INFORMATION POLICY - A FIRST STEP FOR INFORMATION TECHNOLOGY RESOURCE COMMITMENT

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ABSTRACT

Almost every sector in business, applied or social science, etc. is involved in one way or the other with the creation, distribution, processing and/or use of information. Information and information technology is becoming so important to the success of organizations that managers of all organizations now feel the responsibility for managing the use of information and information technology like other resources, such as people, capital, facilities etc. However lack of common vision for the role of information, information technology and information systems may result into disasters and frustration in many organizations. In this paper we investigate the impact of this problem of lack of Information policy in organizations. The scope of our study was limited to the situation, in general, in developing countries. It is established that there are no clear strategies and policies at the University and, in Tanzania regarding information and information technology, thus underscoring the need to have one.

INTRODUCTION

The current level of IT in any organization influences significantly the formulation of its informatics strategies and policies. Different nations that have invested in development, use, or adaptation of information technologies are today at different levels of accumulated experience, and economic development depending upon national priorities and investment policies, Developing countries, however, for various reasons have not been able to apportion as much of their budget to information technology development(1).

Use and applications of information technologies is already widespread within Africa (2,3). There are some trends that appear to have the greatest relevance to Africa, specifically, to Tanzania. Apart from scientific applications, business management and finance is perhaps the other most important computer applications area today. Over the years word processors have formed the basis of office automation. Additionally, spreadsheet, databases and decision support systems have greatly simplified work and

significant enhance throughput. Links to electronic mail (E-mail) system or fax machines along with the availability of graphical and user friendly interfaces have encouraged managers to acquire computing skills.

Decision makers are beginning to understand that information is not just a by-product of conducting business; it influences business. Information can be the critical factor in determining the success or failure of a business. In order to maximise the usefulness of information to a business, it must be managed correctly, just as other resources are. Managers need to understand that costs are associated with the production, distribution, security, storage and retrieval of all information.

Furthermore although information is all around us, it is not free, and its strategic use for positioning a business competitively should not be taken for granted. The availability of computers has meant an information explosion for society in general and business in particular. Managing computer generated information differs from managing manually generated information in significant ways. There is usually a greater

quantity of computer generated can information to manage; origination and maintenance costs of computer generated information can multiply at alarming rates; and computer generated information is often treated less skeptically than information generated in other ways. It is in the spirit of minimizing the costs involved and maximizing the throughput in acquisition, storage, retrieval, distribution, and management of information that calls for an information policy.

In the first part of this paper we try to show why information policy is a necessary and a prerequisite to the development of information systems. In the second part we present the results of our study to justify the urgency that is required for our Tanzanian organizations to have information policy in place before committing more resources.

INFORMATION POLICY

Information and information technology is becoming so important to the success of organization world-wide that managers of many organizations now feel the responsibility for managing the use of information and information technology like other resources, such as people, capital, facilities etc. One important key to success in managing the development and use of information technology is the existence of a common vision of how information and information technology can improve the effectiveness or efficiency of the organization.

This common vision shared by systems analysts, systems designers, top executives, functional management and information systems managers for the role of information, information technology, and the information systems organization is required, coupled with a course of action towards this vision. The development of an explicit vision for information technology generates discussion on the role of this critical resource in meeting the objectives of the organization, thereby defining the strategic role information technology. The common vision of information and information systems must be linked with the strategy of the organization.

The common vision of the future role of information and information systems is called the **Information Systems Architecture.** This common vision coupled with a course of action towards this vision is called the **information policy.** The activities and decisions needed develop the Information Policy are called **Information Policy Planning.**

OBJECTIVES OF INFORMATION POLICY

The objective of the information planning process is to provide an information systems plan that supports the organization's short and long term information needs and is integral with the general organization's policies. This process leads to 1) adjustment of existing information policies and 2) the structure of the information function within the organization, 3) the specification of the development and implementation process of information systems. 4) a realistic specification of the (technical, infrastructure, human, skills, financial) resources needed and 5) the acceptable of the plan by decision makers who will be responsible for the future planning and implementation, and the transfer to those who are (will be) responsible for the maintenance of the plan on the long term.

INFORMATION POLICY PLANNING: A CONTINUING PROCESS

The Information Policy should not be considered as unchangeable. It represents the best ideas at a certain point of time. It is an initial plan which relates to the views on the general policies. This infromation policy plan process should 1) create an environment and an initial policy plan (of action) that can enable the organization to react to future changes in priorities and direction without radical disruption of on-going developements and 2) define an infromation function to maintain the continuing process of planning, development, maintenance and control of the infromation function within the organization. Information policy planning is an activity, that has to be carried out as a part of the general policy planning processes within the organization.

THE INFORMATION SYSTEMS ARCHITECTURE

An information system architecture is a written expression of the desired future for the use and management of information technology in an organization. It consists of a comprehensive set of guidelines, pictures, or statements within which an organization can consider and execute particular decisions.

It covers all relevant issues of information and information technology such as; the value and role information systems, data, hardware, software, data communication, and the managerial arrangements. It is critical to communicate the overall direction of information technology through OUT the organization so that everyone can understand that the organization is focused on the same defined target in the future.

WHY AN INFORMATION SYSTEMS ARCHITECTURE?

Information Policy Planning
An Information Systems Architecture provides the basis for the development of the Information Policy. An Information Policy is a plan on how to achieve the vision, described by the Information System Architecture. The Information System Architecture provides the "What" has to be achieved. The Information Policy answers the question of "how" the organization will get there and which resources are required.

Communicating with top management
It helps to explain the need for major capital and staff investments in the information technology area

Helping vendors
Having an architecture helps to communicate with vendor on he need for certain capabilities.

Providing a unifying concept
People who work within an organization have different roles, education experiences and interests. These differences cause different understanding of what should be the importance and the priorities in the application of information technology. An explicit overall information

Systems Architecture can provide people with a unifying concept to clarify direction and help them understand where their functions fit.

A context for decisions
Another important function of an Information Systems Architecture is to declare context within which managers at all levels can make decisions.

Evaluating technology options
The range of technology options for solving information problems is broad and growing. Moreover, the number of vendors and the number of different operating systems is also growing rapidly. An Information Systems Architecture can help to provide some guidance in making decisions that select one option or vendor over another. It allows the organization to take advantage of the range of technical option and see how they best fit into some overall strategy.

COMPONENTS OF AN INFORMATION SYSTEMS ARCHITECTURE

In our vision an Information System Architecture should comprise five closely related components: the Application Architecture, the Data architecture, the hardware Architecture and the Organizational Arrangements.

Application Architecture
The Application Architecture consists of descriptions of all relevant and overseeable applications, derived from analyses of the organization's operational and managerial processes and the data supporting these processes. Each description includes: the purpose of the application, organization's processes addressed, problems addressed, data created and used, dependencies on other applications, general requirements for procurement implementation and operation.

Data Architecture
The second major area for agreement in the development of a Information Systems Architecture is that of Data. Data is recognized as a major organizational resource like other assets, such as finance, personnel, equipment, facilities. Every organization plans and managers

these assets. Similarly, information and data must be planned and managed. Data planning means the development of a blueprint for data and the relationship between data across organizational functions into the future. The plan says what data is required, where they will be used, and how much data is expected.

Hardware Architecture

The third set of decisions in an information systems architecture concern the hardware components of an information system, that is, the attributes of he data processing, data storage and input/output equipment. Today, organizations operate or are planning to operate the so called distributed computing environment. Some major issues are:

- multi-user or single-user,
- locations of equipment,
- operating systems.

Network Architecture

The fourth component of the IS architecture involves the data communication network design. A policy has to be developed concerning Local network architecture as well as the communication with other organizations. One example of this important aspect is E-Mail. Issues that should be addressed include: ambiguity of the network access, location of applications, communication protocols, network topology, and capacity.

Managerial Arrangements

The final aspect concern the future arrangement of future information systems. The management system is one of the key elements in the overall information systems architecture. Issues that have to be addressed are;

- functions of information systems management,

- centralization or decentralization of responsibilities,

- skills and knowledge required,

- mechanisms for planning and control.

DEVELOPING THE INFORMATION POLICY PLAN

Determining an information systems policy plan, consisting of the information systems architecture and the course of action to achieve this architecture, is a complicated conceptual task. It requires seeing the ideal future and making basic technical and managerial decisions. The information policy plan may be developed in a variety of ways, depending on the culture of the organization, the wishes of the management, and the resources available. Whatever approach is used, the planning process should include activities and decisions along the following steps:

- Analyses of General Characteristics, Environment, Goals and Strategies.
- Define and Anayze Organizational Processes
- Define and Analyze Organization's Data
- Review Current Information Systems
- Review Technology and Skills Available
- Design Information Systems Architecture
- Establish Information Policy
- Maintenance of the Information Policy.

THE LITERATURE REVIEW

Information Policy as a subject has been investigated world-wide especially on the question of its impact on diifferent organizations, like health care environment {4}, Universities and research centres (5), and many other organizations. Our initial observations showed that in Tanzania less has been done on the issue. There are very few papers which covers related investigations (3). However, learning from published cases on the subject world-wide, it is necessary to start looking at this issue in our country because it shows how worse the situation may be if we advance technologically without an information policy. This is true at the national level as well as at individual organizational levels.

We, therefore, decided to investigate the University of Dar es Salam as an example to show how necessary it is to have information Policy in place before committing more IT resources as presented in the next sections of this paper.

THE SURVEY FINDINGS

Many companies in Tanzania have recently been involved in computerising their departments. These departments include finance, secretarial, research centres, bureaus, and other industrial and/or business departments. Our initial observation showed that most companies embarked on computerization without a clear guideline (an Information Policy) which would guide them in reaching their goals. As a result what was thoughtto be an improvement has now turnea into frustrations in some of the large companies. We therefore decided to collect our data from the university of Dar es Salaaam to investigate the level damage to similar companies which have gone through the same experience. We believe that in many cases the choice of the University was a good representative as there are as many activities as they may be found anywhere else.

Collection of data involved distribution of about fifty questionnaires to different user groups (departments/institutes) at the University whereby 60% booklets were returned dully filled and the evaluation was done on them. The following findings were realized after through analysis.

HARDWARE

A summary of the hardware, peripherals supported and storage devices is given in the following tables

TYPE/MAKE	TOTAL NUMBER	% OF TOTAL
IBM	57	28
NCR	25	12
SIEMENS	19	9
ICL	18	8
MACINTOSH	14	6
OLIVETTI	11	5
WANG	5	2
OTHER	65	30
TOTAL	214	100

PERIPHERALS AND STORAGE

		TYPE	NUMBER
(a)	PRINTER		
		Dot matrix	67
		Laser	28
		Inkjet	12
		Line Printer	5
		Daisy Wheel	2
(b)	OTHERS		
		Mouse	67
		VDU (Graphics)	19
		Scanners	5
		Plotters	4
		Modems	Several
		Light Pens	
		Tracking Ball	4
(c)	DATA STORAGE DEVICES		
		Magnetic Disks	Several
		Diskettes	Several
		Streamer Tape	53
		Cassette Tape	2
TOTAL			214

As observed, there are different brands of hardware located in different departments. The dominant hardware is IBM PCs (28%) with their Dot Matrix or Laser Printers. The second popular brand is NCR (12%) followed by SIEMENS (19%) and ICL 18%). Other brands constitute of 43% of total units available. The data storage devices used in many department are the magnetic disks and diskettes. A major issue at present is the need to resolve the multi-computer supplier se-up that places more technical demands on computer users that are forced to learn different machine environment and gives the departments

less negotiating power over the supplier on maintenance and other contractual issues. As a result, obsolescence of computers (within a very short of time) in many departments have become a major concern.

SOFTWARE

Different application packages are in use. The popular packages at the University are the World Processing (Word Perfect), Spreadsheet (Lotus 1-2-3) and Database (Dbase IV). These are followed by Graphics (Harvard Graphics) and Statistical (SPSS) packages. Anti virus and windows software are also found in many departments though they are infrequently used. The popularity of these rudimentary packages is an indication that most departments prepare management reports, particularly, financial reports e.g. budget by using these software. This is a limitation. There are other equally important packages in financial management; for example, the accounting packages, quantitative forecasting models, etc. These could be used in conjunction with the aforementioned packages to enhance financial management. A summary of these findings is shown in the table below.

SOFTWARE	RANK				
	1	2	3	4	5
Word Processing	29	1	-	-	5
Spreadsheet	5	11	3	3	12
Data base	2	9	5	1	15
Graphics	4	6	5	2	3
Statistical	3	1	5	1	18
Accounting	1	1	2	2	20
Computer Assisted Learning (CAL)	1	1	3	2	21
Expert system	-	-	-	4	23
Personnel Management	-	1	1	2	24
Project Management	-	1	2	1	23
Library Operations	1	-	-	-	-

Key: 1.   Major use
         2.   Average use
         3.   Occasional
         4.   Available but not used
         5.   Not available

A strange phenomena is that none of these software is supported at the University level and hence forcing users to acquire and learn different software packages resulting into unnecessary and unproductive investment. Users are taken too much with what is on the market that what they actually need. There is no co-ordination; nobody knows where to find the backup of his software in case his fails. Allot of frustrations arise as a result of incompatibilities software packages acquired. In fact there seemed to be no clear direction as far as standardization is concerned

TELECOMMUNICATIONS

There are different brands of hardware at the campus with very little or insignificant communications among them. To facilitate communication between computer systems, standardization on a limited number of computer suppliers and types is important. But this has been quite a problem at UDSM because of lack of infomatics policy and hence proper co-ordination. The proportion of computer units configured as a network is relatively small.

Only 22% of total units are connected as in-house in only five departments (refer tables below). The popular means of communication is through the traditional telephone lines followed by FAX. Of late, E-mail is becoming a popular means of communication with about 50 (1994) to 180 (1995) points (with about 2000 current potential users) connected to a host centre (Computing Centre) which is the SADC National and Regional IT focal point. But the highest rate of mail and file exchange is between the University and abroad because the majority of users are foreign students, NGO's foreign experts and lecturers with contacts abroad. However, emphasis is being directed to local users and exchange of files.

NETWORKING

TYPE OF NETWORK	NO. OF TERMINALS	IN-HOUSE (DEPARTMENT) NETWORK
STAR	6	IPI
BUS	11	MATHEMATICS
RING	(i) 11	ESTATES
	(ii) 12	CPE
	TOTAL 47(22% of Total)	

TYPES	FREQUENCY					
	INCALLS			OUTCALLS		
	VERY HIGH	HIGH	LOW	VERY HIGH	HIGH	LOW
Telephone	12	8	2	7	11	5
FAX	4	5	5	2	5	
E-Mail	-			-		
Radio-comm (Channel 4)	-	-	-	-	-	

HUMAN RESOURCE

Apart from the academic staff, the University community in general, have very few computer professionals. This is reflected in table below which depict the computer personnel available.

MANAGERS	-
SYSTEMS ANALYSTS	-
PROGRAMMERS	4
SYSTEM ADMIN.	4
HARDWARE ENGINEERS	1
OPERATORS	29
DATA ENTRY	24
TOTAL	62

The survey data also reveal that the majority of the University staff fall in the computer competence levels II and III, that is, staff who have limited knowledge and those who require introduction to computer respectively. The breakdown of staff with their level of competence is as shown in the table in the next page.

The above results does not depict a healthy situation at an academic institution. It is from this basis that efforts to minimize computer illiteracy at the University have started. Within one year i.e. 1995, about 200 employees from different departments had undergone basic microcomputer applications training at the University Computing Centre sponsored by the Program Management Unit (PMU). A larger number of trainees composed of accounts/finance personnel, secretaries and administrative officers. Few technicians, medical staff and librarians attended the courses. This has greatly raised the enthusiasm among the employees on the application of computers, as a result, demand for training is very high. However, lack of microcomputers in many departments for on job practice, and financial constraints have become a stumbling block in ensuring that many workers are availed to such training or to an advanced level. Although these efforts are being undertaken at the University, the results of this study are assumed to reflect the operational profile of IT in other African Universities as well as other organizations in Tanzania. On this basis we draw the following conclusion and recommendations.

STAFF	TOTAL	COMPETENCE LEVEL		
		I	II	III
Academic	292	70	108	105
Secretarial	98	3	74	21
Office Administrative	41	-	21	20
Technicians/Research assistants	105	30	25	50
Accountants	27	1	6	20
Medical staff (MA,AMO,MO)	6	-	1	5
OTHERS	43	2	7	34
TOTAL	612	115	242	255

Key:

1. *Very confident with computer, and use it very often. These may be knowledgeable.*
2. *limited use only e.g word-processing*
3. *Require introduction to computer*

CONCLUSION AND RECOMMENDATIONS

The direct access to the Information Technology is a vital factor to the efficiency of any working sector. Sectors with skilled personnel in this technology automatically boost their return and enjoy a smooth atmosphere in their day to day activities. However this can not be done without a clear vision on the movement of an organization at least in the next few years. It was observed that most companies train their staff on had hoc basis and with no clear direction especially when it comes to computer technology.

Multi-computer supplier who set-computer platforms places more technical demands on computer users and force them to learn different machine environment giving the departments less negotiating power over the supplier on maintenance and other contractual issues. As a results, obsolescence of computers (within a very short of time) in many departments have became a major concern. There are also so many brands of software and data communication equipment that the issue of compatibility becomes impossible. In fact there is no disaster recovery plans for data at the University as well as in most of large organizations in Tanzania.

All these problems (few have been mentioned) seem to arise much from the fact that many organizations do not have Information Policy to guide the development as far as information is concerned. At national level, we observe that there is inadequate information available, and that it appears that no clear strategies exist in Tanzania regarding infomatics, thus underscoring the need for a national policy. In the absence of a deliberate Government policy, Tanzania may soon find itself succumbing to external actors, a situation that may prove quite difficult to regulate and control.

REFERENCES

1. Tanzania Commission for Science and Technology (1993); "Report of UNESCO Meeting of High level Infomatics experts in Africa RINAF - Nairobi", *Internal Technical Report*, Dar es Salaam

2. *Information Network (1990);* "Science and Technology Information Services and Systems in Africa", National Academy Press, Washington DC

3. Sheya M.S. and Koda G.R. (1987); "The State of Infomatics in Tanzania: Policy issues and Strategies". *Proceedings, University of Dar es Salaam.*

4. Louwerse C.P (1994); "The Organization and Management of Information Security issues in Health care", *International Journal of Bio-Medical Computing,* Vol 35, Iss. 5, pp. 195-200

5. Costanza R. (1992); "Assessing and Communicating Data Quality in Policy-Relevant Research", *Environmental Management,* Vol. 16, Iss. 1, pp. 121 - 131.

6. Kim N.H. (1994); New ministry to Lead Information Policy", *Electronics,* Vol.67, Iss.23, pp.3