

An Analysis of Factors Influencing Implementation of Computer Based Information Systems in Public Universities in Kenya: A Case Study of Egerton University

Jerotich Sirma^{1*} Felix Obegi¹ Dr. Christopher Ngacho³

1.Lecturer, Faculty of Commerce, Department of Accounting Finance and Management Science, Egerton University, Nakuru Town Campus College, P.O Box 13357, Nakuru-Kenya

2.Dean, Faculty of Commerce, Kisii University, P.O Box 408, Kisii-Kenya

*Email of the corresponding author jerotichk@gmail.com

Abstract

Public universities in Kenya have continued to implement Information Systems (ISs) so as to be more efficient and competitive. However, factors that influence the implementation of ISs have not been fully analysed and documented. Therefore, the aim of this study was to identify factors influencing implementation of computer based information systems in public universities in Kenya. The study used descriptive survey design. The target population was the process owners and system users from all departments in Egerton University that have implemented IS. Stratified sampling was used to select a sample size of 306. Data for the study was collected using questionnaires. The results of the study indicated that university top management support, end-user training, understanding and approval by top management, availability of qualified and competent ICT staff were important factors for the successful implementation of Information system. The findings of this study are expected to guide the University management, other institutions of higher learning on related issues and provide a framework to describe the IS implementation process.

Keywords: Computer based information system, Public Universities in Kenya, Egerton University

1. Introduction

The worry most managers and designers of computer-based information systems are facing is the reason why end-users are not using systems adequately and gainfully in organizations today. In general, designed information systems provide the benefit of reduction on total-cost-of-ownership, increase of user productivity output and value-added modifications to products and services which seem to have been unrealized. The underlying scenario is described as 'systems being technical successful, but organizational failures' in IS circles and among IT professionals. When IT investments are rising, the return on investment (ROI) as well as white-collar and knowledge worker productivity gains remain disappointing. The situation is more evident in developing countries, particularly for those in Africa (Foster et al., 1990). Research in information systems has failed due to too much emphasis being placed on technical aspects and failure to consider the social and behavioral dimensions of the implementation process (Lucas, 2001). According to Mosse and Sahay (2003), the influence of IT acceptance and institutionalization may be contributed by social and behavioral factors. However, there is limited research to date on the importance of similar factors connected with critical information systems in developing countries.

Information System implementation is the process of putting a planned system into action. It is a process where hardware and software are acquired, developed and installed; the system is tested and documented, users are trained to operate and use the system, and organization converts and uses the new developed system (Laudon et al., 2009). To be effectively adopted, Information Communication Technology (ICT) requires good governance and appropriation of allocated government funds and foreign aid. On the other hand, public universities in Kenya have been undergoing transformation in response to increase in the number of students. This has in turn compelled them to adopt and implement IS in order to provide better services to their students. However, the rapid infusion and diffusion of IT into public universities in Kenya raises important management issues for top management and technical staff (Sevilla and Shabaya 2007). Wanyembi (2003) emphasizes that Kenyan universities in general have been struggling with answers on questions about how they can fully utilize and implement computer technology. They also grapple with the issue of creating an environment where IT not only exists, but is used effectively, efficiently and productively

1.1 Statement of the Problem

New information systems have a powerful potential to improve the functioning of organizations (Neumann, 1996). That potential is only realizable when information systems can be successfully developed and implemented. In Kenya, effort and resources have been directed to implement information systems in both the public and private institutions (Sevilla and Shabaya, 2007). For the past five years, Egerton University has invested over 30 million shillings in establishing the ICT infrastructure and implementing information systems

(Tender Evaluation Report, 2005 and ICT reports, 2010). Even after the huge investment by the university some systems are still not fully operational and utilized by all end user departments as some tasks that can be done by use of this IS are still being done manually. Furthermore, the bulky Short Message Service (SMS) is still not fully implemented and functional as it ought to be. This begs the questions, why aren't these information systems not fully implemented and operational as earlier expected and envisioned by the university management? Why are there still some tasks being done manually when there are information systems in place? While the benefits of ICT at Egerton University cannot be disputed, there is no documentation of the factors that affect implementation of information systems at the University and there is no record of an implementation outcome despite the continued use of information systems at various levels of its operations and the university's quest to acquire more information systems. Therefore, the study sought to address the issues that influence Information Systems implementation outcomes at Egerton University.

1.2 Purpose of the Study

The main objective of this study was to identify the factors that influence implementation of computer based information systems in public universities in Kenya, a case study of Egerton University.

1.3 Specific objectives

- i. To identify factors that influence IS implementation at Egerton University
- ii. Determine relative importance of the factors identified in the research

2. Literature Review

2.1 Overview on Information Systems

An information system (IS) is a computer-based system that is designed to support the operations, management, and decision functions of an organization. Therefore, information systems in organizations essentially provide information support for decision makers. These systems encompass transaction processing systems, management information systems, decision support systems, and strategic information systems (Stair and Reynolds, 2010). This play an important role as they consist of a set of interrelated elements or components that input, process, store, and disseminate data and information and provide a corrective feedback mechanism to meet an objective of an organization.

According to Siegel (2003), there is a limitation in Kenya on how information systems are planned, developed, implemented, utilized, exploited, managed, controlled and maintained which has led to lack of local standards and benchmarks. However, the International Development Research Centre did put its pioneering experience in ICTs programming to good use in Kenya. In October 2003, a project to support the completion and implementations of a robust Information and Communication Technologies policy was started.

2.2 Information System implementation process

According to Laudon and Laudon (2009), one model of implementing information system is the Kolb/Forhman model of organizational change. This model divides the process of organizational change into seven-stage relationship between the organizational consultant and his or her client (the consultant corresponds with the information system designer and the client to the user). The success of the change effort is determined by how the consultant and client deal with the key issues at each stage. Other models of implementation describe the relationship as one between designers, clients, and decision makers, who are responsible for managing the implementation effort to bridge the gap between design and utilization (Swanson, 1988). Recent work on implementation stresses the need for flexibility and improvisation with organizational actors not limited to rigid roles (Markus and Benjamin, 1997).

2.3 Implementation efforts in the Kenya government

Over the last five years, the Kenyan government has initiated some capital investment towards set up and installation of ICT infrastructure. Funding for these investments is achieved through partnerships between the government and development partners. The foreign funding component constitutes the largest percentage of this investment in terms of technology (Gichoya, 2006). The government contribution is usually in the form of technical and support staff and facilities including buildings. So far, the Government Information Technology Investment and Management Framework is connecting all ministries to the Internet under the Executive Network (Limo, 2003). The government is also connecting the ministries to run integrated information systems for example the Integrated Financial Management Information System (IFMIS) and the Integrated Personnel and Pensions Database (IPPD).

2.4 Reviews on IS implementation in institutions of higher learning in Kenya

According to Tanui (2003), implementation of IS in institutions of higher learning in Kenya is done haphazardly.

Additionally, whatever is designed and agreed upon as project activities becomes difficult to implement due to persistence change in university administrations. Furthermore, lack of ICT policy has also been mentioned to be another contributor to either failure or success of any IS implementation in public universities. ICT policies are developed to provide guidelines for implementation, operation, management and maintenance of ICT resources at the university. Odhiambo (2003) for example argued that, it is the lack of ICT policy that led to the development of unreliable networks at Moi University, even though implemented; its benefits are yet to be realized. Muniafu (2003) argues that some universities do not follow a standard ICT procurement procedure. According to him, the acquisition of ICT resources and their implementation are never on strategic action, in that, procurement is never planned

Heeks (2002) considered importation and adoption to be a major reason for ICT failure in developing countries. The adoption of various approaches and styles of managing ICT also negatively affect the quality of ICT services and its implementation (Wanyembi, 2001). This implies that universities need to undertake careful evaluation and harmonization of contrasting management styles for effective and efficient establishment and service provision. Implementations of such donor sponsored projects are consequences of donor suggestions for the creation than the result of strategic information plan of a target university. Bii and Wanyama (2001) underscored the fact that donor-initiated and sponsored projects are rarely sustainable in the developing countries once donors wind up their support. This is particularly so if, at the time of the sponsor's withdraws; the recipients have usually no plans for sustaining the ICT facilities that were acquired through the donor support. Odhiambo (2003) indicated that government taxes and other statutory levies have been a major problem to universities. To be seen supporting use of ICT in the management of information in institutions of higher learning, the government should exempt these institutions of taxes charged on donations and ICT equipment acquisition. This would enhance information generation, retrieval, dissemination and implementation of ISs for the benefit of students and teaching staff.

Bii and Wanyama (2001) pointed out that failure to prioritize the information sector and its contribution to national development in the developing countries has led to lack of funding and information policies in all sectors of their economy, including higher educational institutions. In this regard, they concluded that a majority of the ICT projects in Kenya's public universities are donor initiated and funded. The development of ICT projects and appropriate policies in this manner, rather than through an individual university's own initiatives and strategic plans, is likely to lead to more managerial problems and donor dependency that negatively affect sustainability of ICT resources and other facilities. Heeks (2002) supported this view by noting that donor led initiative can be quite problematic at times due to conflicting interests. Nonetheless, if there is design divisibility; it increases the opportunities for successful implementation, local improvisation, and learning and allows improvisations that reduce design-actuality gaps. This divisibility means that staff could learn from early relatively small failures, and could address subsequent improvisations of both design and actuality to manage project components.

Even though the adoption and utilization of ICT in Kenya's public universities is at infancy, its execution must be done cautiously in a manner that will allow a successful implementation (Bii and Gichoya, 2006). Biwott (2003) observed that in universities, it is the presence of commendable policies that are either poorly implemented or not implemented at all. With most universities now having an ICT policy in place, it is hoped that future implementations will follow laid down guidelines in these ICT policies and that universities will follow the stages of growth model prescribed (Galliers et al., 1998).

3. Research Methodology

3.1 Research Design and Target Population

The study used a descriptive survey design. This is because the research endeavoured to collect data from members of the population in order to determine the factors that influence IS implementation with respect to the variables. The target population for the study was the process owners and system users from all departments that have implemented information system within Egerton University.

3.2 Sample size and sampling procedure

Egerton University has a total population of 1961 employees who use the university information systems and the information it produces. A sample size of 306 was chosen using Krejcie and Morgan (1970) model. The study used a proportionate stratified sampling approach to identify the proportion of respondents from each department. Simple random sampling was then used to identify 272 system users and 34 process owners to participate in the study from each stratum.

3.3 Data collection and data analysis

The study used primary data which was collected using semi-structured questionnaire. Split-half method was used to test for the instrument reliability. The data from the research was processed, summarized and coded

using tables to address the research objectives.

4. Results and Discussions

According to the results in table 1, the majority of respondents (129) felt that university top management support and communication was key to successful IS implementation. University top management support and communication had a mean of 3.90 and 3.86 respectively. It was followed by understanding and approval by the top management with 41.1%. Sufficient funding was rated the lowest with only 15.5% of respondents strongly agreeing to it and 32.4% strongly disagreed making it the least significant factor that users thought had an influence to an IS implementation outcome at Egerton University.

Table 1: Extent in which Organizational factors influence IS implementation

Factor	Strongly Disagree	Disagree	Indifferent	Agree	Strongly agree	Mean	Std Deviation
University top management support	4% 12	9% 28	22% 67	23% 70	42% 129	3.90	1.164
Communication	6% 18	9% 28	20% 61	23% 70	42% 129	3.86	1.226
Organizational change management	23% 70	11.5% 35	19.2% 59	20.3% 62	26% 80	3.86	1.226
Understanding and approval by top management	2% 6	3% 9	26.9% 82	27% 83	41.1% 126	4.03	0.988
Sufficient funding	32.4% 99	21% 64	21.2% 65	10% 31	15.5% 47	2.55	1.423
External pressure	23% 70	12% 37	37% 113	11% 34	17% 52	2.92	1.367

The results in table 2 indicate that end-user training had the highest rating (41.7%) in relation to the human factors that influence IS implementation. End-user training had a mean of 3.93 and a standard deviation of 1.078. Nonetheless, user attitudes and behavior had the least rating with only 66 respondents indicating that it strongly influenced IS implementation. The majority of the respondents (45.5%) were indifferent on whether user attitudes and behavior influenced IS implementation.

According to the results in table 3, most of the respondents (254) strongly agreed that end-user involvement was important in ensuring that IS was successfully implemented. End-user involvement had a mean of 4.58 and a standard deviation of 4.58. Moreover, majority of the respondents (34%) indicated that IS information quality strongly influenced IS implementation. ICT infrastructure was rated the least of the projected related factors that strongly influenced effective IS implementation.

Table 2: Extent to which human factors influence IS implementation

Factor	Strongly Disagree	Disagree	Indifferent	Agree	Strongly agree	Mean	Std Deviation
End-user training	2% 6	7% 21	29.3% 90	20% 61	41.7% 128	3.93	1.078
Qualifications of ICT support staff	4% 12	6.9% 21	18.2% 56	32% 98	38.9% 119	3.95	1.096
User attitudes and behavior	8.2% 25	7% 21	45.5% 139	18% 55	21.3% 66	3.38	1.139
Competence IS staff	7% 21	4% 12	27% 83	25% 77	37% 113	3.81	1.177
User ICT skills and competency	3% 10	8% 24	30% 92	26.5% 81	32.5% 99	3.77	1.087

Table 3: Extent to which project related factors influence IS Implementation

Factor	Strongly Disagree	Disagree	Indifferent	Agree	Strongly agree	Mean	Std Deviation
IS implementation planning	5.1% 15	10% 31	33.4% 102	19.5% 60	32% 98	3.64	1.172
ICT infrastructure	11% 34	10% 31	25.5% 78	39% 119	14.5% 44	3.35	1.179
IS Project urgency	6% 18	11.5% 35	28% 86	21.5% 66	33% 101	3.64	1.215
IS Information quality	4% 12	9.5% 29	27% 83	25.5% 78	34% 104	3.76	1.136
End-user involvement	1% 3	10.8 33	0 0	5.2% 16	83% 254	4.58	1.005

A factor analysis was conducted to reduce the factors influencing implementation of computer based information systems into a meaningful number. The results of the factor analysis using principal component analysis as an extraction method led to seven components extraction, as shown in table 4 below. From the output, the total variance is explained by seven components which explain 86.8867% of the factors influencing implementation of computer based information systems.

From the results in table 4, end user involvement explained 22.454% of all factors that influenced IS implementation. This suggests that when the end-users are involved they support the IS implementation process thereby making it more successful. Furthermore, the results in table 4 show that 17.885% of the factors influencing IS implementation was explained by top management support. Top management that supports implementation of computer based information systems fully through financial allocation, advice, networking and emphasis on implementation is likely to boost the adoption process to a great extent. This can be explained by the management of IS implementation. Moreover, 14.884% of the factors influencing IS implementation was explained by communication. Communicating with all the parties involved in implementing IS enables them to gain trust with the process thereby making it to succeed.

According to the results in table 4, end-user training explained 22.45% of the factors influencing IS implementation. This indicates that users must be equipped with the necessary skills and competencies to enable them drive and support the implementation of Information System process. Furthermore, 17.885% of the factors influencing IS implementation were explained by the understanding and approval by the top management. Information System implementation process is likely to fail without management understanding and approval. This is because they may not be committed to the implementation process hence making it to be unsuccessful. Table 4 shows that qualifications of ICT staff and competence of IS staff explained the factors influencing IS implementation by 14.884% and 10.558% respectively. This implies that if the project team has the requisite skills and competencies, then the implementation of Information Systems will be boosted.

Table 4: Factors influencing IS implementation

Component	Initial Eigen-values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.End-user training	5.614	22.454	22.454	5.614	22.454	22.454
2.Understanding and approval by top management	4.471	17.885	40.34	4.471	17.885	40.34
3.Qualifications of ICT staff	3.721	14.884	55.224	3.721	14.884	55.224
4.Qualifications of IS staff	2.639	10.558	65.782	2.639	10.558	65.782

5. Summary and Conclusions

The aim of the study was to identify the factors influencing implementation of computer based information systems in public universities in Kenya. The empirical results of the study indicated that university top management support, end-user training, understanding and approval by top management, availability of qualified and competent ICT staff were important factors for the successful implementation of Information system.

Furthermore, sufficient funding, cross-functional teams, external pressure, IS implementation strategy and proper IS integration were considered as minor factors influencing an IS implementation. As many arguments for IS planning prove, IS project implementation is a complex exercise and more research is needed to identify challenges, good practice and solutions for successful implementation. This paper analyzed and synthesized all information gathered to develop a framework that hopefully can be used during IS infrastructural planning and implementation in higher institutions of learning in Kenya.

The results of this study are similar with the finds of Wong (2000), who found out that poor IS consultants effectiveness and poor project management effectiveness can lead to low quality IS implementation efforts which in turn contributes to user's resistance to change and their un acceptance of the new implemented systems. It is important to note that lack of IS knowledge and awareness may be a contributing factor to the lack of enthusiasm by top management to allow user participation, though user contribution is important to IS implementation efforts. Therefore, since IS implementation is complex, diverse and with opposing central requirements, it demands the involvement of many users and interested parties from different functional units. Employees from all sections and departments involved must have input in the design, selection and implementation in order to make the process successful.

5.4 Suggestions for further studies

A similar study should be done to validate these case-based results through a large scale of IS implementation in all public universities in Kenya. Also, there is need for a similar research to be done in Private Universities to see if they share similar experiences.

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