private and public universities in the capabilities of systems they had implemented. This study employed a case study approach that could affect the authenticity of the findings and it failed to indicate the number of participant and methods of data collection.

A study by Makokha (2013) purposed 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 which were given to 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 analyzed. 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 in 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. 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) while integration of Procurement department, increased by 0.307 of Integration of Computer Science department and reduced by (0.997), integration of Student Affairs department. Also 85% of implementation of ERP system is accounted for by integration of Human Resource, Finance, Procurement, Students Affairs and Computer Science. This study avoided the implementation of ERP in the academic affairs and did not clarify why it was implemented. This study also was a case study hence the data collected was restrictive and the study solely focused on business management of the university and not academic activities.

The following gaps were identified from the above literature. Rudy (2010) indicated that the efficiency in the flow of data/information formed the basis of integration despite the cost implications. The focus was on success factor that aided ERP implementation processes in large aerospace and Defense Company. However the study did not have clear participants and had no information on how data was collected of which the current study has done. Makokha (2013) study focused on the implementation of ERP system in Kenyan public universities in which she reported that gender and duration of the use of ERP was significant in the ERP system implementation and not for timely information flow of which the current study filled the gap by investigating the application of ERP for timely information flow. Vajargah (2010) focused on the application of ICT in higher education in Shahid Beheshti University. The study reported that web-based presentation of curriculum before and during the semester was done using email in teaching and learning activities, Web-based diagnostic, formative and summative assessments, using supplementary software's for effective teaching and learning, designing a dynamic feedback system, producing digital unlimited leaning materials (e-books, handouts) were some of the activities of ICTs. Others included using digital libraries and internet-based information for enrichment of curriculum content and process, Sharing and exchanging learning and experiences among university professors working inside and outside of the University.

1.2 Purpose of the Study

The purpose of this paper was to determine the effect of the application of ERP in the management of academic affairs in public universities in Kenya.

1.3 The Study Population

The study population is the one from which the researcher used to generalize the finding of the study to the whole population. From the study population accessible population was drawn. The accessible population was established from the 11 universities found in the western region of Kenya. The study therefore targeted 22 DVC for academic affair and Registrars Academic, 11 IT personnel, 286 CODs and Deans of schools or faculties and 1100 Lecturers the respondents who were included for the study because they are directly involved in the dealing with the management of university academic affairs. The DVCs for academic affairs initiates the policies for the management of academics in universities geared to efficiency, the Deans and CODs directly deal with the management of students' academics and the lecturers are directly involved in the learning and teaching of students. Therefore they were best suited to provide information on the efficiencies of ERP in managing academic affairs. The information technology personnel are directly involved in technology implementation and training in technology use. Therefore they are expected to provide information on the types of ERP implemented and their efficiency in managing academics in universities.

Table 1.1: Sample size of respondents in universities in Kenya

Region	No. of univs	DVC / Registrar	Deans / CODs	IT personnel	Lecturers
Eastern	1	2	15	1	40
Western	3	6	45	3	120
Central	4	8	60	4	160
Total	8	16	120	8	320

The data in Table 3.2 shows different sizes of sample for this study. Stratified random sampling was used to select the Lecturers, Deans and CODs for the study but purposive sampling was used to select the DVCs academics, Registrar academics and the IT technician. Eight universities were selected for the study. This is because the university was used as unit of analysis and there were a minimum of 8 public universities selected for the study. The stratification for Lecturers was based on the courses they teach while Deans and CODs were based on the school of faculty and the department they headed respectively. The number of respondents for each category depended on the size of the respective population, in total there were 516 respondents.

2. Findings of the study

The study found out that the application of ERP for timely management of data in academic affairs in universities had tremendous effects. Respondents from the universities that had implemented ERP were asked to establish the application of ERP for the timely flow of information

across departmental units in the management of academic affairs in universities in western region of Kenya. They were to identify areas where ERP had been applied and the improvement witnessed with ERP application. The null hypothesis that there is no statistically significant difference between the timely information management of data as a result of the application of ERP tested.

2.1The Perception of DVCs and Registrars on ERP Application of ERP for Timely Data Management and Improvements Enhanced in Academic Affairs

The respondents in universities that had applied ERP in various areas of academics were asked to indicate the improvements that had been enhanced with the application of ERP and the findings are summarized in table 2.1.

Table 2.1: Improvements Enhanced in Departments and Schools/Faculties as a Result of the Application of ERP

Improvements	I %	NI %	Mean	SD	X^2	df	sig
Internal communication	12(75.0)	4(25.0)	1.25	0.447	0.762	1	0.383
External communication	3(18.8)	13(81.2)	1.81	0.403	0.527	1	0.468
Internal coordination	12(75.0)	4(25.0)	1.25	0.447	0.762	1	0.383
External coordination	3(18.8)	13(81.2)	1.81	0.403	0.527	1	0.468
Information update	9(56.2)	7(43.8)	1.00	0.000	0.327	1	0.568
Consistent data	9(56.2)	7(43.8)	1.00	0.000	1.778	1	0.182
Secure storage of data	9(56.2)	7(43.8)	1.00	0.000	0.527	1	0.468

Key: I = Improvement NI = No Improvement Source:Field data, 2016

From table 12(75%) the respondents indicated that there was greatest improvement in internal communication and coordination and least improvement was noticed in external communication and coordination. The study therefore established that there were greater improvement in virtually all the areas of academics but externally there were minimal improvements. This could be attributed to disconnect amongst universities that even used different ERP systems. However on the overall the findings indicated great improvements in timely flow of information. However 81.2% of DVCs and Registrars did not notice improvements in eternal communication and coordination. The findings as indicated in table showed that the DVCs and Registrars had noted improvement in the use of ERP in its application for the timely flow of ($p>0.05$). The hypothesis that there is no statistically significant difference between timely management of data and the application of ERP was rejected therefore there were improvements in areas of academic affairs where ERP was applied. For the characteristics whose association was significant, the extent of relationship was low. The Deans and CODs views were sought to indicate the improvements enhanced with the application of ERP and the findings are summarized in table 4.5

Table 2.2: Improvements Enhanced in Departments in Schools/Faculties as a Result of the Application of ERP

Improvements	I %	NI %	Mean	SD	X^2	df	sig
Internal communication	76(74.5)	26(25.5)	1.12	0.322	3.203	1	0.073
External communication	30(29.4)	72(70.6)	1.58	0.496	0.060	1	0.807
Internal coordination	78(76.5)	24(23.5)	1.09	0.292	2.493	1	0.114
External coordination	26(25.5)	76(74.5)	1.61	0.492	1.422	1	0.233
Information update	84(82.4)	18(17.6)	1.00	0.000	1.444	1	0.230
Consistent data	84(82.4)	18(17.6)	1.02	0.152	0.577	1	0.448
Secure storage of data	72(70.6)	30(29.4)	1.16	0.371	12.204	1	0.000

Key: I = Improvement NI = No Improvement Source:Field data, 2016

Findings from the table showed that there was great improvement in universities that had applied ERP. This was shown by 84(82.4%) of the respondents who indicated improvements in information updates and consistent data flow. Improvement was also noted in internal communication and coordination in which

78(76.5%) and 76(74.5%) of the respondents indicated improvements respectively. However minimal improvement was also noticed in external communication and coordination. This was shown by 30(29.4%) and 26(25.5%) of the respondents who showed no improvements. Further 18(17.6%) of the respondents indicated no improvement in information update and consistent data respectively. Variation in responses led to the testing of the null hypothesis and the findings indicated that there was a statistically significant difference between timely management of data and the application of ERP as $p>0.05$. Therefore the hypothesis was rejected except for secure storage of data whose $p<0.05$. The findings indicated great improvement in internal communication, external communication, internal coordination external coordination information update and consistent data. For the characteristics whose association was significant, the extent of relationship was low. Further the views of the lecturers on enhanced improvements with the application of ERP were sought and the findings are summarized in table 2, 3.

Table 2.3: Improvements Enhanced in Departments and Schools/Faculties as Result of the Application of ERP

Improvements	I %	NI%	Mean	SD	X^2	df	sig
Internal communication	174(58.6)	123(41.4)	1.11	0.315	0.747	1	0.387
External communication	105(55.6)	192(44.4)	1.44	0.498	51.200	1	0.000
Internal coordination	168(56.6)	129(43.4)	1.10	0.296	76.550	1	0.000
External coordination	87(29.3)	210(70.7)	1.49	0.501	2.500	1	0.114
Information update	156(52.5)	141(47.5)	1.02	0.136	1.444	1	0.230
Consistent data	153(51.5)	144(48.5)	1.04	0.191	2.944	1	0.086
Secure storage of data	237 (79.8)	56(20.2)	1.15	0.359	13.348	1	0.000

Key: I = Improvement NI = No Improvement Source:Field data, 2016

Findings from table 4.27 indicated that 237(79.8%), 174(58.6%) and 168(56.6%) of the respondents from the universities indicated that there was improvement in secure storage of data, internal communication and coordination respectively. However 210(70.7%) of the respondents indicated that there was no improvement in external coordination. This implied that on the overall universities that had integrated ERP in academic management experienced improvements in timely management of data. This also indicated that universities had not connected externally The findings on the Lecturers shown in table also indicated that averagely there was agreement that there was improvement in the application of ERP in the areas they were applied to hence the tested hypothesis was rejected for internal communication, internal coordination, information update and consistent data as $p>0.05$. For the characteristics whose association was significant, the extent of relationship was low.

The finding of the current study concurred with those of Rudy (2010) which indicated that Enterprise Resource Planning (ERP) Systems had the potential to streamline Information flow processes. The respondents of the current study indicated the ERP had been applied in most of the academic areas to some extent agreeing with those of Rudy (2010). The similarity was in the application to streamline information flow in a large aerospace and Defense Company in accounting, finance and procurement. The difference was because of the nature of of the area of application of ERP and the organization involved. The current study showed that ERP was majorly applied in departments, admission and time tabling. This concurred with the observation of Makokha (2013) which indicated that application of ERP in Kenyan universities was done in human resource students' affairs and finance and computer sciences. The difference was in the nature and the area of application that was involved. In the current study the application of ERP was for the purposes of managing academic affairs unlike the findings of Vajargah (2010) who focused on the application of ICTs in higher education in the case of Shahid Beheshti University in Tehran in Iran for the purposes of teaching and learning to enrich the curriculum through quick information flow.

The findings of the current study concurred to some extent with those of Sabau, (2009) which established that ERP system provided benefits for universities in terms of business and technical point of views in terms of improved internal communications; reduced or eliminated manual processes; enhanced strategic decision making and planning capabilities; established a self-service environment for employees; improved self-service environment for students and faculty; enable higher availability of administrative systems; support sophisticated data analyses for use in decision-making; and reduced dependence on paper. The difference was that the current study was concerned with the application of ERP to academic affairs but the reviewed study covered the whole university management systems. The similarity of the reviewed study with the current study was on improvements in the internal management of academic

affairs and minimal improvement in external communication and co-ordination.

3. Conclusion

Following the themes developed from the objectives of the study the following conclusions were made from the findings of the study as presented. The study found out that ERP was applied in various areas of academic affairs such as human resource, examination, timetabling and admission. Minimal application was in online teaching, lesson attendance and course coverage. Universities that had applied ERP experienced great improvements in internal communication and coordination but minimal improvement was experienced in external communication and coordination. Also the study revealed that timely management of data was affected by the application of ERP. The study concluded that universities that had applied ERP in various areas of academics witnessed tremendous improvements in timely management of data in academic affairs processes. It was also concluded that external communication and coordination experienced minimal improvement due to the different operational nature of the universities.

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