

## A Guided Assessment of Online Processes and Implementation in Sub-Saharan Africa

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**Abstract:** This study presents a mix of known models that had aided the successful implementation of International acclaimed Software. There after recommends a way forward for the successful implementation of software in the sub-Sahara Africa. The advent of Information Technology and Communications (ICT) has brought about diverse changes within the operations of most organizations. It is expedient for man to abhor changes; however, it is only change that remains constant in this world. We investigated a number of challenges and constraints that had bedeviled the successful Software Implementations in the developing world, Nigeria as a case study. The software packages that had been successfully implemented in most developed world had in most cases faced series of hiccups. The cry for development and technology transfer had been the dream of people of the third world, but they are not ready to pay the price to get true technological transfer. It is obvious from this study that the most affected organizations are the Public Enterprises and the Civil Service. It has been observed that the character/attitude, culture and ethics of the people had contributed to the enormous bottlenecks in software implementation in Public/Civil establishment. This study gives a guided assessment of the implementation processes and proffers some solutions to the teething problems in the Nigerian context.

**Key words:** Guided assessment, software implementation, sub-saharan Africa, online processes

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### INTRODUCTION

Programming is an art, which requires the right tools and steps to follow that will enable one to write well-designed programs. It requires the development of a solution to an identified problem and the setting up of related sets of instructions which, when directed through the computer hardware, will produce the desired results. This takes significant amount of time and thinking. The level of thinking (which could be synthetic, analytical, or postulation) varies depending on the complexity of the problem. Once these programs are completed and bundled together into a single component, the operational manual prepared and then the implementation can be considered.

Software implementation is one of the most crucial phases in the Systems Development Life Cycle (SDLC), whose primary focus is to ensure that the demands/expectations of the end-users are met. The end-users usually define the problems and their expected solutions and this will enable management to conclude on using a software solution. This involves the engagement of experts, acquisitions of the software/hardware, training

of the user personnel and possibly the provision of necessary infrastructures that will enable the initial take off.

Most transformation efforts hinges on IT and without a good level of IT literacy of the personnel, each transformation programme may turn out to be abortive dreams. It is through better use of ICT infrastructures, that organisation can open their doors to international markets as well as survive even in the face of aggressive competition. There is the need to invest heavily on IT capacity building of staff, who use the available technology to draw their organization closer to the world.

Trained staff on software is often re-assigned other responsibilities and these misplaced priorities had affected the successful implementation of many software solutions. The training process would then become a means of appropriating the project funds. Those sent for training are hardly serious about the why, what and where (the purpose of the training) of the software with reference to their organization. In the process of time, they returned unfulfilled and unprepared for the responsibilities imposed on them after the training. In

some cases, they seek for re-assignment. Improvement in IT literacy, culture, confidence and competence can be attained through constant training of the people-ware of the organization. The ICT effect on globalisation had created enormous fears in the people that they would do anything to stall its successful implementation.

It is amazing that the huge investment on ICT from the third world most especially in Sub-Sahara Africa has not been able to translate into ICT literacy and acceptance. There is the need for organization to have their culture, ethics and identity for which they are known.

Also, the astronomical increase in the volume of data created on daily basis after the installation would need to be protected against natural and artificial disasters.

In doing this, a number of considerations are not put in place to oversee the fact that all the components of the organization are involved. The consultants are left to determine all the components of the organization. All these will cause a magnificent delay in achieving the expected results.

**Motivation for the study:** In Adibe (2000) major threats and risks identified in software implementation in sub-Sahara Africa includes energy (epileptic power supply), incompetent technical personnel and illiteracy of end-user. A major challenge of online process/software implementation in sub-Sahara Africa is inefficient networking infrastructure. The only available protocol in the zone (http) is not a connection-oriented protocol. It does not have a session concept. Every transaction between client and server requires a new connection to be established. The enabling infrastructures that will support the amount of hardware/software into the sub-Sahara Africa are not yet on ground. Energy is another great constraint. In places where energy is stable, the technical know-how would be lacking and a clear understanding of the business might be lacking. The people-ware are usually not adequately trained to be competent and confident of themselves. The most pathetic of them all is the fact that even after the successful implementation, the key operational areas are constantly under some forms of natural/or man-made fire disasters. There are these constant physical threats, which are carried out by the intruders, criminals, disgruntled staff (insider's threat) and natural disasters. Lack of good maintenance culture is a major threat to online processes in most third world/developing countries. Non-replacement of worn out infrastructures (where they exist) is so pronounced in the Sub Sahara Africa.

Agbese (2000) discusses extensively with particular reference to Diamond Bank (Nigeria), the challenges of e-banking from inception in Nigeria. These are the propellers for this project.

**Problem identification and needs:** Most organizations often mistakenly regard software implementation as purely technical issues. In fact, at least half of the issues in software implementation disasters are not technical but people and culture related. The lack of confidence and organizational ethics had denied most establishments the benefits of ICT. There are the issues of improper definition by the commissioning, this affect the managers of the project and also the users of the project.

## MATERIALS AND METHODS

**Migration process from manual to electronic:** The greatest challenge of the online processes is the mode of migrating from paper-full bureaucracy to a paperless society. Many had expressed a lot of fears about this process and doubt its efficiency because it is difficult to bring a change. However, in this report, we shall consider four models of converting from the formal process of doing business to the computerized environment. The strategy used in software taken over the operations of the organization depends on certain circumstances. The choice of the model from the parallel, the direct changeover, the pilot and the phase-in depends on the focus of the management and their ability to support the teething problems that will follow it. These methods have their advantages and disadvantages. The application of any of the model depends on the decision of the implementers and the management.

**The phase in model:** This is used when it is not possible to install the new system throughout the organization all at once. The files conversion, training of people-ware, or arrival of equipment could force the staggering of implementation over a period of time.

**The pilot model:** This model would be recommended when a new system involve new techniques or drastic changes in organization performance. It is a working version of the system that is implemented in a part of the organization like the department or work unit. All the people-ware in this area knows that they are piloting a new system and changes may be made to improve the system.

**Direct change-over:** As for the direct changeover, there exist no backup plans. The former method of doing the operation ceases at a specific date while the new approach takes over. This model is most dangerous because if it fails, there is no fall back plan.

**The parallel model:** This is most recommended since both the new and the old approach of doing business still continues. The results are compared and until the results

are satisfactory, the old methods of operations are never discarded. This model is the most reliable, however, it is time and energy consuming to attain. A lot of sacrifice is required on the part of the people-ware.

**RESULTS AND DISCUSSION**

**Online processes of the educational sectors:** The National Universities Commission has brought changes into the administration of higher education in Nigeria that will help Nigerian graduates to compete favorably in the international community. The most current directive on the online connectivity that would enable Nigerian graduates to be familiar with the Internet. In compliance with the directives, many universities deployed the students’ administrative software that would enable students to carry out their registration online. Various deployment techniques had being adopted by the different institutions. The major problems encountered were inadequate infrastructures and the corrupt officers and admission syndicate groups within and outside the University systems who benefit from the manual method of registration of students. These groups became the internal threats to the successful implementations of the online connectivity.

In this report, three Nigerian Universities are considered, namely-Ahmadu Bello University, Zaria, University of Benin, Benin City and Nasarawa State University, Keffi (Table 1).

**The Ahmadu Bello University (ABU) Zaria:** The experimentation of the online registration of Students was that of Direct change-over method. Due to the various hiccups encountered by the students in the course of implementation, the process failed on the first attempt. The problems of the technical know-how and downtime of the Internet service providers brought delays on queues, which over a period of time prompted the management to reverse their earlier decision and thus abandoned the process for the manual registration.

**University of Benin, Benin city:** This University applied the pilot method. They started with the

first-year and the Postgraduate school. This led to a good record of success in the implementation.

**Nasarawa state university, Keffi:** In this University, the phase-in method of online registration of students was used. A standard academic portal was deployed which was made flexible to accommodate the computer literacy level of the target audience. The approach was for semi online, which enables students to carry out their registration by downloading the forms but manually fill in their courses for the manual authentication by the level advisers. Help lines were provided and a helpdesk was made available to service the students who had little or no knowledge of the Computer. At the end of the process more that 90% of the students registered electronically while about 95% of first year students were able to determine their admission status online.

**Electronic banking:** The Central Bank of Nigeria gave the directive, that all banks should raise their capital base to twenty five billion naira (N25bn) within a stipulated period. This led to collaboration, merger and consolidation in the banking sector. A significant feature of the reform was the mandatory computerization of banking operations. The integration of heterogeneous data became a major problem, so as not to loose any customer’s information. The technical knowledge of transforming data of different format is usually lacking in the industry. The approach presented by Brackett (1994) in his book Data Sharing using common Architecture is an important tool for e-banking. Some banks are still battling with the problem of data integration. The flexcube banking package had been successfully implemented in several countries with its communication facilities, but has some communication problem here. The problem of the ISPs, of which the downtime usually extends to days and weeks, must be addressed for this sector to benefit on their investments.

**The ASYCUDA project:** The pilot method was adopted in the implementation of the Nigeria ASYCUDA (Automated System for Custom Data) project. One of the selected sites was the MM Cargo command of the Nigeria Custom Service. The hiccup that emerges at this site was the fire

Table 1: Presentation of the results of conducted study

| S/N | Type of project                     | Location  | Methods applied                  | Results/Remarks   |
|-----|-------------------------------------|---|----------------------------------|---|
| 1   | Education                           | Ahmadu Bello University Zaria (Northern Nigeria)              | Direct change over method        | Failed and reverted back to Manual.   |
| 2   | Education                           | University of Benin ( Southern Nigeria)                       | Pilot method                     | Successful but takes some time.   |
| 3   | Education                           | Nasarawa State University, Keffi.<br>(North-Central Nigeria). | Phase-in-model                   | Successful  |
| 4   | Banking                             | Nation-wide(Nigeria)  | Phase-in-model                   | Successful but wastes downlink access outside banking hours                                     |
| 5   | ASYCUDA-Customs and Exercise Duties | West Africa   | Mixed-Model with backup facility | Failed initially but successful after modification -i.e., introduction of Backup recovery cycle |

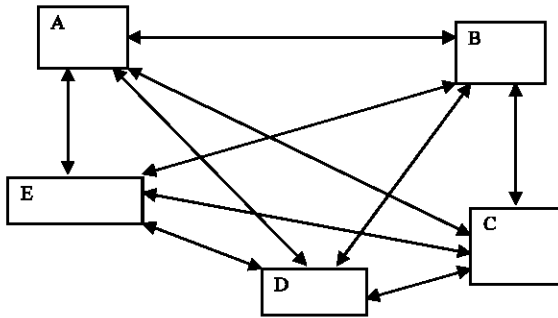


Fig. 1: Network of the backup and operation

disaster, however, the mixed model of the backup enable easy recovery as soon as the hardware was put in place. According to Kaczmarek *et al.* (2003) a special type of backup is needed to ameliorate this problem. Figure 1 shows the architecture of the backup system/data storage.

### RECOMMENDATIONS

Some of the action plans to have a fulfilling software implementation and online processes are:

- There should be a disaster recovery plan right from the first day of the project. This should include among others the recovery of the databank, in case of fire or flood. In case of virus attacking the entire network, irrespective of the firewalls that had been put in place, there should be fallback plans to recovery of major data that had been created. System hardware is responsible for the data being written and how it is made available to the server and applications. The logical structure of the data is not monitored by the hardware. To minimize the intrusion of logical errors in the data system over time, a backup of the original data should be retained so that, in the event of a failure, it is possible to recover the data to some defined error-free point.
- With the aid of telecommunication, as the installation and configuration progresses, keep multiple on-line installations at different sites and possibly outside the geographical domain. Also, at pre-defined frequencies for contingency purposes keep an up-to-date backup with a diary. With the aid of Internet/Intranet, at any stage of the implementation, multiple copies should be kept at different locations and on different platforms. This should be made known to the people that there are multiple backups round the world that could not be destroyed by fire outbreak. This will definitely reduce malicious fire outbreaks in the Treasury/Accounts/Finance

department. To achieve this, there is the need to apply the mirroring technique as described in the figure.

- Backup of the status of the present configuration and the corresponding files that had been created should be kept at the end of the work-hour or at a pre-defined frequency for contingency purposes. These backups at multiple sites will become useful when there are any forms of artificial disaster which are usually carried out by intruders, criminals and disgruntled employees (insider's threat).
- As soon as the software and the data creation are completed, there is the need for the mirroring of databank to defined remote sites and each would have to be firewall. The back office would have the backup into microfilm and other media. The back office must keep a backup diary, which need to be verified for data integrity from time to time.
- The problem of energy should be addressed. Power failure has been a major constraint facing the development and effective implementation of software in sub-Sahara Africa. In order to succeed in software implementation, it's important to have a backup power supply that would be available during the implementation.

### CONCLUSION

The advancement in information and communication technology will soon make it possible for one to access any database anywhere in the world via wireless connections. In that wise, distance will not be a barrier for one to be connected to the choice software. There is an immediate need to change the strategy of implementing software in the sub-Sahara Africa and this is highly necessary for the prevention of the region from sliding into ICT dark age. Though this process might be costly, resource intensive and possibly lengthy, however, it is paramount to understand the development these processes will bring.

In order to achieve successful software implementations in the sub-Sahara Africa, there are some known disasters that are artificial in nature and can easily be averted. Disaster is defined as a great and sudden misfortune. There must be laid out plans that will assist the recovery of information within the shortest possible time and return back to full operations.

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**REFERENCES**

- Adibe, M.O., 2000. Threat and Risk Management in Information Systems. COAN Conference Series, 11: 153-161.
- Agbese, A.A., 2000. Security Issues in electronic payment systems: A close look at Diamond Bank, Jos. Post Graduate Diploma Project dissertation of Abubakar Tafawa Balewa University, Bauchi.
- Akinola, Oki, 1999. Internet and the World by the year 2000. COAN Conference Series, 10: 187-201.
- Brackett H. Michael, 1994. Data Sharing Using Common Architecture. John Wiley and Sons, INC.
- Cabrera, L.F., R. Rees and W. Hineman, 1995. Applying Database Technology in the ADSM Mass Storage System, Proceedings of the 21st International Conference on Very Large Data Bases (VLDB), Zurich, pp: 597-605.
- Kaczmariski, M., T. Jiang and D.A. Pease, 2003. Beyond Backup Toward Storage Management. IBM. Sys. J., 42: 322-337.