

Thesis Design

Master Thesis

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Title: Organization and management framework for ICT implementation in developing countries, Comparison between urban and rural environments

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1. Background:

This master thesis is part of the study of information science followed on the Catholic University of Nijmegen (CUN). This thesis is under supervision of the institute of Information retrieval and Information Science (IRIS). Research focus of this institute has always been on the communication oriented aspects of ICT with an architectural approach. Since CUN is a member of the international federation of catholic universities (IFCU), it is united with other catholic universities around the world in research and education. According to Reijswoud & Proper [7] IRIS is interested in collaboration with other member universities. One of their reasons is:

"We feel that it is a social and moral obligation for the developed world to put resources towards the development of the potential use of ICT in the lesser-developed countries. New reference models and frameworks for ICT are needed that are beneficial to all parties and stimulate the development of the lesser developed regions of our world."

From a global point of view, ICT is seen as a very important resource for our economy and development. Since developing countries are far behind in the usage of ICT 'The digital gap', they will stay far behind in economics and development as well. During the World Summit of Information Science (WSIS) in December 2003 one of the points at stake was that ICT should be implemented in villages, schools and hospitals. In 2015 a major part of the world should have access to the internet. See also point 6 of [8]. In my point of view, implementation of ICT in developing countries can only be successful when projects are small, comprehensible and managed properly. With the architectural methodologies learned in the study of information science, together with representative cases in a developing country, a framework could be developed to achieve a successful implementation in several conditions.

A number of countries have made tremendous efforts in tightening the 'digital gap' by improving development in education through the use of ICT. The Tanzanian government feels that the "one size fits all" does not work everywhere. In a workshop held in Dar es Salaam, 'harness ICT potential' [2], Dr. Nesta Sekwo said that: *"We, therefore, in Tanzania need to develop our own strategy for effective application of ICT taking into consideration of social, cultural, geographical and economic conditions instead of directly importing strategies used in other countries"*. With this mindset I'll start my project in Tanzania, combined with practical cases and the literature as mentioned in the references.

Another notion of the importance of ICT in Tanzania can be found in [1]. According to the ministry communication, *"The lack of an overall policy and poor harmonization of initiatives, have led to random adoption of different systems and standards, unnecessary duplication of effort, and waste of scarce resources, especially through the loss of potential synergies"*. Therefore, they developed a National ICT policy, what deploys a broad-based national strategy to address Tanzania's developmental agenda. Appropriate institutional arrangements are to be created to ensure that all stakeholders can rise to the challenge of implementing this ICT policy. A proper framework could help to meet this challenge.

2. Problem Definition:

Although any small project will only help a developing country forward with small steps, there is much that can be learned from small cases. When there is enough experience from several cases, a framework can be developed, that can be used repetitively. This framework should not be seen as "one size fits all", but it should be seen as a guideline to solve ICT related problems, given a certain circumstance. The main problem of the thesis will be:

Development of a practical framework for useful implementation of ICT in education and healthcare in both urban and rural Tanzania.

To develop the framework, three main actions will be taken

1. A profound analysis will be done in previous and current IT implementation efforts in Tanzania and countries with equal circumstances.
2. Analysis will be done to measure the effectiveness of taken efforts in the eSAP Project, the process of implementation and steps taken by the Tanzanian participants will be monitored.
3. Participation in the development of a new project, namely the introduction of a library in the village of Sumve.

These three main actions can be executed independently, but the combination of knowledge gathered in each action will be of importance in the others as well. The outline of the projects will be described in the Methods section.

3. Methods:

There are several approaches to develop a framework for ICT architectures for ICT implementation and there are many organizations actively thinking and helping with implementation of ICT in developing countries. Knowledge from current projects and experiences will be of great importance to create a theoretical framework. However, in this thesis I will try to develop a framework from a practical point of view. Since our view of the world is formed in a western way, we seem to miss factors in developing countries that might cause a project to fail. Therefore I'll investigate the problem from the perspective of the users, namely the people in the developing countries.

For the development of a theoretical framework, assistance of another student will be used. His main interest is the theoretical point of view. During the period of my stay in Tanzania, he will be actively providing me with information that is useful during the other projects.

During the first phase of this thesis, we will explore current projects and methods used for the implementation of ICT in developing countries. Contacts have been made with several organizations that are active in both ICT based programs for education and healthcare, like IICD and Vi@frica. When already developed and mature models are found during the research, they will be used and compared with others. Main goal is to understand major problems in developing countries and how to overcome these problems by using guidelines. During the second phase the project will be performed in Tanzania where a start will be made with the evaluation and monitoring of the eSAP project.

The eSAP project:

"The SAP project aims at the fulfillment of some key conditions for sustainable academic education and research and therefore for sustainable development of a country and region as such" [4] SAP stands for: Supply of Academic Publications to and from universities in developing regions. The main goals of the project are:

1. Create the necessary conditions for an optimal and workable use of the electronic scientific resources available on the Internet.
2. To create and offer a sustainable system for the electronic publication of the proper academic output (publications) of the African universities on the Internet.

These goals can be reached in several steps, which are indicated in the SAP outline. Most important for this thesis is to have take a look at these steps in specific, compare them to methodologies used by other organizations and their outcomes. Hereby risks will be shed to a light and a balance has to be found for suitable solutions in each situation. The kind of problems can best be described with an example.

One of the steps that will be taken during the eSAP project, is training one expert per university in electronic publishing, who will act as guide and coach for others. This expert will probably be attracted by other business where he could earn much more than in his current job at the university. So this person should either share his

knowledge very quickly, or he should only be an expert on a small issue. At the other side, he should be attracted to stay in the university, not only for his own wealth, but for the development of the university and therewith, the community around it.

There are some good examples in healthcare (Lankinen et al. [6]), where village workers are bound to the rural environment because they have a wife and children, who will stay behind if he was to move to town. This village worker will not be allowed in the course for village worker if he is single, since they are not bound to the rural environment and will probably move to town, what means that the investments flows away directly.

The method that can be used to explore probable problems is a field study at several universities. The Tanzanian participants of the eSAP project will all be visited and if time allows a visit to Uganda, the Martyrs University could be visited as well. Standard evaluation methodologies will be used as long as they are applicable to the situation. One could think of an objectives based approach to determine if eSAP meets its objectives as defined in the development process. Secondly a Decision facilitation approach could be used to resolve issues important to developers and administrators, so decisions can be made about the future of the resource. (Chapter 2 Friedmann & Wyatt [5])

In the assumption that the implementation of eSAP will be done according the guidelines developed by eSAP, the main interest will be on how the local universities will handle organization and management according to these guidelines.

Comparison can be made between the universities, which are located in various parts of the country. Their locations imply a different situation and might even imply a different culture. However, to create an objective point of view on the situation, a look should be taken in a more rural environment. Since the project team of eSAP takes a somewhat different point of view at the problems than other organization it is of high interest to compare their methods with those of others, or methods still to be developed.

Sumve Library

This is one of the reasons to start with a second project, namely the implementation of a library in Sumve. This small village is located 40 km. from Mwanza and doesn't have access to all the resources of Mwanza, although it has a hospital that facilitates 500.000 patients [9]. This is an equal amount of patients that is seen in Nijmegen.

The hospital does not only have few resources for the execution of proper health care, but there is not much access to up to date information as well. Therefore, Sumve foundation for medical support has taken the initiative to build a library in Sumve. This library should primarily be used for medical information and courses for the nurses in the hospital, but it should be accessible for the secondary schools as well. In this project a look will be taken at possible IT solutions for a library system and internet access. Although the hospital does not have to be able to publish, like the case in the universities, there are some parallels in the projects.

Both projects will rely on functions of a library. During the eSAP project, librarians were educated and therefore they have knowledge of gathering information and keeping it. With help of the University of Mwanza, Sumve could build a library with a direct relation with Mwanza University. Students from the secondary

schools and the nursery school could have access to resources of the Mwanza University.

When key problems and factors are gathered in the Sumve project, comparisons can be made with issues in the eSAP project. It is possible that the same dampening factors play a role in the progress of the projects, while one assumes that the Sumve environment will pose severe problems that are not at stake in Mwanza or Dar es Salaam.

With these factors in mind a framework could be developed to discuss the various factors playing a role in the implementation of IT. Like said before, other studies are done in this area, but in this thesis the viewpoints on the same problems are brought together and reflected to be able to actually know the cause and differences of problems specifically in a developing country. According to R. Rozendal [10], the key for the success of a development project is local ownership. So a western organization should hold their hands back on the initiation and development and only guide the local in decision making. Although I strongly believe that this will lead to a long lasting result, the result of this thesis should point out if these key factors like local ownership are applicable in different situations.

4. Point of view:

The point of view of eSAP is somewhat different as the IICD point of view. While IICD and Vi@frica both emphasize a bottom up view of the problem, the eSAP uses a top down way of working. In the IICD methodology, the local initiative is actively supported and there is a close look at the actual users of possible information systems. The information system should be implemented together with the workers and users of the system. When they learn together with the system, they will work with it and they will learn from it instead of simply not using it. Of course this is a well known fact in western IT development, but effects of different implementation methods could vary from the effects in a developing country.

From the point of view of eSAP, the universities are not prioritized enough and therefore ICT efforts should be taken at the universities and the top level of the educated population. When they will be able to develop their knowledge further, they will be able to take initiatives and teach others. In fact this means that everyone should be willing to share their knowledge, so it can spread quickly and thereby improving the whole community and therewith the development of the country. I can strongly emphasize with this point of view. Most initiatives from western companies concern groups in the lowest levels of development, where of course, help is needed the most. However, on the other hand, they will not be able to grow by themselves and will stay dependent on help from outside.

In Information science we use several aspects to consider ICT related problems. All of these aspects play a role in the architecture of the framework.

- The human-aspect is focused on the individual, its capacities, wishes, way of thinking, communicating, work, learning, etc.
- The Organization aspect is focused on goal-driven engineering of cooperation forms between different actors (human, machines, departments).
- The information aspect is focused on the actual information that is exchanged by actors and groups of actors and in which way this information is exchanged (transmitted).
- The technological aspect is about how this information should be transmitted technologically.

The choice of aspect will influence the development process and the final result of a project. E.g. when someone starts with a very technical point of view, one could end up with advanced (expensive) technology, without even using it. In my point of view, key factors in a well developed project should be the human aspect and the organization aspect. Therefore, this thesis will mainly present issues from these aspects, while only small technological aspects will be considered. In the aspects of the way of working of Vi@frica, IICD and eSAP the human and organizational issues are the most important factors as well. Only in the Sumve project technological issues can play a role in a possible failure of the project. In the eSAP project the success of the project will mainly be based on the management and organization of the project.

5. Time schedule:

Date	Action	Deliverable
15-03-04 20-04-04	Exploring involved parties, extending network	
20-04-04 30-04-04	Development of action plan	- Initial Project document
03-05-04 14-05-04	Literature study, exploration of other existing projects	- Theoretical recommendation document - Interview drafts
15-05-04	Flight to Tanzania and visit to Dar es Salaam and MoroGoro Universities	- urban environment draft
22-05-04	Travel to Sumve, introduction to Sumve library project	- rural environment draft
31-05-04	Visit to Mwanza University	- structured evaluation document
05-06-04	Back to Sumve	
07-06-04 18-06-04	Second visit to MoroGoro and Dar es Salaam Universities, Round table discussion	- First analysis report - Evaluation report
21-06-04	Sumve, exploration of possibilities and meetings with board and teachers	- Rural and cultural factors document
28-06-04 02-07-04	Meetings at Mwanza university, in depth interviews with board and project participants	- Perception factors document
05-07-04 09-07-04	Possible meetings with technicians (Arusha and Mwanza region)	- Technical factors document
12-07-04 16-07-04	Possible last meetings with Dar es Salaam and MoroGoro universities and possible visit to Martyrs university, Uganda	- Comparison document, rural and urban environments - Advisory report eSAP
19-07-04 27-09-04	Work on Sumve library project and possible meetings with Mwanza university, key participants and other organizations (e.g. Vi@frica, IICD)	- Draft thesis - Views exploration document - Recommendation Sumve
01-10-04	Development of final report	- Master Thesis.
10-10-04 14-10-04	Work on presentation	- Presentation

6. References:

The list below shows the references used for this Plan of action. This list is followed by references that will be used for other deliverables.

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