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E-government in Tanzania: current status and future challenges

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Abstract The public sector plays an important role in the economic growth and development of developing countries. The application of modern Information and Communication Technologies (ICT) may help improve the public sector by contributing to new services and processes that address citizens as well as government-to-government services, involve citizens more directly in decisions being made, and contribute to streamlining work processes and standardizations needed to develop a well-functioning public sector. Research focusing on E-government in developing countries is still dominated by case studies and conceptual pieces of work. Thus, more empirical-oriented work is needed to expand our knowledge on current status, challenges and future plans.

The reported study has been initiated to address such needs. The objective is to investigate, from a broad perspective, on-going E-government initiatives in the public sector in Tanzania. The contribution of this work is twofold. First, the descriptive findings are important to gain insight into the current status of E-government projects in Tanzania. Second, the study reported here could guide the way forward for practice as well as research. We firmly believe that both practice and research should be based on the current situation and identified challenges and aim to describe such issues to guide future work.

Keywords: E-government, Developing Countries, Tanzania

1 Introduction

E-government, the use of information and communication technologies to improve the activities of public sector organizations to improve the services offered to the public [1], has been advocated by governments globally as a means to acquire efficiency, accountability, and transparency in governance [2]. ICT has been used by developing countries for many years to automate internal work and process data. By introducing E-government, more emphasis is placed on how to support and transform external work, and to develop communication and transaction devices to address external stakeholders [3] by focusing on applying information and information technology to all aspects of government business [4].

Tanzania is one of many developing countries where multiple E-government initiatives are being introduced to support poverty reduction and sustain good governance, demonstrated by recent technology implementations and government strategy documents. Such initiatives are driven by the promise of efficiency and transparency in governance to leapfrog the slow process of development [5], and are exemplified by Tanzania's ICT policy, dating back to 2003, where E-government was introduced as a major driving force to:

“Enhance sustainable socio-economic development and accelerated poverty reduction both nationally and globally” [6].

More work is needed to evaluate initiatives to develop cumulative knowledge of E-government services and to explore how these services have led to more effective government services. Since no comprehensive evaluation has been made of E-government projects in Tanzania beyond learning from isolated projects and

stand-alone case studies, we conducted a baseline study to map the current status and identify future challenges, which are reported here.

The paper is organized as follows: next we present E-government in developing countries as our theoretical premise. Then we introduce the research context and explain our research design and data analysis approach. Thereafter the findings are reported, focusing on challenges and future plans. Based on the findings the discussion section focuses on identifying current needs, challenges, inhibitors and enablers of E-government in Tanzania. Finally, we summarize by discussing sustainability issues and implications for practice and research.

2 E-government in developing countries

E-government as an area of research and practice has been around for roughly a decade and a half. Recent reflections based on rigorous examinations of the intellectual development of the field have revealed that the field is gradually maturing [7, 8, 9] but is still under-theorized [8] and with only few attempts at either theory testing or theory building [7]. Implementing E-government initiatives in developing countries is complex and faces many hurdles [10], and more research endeavours are needed to develop cumulative knowledge [11]. Current knowledge in E-government is mainly based on research done in developed countries. Since institutional, cultural and administrative contexts must be considered when introducing E-government initiatives, knowledge cannot simply be transferred from developed to developing countries [10]. Thus, research on E-government in developing countries should not be oversimplified by assuming that learning could be drawn from stand-alone, isolated projects in others without considering the surrounding context.

The potential for improvement by introducing E-government in developing countries relates to several areas [10], various levels of impact [12], and sustainability issues [5]. These theoretical premises guided our study.

Focusing on the various areas of improvement, E-government in developing countries is firstly a matter of setting up processes and services necessary for state activities [10]. A major challenge is the lack of necessary data and poor data quality on issues such as land registers and lack of birth certificates. E-government offers the opportunity to improve these services, also in areas with a low literacy rate [10]. Secondly, access to information on different fields of activity, such as data on economic activities, medical data, or information on processes in public administration, is of critical importance to develop policies and consistent development planning [10]. Thirdly, E-government is not only about delivering services to citizens, but also about improving government-to-government services. Hence, E-government could also help improve (internal) state efficiency by an improved amount and quality of government information retrieval, which could be used to develop policies. Fourthly, E-government could help to improve the finance and taxation systems and reduce corruption by introducing more effective and transparent systems. E-government systems can make public administration more democratic and responsible [10] by allowing citizens to participate in government processes, and offering better control mechanisms by providing citizens with more and better government information. Finally, E-government could act as a mechanism to impose formalization to facilitate administrative work. Incomprehensive administrative behaviours without proper controls contribute to unequal treatment and corruption [10].

E-government projects are introduced to improve government efficiency. Sein and Harindranath [12] discuss various impacts, identifying three levels of effects. First-order impacts substitute old technology with new technology. The same kind of work is conducted by using new technology. Second-order impacts relate to an increase in the phenomenon enabled by technology, where governments are capable of doing more after introducing E-government services. Finally, third-order impacts are the generation of new processes and new ways of working by introducing the E-government services. Governments are now able to work

differently and, hopefully, smarter than before by introducing E-government services.

Identifying potential areas for improvements [10] and levels of effects [12] provide us with dimensions to understand E-government projects in Tanzania and their potential effects on society. Concerning sustainability the question remains: How sustainable are current E-government projects in Tanzania? Sustainability parameters of E-government initiatives relate to various stakeholders [5]. Sustainability parameters for government include a high degree of awareness of the project and interest in utilising citizens' services. Furthermore, the project must result in cost saving for citizens and governments, and should be scalable and replicable [5]. Multi-stakeholder platforms should include a mixture of government and private services to be able to deliver services in the local language, reaching out to the poor. Local service providers could be included, for instance, by delivering E-government services through Internet kiosk operators. Finally, sustainable parameters for citizens include the provision of cost-effective services, reducing red tape and corruption, for instance, by providing one-stop citizen services and services being available regardless of technology issues [5].

Despite huge potential and significant investments in such projects [5, 12], there are few examples of highly successfully and sustainable E-government implementations in developing countries. E-government is not a "silver bullet" that automatically results in some kind of positive development. It runs the risk of achieving unintended, and maybe counterproductive, consequences, such as increased control and concentration of power [10].

3 Introducing the research context

Contextual understanding and awareness are needed to successfully design and implement E-government services [2]. Thus, successful experiences from one context cannot automatically be successfully transformed into another. That is, learning and knowledge from the western world may not easily be transformed into guidelines on how to manage and design E-government projects in Tanzania. We need to understand the contextual issues to better understand the current status of and future challenges for E-government implementations in Tanzania.

Tanzania is characterized by a low per capita income, widespread poverty and a great challenge to meet the National Strategy for Growth and Reduction of Poverty (NSGRP) and Millennium Development Goals (MDGs) in 2010 and 2015 respectively [13]. The estimated per capita income was US\$290 in 2004, leaving Tanzania among the most underdeveloped countries in the world. Among the development challenges Tanzania has faced for many years are national economic growth, a reduction of poverty and enhanced good governance [14]. With foreign debt in excess of 80% of GDP in the late 90s, Tanzania was one of the so-called Heavily Indebted Poor Countries. Because of macroeconomic objectives, the major focus of Tanzanian government policies during 2003/2004 as set out in the Poverty Reduction Strategy was to promote growth and strengthen poverty reduction policies while consolidating and maintaining macroeconomic stability. During 2000, agriculture accounted for nearly two-thirds of GDP and over 80% of the workforce and export earnings (predominantly crops, fishing and livestock). Manufacturing contributes less than 10% to GDP, but growth is quite high relative to other sectors, mainly due to a rapid programme of privatization of state assets under the direction of the Parastatal Sector Reform Commission of Tanzania [15]. Tanzania's national ICT policy stated the mission to benefit from ICT already back in 2003:

"To enhance nation-wide economic growth and social progress by encouraging beneficial ICT activities in all sectors through providing a conducive framework for investments in capacity building and in promoting multi-layered co-operation and knowledge sharing locally as well as globally" [6]

Deploying ICT in government is seen as a major driving force to achieve this mission to enable the government to become a driving force for sustainable progress in the national ICT arena: the development of coherent strategies, the mapping of on-going projects, and the coordination and implementation of E-government services where needed to ensure progress in the E-government area.

4 Data collection and analysis

The data collection took place for eleven months from initiation to the final interviews. Data collection was structured in different phases. Six interviews were conducted in this first phase of the data gathering activities. In the next phase 23 interviews were conducted and 21 questionnaires distributed to ministries, departments and agencies (MDA). Based on the results from this phase, a new round of interviews took place, focusing on “best practices” to identify critical success factors for E-government implementation.

The major data source was obtained from interviews with major stakeholders. Other sources included questionnaires, project documents, e-mail correspondence, strategy documents and minutes from project meetings and workshops. Twenty-nine people were interviewed. These people held key positions related to E-government projects in the government sector and MDAs in Tanzania. The conversations lasted about 45 minutes, focusing on existing practices, experiences and challenges related to the design, implementation and management of E-government projects in Tanzania. The same issues were addressed by the questionnaire, which was returned by 18 of the 21 MDAs addressed.

5 Findings

A major task of E-government projects is to collect and store data on various issues related to various censuses and economic data. Data collection exercises are initiated to collect relevant data from various locations around the country. The data is transferred online to the National Bureau of Statistics (NBS) headquarters for analysis and storage before dissemination. NBS also receives data from other MDAs, like the ministry of industry, trade and marketing, whereby the marketing directorate of the ministry collects data on the prices of crops and livestock from various places and inform the citizens. Such data may also be transferred by mobile phones, using a system developed in collaboration with Vodacom Company, where data from mobile phones is transferred to computer systems for analysis and storage. Thus, information on prices of crops and livestock is easily accessible to citizens or businesses.

Institutions like the Tanzania Revenue Authority and the Tanzania Electricity Supplying Company are responsible for collecting tax and utility bills from all revenue earners (both employees and employers). The bills are processed electronically to improve efficiency and avoid miscalculations. With the current development, such bills can be paid directly through banks, and reconciliation is done online. Several others MDAs also use IT systems to bill their customers.

The land ownership system (MOLIS) obtains data and information from a geographic information system of a particular area and uses it to allocate plots from the surveyed area. The system helps to avoid multiple allocations of plots and hence aims to solve complaints about plot allocations. The produced information is then sent to a database of the surveyed area. Another environmental planning system uses GIS technologies to inform stakeholders of the nature of the environment of a given area and suggests activities to be undertaken in that area in order to conserve the environment.

Petrol station owners are informed of the quality and price of petrol products through a petrol managing system owned by EWURA. Depending on the distance from Dar es Salaam, EWURA sets the prices by regions so that customers know

the range of prices of petrol products. With access to this information, customers are well informed and able to protest in case petrol station owners violate the price range provided by EWURA.

Almost all MDAs have their own website, but the information available online is rarely updated. The websites are mainly used for one-way information distribution from MDAs to the citizens to inform the public. It is common to post announcements for interested people to get hold of and react accordingly. Announcements are made on tenders, employment opportunities, examination results, new tariffs, conferences and seminars, and are done online to address a larger (online) audience than those who are physically visiting the office.

On some occasions the websites are used to offer services as well as to download applications or forms without being able to visit the office to get the forms. A common structure is a system where you may download the forms, print them, fill them in and then submit them. There are a few examples where forms may be filled in online and where decisions are being communicated through e-mails. This is considered important to improve service provision and hence efficiency.

Despite the availability of websites where information and services are distributed, we found that a major challenge is to convince employees who are still reluctant to change the way they work. Sharing information online is often considered awkward, and many employees are afraid of sharing information with others without being able to fully control who is able to gain access to the information.

5.1 Challenges of implementing E-government in Tanzania

A major challenge is the lack of awareness of the opportunities and potential impact of introducing E-government systems in the public sector. Without an awareness of potential benefits, the resistance to change remains strong. A majority of the respondents reported that mind-set and behaviour, missing awareness, poor acceptance and the traditional paper-work culture hinder the adaptation and use of ICT in workplaces, and thus represent huge setbacks for the use of ICT in the public sector. Talking about mind-set changing and the use of ICT in Tanzania, one of the respondents commented:

“Changing the minds and behaviour of the users from the manual documents to electronic sharing and working on these documents is a big challenge... this is due to the fact that they have been used to a manual system for a long time”

Lack of funding is a major challenge which does not only imply a lack of resources as such, but also a lack of current structures and mechanisms to make funding available, to organize budgets and to distribute resources. The structure of the MDAs influences the establishment and management of IT departments or units. In almost all ministries, IT units either fall under the departments of planning or the department of finance. Hence, the IT units do not have their own budgets, and they run the risk of being more or less invisible in the organization. Consequently, planning and implementing IT systems are difficult since the IT units are not responsible for strategic decisions or budgets, as an interviewee commented:

“Availability of resources is a challenge, for example systems like TFDA (Tanzania Food and Drugs Authority) MIS don't have some of the hardware because of a lack of funds; we are fighting the same general fund we have here. Once we propose our budget for IT, management looks on the individual and short-term impact of the investment in IT instead of looking at benefits to the organisation in the longer term... this is a big problem in the public sector”

Lack of influence on how to prioritize is further challenged by the fact that the financing of equipment, Internet subscriptions and the procurement of software depend heavily on donors. Such dependency may be more or less direct where the E-government systems are established by the assistance of donors and receive direct support throughout the project period, or they depend on government units, which are also donor-dependent. Very few MDAs, especially agencies, are able to fully finance the systems from their own budgets, which makes it difficult to plan and prioritize relevant eGovernment systems. Projects are therefore often prioritized as a response to the donors' interests and priorities, more than the MDA's internal needs and plans for further development.

Most of our respondents find the lack of funding, insufficient or poor budget processes and lack of other resources among the hindering factors in the promotion and use of E-government systems in the MDAs. In this account one of the interviewee said:

"There is no budget for IT..I usually have to ask managers for money from their respective department budgets if there is an IT- related problem to solve"

There is a need to increase the knowledge and skills of the end-user on the use of ICT. The lack of training opportunities and the fact that trained IT personnel are better paid in the private sector further hinders the use of E-government projects. One of the respondents argued that:

"Most of the end-user are ICT illiterate...without email accounts, they don't communicate with other via email...they do not use standard applications like excel, which is still a problem"

Lack of IT-skilled staff is a striking challenge. There is a lack of skilled ICT personnel all over the government sector in Tanzania. Poor service schemes for IT professionals and the positioning of IT units or sections within the MDAs are two of the common problems. Most MDAs have just one key staff member with IT knowledge skills, while other staff members in the units are, at best, semi-skilled. Thus, there is a frequent need for training and recruiting, since IT skills are very fluid. IT personnel are poorly paid compared to those who work in private firms or other disciplines like accounting and human resources. Consequently, the turnover of IT personnel is very high, especially for those have already acquired IT experience and skills, who may earn a far better salary in the private sector than in the government sector.

Human resources to make the system run are the central issue. One of the respondents highlighted this perspective by arguing that:

"We propose and defend our facts but the managers are still reluctant in supporting investing in human capital in the IT sector"

In making her point on the lack of or inadequate IT-skilled staff, one of the respondents said:

"One of the biggest challenges is that I am alone as a staff member in the IT unit; there are no subordinates...the capacity is very low, we have a hiring programme, sometimes we hire for one year from the University of Dar es Salaam"

There is a reported need for more training in basic computer applications, and to have a plan for the continuous training of both the IT personnel as well as other staff is important.

5.2 Future plans

The further development of strategies and policies is important to guide coherent development and implementation of E-government services in the future, progressing towards full adoption and utilization of ICT investment, as argued by one of the respondents:

“After developing internal policy guidelines on the use of ICT, we are developing strategies, which could guide the decisions makers and help them understand clearly that initial investment in ICT is expensive”

Development and/or improvements of the websites are considered an important step forward for the public sector in Tanzania. These websites used to contain information on and services in regions. Evidencing that aspect, one of the respondents said that:

“We are planning our website to contain comprehensive information and to allow an exchange and posting of information to external stakeholders...the use of WIKIS-KILIMO (agriculture) matters that are researchable should be linked provided we get funds... we will be adding services, documents and software for people to use, we don't want physical notes (hard copies)”

Still, many remote offices are not connected to any network. Thus, the question of improving, increasing and purchasing new infrastructure to connect more offices to the Internet and intranet is seen as an important future goal to increase information display and service provision in the public sector. Moreover, it will also increase the use of intranet and email in communication in favour of sending physical letters or reports. An interviewee from one of the ministries had this to say on the matter:

“We have good plans to improve the ministry's services by increasing the number of computers, improving the network and Internet infrastructure, equipping staff with current knowledge on ICT. Despite being frustrated by a small budget...we are strategically planning to expand the ICT services”

6 Discussion

The public sector in Tanzania faces many challenges and barriers to implement and fully integrate E-government services. It is clearly a need to focus on infrastructure and broadband connections to the various offices in Tanzania. Still few computers are available, the Internet connections are unreliable (or non-existent), the network structure is often poorly designed, and the software might not be updated. All the more advanced systems are to be found in the offices where computers are available and the Internet connections reliable. As a first next step, Tanzania may focus on improving infrastructure and access to hardware and software.

Availability of technology and networks may not change anything if there is a lack of understanding and skills on how to utilise technology. Developing competence among the officers and managers and recruiting IT-skilled personnel are needed to disseminate knowledge internally as well as externally on how and why to use E-government services in Tanzania.

There are three main challenges related to this issue. First, it is clearly a need to hire more IT-skilled personnel in the public sector in Tanzania. The universities, which provide graduating candidates for the public sector, need to focus on how E-government systems may be used to transform the public sector and increase the effectiveness and efficiency of the public sector in Tanzania. Second, the lack of IT-skilled personnel is clearly a question of costs and priorities. The reported lack

of top-management support may hinder the allocation of resources to support ICT. Third, the ICT department is still mainly considered as a service department in the MDAs, focusing more on fixing computers than managing more efficient work processes internally and externally by using E-government services. Thus, IT skills are considered important for the very few officers working in the IT department, and skills everyone needs to manage their work as efficiently as possible are not considered as important. To be able to further utilize ICT to work as efficiently as possible, it is important to increase awareness and skill of not only the few IT personnel, but of all public servants working in the sector.

A similar important challenge is to develop good E-government examples. The examples identified are often stand-alone examples including only one or very few offices. To bring the government sector forward, the authorities might consider bringing together several of the ministries, departments and agencies to design some services that are needed by several offices, where there are also some quick wins for the users to further increase understanding of the importance of implementing more E-government solutions.

The need for integrating services brings us to another main challenge, which is the organization and responsibility of ICT in the MDAs. The IT departments are seen as service departments in each office, without anyone being responsible for designing, developing and implementing E-government services from a holistic point of view. It is necessary to increase awareness of the importance of EGovernment in the MDA's. Several studies in the last decades have informed us that top-management support is critical to the success of developing and implementing information systems, which is clearly missing in Tanzania. Further work is needed to get ICT on the agenda in the decision-making organizations in Tanzania. By doing so, the strategy and priorities may be more dependent on Tanzania's' needs than the donors' interests and focus areas.

The above-mentioned challenges are difficult to solve and might be difficult to influence by researchers and practitioners in the short run. Based on our study, we would argue for the importance of focusing on some quick wins, which might be within reach in smaller-scale projects.

Firstly, it seems important to identify internal champions to propel projects forward. These champions are often able to get the colleagues interested, and to explain the value of introducing E-government services in the organizations internally and externally. Thus, the champions are important for bottom-up initiated projects, where the initiatives are taken locally, where the main value of the initiated project is.

Clearly identified value is the second enabling factor for the success of locally initiated projects. It might be easier to identify value if the projects and services are initiated from the local offices, compared to initiatives from central governments and donors, even though the overall value for the government sector might be higher for the latter projects, as discussed earlier. Independent on project type, it is necessary to identify the value for the offices and other stakeholders involved to increase commitment.

Finally it is necessary to start where competence is available. The competence level varies from one office to another. It is sensible to start at identifying the current competence level to identify whom to invite to participate in designing new E-government services. During the interviews we identified highly skilled ICT personnel who spent their working hours on basic technical issues like installing software and cabling networks. These workers had very clear ideas on what could be done and how to do it, but realized that the basic needs occupied their full attention, hindering any activities related to work smarter by introducing E-government services.

The identified E-government services focus mainly on access to information and data quality. Databases are developed and data stored from various sources to improve data quality. Improved data quality is a prerequisite to develop well-functioning E-government services [10]. Currently, the identified initiatives focus less on providing services to citizens based on the improved data quality. As such,

the potential is not transformed into services, which are utilizing collected government data. Furthermore, E-government initiatives focus more on government-to-government services than government-to-citizen services. Our findings also include examples of E-government services focusing on the improvement of finance and taxation projects. More efforts are needed to disseminate learning from one project into sector-wide E-government solutions including a larger part of the government sector, addressing various stakeholders' needs.

The impacts identified relate, at best, to the first and second order impact [12]. Impact does not seem to be very important at this stage. It seems more important to get systems up and running than to consider the potential impact on government, citizens and other stakeholders. Most systems are designed to substitute older systems, providing the same kind of functionality implemented in an ICT-based system. Such initiatives may be important and useful, for instance by increasing the data quality on the data being processed. Second order effects are exemplified by the use of the land ownership and petrol managing systems. By collecting data from various sources, independent of time and space, these initiatives increase the capability of government institutions to do more work. Third-order effects, where E-government systems alter the way the government sector is organized, and the business processes are yet to be identified. Lack of awareness, lack of competence and lack of responsibility may hinder altered work processes, which might utilize technological opportunities to re-organize to work smarter.

Sustainability is a major challenge for E-government projects in Tanzania. Sustainability parameters for government and citizens, introduced by De' [6], include a high awareness of various stakeholders, cost saving for all participants, scalability and replicability. As discussed above, such issues are clearly not addressed by current E-government services. Thus, E-government projects in Tanzania may end up with several non-sustainable projects with only a very limited influence on a specific context and/or for a limited time horizon.

7 Conclusion

This study has been initiated to increase our knowledge of the current status of E-government initiatives in ministries, agencies and departments in Tanzania. Moreover, we aimed at investigating the perceived challenges for further development and use of E-government systems, and, based on the findings, to be able to discuss the way forward, both in the long as well as short run, on how to proceed by implementing E-government systems in Tanzania.

Our findings could guide both practitioners and researchers' future work in this area. In the long run, we argue for the importance of centralised initiatives with a clear value for several MDAs. Such projects should focus on problem areas with identified needs. One area where there is clearly a need for more robust, transparent and cross-sectors solutions, is the tax registration area. Thus, this could be one focus area for further development. In the short run, we argue for the need of identifying IT-skilled personnel and competence, which is presently available at the MDAs. The competent personnel could be invited to design and develop bottom-up solutions based on the local needs where they are situated. Thus, the competence could be utilised in a better way, and local needs identified and addressed. The main challenges for such bottom-up initiatives in the long run are to develop common services for the whole sector based on the needs and experiences from small-scale pilot studies.

The main hindrances to further developments are, from our point of view, the lack of equipment and lack of IT competence in organizations. Before hardware, software and networks are generally available, Tanzania will not be able to fulfil the objectives presented in its IT policy. We would argue for the importance of investing in equipment to overcome the main hindrance to further development.

Even more challenging is the lack of competence. First, more IT-skilled personnel need to be hired to strengthen the IT departments in the MDAs. In the long run, it might also be necessary to increase the competence of ICT's transformation of the government sector among all officers working in the public sector in Tanzania. To succeed, it seems necessary to focus on internal training. Success may depend on the competence level of newly recruited employees in the public sector, which means that the role of the universities is of critical importance. The universities should include teaching on the role of technology in the future development of Tanzania's government sector as a core competence for all their candidates.

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