Policies, Master plans and a Rolling Strategic Plan in Effective Implementation of ICT Infrastructure and Services: Case Study of the Open University of Tanzania

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ABSTRACT

Information and Communication technologies (ICT) is a strategic resource for higher education and its development must be made purposefully to achieve the stated University mission Implementation of Information and communication Technology (ICT) infrastructure and services is among the major challenges faced by the Universities in developing countries today. Among the critical issues is the necessity to have in place an ICT policy plan which is fully aligned with the University Rolling Strategic Plan RSP). This alignment helps senior management to be consistent and more focused in the implementation. Furthermore, it promotes awareness and the necessity to modernize its ICT resources that enable the University to face the twenty first century realities at a better footing. It is also necessary to create a long-term vision of the university information system architecture to prevent event-driven actions, isolated un-interoperable systems and redundant computing and data resources throughout the University. This is achieved through the interpretation of the ICT Policy Plan into an ICT Action Plan—an ICT Master Plan, which in turn provides a detailed specification of priority projects and the associated allocation of resources over a period of agreed number of years. The long term vision should be based on the organisation analysis, ICT analysis and corporate strategic plan.

This paper intends to highlight and share with other educational institutions in the developing world on how the ICT Policy, Master Plan and RSP have helped The Open University of Tanzania to successfully develop, implement and use its ICT infrastructure and services.

1. INTRODUCTION

The Open University of Tanzania was officially established in 1992 and became operational on 1st March, 1993. The University is an open and distance learning institution offering certificates, diplomas, degrees and postgraduate courses. Educational delivery is attained through various means of communication such as broadcasting, telecasting, Information and Communication Technologies (ICT), correspondence, enhanced face to face, seminars, contact programmes or the combination of any two or more of such means. At the moment the Open University of Tanzania consists of the following Faculties, institutes and directorates: The Faculty of Arts and Social Sciences, Faculty of Education, Faculty of Science, Technology and Environmental Studies, Faculty of Law, Faculty of Business Management, Institute of Continuing Education, Institute of Educational Technology, and the Directorate of Research, Postgraduate Studies and Consultancy.

The Open University of Tanzania conducts its operations through Regional Centres and Study Centres. Currently there are 26 Regional Centres and 69 Study Centres. The Open University has more than 220 full time and about 240 part-time, academic members, not mentioning various cooperating tutors and resource persons engaged on temporary terms. Currently the University has a student population of over 35,000 (undergraduate and postgraduate).

1.1. Background

At the national level, the significant achievement of ICT in Tanzania can be traced from the early nineties after various adjustments in policy, regulatory and commercial facets, both macroeconomic and within ICT's converging sectors. Since then, Tanzania has experienced dramatic changes in the use of ICT, but made more complicated by user's limited knowledge, use of different software and hardware imported from different places of the world, poor communication and power infrastructure and poor control and maintenance of the ICT in general. Notable milestones include: In 1994 when the first TV station started broadcasting; establishment of mobile phone companies in 1995; and Tanzania was connected to the Internet for the first time in 1996. Although access to ICT was still on the lower side compared with developed countries, there are signs of better accessibility to various communication devices such as telephones. For example, while the population of Tanzania is growing at the rate of 3.3% annually, the annual number of Tanzanian subscribing for telephone lines grows at an average rate of 48% as shown in figure 1 and summarised in table 1 below.
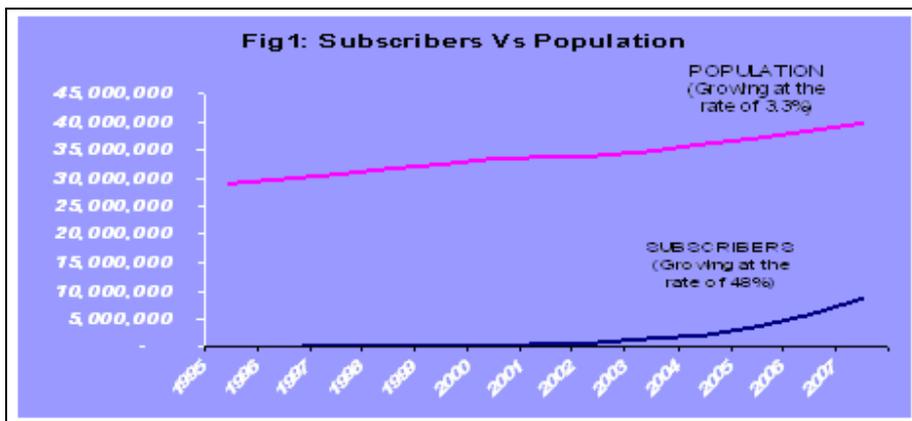

Figure 1: Telephone Subscribers Vs Population (Source: TCRA, 2008)

Details of population against subscriptions are summarised in table 1 below.

Table 1: Tanzania Population Vs Telephone Subscriptions (Source: TCRA, 2008)

YEAR	POPULATION	SUBSCRIBERS	NON SUBSRCIBERS
1995	29,147,703	90,198	29,057,505
1996	29,963,838	104,200	29,859,638
1997	30,802,826	134,645	30,668,181
1998	31,665,305	157,912	31,507,393
1999	32,551,934	200,320	32,351,614
2000	33,463,388	300,237	33,163,151
2001	33,756,093	453,362	33,302,731
2002	34,161,166	768,449	33,392,717
2003	34,876,231	1,442,006	33,434,225
2004	36,049,581	2,090,360	33,959,221
2005	37,267,530	3,544,207	33,723,323
2006	38,523,907	5,766,566	32,757,341
2007	39,816,363	8,488,774	31,327,589

The adjustments on policy also include tax exemption on personal computers (PCs) and their accessories after which there was quite a lot of improvement in ICT usage. At the individual level, people are increasingly purchasing computers for home use, as well as enrolling in short courses on how to use PCs. At the organisational level, efforts are mainly aimed at purchasing computers, installing various information systems and to some extent training staff on how to use ICT being installed in their organisations.

1.2. ICT at the Open University of Tanzania

Less than 5% of staff used computers when the Open University of Tanzania started and mostly secretaries. Teaching and training continued to be carried out using old pedagogy with minimum interaction and participation. On the part of students, there was generally lack of computer courses in their programmes. This was due to lack of adequate supply of facilities and skills in the area of ICT. Significant ICT development at the Open University of Tanzania can be traced from 2004, when OUT embarked on grand institutional transformation

2. THE OUT ICT POLICY, MASTER PLANS AND THE ROLLING STRATEGIC PLAN

In 2004, Open University of Tanzania embarked on an institutional transformation with support from Swedish International Development Agency (SIDA). The transformation programme aimed at strengthening the University (capacity building) through organization development and improvement of its services based on the following two basic principles:

- o The enhancement of organisational capacity which was instrumental to delivery of quality education by the University.
- o The employment of ICTs to manage and deliver the OUT services which was critical in improving the educational delivery.

With these principles as starting point, various studies/analyses were conducted and plans prepared between February to June 2004. These SIDA-supported interventions which comprised of organisational analysis and ICT analysis were the driving factors for the establishment of new OUT corporate strategic plan, an ICT policy and a master plan, where ICT initiatives were found to play a very important and cross-cutting role.

In order to create a common vision on the use and development of University ICT resources, it was agreed to develop an ICT policy plan. This plan was to be aligned with the University corporate strategic plan. This alignment made the top management aware of the necessity to modernize its ICT resources and become committed to the development of automated systems that enabled the university to face current realities. It was also necessary to create a long-term vision of the university information system architecture to prevent event-driven actions, isolated un-interoperable systems and redundant computing and data resources throughout the University.

Figure 2 below depicts the interrelationships of the outputs of the analysis and planning phase, as well as how organizational development and ICT initiatives are interwoven and reinforcing each other.
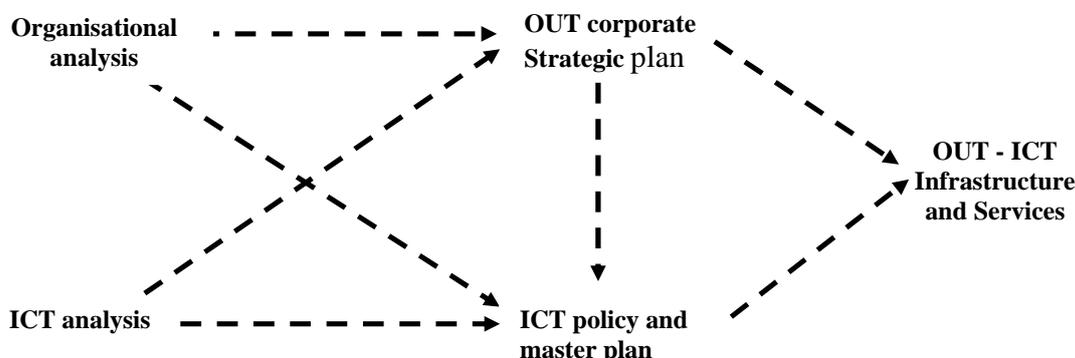
Figure 2: Organisational development with ICT interventions

It was realised that OUT depends more than any other educational institute on information and communications means. The potential impact that ICT may make in developing OUT was found to be huge and therefore this importance resource was given special attention. It was further realised that ICT will be a driver to create a shift in organizational management and operations. ICT was expected to greatly enhance the potentials of OUT, but not without organisational development of the institution at the same time. Strategically, strengthening the organization hand in hand with building ICT resources was expected to deliver significant improvement.

The process of drawing up a policy was as important as the policy itself. It was championed by the University's top management and involved all staff categories using future search workshops. Both the ICT policy Plan and ICT master plan were approved by the University council in 2004 and implementation started in 2005. The ICT Master plan provided a detailed specification of priority projects and the associated allocation of resources over a period of four years.

The specific ICT projects identified initially are shown in table 2.

Table 2: Identified Project Areas and Priority ratings

No	Project Description	Agreed Priority
1.	Establishment/designation of IRMC and provision of internet services	Prerequisite
2.	End-user training	Prerequisite
3.	Data communications infrastructure	1
4.	Financial Information Management System	1
5.	Information Usage and Security Management	1
6.	Academic Register Management Information System	1
7.	Library Management Information System	2
8.	Open and On-line Distance Learning and Teaching Programmes	3
9.	Human Resource Management Information System	3
10.	Examination Data Bank Management Information System	3

The implementation of the Master plan is being reviewed every year and as a result additional projects are being incorporated. This year ICT policy is being reviewed and updated to take into account new developments with much emphasis on the use of Open sources.

3. IMPLEMENTATION OF ICT INFRASTRUCTURE AND SERVICES AT OUT

The Institute of Educational Technology is mandated to oversee the implementation of both the ICT policy Plan and ICT master plan under the supervision of the ICT steering committee chaired by the Vice Chancellor. Eight ICT projects are being implemented since 2005 and they are at different stages of implementation.

     (i)   Establishment/designation of IRMC and provision of internet services
     (ii)   End-user training
     (iii)   Data communications infrastructure
     (iv)   Information Usage and Security Management
     (v)   Students Academic Register Management Information System
     (vi)   Library Management Information System
     (vii)   Open and On-line Distance Learning and Teaching Programmes
     (viii)   Examination Data Bank Management Information System

Generally the implementation of the ICT policy and priority ICT master plan projects has considerably improved the teaching and learning process.

In the next section we revisit the status and Lesson learnt for each of these projects.

3.1. Establishment/designation of IRMC and provision of internet services

Communication and information flow within the organization has improved tremendously following the re-configuration of mail server with introduction of various features such as mailing lists. Most of staff are now using extensively the university e-mail and mail lists. The University web-site is in the final stage of being updated from the old one at http://www.out.ac.tz/ to http://www.out.ac.tz/newsite. There is also room available for students at the university library which is thirteen hours a day and is always busy. Other services available on line so far include internal telephone directory and examination/test results.

3.2. Training

3.2.1 End-user Training

The OUT realised, right from the outset, that ICT training was key and a critical success factor and as such is a pre-requisite of the realisation of all proposed ICT initiatives. The end-user training is divided into two major groups, namely academic staff and administrative staff. In both groups the training is being offered in different levels starting with basics. Plans are now underway to have ICT skills course for students in all programmes.

3.2.2 Professional Training

This is mainly planned for IET staff and started with exposure tours to various Universities in order to give staff picture on how other universities in the management, control and maintenance of ICT. Training at advanced level (Masters and Doctorates) for senior staff is also being undertaken focusing on ICT management, software engineering, security, media studies, *e*-learning and *e*-governance.

3.2.3 Academic Programs

In 2006, new programme, Bachelor of Science in Information and Communication Technology was introduced under the faculty of Science, Technology and Environmental Studies. The B.Sc. (ICT) curriculum was designed to provide students with the technical knowledge and skills necessary to specify, evaluate and manage information systems. This was followed by the establishment of ICT Department in 2008.

3.3. Student Academic Register Management Information System

The Students Academic Register Information System (SARIS) has simplified student administration. Majority of staff now uses SARIS established at admission and there is no need of entering student basic data up to the end of studies. Registration into various courses, tests, examinations, continuous assessment and practical training in industry is all handled by the system.

3.4. Library Management Information System

Library holdings are available on the web therefore accessible from every office and laboratory within and outside the University. http://www.library.out.ac.tz/libcat/. The University is now in the process of improving the library information system and integrate all regional centre libraries. Digitization of library materials like theses and dissertations, materials written in the National language Kiswahili and other resources representing rich indigenous knowledge is underway, thus taking advantage of ICT and projecting the University as an active creator of knowledge. Through collaboration with other libraries abroad the University library now gives staff and students access to e-journals and digital libraries in those countries.

3.5. Open and On-line Distance Learning and Teaching Programmes

The OUT has adopted moodle as a Learning Management System which has been customised locally and running on EduUbuntu and new avenues in instructional designs are being explored.

3.6. Examination Data Bank Management Information System

This system is designed to enable storage of questions, reviewing question, Preparation of examinations (Assignment, Test, Final exams, etc).

4. ICT SUSTAINABILITY AT OUT

OUT's corporate strategic plans, ICT policy plan and ICT Master plan, clearly indicates that the development and deployment of ICT related projects are expensive undertaking and which will also lead to the ICT infrastructure that supports the core mission of the university as detailed in OUT's ICT Master plan (OUT, 2004). Therefore the question of sustainability must be thought off and addressed at the outset. At OUT the sustainability of ICT resources have been considered at three levels;

a) Organizational level. That is structures must be put in place to ensure that an organizational unit or individual owns ICT resources.
b) Technical level. Technical and managerial skills to manage, control and maintain ICT resources are developed and retained within the university.
c) Financial level. Financial resources are available at the right time to ensure continuous availability of the ICT services.

4.1. Organizational level

The recommendations were made to have an Information Resource Management (IRM) Centre which will be responsible for overseeing the ICT services in the University. In order to address these needs, the Institute of Educational Technology (IET), which was only responsible educational technologies, was re-organised in order to accommodate two (2) major functions and hence departments, namely Information Resource Management (IRM) and E-learning. IRM department was made responsible for supporting the ICT services of the University and E-learning department was mainly made responsible for e-learning services, research and development.

The most difficult resource to sustain under this arrangement was the skilled staff working at the IET, in charge of management, control and maintenance of ICT resources and services. Salaries under the University scheme of service could not retain such staff, as they commanded higher

salaries on the open market. Special incentive scheme for ICT staff was developed and later approved by the University Council in 2005. Finally, OUT ICT Steering Committee was established and it is chaired by the VC.

4.2. Technical Level

At the Technical level the emphases is mainly in two areas. First was to build internal capacity in developing various university information systems using Open source platforms. Secondly to improve, develop and retain technical and managerial skills to manage, control and maintain ICT resources within the university.

4.3. Financial Level

This is very challenging area due to limited budget. At the moment various discussions are being carried on the possibility in the following areas:
(i)   Faculty /Institutes/Departments to have budget lines for ICT expenses.
(ii)   Students to pay for ICT as part of fees (under discussion).
(iii)   Establishment of an ICT fund based on a "self insurance" principle (under discussion).

5. Challenges and Opportunities

Deploying ICT infrastructure and services in developing countries is a challenging undertaking. In this section challenges and opportunities experienced are discussed.

5.1. Challenges
(i)   Retention of Skills technical staff
(ii)   Shortage of skills in particular in the following areas
          o   Development of multimedia products including simulations and animations
          o   Instructional design for e-learning programmes.
          o   ICT services management.
(iii)   Development of institutional financing model for sustaining ICT, i.e. Bandwidth, repairs/replacement of equipment/applications, Operating systems and software licences such as anti-virus etc.
(iv)   Development of content i.e. course content, research and publications. Open content consortium
(v)   Change mindset of the academic staff when going e-learning.
(vi)   Low computer literacy in particular for students in the regions
(vii)   Frequently power cuts and fluctuations.

5.2. Opportunities
(i)   Strategies for development of national, sub-regional and regional bandwidth consortium
(ii)   Strategies for development of open source systems consortium.
(iii)   Strategies for promoting and deployment of Open source software.
(iv)   Strategies for helping faculty integrate technology into their instruction mainstream.

6. CONCLUSION

ICT for higher education is a strategic resource and its development must be made strategically to achieve the stated University mission that includes teaching, research and service to the community (consultancy). Administration of various University processes has been considerably eased through the use of the developed ICT infrastructure and services. Our experience shows

that the very process of developing the ICT policy, Master Plan and RSP generated the needed consensus at University level which was and still a key to success of future ICT projects. The ICT Master Plan ensures prioritisation in view of limited resources, while creating synergy and complimentarily of various ICT projects. ICT policy, Master Plan and RSP have helped the university management in discussing, understanding and taking ICT as an agenda and an important component for good management and administration and above all as a tool and catalyst for wider and deeper University reforms.

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