The Use of Technology in Land Administration. Is It Scalable, Secure and Sustainable?
A Critical Review of the Uganda and Ghana Case Studies.

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PREAMBLE

This paper was inspired by the World Bank publication in 2014, Agricultural Land Redistribution and Land Administration in Sub-Saharan Africa. *Case Studies of Recent Reforms.*

The author embarked on this journey of exploring the types of technology deployed because despite more than fifty years' experience now with grappling with modernising Land Administration systems, governments across Sub Sahara are still failing with their land administration projects. Several of the failed projects can be ascribed to the deployment of technology that was either not appropriate or ready for the particular project. There are several reasons for the incorrect deployment of technology, but it would be ingenious to lay the blame for these failed projects at the door of technology.

The objective of this paper is to assist fellow land practitioners in Sub Sahara Africa who are not necessarily experts in the technological dimension by providing them with the theoretical framework to understand the basic requirements of the technology. We hope this paper assist these practitioners to look more carefully at how and what technology are deployed in their respective land modernisation projects.

In an effort to move away from the theory and entrench the paper in reality, the author will use the case study of Ghana and Uganda as surrogates for context in explaining the role of technology within Land Administration Projects.

Uganda and Ghana have both embarked on a journey to modernise their Land Administration systems and have for more than a decade worked on different phases and aspects of the Land Information systems.

OVERVIEW

Land, a finite resource, provides food, shelter and safety to the inhabitants of the world. Its effective administration is necessary not only for us to fulfil core needs for human survival, but also for making lives of people more connected, comfortable and prosperous. With effective land administration, comes better managed cities, better and more efficiently laid/managed infrastructure and utilities, secure and equitable land rights for all including women and indigenous people, lesser disputes over land rights and higher economic stability and growth. One cannot therefore overemphasise the need (and role of) fit-for-purpose, affordable and inclusive land administration systems anchored in enabling technologies.

Throughout the African continent, countries have over the last 20 years started to embrace the need for and are now seriously looking at innovative ways of achieving sustainable mapping, registry, and systems of defining land rights that lead to lessening of disputes, bring in clarity for administration and enhances development. Working in close conjunction with the various states in the continent is multitude of private companies, consultants, donor organisations and partners from other countries with better land administration systems ready to support their peers. These agencies provide consultancy, services and solutions that are meant to help in achieving better land administration goals. However, often times these solutions are not home-grown and tend to be conventional that hardly match the many realities and contexts of Africa. Besides, lack of sustained and continuous financial support, scalability of successful projects, political and administrative instability or capacity issues often hinder progress.

The time to argue whether we need to deploy technology in Land Administration System (LIS) is already long gone. The debate nowadays is no longer whether we need technology, but what kind of technology and how we should deploy technology to modernise land administration. A modernised LIS can be argued to be the bedrock of any economy, whether it is an industrialised economy, an agrarian economy, or even a services-based economy.

Dr Frank Byamugisha wrote in a World Bank publication that “Although only about 10% of Africa’s rural land is registered, leaving 90% of the land informally administered, formal land administration still plays an important role in securing land tenure.” (Frank F. K. Byamugisha, 2014) Formal land administration is normally done through systematic titling, with accurate record keeping.

Instead of arguing the merits of using technology in Land Administration, the paper will focus on the trends and practices where technology can potentially transform land administration.

The World Bank and most all governments have articulated on multiple platforms that an effective information system that can provide affordable, timely, and accurate information about land resources and their quantity, quality, ownership, and use is fundamental to any land administration and land management system.

The UN’s Economic Commission for Europe (1996, 197) defines land administration as “the processes of determining, recording and disseminating information about the ownership, value and use of land, when implementing land management policies.” At this point it is prudent to point out that effective land administration systems is not only made up of technology, but people, process and technology are all equally critical for an effective land administration system. This paper however, will deal specifically with the role of technology in the Land Administration System.

THE TYPES OF TECHNOLOGY

Various types of technology are currently deployed within the land administration environment. It is not the intention of this paper to critically analyse each of these technical components, but rather to address the impact and or trends of the technology.

With the advent of web based technologies, and the proliferation of the internet as logical platform for businesses to interact with their customers, came the eGovernment wave. Governments around the world embraced the internet and most have adopted eGovernment strategies and programmes. This catapulted the old fashioned paper based cadastral system to become an e-Cadastre. An example of this is South Africa's Project Vulindlela, which is the development and implementation of an e-Cadastre.

Another trend in the technology is the concept of "OpenSource" technology. OpenSource refers to computer programming where the source code of the programming or software is available freely (as opposed to proprietary) to the general public for use and or modification from its original design free of charge. A brief literature review will soon reveal that the subject has been extensively covered in both academic writing as well as industry publications. This paper will not necessarily delve into the suitability of this technology trend, but will simply compare the efficacy of the technology as opposed to proprietary software.

The attraction for this type technology option seems to stem from the fact that the source code is available free of charge, and enables anyone to modify or adapt the software to their particular needs. The logic, I would imagine, is that intuitively, if something is free, it should be a cheaper alternative to a proprietary system. This logic would hold if the LIS implementer has a ready source of skilled programmers (at no cost) who could code the functional requirements and who would be around for the long term to ensure that the LIS receive the necessary upgrades as the business environment evolves over time.

Land Administration systems must be viewed as the custodian of the country's property asset base, arguably a country's most valuable asset. In an effort to safeguard the country's most valuable assets, governments should therefore treat its land registry in the same way that commercial entities treat their valuable assets.

No bank or finance house –organisations which traditionally understand the cost benefit analysis- has ever deployed its vaults or core banking system on an OpenSource platform. The reason for this is simple. It does not make any business sense to put one's prized assets in a system that is not scalable, secure or sustainable. Opting for OpenSource, is the equivalent of a customer who is about to purchase a modern vehicle, but opts not to buy the motor vehicle from any of the established motor manufacturers, but rather approach a mechanical or engineering workshop and ask the proprietor to build them a customised vehicle. Even if, in the unlikely event, the engineers manage to assemble a workable vehicle, the reality is that should the customer ever have a need to maintain the vehicle, he or she would not have the freedom to go into a generic workshop to have a service done. Nor will the parts be readily available. This is the same for purchasing software.

In our efforts to test this hypothesis in a real life scenario, this paper will critically look at two very similar land administration projects, where the one involved the deployment of open source software and the other the deployment of off the shelf software. We will compare the case of Uganda's DeSILISoR Project with that of Ghana's GELIS project. In an attempt to compare like for like, we will focus only on the first phase of both projects. In both instances, Phase 1 was deliberately designed in such a manner as to serve as a proof of concept, where the system implemented is referred to as a pilot project, and its objective was to demonstrate to the users how the technology will enable the ministry to modernise its land administration processes.

THE KEY PRINCIPLES OF TECHNOLOGY

It is useful to adopt a technology framework to guide the effective use of technology in the LIS. The proposed framework we advocate is simple its application, and consist of three distinct components.

- Scalability,
- Sustainability and
- Security.

Though it seems straightforward, these three principles hold the key to successfully deploying an effective technology in LIS.

Government entities charged with deploying an effective and efficient "fit for purpose" LIS require real-time access to accurate information. Whether the system supports land registry, land resource management, cadastre, valuation, or property tax administration or a combination thereof, it enhances the ability to make sound decisions and operate within budget while streamlining cash flow.

Benchmarks exist for government decision-makers to use in the design, implementation and maintenance of an LIS, but many current efforts risk failure. That's because they do not sufficiently capture the full complexity of all the technology decisions that underpin a land administration system as well as the entire range of potential citizen services that need to be provided.

The hope is that this paper provides the theoretical framework that land administration practitioners could adopt to assist them in delivering the appropriate technology for their LIS. The framework provides a set of attributes against which the strength of LIS technology solution design can be assessed and tested.

Sustainability, Scalability, Security.

Without trying to oversimplify the issue, the author is of the view that these principles (or qualities) are critical when considering the deployment of a LIS. Each quality considerably impacts the effectiveness and the total cost of ownership of the LIS technology, which in turn determines the long-term success of the technology deployed. Taken as a whole, they serve as a framework to guide discussions on solution decisions and deployment. This section below briefly outlines the necessary characteristics and/or attributes of the framework.

Sustainability Attributes

Sustainability generally refers to the longevity of the solution long after the implementation has been signed off as successful.

- Can the technology streamline processes for meeting the expected long-term demand for government services?
- Has the project design planned for continual investment so that the technology does not become static and dated?
- Does the operation's business model include funding from increased revenue generation?
- Does the technology provider that deploys the technology have the capacity and infrastructure to maintain and support their technology over time?
- Is the technology the same as used by the larger user community that the government agency interacts with in order to drive improvements in features and functionality?
- Is training available to ensure long-term capacity development and skill transfer for staff?

Scalability Attributes

Scalability in essence means that the system should be able to row with the needs of the Land Administration function, both in terms of volume of transactions as well as in terms of an increase in functionality as the LIS interface with different stakeholders over time.

- Can the technology deployed adapt to new emerging technologies such as mobile, GPS, maps and imagery?
- Does the technology deployed have the ability to take advantage of new technology platforms over time?
- Is the technology capable of managing increasing data volumes and users—both internal and external?
- Does the solution enable extended functionality such as e-conveyances?
- Can it support a living registry (inventory vs. transactions)?
- Will the technology deployed extend to zoning or land-use planning, including health and industrial planning?

- Does the technology deployed integrate with other government bodies, such as the courts and the treasury?
- Do the technology and the tools facilitate the implementation of new laws and regulations?

Security Attributes

Security is perhaps the most under-estimated quality when considering the technology for the LIS. This is ironic, since one of the key drivers when implementing the LIS is almost always listed as the need to eradicate fraudulent land claims.

- Are protections in place to thwart hackers and viruses?
- Will the solution alert the public to property inquiries?
- Does it include a code of conduct and ethics for the staff to follow?
- Can the system transfer data easily with other systems and government agencies?
- Can public archives be physically protected, either in paper or digital format?
- Is information access both secure and private?
- Are there protocols for redacting private information?
- Can locked-down administrative rights be applied?

By presenting a comprehensive set of questions to ask when deploying technology for Land Administration internally and with a solution provider, the 3-S decision framework helps to uncover a majority of the answers that governments need in order to deploy effective LIS technology. They can also ensure they are choosing a technology that not only meets their needs today, but also supports their land management efforts well into the future.

THE UGANDA STORY

Uganda's Desilisor Project was intended to establish the basic LIS infrastructure for the entire country and to transition from a manual land registration service to a computerized one, over an estimated period of seven years. The initial phase was broken down into two stages: (1) a pilot stage for LIS development and testing in six cadastral zonal centres and (2) a roll-out stage. As explained earlier, this paper will only analyse the activities of the pilot or proof of concept stage.

Designed to take three years, the pilot stage aimed to secure existing land records, develop an LIS suitable to local conditions, test the LIS in pilot cadastral zones, and prepare to roll it out to the entire country. The LIS itself was expected to cover land administration, with initial activities focused on land registration and cadastral services. Implementation began in 2010 and ended in February 2013. The roll-out stage, estimated to take four years, aims to expand the LIS to the entire country with a nationwide basic land information infrastructure and with the LIS design enhanced to cover property valuation, physical planning, and support for cadastral surveys; it is expected to start in 2014 with funding from a new World Bank–supported project, which was approved by the World Bank Board in May 2013 (World Bank 2013).

The pilot stage, commonly referred to as "DeSILISoR", ("Design, Supply, Installation, Implementation of the Lands Information system and Securing of Land Records") was placed under the responsibility of the Ministry of Land, Housing and Urban Development (MLHUD), and consisted of five main components:

1. Detailed design of the larger national LIS architecture and of the LIS system for piloting in six cadastral zones;
2. Data conversion comprising rehabilitation of the land registers, conversion of registration and cadastral documents to digital form, and preparation of the documentation for system decentralization;
3. Data integration, including integrating the title registration and cadastral data, and identification and recording of technical and other problems in the cadastral and registration data, including incompatibilities and inconsistencies for future resolution;
4. LIS (parcel information management) implementation in the pilot areas including installation and operation of the LIS; and
5. Review of the LIS design and operations to correct any operational problems, to improve system design based on user acceptance tests and lessons learned from the pilot stage, and to prepare a detailed plan for the roll-out stage.

The core component of the Land Administration was a proprietary solution provided by Thomson Reuters, who assumed responsibility for development and provision of the LIS software. The operational activities were completed on time and the one-year maintenance period started at the end of operational activities and ended in February 2014. The objective of the assignment was to contribute to the establishment of an efficient land administration system in Uganda, to facilitate and to improve the delivery of basic land services to the population and to improve land tenure security.

More specifically the project goal was the development of customised –fit-for-purpose- LIS software, integrating the data converted into digital form from the Land Registry (LR) and the Department of Survey and Mapping (DSM) in order to secure current land registry records in a unified database. The land information system (LIS) aims to integrate spatial and alpha numerical aspects of land administration, land registration and cadastral data managed by the MLHUD offices. Most of the titles in Uganda are mainly Mailo, Leasehold and Freehold Titles.

According to the terms of reference as published in the request for proposals, the project specific objectives were the following:

- rehabilitate existing land records and save the existing titles, registrable instruments and other registration documents and cadastral maps from continuous degradation by transferring them into digital form;
- achieve a re-engineering of business processes and modernisation of registry offices including change of organisational culture, substantial upgrade of human resources, working environment and supporting system tools;
- test the approach and land information system design and architecture on pilot districts and prepare for further roll-out for the entire country.

Given the above objectives, the project scope covered the following areas:

- Detailed design of the land information system including the proposal for re-engineering and modernisation of the registry and its procedures
- Data conversion: cadastral maps and titles together with and registration instruments
- Establishment of a Digital Base Map for pilot area of 17.000 square kilometres (up-to-date ortho-photo for cadastral mapping)
- Procurement and installation of IT equipment
- Implementation of Land Information System in 9 project sites
- Organisation of public information and awareness campaign and capacity building and training of personnel (i.e. sustainability through training and maintenance)
- Preparation of the strategy and implementation plan for the nationwide roll-out.

Uganda's LIS Development Approach and Expected Impacts

The preliminary design document for Uganda's LIS suggested options for the broad architecture that articulated advantages and disadvantages, especially for centralized and decentralized approaches, taking into account the following:

(1) the large and growing number of districts (among other units) and their implication for establishment, operation, and maintenance costs of the system,

(2) the volume of current and projected land transactions, and

(3) the accessibility of land administration services to people.

Ultimately the Uganda adopted an architectural design that consolidates neighbouring districts into 21 cadastral zones. The LIS is being decentralized to zonal centres, but the National Land Information Centre servicing all of the zonal centres and act as a backup for the land data held at zonal centres. It is therefore clear that Uganda approached this proof of concept with the realisation in mind that the operational requirements will change over time, and the system needed make provision for the potential changes in operational processes.

The LIS system itself consists of three main technologically integrated elements:

1. spatial data management, based on the use of a geographic information system (GIS),
2. a document management system (DMS), and
3. a workflow management system (WMS). These three main elements have already been integrated into one LIS, which, in the initial phase, is mainly limited to parcel information management (Government of Uganda 2007).

Although the entire implementation of Uganda's LIS is not yet complete, it has already produced some impressive paybacks, including;

1. a decrease in the average time to transfer property, from 227 days in 2007 to 52 days in 2012;
2. a reduction in time to process a mortgage, from several weeks to three days; and
3. a decrease in the number of days to complete a search on an encumbered title, from 15 to 1.

Observations and Conclusions from Uganda's LIS Experience

Uganda's approach to technology was to lean on a tried and tested Land Administration software solution, supported by a reputable global technology firm, who could assume all the technological risks for the system. The technology deployed was comprehensive, coherent, and all-inclusive, thereby minimizing the risk of future miscommunication between systems or subsystems. Given that the 3S framework (scalable, secure and sustainable) was clearly present, Uganda can now roll the platform out nationally, from six zones to 27 zones. The security features of the LIS, enables the MHLUD to give access to only authorised uses, and further gives the Ministry the ability to audit every transaction, including who made the changes as well as a date stamp. Ownership of the proof of concept system was handed over to government and the software is now fully owned by government. In order to ensure continuous upgrades and maintenance, government has the option of procurement the standard support agreement that is customary with any software deployment. This will ensure the sustainability of the platform.

THE GHANA STORY

Motivation for LIS Development in Ghana

As can be seen below, Ghana is not dissimilar to Uganda, but for ease of reference, we will list the Ghanaian problems in land administration as the following;

1. a multiplicity of land tenure regimes,
2. a small statutory land administration system running in parallel with a large informal land administration system managed by traditional authorities,
3. a deeds registration system running in parallel with a title registration system, and
4. out-dated and poorly maintained manual land records (World Bank 2003).

To address the issues in the land registration and administration systems, the government of Ghana prioritized the reform and modernization of land administration in its 15–25-year long-term land administration program, starting in 2003. Ghana's series of Land Administration Projects (LAPs) have been the main source of funding for the design and implementation of its LIS. LAP I was implemented from 2003 to 2010 (World Bank 2003), and LAP II began in 2011 and is due for completion in 2016 (World Bank 2011). Both LAP I and LAP II contained funding for improving land registration and administration systems, including the design and implementation of a computerized LIS, which included systematic land titling, registration, valuation, and development of the LIS. According to the terms of reference as publish in the Request for Proposal (RFP), the design of the LIS was planned to include three stages: (1) LIS design and development of six subsystems, (2) integration of the subsystems into one system, and (3) data conversion and upload to the system (Government of Ghana 2007).

The first stage was carried out in 2007 and 2008 and concentrated on addressing the immediate needs of the systematic land titling campaign in Accra and on LIS design. Stages 2 and 3 were planned to be tendered and initiated after the completion of the first stage or in parallel, depending on the results of the design (Government of Ghana 2007). The LIS proof-of-concept stage delivered the LIS Requirement, Design and Implementation Strategy Reports as well as various general recommendations regarding system development. Based on the government's request, the design stage also recommended the use of free/libre open source software (FLOSS) for LIS development (Byamugisha, 2014).

According the current LAP II project coordinator, Ben Quaye, a new study was carried out in August 2009 "to perform an initial assessment and prepare a detailed plan for the implementation of Open Source Cadastral and Registry (OSCAR) tools in Ghana" (Hall, Quaye, and Mensah 2009, 99). This study can be considered a continuation of efforts to determine the solution for Ghana's LIS design and implementation. The study provided a comprehensive report with a situation analysis, a baseline assessment, the requirements for system design, and recommendations on system specifications, an implementation plan, and terms of reference for a consultant to support implementation of OSCAR.

The implementation of OSCAR was to be done in phases over three years. In general, phase one covered assessment, design, and coding of the common core code; phase two covered assessment, design, and customization in Ghana; and phase three covered deployment, testing, and training. The core software development and programming in phase one was planned to be carried out in Rome, and the customization was to be done in Ghana in phase two. Phase one was completed, but phase two was not completed, because the project funds ran out. Consequently, phase three could not start because phase two was not completed. Within the LAP but independent of the LIS, a Land Use Planning and Management Information System (LUPMIS) was designed and implemented. LUPMIS included the production of new orthophoto maps integrated with existing spatial data to support land use planning at the national, regional, district, and local levels.

In addition to the LAP, other projects related to the establishment of the LIS were implemented, such as the Urban Management Land Information System (UMLIS). The UMLIS pilot project, financed by the government of Ghana and the Swedish International Development Cooperation Agency (SIDA), was carried out in 2006–09 and aimed to support the establishment of the LIS in urban areas. The pilot project covered a relatively small pilot area, and the LIS database management system was developed based on a proprietary software environment (Microsoft SQL Server). The project was considered to support the LAP in prototyping some solutions, such as a database for land rent management based on property valuation that can be integrated with the structures of the LIS proposed in the LAP.

Observations and Conclusions from Ghana's LIS Experience

Ghana's long-term land administration program, implemented through a series of LAPs, provides an appropriate funding framework to support development of an LIS. However, the LIS itself is a comprehensive, multifunctional information system, and the complexity of its development and implementation should not be underestimated. Development and implementation of such a system requires preparation of a structured program of activities whose implementation requires close coordination. This was not done in Ghana. In the end, the OACAR (open source) was not deployed at all and only the proprietary technology (based on Microsoft's SQL) was implemented.

Although Ghana's LIS had all the building blocks in place or planned out, its development was done in a piecemeal fashion, without an adequate framework, blueprint, or road map to tie the pieces together or to guide their mutual development. For example, the development and installation of the initial LIS subsystems, the reengineering of business processes, the conversion of manual land records through so-called Intelligence Scanning, and the development of generic software in Rome and its subsequent attempts to customize it in Ghana were all undertaken independently and without careful sequencing. The various building blocks seem to have been initiated to address immediate problems and achieve quick wins, with integration considered only at the end. Ghana's potential quick wins included the use of scanned data, separate systems such as UMLIS and LUPMIS, and LIS subsystems for registration, valuation, survey, and mapping, and vested and public lands management. Unfortunately, with the exception of UMLIS and LUPMIS, none of the potential quick wins have materialized.

And integration of these pieces has not taken place either as of March 2015. An important challenge to future integration is coordination in systems development and a risk that some systems and subsystems might not communicate easily if at all. Global experience indicates that additional effort and financial resources will be required to achieve this given that appropriate detailed design and other measures were not taken upfront. The use of FLOSS and the Solutions for Open Land Administration software was ultimately unsuccessful. It required significant effort in detailed design of LIS customization and system architecture, integration with other components required for land registration and cadastral procedures, and reengineering of business processes.

CHALLENGES AND LESSONS LEARNED FROM GHANA AND UGANDA'S EXPERIENCES IN DEVELOPING LIS

According to the World Bank (2012), SSA countries have been the most active in undertaking reforms: SSA countries undertook 49 reforms to make it easier to register property between 2005 and 2011, compared with a range of 6–34 reforms in other regions of the world. However, their land administration systems are still inefficient. This progress in reforms notwithstanding, more than 80% of SSA and South Asian countries still have paper-based systems in deteriorated conditions (World Bank 2012). Hence, developing a computerized LIS is still a largely unfinished business in SSA, and much can be learned from the SSA countries that have made progress in this area.

Similarities and Differences between Ghana and Uganda's LIS Experiences

In both countries, LIS development is part of a long-term strategy for development of the land sector, as defined by Uganda's 10-year LSSP and Ghana's 15–25-year Land Administration Program. In both countries, LIS implementation is underpinned by long-term financial commitments from development partners.

Development of Uganda's LIS was preceded by and based on a preliminary design, comprehensive terms of reference and technical specifications, and a blueprint for implementation, all prepared upfront to guide detailed design, piloting, and roll-out. The design and piloting were packaged into one major contract, which also included reengineering of business processes and work flows, conversion of cadastral and land records, training of staff, and LIS installation in pilot cadastral zones.

Ghana's LIS design and implementation activities were developed with a focus on different elements and subsystems to be integrated later, without the benefit of an upfront architecture design and blueprint to guide implementation. Ghana's approach was predicated on cost consciousness, with the potential benefit of generating early wins, but also the potential risk that the subsystems and other elements could fail to communicate. Uganda, on the other hand, based its approach on scalability, and sustainability, and opted to base its LIS on proprietary software, whereas Ghana's LIS is based on FLOSS, which resulted in a system that was neither sustainable or scalable..

Potential Issues in LIS Implementation

Based on a review of the progress in LIS development and implementation in Uganda and Ghana, this paper identified a number of issues that SSA countries should anticipate when undertaking such a task:

- Modernising one's LIS is a lengthy process. LIS development is a long-term activity, taking up to 10 years, which makes it vulnerable to loss of support unless it is underpinned by strong political commitment and support from development partners. To meet these requirements and to strengthen its feasibility, it is necessary to have a long-term strategy, realistic goals and objectives, and adequate management of stakeholders' expectations. Discontinuation of support for the system during implementation may result in its collapse and lead to an even worse situation than before the system was initiated.

- Possible resistance, both direct and indirect, to change and power plays by different authorities. Resistance is probable because LIS implementation requires a deep reengineering of many procedures and established practices, decentralization of decision making, and changes in organizational structures. This may provoke resistance at different levels.

- Sustainability of project results through capacity development. LIS implementation requires development of new skills for personnel at different levels to enhance sustainability. Sustainability also requires extensive capacity development to overcome the general technological weaknesses of existing land administration institutions. This lesson is hard enough, and if you still have to develop programming skills to maintain an open source platform, the project is almost destined to fail.

- Modernising the LIS is not only about technology. The regulatory and legal framework needs to be modernised as well. A computerized LIS and electronic conveyance require a new legal framework in many countries. Similarly, a computerized LIS needs to be populated with a critical mass of spatial data, which will require accelerating land registration in most SSA countries.

- Financial support for operation and maintenance of the computerized LIS. Proponents of Open Source argue that the technology is free. However, without on-going maintenance and support, the LIS will fail. In addition, the LIS needs non-interruptible electricity supply, skilled and motivated personnel, financial support for software, hardware maintenance, necessary spare parts, and consumables, as well as for services such as Internet connectivity. Failure to pay for the provision of such services even for a short time may lead to service disruptions and damages to the system, and finally to the collapse of the system. There is also a reputational risk associated with failing to provide services to customers.

Lessons Learned from LIS Implementation

Ten years on, Ghana and Uganda are now at different stages of their LIS system design and implementation, with Uganda making considerable progress, and Ghana having to re-do their proof of concept stage. However, useful lessons can be extracted even at this stage. The lessons emerging from this study are the following:

- LIS development and implementation should be considered an integral part of land administration reform. To the extent that LIS development requires institutional and organizational changes together with changes in the positions and responsibilities of some civil servants working in land administration services, it should also be considered part of public service reforms.

- Development of an LIS is a key driver to improving land administration services and requires a holistic vision, a coherent strategy, and a phased approach to planning and implementation, with buy-in from all key stakeholders. Countries need to embrace the simple 3S framework, which requires sustainability, scalability and security for the LIS.

- Given the technological complexity of LIS projects and the need for high-level expertise that is not always locally available, the development of an LIS should learn the lessons from its peers and make use of both local knowledge and international expertise. No country needs to re-invent the wheel, or develop its own software.

- Capacity development and training of personnel at all levels of LIS operation and maintenance should be a critical part of LIS development. Capacity development should be directed not only at training on the use of software and hardware but also on the legal and cultural aspects of the work environment. This may be required to transform the attitudes and work habits of public service personnel.

- Development of an LIS requires cooperation between agencies and among different levels of central and local governments. Land Administrators need to involve technical expertise before they decide on the technology.

- Public information and education campaigns at different stages of LIS development are important to get support for the project and to manage expectations. The public outreach campaign should be designed to deliver the message about the advantages of the new system for customers and to get feedback from customers regarding the quality of services provided and areas for improvement.

- The legal framework may need to be updated to accommodate implementation of computerized LIS and to transition to electronic conveyance and other service improvements enabled by ICT.

- System design requires careful consideration of the different technological approaches such as FLOSS or customer off-the-shelf software. FLOSS is not free. Experimentation can result in expensive lessons.

- Implementation of an LIS is best done in a sequence, starting with a pilot covering a limited area of the country, and eventually expanding to cover the entire country. It may take seven to ten years to fully implement, including the preliminary design stage.

CONCLUSION

In the final analysis, Ghana's LAP1's attempt at a Phase 1 resulted in the OpenSource software not being deployed at all, and in Uganda, DeSILISoR, which was based on proprietary software, was widely acclaimed to be a success. Uganda went on to Phase 2 of its Project and Ghana is in the process of redoing the Proof of Concept with their LAPII project.

The lesson here is not whether OpenSource or proprietary solutions are best, but rather to demonstrate the criticality of technology when deploying the Land Administration system. Many of the Ghanaian land administration staff argue that it was not necessarily the technology that caused the failure of LAP I, and they might have a point. However, the development of FLOSS (in Rome) drained the funding and resources of the project, to the point where the project could no longer continue, and the software developers were not prepared to develop the free software without any further funding. Yes, there were other aspects of the project that failed, but the truth is, the FLOSS was not deployed on a single computer. This means the proof-of-concept phase failed in its primary objective of delivering a LIS framework that could be rolled out to the rest of the country, unlike the Uganda example, where they are now ready to roll out nationally.

If the technology is poorly selected, the unfortunate consequence is that the entire project will fail. It is essential that whatever the technology, the vendor must be able to demonstrate that the platform is scalable, secure and sustainable.

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BIOGRAPHICAL NOTES

Gasant Jacobs is the Head of Business Development in Sub-Sahara Africa for Thomson Reuters' Tax & Accounting (Government) business unit and is based in Johannesburg, South Africa. As a Property Tax specialist, Mr. Jacobs focuses on designing and delivering Government Revenue Management solutions for local and national government clients throughout Sub -Sahara Africa.

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Widely acknowledged as an industry expert, Gasant has delivered papers around the world, including the World Bank in Washington DC, FIG in Malaysia, and industry conferences across Africa.

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