Ex Ante Evaluation of Information and Communication Technology Projects; Case Studies of Kenyan Universities

TIMOTHY MWOLOLO WAEMA[*]
School of Computing and Informatics, University of Nairobi

MS. CLEMENCIA MARURA MWAMBURI
Jesuits Conference of Africa and Madagascar

Abstract:
Information and communication technologies (ICTs) have increasingly become crucial to achieving organizational and strategic goals. This has led to an ever increasing expenditure on ICT and an accompanying increasing demand to measure the business value of the IS investment. The need to evaluate investments in ICT projects is further exacerbated by the 'productivity paradox' observed in these investments. Despite higher investments in ICT, the resulting business value is not easily visible. One of the most important evaluations of any project is the ex ante evaluation. This is a type of evaluation which informs the go/no go or approval decisions of projects. It is extremely important because it is through this evaluation that beneficial projects are picked and implemented and non beneficial ones dropped.

This paper explores the influence that ex ante evaluation has played in the approval for implementation of ICT projects in universities in Kenya. The theoretical framework used for this evaluation focuses on three interrelated constructs that contribute to the success of evaluation, namely; context, content and process. The context of evaluation refers to factors external and internal to the organization that influence evaluation and its management; the evaluation content refers to the subject of evaluation, the criteria used and the criteria measures; and the process of evaluation refers to the way that evaluation is carried out, the time frame and the tools and techniques used. The evaluation was carried out using a total of seven selected case study projects. Three of the ICT projects were from one of the largest public universities while four projects were drawn from two of the most established private universities. Data was collected through interviews with key project stakeholders, review of project documentation and review of relevant information contained on the Internet and institutional websites. The project cases are analyzed using the context, process and content conceptual framework.

From the results, the paper concludes that all the universities studied had some form of project approval process. The level of sophistication or rigour in the process and management expectations varied at each institution. In addition, the basic methodology used in all cases was the non-rational (influence) methodology. In this approach influence techniques are used to persuade and obtain commitment and participation from Management (the approving parties) and the beneficiaries/users of the final product/service of the ICT project. Other conclusions are that in situations where there is a high profile and well established ICT function, the ICT experts have a huge role to play in deriving the benefits and influencing approval; that most project benefits were mainly stated in a narrative form and project risks were generally not accounted for; and that external stakeholders have a significant role in influencing approval of ICT projects (the accrediting body in both private universities the Ministry of Education in the case of the public university). The study also concludes that the amount of time taken in the evaluation

[*] Authors' Addresses: Timothy Mwololo Waema, School of Computing and Informatics, University of Nairobi, P.O. Box 30197, 00100, Nairobi, Kenya, Tel: +254-20-4446544, e-mail: waema@uonbi.ac.ke: Clemencia Marura Mwamburi, Jesuits Conference of Africa and Madagascar P.O. Box 1540-00502 Karen Nairobi, Kenya, Tel: +254-20-884528, email: mary.jacinta@yahoo.com

process was a function of the amount of money to be invested and how easily the beneficiaries and users can relate to the benefits. The returns to be gained from spending large amounts of money become more critical and have to be illustrated to Management. In cases of huge amounts of investment, the phased approach was used.

The study ends with some recommendations for both research and practice. In particular, we recommend universities implement formal mechanisms for monitoring and evaluating the benefits of ICT projects. A formal evaluation will enable them to establish the value to be derived from ICT and to properly manage this value. These formal mechanisms must have a strong documentation component. This will enable follow up and ex-post evaluations particularly for benefits management. It will also facilitate institutional learning. We also recommend further research on why and how evaluation can be further entrenched into the project management processes of universities and other institutions as a way of improving the success rate of ICT projects implementation. One of the key areas that clearly needs to be researched is the evaluation of information systems (IS) software projects from a process, outcome and context perspective. It is also important to research on how to further entrench the business approach in the evaluation processes. This would entail carrying out research on evaluation within the context of aligning IS projects with business plans, with very clear indicators of the business expectations of the projects.

1. INTRODUCTION

Kenya has 7 public universities and 13 chartered private universities. A public university is maintained or assisted out of public funds while a private university is established with funds other than public funds. The total enrolment in universities has increased from 3443 students in 1970 to over 130,000 students in 2006 (20,000 in private universities and 110,000 in seven public universities) (Kashorda, et al, 2007). Despite the increased demand for higher education as indicated in the increasing enrolment figures given here, this marks a transition rate from secondary level to university level of an average of about 12% percent.

Kenya had many failed attempts at developing an ICT policy for more than two decades. When a draft was ready, it remained in draft form for several years, largely because of a disjointed institutional framework for policy development, lack of high-level ICT champion in government and lack of adequate and sustainable funding for ICT (Waema, 2005). The first comprehensive and stakeholder driven ICT policy was discussed and approved by the cabinet in January 2006 and an ICT policy document published through the Kenya Government Gazette Notice (The Kenya Gazette, 2006). The vision in this policy is "*a prosperous ICT-driven Kenyan society*", which puts ICT in the center of national development.

The Ministry of Education has a policy contained in Sessional Paper No. 1 of 2005, entitled "A Policy Framework for Education, Training and Research" (Republic of Kenya, 2005). The policy has the vision for education as "*quality education and training for development*" and puts the overall goal of education as to achieve Education For All (EFA) by 2015 in tandem with national and international commitments. The policy recognizes that ICT is one of the key pillars of education and training and has two pertinent policy objectives: to promote and popularize ICT by 2008, and to promote and popularize open and distance education at all levels of education and training by 2010. In addition, this policy

document commits to make education the natural platform for equipping the nation with ICT skills in order to create a dynamic and sustainable economic growth and to facilitate the use of education institutions as hubs of ICT dissemination in rural areas. Finally, the thrust of the policy is "*to integrate ICT education and training into education and training systems in order to prepare learners and staff of today for the Kenyan economy of tomorrow and therefore enhance the nation's ICT skills*".

In addition, the Ministry of Education has a sector-wide five-year ICT strategy for education and training (2006-2010). This strategy was developed in line with the national economic development plan (Economic Recovery Strategy for Wealth Creation, ERS) as well as the national education and ICT policies outlined above.

With respect to performance monitoring and management, the public universities enter into a performance contract with the Ministry of Education on expected service delivery and standards for service delivered for each financial year. On the other hand, all the private universities are accredited by the Government of Kenya's Commission for Higher Education (CHE).

University education and training is expensive and requires huge investments by all partners. In 2003, the average spending per student at the university levels was 31 times as expensive in relation to primary education, 6 times as expensive in relation to secondary education and twice as expensive in relation to Technical, Industrial, Vocational and Entrepreneurship Training (TIVET) education. This is particularly expensive to government. At the same time, Government's policy has for some time been focused on providing Education for All (EFA) starting with the provision of Free Primary Education (FPE). The public universities are thus faced with dwindling financial resources from the exchequer and have to depend less and less on the Government by diversifying their sources of income as well as ensuring more efficient and cost effective use of institutional resources. At the same time the Government is promoting private sector investment in the development of university education and training.

In ICT, universities in Kenya face a number of challenges. Some of the key ones include the limited ICT budgets, high costs of Internet provision, large ICT infrastructure investment required in each institution, large associated costs of operating and maintaining the infrastructure, lack of awareness of the strategic impact of ICT by senior management, and limited or non-existent technical capacity in some of the institutions.

With respect to evaluation, McBride and Fidler (1994) note that despite a plethora of IS evaluation methodologies developed, 'none of the methodologies is widely adopted by practitioners'. If these statements are true in the developed world where the art of measuring for effective management is well studied and established, one wonders what to expect in "emerging" nations, especially in universities. This paper attempts to establish how the ex ante evaluations are carried out and how the evaluation outcomes are employed in making go/no go decisions for major IS projects in universities in Kenya.

2. CONCEPTUAL FRAMEWORK

2.1 Introduction

Information systems have become ubiquitous in organizations; not only are they used for operational purposes, they are employed in controlling, planning and strategic levels of management in organizations. This has led to ever increasing expenditure on IS and an accompanying increasing demand to measure the business value of the investment associated with IS (Cronk and Fitzgerald, 1999). The need to measure/evaluate IS investments is further exacerbated by the 'productivity paradox' (Brynjolfsson, 1993), observed in these investments. Despite higher investments in IS, the resulting business value is not easily visible.

"The evaluation process is about establishing by quantitative and/or qualitative means the worth of IS to the organization …bringing into play notions of cost, benefit, risk and value" (Willcocks, 1992).

As an organizational process, evaluation, plays a multifaceted role and, as such, it is a vital organizational function, strongly related to other management and decision making processes (Serafeimidis and Smithson, 1999). Serafeimidis (2001), in his review of research issues in evaluation of information systems, identifies the varying roles that evaluation plays as an organizational process. These roles, according to findings of other researchers' work include establishing by quantitative and/or qualitative means the worth of IT to the organization and ranking alternatives. Other roles are that evaluation forms a

central part of a complete and incremental planning, decision-making and control (diagnosis) process, is a crucial feedback function which helps the organization learn and thereby reduces the uncertainty of decisions, and is a mechanism for gaining commitment and, in highly politically influenced environments, for legitimization while in some occasions is a mechanism for exploration and discovery.

One of the most important evaluations of any project is the ex ante evaluation. This evaluation, which informs the go/no go decisions (Serafeimidis, 2001) of projects, is extremely important because it is through this evaluation that beneficial projects are picked and implemented and non beneficial ones dropped. This is the ideal situation. However, the opposite is equally true if the correct evaluation is not carried out whereby non beneficial projects are implemented and beneficial ones dropped or a mixture of beneficial and non beneficial picked. Proper evaluation of the IS projects at various appropriate stages of the project, using the most suitable evaluation methodologies should therefore be able to identify these issues in the projects and facilitate the successful management of the projects.

Various researchers have identified the challenges associated with the evaluation of IS. Dilemmas in appropriately measuring the value of IT include the fact that it is increasingly difficult to isolate the role and function of IT from other aspects that make up a product, a service, a distribution channel, a business process and so on and that there is an enormous time lag between IT investments and their results (Zee, 2002). Other reasons cited for the difficulties encountered in measuring and managing of IT benefits is the fact that despite the considerable amount of research, no comprehensive or rigorous *economics of information* has been developed as a result of lack of consolidation of the myriads of work done into a coherent theory (Remenyi et al., 2000).

Numerous methods and techniques have been developed and cover ex ante, ex post and continuous evaluation of projects depending on the role that the evaluation exercise is intended to play in the project: The overall or net effect of these evaluations on information systems projects depends on the context, content and process (Serafeimidis and Smithson, 1999). Many researchers (e.g. Farbey *et al.,* 1993; Serafeimidis, 1997; Symons, 1991; Walsham, 1993; Willcocks and Margetts, 1994) have argued that, for evaluation to be 'successful' it requires a richer examination of the organizational situation than has traditionally been made. They argue that IS evaluation process and content are closely intertwined with each other and also with the context of the organizational change associated with the development and introduction of a new information system. We have chosen a conceptual framework outlined below that is in line with these ideas.

2.2 Conceptual Framework

The conceptual framework adopted in this study in the one developed by Serafeimidis and Smithson (1998) represented diagrammatically as follows: -

Figure 1 A conceptual framework for understanding IS evaluation (Serafeimidis, 1997, p. 71)
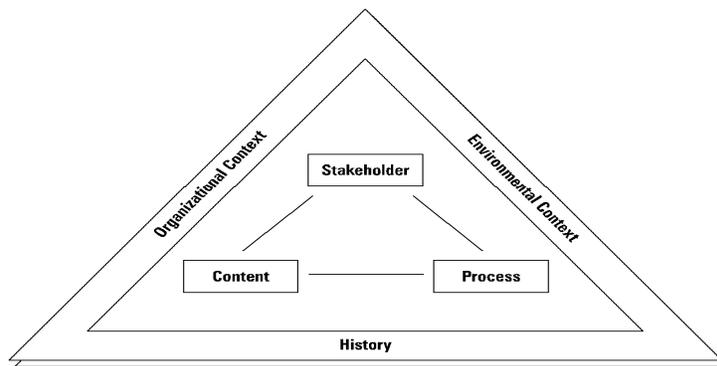
Source: Serafeimidis, 1997, p. 71

According to this framework there are three main aspects that contribute to the success of evaluation namely the context, the content and the process. These are outlined below.

2.3 Evaluation context.

The evaluation context is determined by factors external and internal to the organization that influence evaluation and its management. These factors relate to the purpose, role and objectives of evaluation. In our case, the purpose is ex-ante evaluation to able go/no go decisions for IS projects while the role may include the traditional role of resource control, learning, feedback, consensus achievement and organizational exploration. The objectives of IS evaluation can be many but in our study an important one is to facilitate an ex ante appraisal of IS investments. However, given that IS evaluation is a social process, there may be hidden agendas as well as formal objectives (Serafeimidis, 2001). The factors relating to purpose, roles and objectives of a particular IS evaluation need to be defined and may be changed by the constant interaction of the evaluation with its context. The changes affect and are affected by the views and behaviour of the stakeholders involved.

In the information systems environment, the stakeholders are all those individuals and groups who can affect or be affected by the information system (Svendsen, 1998). Various authors (e.g. Hirschheim and Smithson, 1988; Symons, 1990; Walsham, 1993) have emphasized the subjectivity and social nature of evaluation and thus the people aspects are of considerable importance. These aspects refer not only to those people doing the evaluation but also to other stakeholders that are affected in one way or another (victims or beneficiaries according to Guba and Lincoln, 1989). Even stakeholders who are not directly involved may still have considerable political influence on the evaluation (e.g., managers) (Serafeimidis, 2001).

2.4 Evaluation content.

Any evaluation involves the measurement of certain variables and the comparison of these measurements against certain criteria. These could be technical measures (e.g. response time, function points, etc.), financial measures (e.g. costs), and measures of system or information quality (DeLone and McLean, 1992), user satisfaction (Ives et al., 1983) or some other form of impact measurement (Serafeimidis, 2001). These are elements of evaluation content and are largely determined by the methodology adopted.

2.5 Evaluation process.

A process is an occurrence or designed sequence of changes of properties/attributes of a system/object. A process may be identified by the changes it creates in the properties of one or more objects under its influence and it could be singular, recurrent or periodic. In general, the process of IS evaluation refers to the way that evaluation is carried out, the time frame and the tools and techniques applied.

The evaluation content, context and process operate within the historical context (the stage of IS diffusion at which the organization is operating under), the management level at which the information system is employed (operational, tactical or strategic) and the evolution stage of the methodology employed.

3. RESEARCH METHODOLOGY

This project explores the influence that ex ante evaluation has played in the approval for implementation of IS projects in Kenyan universities and how it is done. The study sought to establish whether the roles identified in the IS evaluation research studies apply within the Kenyan context, the difficulties encountered and contributions to approval. This was done primarily by comparing what was established through the literature review and what is being done in the research sites. Also explored is the relationship between theory and practice and what can be learnt for the emerging economy context in this field.

The research methodology selected for this research is the case study methodology. This methodology lends itself very well for the research in question because case studies seek to describe a unit in detail, in context and holistically. Case studies are designed to bring out the details from the viewpoint of the participants using multiple sources of data. They offer a way of organizing data and looking at the object to be studied as a whole, enabling in depth investigation and deeper insights and therefore better understanding of the problem at hand (Feagin, Orum and Sjoberg, 1991).

The research instruments used were interviews of key stakeholders, review of project documentation in the selected universities as well as review of the Internet and institutional websites. These multiple sources of information enabled confirmation of the validity of findings wherever possible. In addition, as many people as possible who were involved in the projects were interviewed to triangulate evidence gathered. The projects selected for the study were those had been proposed for implementation within the last five years. Once this information/data was gathered, analysis was carried out to establish how the evaluation influenced the go/no go decision (approval) for the projects and how the practices compared with those reported in literature.

The research consists of a total of seven case studies from one public university and two private universities. Both public and private universities were studied to enable comparison of the cases studied. The sample of institutions was determined by the willingness of the institutions to allow the study to be carried out while the sample of projects studied depended on whether information on those projects could be provided. It became necessary to sign non-disclosure agreements with the three institutions to ensure that there was confidence to provide the necessary information required for the research without fear that it would be divulged to third parties. This is one of the reasons why the identity of the institutions has been carefully disguised in this paper.

In line with the conceptual framework, Table 1 summarizes the information sought in the interviews and document studies of the research.

Table 1: Information collected from the project cases

Conceptual framework dimension	Information sought
Context	The multilevel systems and structures within which the organization is located. The social, political, economic environment in which an organization operates The organizational and cultural characteristics Methodologies and processes Stakeholders involved
Content	For each of the projects studied The subject of evaluation The criteria used and The criteria measures
Process	For each of the projects studied the way that evaluation is carried out, the time frame and the tools and techniques applied
Other Issues	For each of the projects studied(aggregate of the projects) Challenges encountered Any emerging evolutionary trends in the evaluation methodologies employed/where is evaluation going in the institution.

4. RESULTS

University A, B and C all located in Nairobi were studied. A sample of the technical projects was selected in each of the sites. These projects had adequate information to enable analysis and derivation of important conclusions that can be further developed in subsequent studies.

4.1 University A

University A is one of the large universities in Kenya. It offers diversified academic programmes for both government and self-sponsored students both on and off campus. An ICT Centre (ICTC) offers computing services for the whole university. The premier strategic plan for the ICTC included the structure of the ICT Center (ICTC), effective rations of PCs (an average of 10:1 for students and 1:1 for the

academic staff), importance of computer networks and need for improvement of security and strategies to get these in place.

The three projects studied are outlined below.

Case 1: Network Installation at One of the Campuses

The selected campus is situated away from the University main campus. When the ICTC was formed most of the campuses did not have local area networks. The project proposal outlined the situation, objectives of the solution and benefits to be accrued. The total wiring for the campus was estimated to cost Kshs. 20 million. Presentations were made to the College and the University Management Board for awareness creation and buy-in.

A phased solution was selected employing three phases:

- Creation of a LAN at the Principal's office, purchase of 25 computers, link to the University backbone and user training. The total cost was Kshs. 650,000 and was completed in June 2002.
- Creation of a student laboratory. A donation of 60 computers necessitated the implementation of a LAN and interconnection to the Principal's building LAN. This was done in September 2002 at a cost of approximately Kshs. 1.2 million.
- Implementation of LANs in the main buildings in the campus and interconnection of all these buildings on the Campus Area Network (CAN). This was accomplished in October 2003 at a cost of approximately Kshs. 16 million.

This phased approach resulted in easier and faster approvals and more funds allocations subsequently because of increased management and user confidence as well as benefit visibility due to direct interaction with the deliverables such as access to the Internet, email, and ease of research and collaboration. It was also greatly influenced by the incorporation of the project deliverables to the performance contract between the university and the government and by the numerous requests for ICT facilities by the students.

Case 2: Implementation of Voice over IP

The geographic dispersion of campuses with disparate telephone networks that could not operate as a single unit led to high telephony bills. The telephone bills were running to approximately Kshs. 40 million per annum. The University administration wanted to reduce this bill to less than half. In the past, a number of interventions had been attempted, including reduction of number of lines, fixing the amount used per line, surcharging excess expenditure and establishing GSM gateways on the PABXs. However, all these interventions had failed to meet the cost reduction target.

Much of the data network infrastructure interlinking the campuses was already in place. The voice over IP (VOIP) solution would allow the University WAN, CANs and LANs to carry voice communication and thus integrate the voice network into the data wide area network. The main selling point of the solution was the time tested 80/20 rule. That is 80% of the voice traffic is intercampus while 20% is outgoing. The telephone bill could be reduced by up to 80% with repayment of the capital cost within 3 years. Other benefits in the project document included:

Improved collaboration

- Ease of management of the voice telephony system (e.g. billing.)
- Foundation for future add-on services e.g. e-learning
- Improved business processes

Two departments were involved in the project proposal, the Estates department which manages the telephony systems and the ICTC which manages the computer networks. ICTC proposed the solution in 2005 and made provisions for the budgets in its development plans. The initial financial outlay was very high thus the project was phased out into three phases:

Creation of infrastructure i.e. installation of servers, routers and 175 IP phones to test drive and create buy-in at Management level. This cost Kshs. 30 million and was implemented in the 1st and 2nd quarters of 2007.

Buying of IP phones to cover up to 80% of the officers to create a critical mass for impact of expected benefits. The campuses would be expected to place individual requests for procurement of the phones based on their budgets and development priorities/plans aligned to the University's strategic plan. Enhancement of the project to carry video and e-learning related activities.

The 1st phase of the project commenced in 2007 after being repacakaged and approved in 2005 instead of the initial plan of 2002. Some of the constraints that led to the delay included; delayed allocation of funds because of project ownership issues and new GOK procurement requirements and procedures. However, the introduction of performance contracts enabled faster allocation of funds.

Case 3: Implementation of the Data Center

The University's Intranet server farm supports several Management Information Systems developed over time, is semi decentralised and has served beyond its planned service life. The MIS systems requirements are beyond the existing servers' capacities leading to maintenance difficulties, including frequent breakdowns and malfunctions, lack of spare parts and lack of support. An additional factor was that some servers failed completely, in turn giving the project high priority and faster approval. Although the project was expensive, its approval was further accelerated by an argument for reduced total cost of ownership.

4.2 University B

University B is one of the private universities established in the early 1990's. It was operating under a ten year Strategic Development Plan running from 2002-2011 which recognises the strategic role ICTs play in the roll out of the University's strategic objectives. The Information Technology (IT) section falls under the faculty of Science, department of Computer Science. The IT section was put in place in 2002/03. It is headed by an IT coordinator who reports to the Dean of the Faculty of Science. The section has 5 members of staff and undertakes user support and installation of computer laboratories. Plans are in place to elevate the profile of the Information Technology (IT) section to be headed by an IT Director (or Manager) reporting to the Deputy Vice-Chancellor in charge of Administration.

Case 4: The VSAT Project

The purpose of the VSAT project was to provide quality teaching, research and community service through reliable Internet Connectivity. The project cost was approximately Kshs. 12,000,000 and was completed in January 2007. The University became a member of Kenya Education Network, KENET (the national research and education network) in 2002. Through this membership it received equipment and a leased line connection of 128 kbps through Jambonet, the internet gateway for Telkom Kenya, one of the internet service providers. In 2005, this connection was upgraded to 256 kbps from 128 kbps.

The VSAT project was intended to increase the Internet connection speed from 256 kilobits per second (Kbps) to 2 megabits per second (Mbps), increase the number of personal computers on the Internet to 600 by year 3 of the project, increase use of Internet for e-journal and database access by 70%, increase website interactivity, reduce the down time of the leased internet link, and assist the neighbouring community through training and use of the internet.

The project was presented in the budget requirements and funds availed after Management approval was received. Due to limitation in the ICT human resource capacity, the University benefited greatly from its KENET membership through technical expertise.

4.3 University C

University C is another private university that was awarded the Kenyan charter by the higher education regulator in the late 1990's. It enjoys an additional accreditation from an external accreditation body.

The university recognised the centrality of Information and Communication Technologies in the delivery of teaching, learning and research. It is mandatory that all students are computer literate.

Workstations and teaching laboratories house over 430 computers where students learn the use of the Internet, online databases research, e-mail and course specific technologies such as electronic financial systems. It also uses technology to efficiently manage university services.

The following were noted as important issues that impacted evaluation. One, there was an all inclusive and participatory process of ideas and project generation. All projects must be in line with the strategic plan. Two, there were regular surveys carried out to establish customer satisfaction, needs and adherence to standards. In addition, performance management and appraisals based on delivery on performance targets set annually. Finally, investment in IT, business process re-engineering and alignment of the strategic plan were key elements in accreditation with the second accrediting body.

In this university, ICT falls under two distinct *departments,* the Library and Multimedia & ICT departments. However, the Vice-Chancellor (VC) was the main champion of ICT in the institution. In general, the project evaluation process was found to be largely embedded in the budgeting and procurement processes. Departmental proposals are discussed annually with the budget committee comprising of the Deputy VCs and Deans of Schools. Proposals that are approved are presented to the Board of Directors. At the procurement stage, the approvals are obtained from the Management Council (consists of the VC and Deputy VCs). Availability of funds, alignment to the strategic focus of the institution and the benefits to the student community form key approval considerations.

Case 5: Library Automation Projects

There are two library automation projects that were reviewed in this case. One concerns the upgrade of the existing library information system (LIS). This project was completed in January 2004 and cost approximately Kshs. 4 million. IBM was discontinuing support for the operating system (OS) AIX Ver. 3 The university had to upgrade the its Libray System OS to AIX Ver. 5.1. As a consequence, the hardware (server) and the Library Information System had to be upgraded as well. The Library Information System (LIS) was considered critical to the operations of the Library and the University therefore granted he approvals with ease.

The second project concerns that automation of the cataloguing system. A backlog of books to be catalogued was growing steadily and needed to be dealt with. There were errors noticed in cataloguing as a result of the manual cataloguing system. The solution to these problems was identified as automation through online indexing services and procurement of computers for the cataloguers, a database and relevant document management software. This project was also deemed to be critical in migrating to digital library and was similarly approved easily.

Case 6: Local Area Network Projects

There are two projects under local area networks in this case. The first is wireless access in campus. Access to the Internet and the Intranet was hindered by the physical limitations of the existing computer laboratories. The main objective of the project was to increase access to the Internet and create wireless access in campus. It entailed upgrading of the bandwidth for Internet access to 1.5 Mbps downlink and 1 Mbps uplink and preparation of the in-house human capacity to roll out the wireless local access network. Some of the students owned laptops while others were willing to buy if an affordable option was available.

This project was implemented in 2005. It was estimated to cost approximately USD 10,000. Eventually the project was broken down into three phases and had later to be scaled down to one third after implementation started because of escalation of costs due to high bandwidth costs. The main concern of the University Management in relation to this project was security and the possibility of access to the internet by students without payment for the service. To overcome this, local users of the technology were contacted to share their experiences and to convince management of the viability of the project.

The second project in this case was the upgrade of the wireline local area network in the campus. This project was implemented in 2006 and cost approximately Kshs. 6 million. It resulted from connectivity problems due to poor configuration, none standard wiring of the building blocks and lack of wiring drawings. The main stakeholders were the ICT technical staff. The technical nature of the problem made the justification process take longer and approval was harder to obtain because the benefits of an improved network which are very technical were not so easy to demonstrate to the Management Council.

Case 7: Smart Classrooms Project

Management was concerned about implementing an effective teaching mode both to enhance learning and to be more competitive as an institution of higher learning. The evaluation process involved establishing the best solution. The approval was easy to obtain because it was a management prerogative.

4.4 Case Analysis Results

In this section, we shall analyze the case studies from the conceptual framework. From an evaluation context perspective, the following are the key results:

- *External Stakeholders* have a key role to play in the prioritisation and selection of projects. These are the Ministry of Education for the Public University through the Performance Contracts signed with the institution and strategic plans developed that guide projects undertaken. In University A, for example, the projects that were in the performance contract between the university and the Ministry of education were easily approved. In University C, two of the projects were significantly influenced by the need to adhere to academic standards established by the external accreditation body. It is also possible for the external stakeholders to place restrictive and bureaucratic requirements that can become bottlenecks in the ex-ante evaluation.

- *Internal stakeholders* also play a pivotal role. When the students place demands for certain levels of service provision the projects that make the realization of these needs are easier to evaluate and to obtain approvals. In the case of a public university, this is related to the power of students to push their issues and management's fear of student strikes. The need for transfer of credits for international students on exchange programs places demands for minimum technology standards in institutions that have this arrangement.

- *The strategic relevance of projects and buy-in by management* or sponsorship by management makes the evaluation process faster. Examples are the voice over IP and data centre projects in University A and the smart classrooms project in University C. However, it is also important to note that the speed of evaluation and approval was a function of the size of the organization and the bureaucracy involved.

- *The benefits to accrue from the projects* and how easy it is for management and the users of the systems to relate to the benefits. The network installations in the University A were given a go ahead to implement more easily once the benefits of initial pilot phases became evident. This is also strengthened by the ability of the project owner to use appropriate means to sell the project.

- *The criticality of the service supported or offered is to the institution was found to be important.* In cases where failure to approve a project leads to the loss of essential services in the institution, the approval was faster. An example was the data centre project in the University A and upgrade of the library information system in University C.

- *The cost of the project* has a bearing on the evaluation process. The more costly a project is, the more there is scrutiny before a decision to go ahead is reached. The high costs of Internet connectivity in the country, for instance, led to the formation of KENET to enable the institutions to obtain Internet connectivity at lower costs through a bandwidth aggregation model.

- *The influence of the project owner* and ability to sell the project to management plays a role in the evaluation at the departmental level while the comfort with ICT at management level has a bearing on the corporate evaluation level. For example, the technical nature of the upgrade of the campus wireline local area network in University C made Management uncomfortable in granting approvals and lengthened the process.

From an evaluation process viewpoint, we found that the ICT project evaluation was embedded within strategic planning, budgeting and procurement processes. In the case of University A, it was discernable that the evaluation process, particularly the informal process that takes place within ICTC, had been influenced by the historical developments and evolution of the ICT function in the University. The amount of time taken in the evaluation process was a function of the amount of money to be expended and how easily the beneficiaries and users can relate to the benefits. This was evident in all the cases studied. The returns to be gained from spending large amounts of money become more critical and have to be illustrated to Management. The phased approach of project implementation provided an opportunity to review and assess the effectiveness of solutions and was widely adopted in University A. It was greatly used to win the confidence of management in a context where most of the managers are not ICT literate.

Finally, from an evaluation content perspective, we found that in all the three institutions, the one time procurement costs were accounted for while it was not possible to establish clearly how the cost of ownership of the ICT systems was taken account of in the evaluation content. Where savings could be computed easily, for example the VoIP project of University A, they were computed and used as a selling point for the projects. At the same time, most benefits were mainly stated in a narrative form and project risks were generally not accounted for. At the same time, the cost of maintenance and cost of ownership were not incorporated in the analysis in any of the projects studied.

5. CONCLUSIONS AND RECOMMENDATIONS

The overall conclusion is that all the universities studied had some form of project approval process. The level of sophistication or rigour in the process and management expectations varied at each institution. In addition, the basic methodology used in all cases was the non-rational (influence) methodology. In this approach influence techniques are used to persuade and obtain commitment and participation from Management (the approving parties) and the beneficiaries/users of the final product/service of the ICT project.

5.1 Other conclusions are outlined below.
In situations where there is a high profile and well established ICT function, like in University A, the ICT experts have a huge role to play in deriving the benefits and influencing approval.
Most project benefits were mainly stated in a narrative form and project risks were generally not accounted for. However, where savings could be computed easily, they were used as a selling point for the projects.
The amount of time taken in the evaluation process was a function of the amount of money to be expended and how easily the beneficiaries and users can relate to the benefits. The returns to be gained from spending large amounts of money become more critical and have to be illustrated to Management. In cases of huge amounts of investment, the phased approach was used.
External stakeholders have a significant role in influencing approval of ICT projects. The accrediting body in both private universities was a key stakeholder in the evaluation process. In the case of University A, the Ministry of Education influenced approval of ICT projects in that the projects in the performance contracts were easily approved.

The reality of the more complex world is that benefits do not just happen when new technology is delivered. Benefits rarely happen according to plan and benefits realization is a process that can and must be managed, just like any other business process (Thorp, 2001). Although the realization of benefits of the ICT projects was not the concern of this research, we suspect that none of the institutions had a system for managing the benefits. We recommend universities implement formal mechanisms for monitoring and evaluating the benefits of ICT projects. A formal evaluation will enable them to establish the value to be derived from ICT and to properly manage this value. These formal mechanisms must have a strong documentation component. This will enable follow up and ex-post evaluations particularly for benefits management. It will also facilitate institutional learning.

With respect to research, we recommend further research on why and how evaluation can be further entrenched into the project management processes of universities and other institutions as a way of improving the success rate of ICT projects implementation. One of the key areas that clearly needs to be researched is the evaluation of IS software projects from a process, outcome and context perspective. It is also important to research on how to further entrench the business approach in the evaluation processes.

This would entail carrying out research on evaluation within the context of aligning IS projects with business plans, with very clear indicators of the business expectations of the projects.

6. REFERENCES

BRYNJOLFSSON, E. "The productivity paradox of information technology", in *Communications of the ACM*, December, 36(12), (1993): 67 – 77.

CRONK, M. C. AND FITZGERALD, E.P. (1996), "Understanding "IS business Value": derivation of dimensions", *Logistics Information Management* Volume 12 Number ½ (1999): 40 – 49

CUEA (2005). CUEA Strategic Development Plan 2002 – 2011

FARBEY, B., LAND, F. AND TARGETT, D. *How to assess your IT investment. A study of methods and practice.* Oxford:Butterworth Heinemann, 1993

KASHORDA, M., WAEMA, T.M., OMOSA, M., AND KYALO, V. (2007). E-readiness survey of higher education institutions in Kenya, Kenya Education Network (KENET).

MINISTRY OF EDUCATION (June 2006). National Information and Communication Technology (ICT) Strategy for Education and Training.

REMENYI, D., MONEY, A. AND SHERWOOD-SMITH, M. WITH IRANI, Z. *The effective measurement and management of IT costs and benefits.* 2nd Edition, Elsevier Butterworth-Heinemann, 2000.

REPUBLIC OF KENYA (January 2005). Sessional Paper No. 1 of 2005 on A Policy Framework for Education, Training and Research, Ministry of Education.

SERAFEIMIDIS, V., "A Review of Research Issues in evaluation of Information Systems", in *Information Systems Evaluation Management* (Ed.Wim van Grembergen), IRM Press(2001)

SERAFEIMIDIS, V.AND SMITHSON, S., "Rethinking the Approaches to Information Systems Investment Evaluation", in *Logistics Information Management* Volume 12. Numbers 1/2. (1999): 94 - 107

THE KENYA GAZETTE (March 2006). Information and Communications Technology Guidelines (ICT Policy), Gazette Notice No. 2431.

WAEMA, T.M. (2005). IN ETTA, F.E. AND ELDER, L. (eds.), *A Brief History of the Development of ICT Policy in Kenya.* (At the Crossroads: ICT Policy Making in East Africa, pp. 25-43). Nairobi, Kenya: East African Educational Publishers Ltd.

WALSHAM, G. "Interpreting information systems in organizations" Chichester, England: John Wiley & Sons, 1993.

WILLCOCKS, L., "IT evaluation: managing the catch 22", in *European Management Journal,* Vol. 10 No. 2, June, (1992): pp 220 – 29.

YIN, R. K. *Case study research: Design and methods,* 1984. Newbury Park, CA: Sage.

ZEE, HAN T.M. VAN DER. (2002) *Measuring the value of information technology*, IRM Press, 2002.