"GHOSTS IN OUR MACHINES": PRESERVING PUBLIC DIGITAL INFORMATION FOR THE SUSTENANCE OF ELECTRONIC GOVERNMENT IN SUB-SAHARAN AFRICA

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ABSTRACT

The adoption of information and communication technologies (ICTs) and the diffusion of the internet have led to the creation of electronic government (e-government) in many countries in the world. E-government aims at providing government information and services through online means. However, ICTs are like the proverbial double-edged sword when it comes to providing a platform for e-government. On the one hand they offer advantages of real-time and instantaneous access to information, while on the other hand they pose significant challenges related to the preservation of information. The discussion on the challenges posed by digital technology becomes even more important in view of the fact that many countries in sub-Saharan Africa are currently implementing e-government initiatives. However, "current technology is not up to the challenge of capturing, managing and preserving electronic records, especially social media records." Issues of sustainability have to be taken into consideration if the electronic information on e-government platforms is to remain accessible and proccessable over time. Governments in sSA will be plunged into the proverbial "digital dark ages" if library information services (LIS) professionals do not deal with the challenges posed by digital information. The quest of delivering government information and services with the aid of ITCs will come to naught if, for example, the information is not safeguarded from technological obsolescence. Typical characteristics of digital information used to deliver e-government will be discussed below, followed by the various challenges posed by the digital medium. Finally, the article will recommend strategies to deal with these challenges. Trusted digital repositories will feature prominently in the recommendations as these provide a possible means of providing permanent public access to electronic government information.

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KEYWORDS

E-government, digital preservation, information and communication technologies, trusted digital repositories

1 INTRODUCTION

The adoption of information and communication technologies (ICTs) and the diffusion of the internet, has led to the creation of electronic government (e-government) in many countries in the world. E-government aims at providing government information and services through online means. However, ICTs are like the proverbial double-edged sword when it comes to providing a platform for e-government. The use of computers in almost every aspect of government, and the amount of data that is produced, threaten the ability of the governments in sub-Saharan Africa to preserve it. The term electronic government (e-government) refers to the use of information and communication technology in the delivery of government services. In other words, e-government refers to:

> the use by the Government of web-based internet applications and other information technologies, combined with processes that implement these technologies, to enhance the access to and delivery of Government information and services to the public, other agencies, and other Government entities; or bring about improvements in Government operations that may include effectiveness, efficiency, service quality, or transformation (United States Federal Government 2002).

From this definition, two things about e-government come to the fore: (i) it is a system of government mediated by digital technologies aimed at enhancing access and delivery of government information and services to the public in a systematic and consistent manner in order to achieve effectiveness, efficiency, service quality and transformation; (ii) the system is automated and utilises technologies that are predicated upon web-based internet applications. This definition emphasises two key triggers of effective and successful e-government, namely systems and processes, at the expense of human resources, often identified in the literature as a third core factor in the implementation of e-government (Mokhtar & Yusof 2009; Trevor, Othman & Norafida 2004). It is a given fact that the provision of efficient, accountable and transparent e-government services depends largely on the availability of information in electronic formats. The long-term availability of government information and records is crucial to the democratic process, research and posterity. But human resources are crucial to support the systems and processes. Professionals, such as librarians and archivists, who collect and assimilate crucial information, are therefore crucial to the management of e-resources by preserving and making such information accessible for the long-term benefit of humanity.

Although data-collecting professionals, such as librarians, archivists and museum curators operate within their defined boundaries, their concern is to organise knowledge

such that it will be retrievable, accessible and useable. From today's perspective, these professionals are concerned with the interactions between digital materials, technology and human activity. Digital objects are "recreated each time they are used, based on interactions of numerous" technological devices. These professionals face similar complex challenges when it comes to managing digital information and making it accessible to the present and future generations. There are a number of key challenges posed by web-based technologies, such as technological obsolescence and consistency of data-collection processes, but in this article we will focus primarily on the challenge of developing trusted digital repository services. Identifying, collecting and storing online publications and organisational records will be a futile exercise if strategies such as developing trusted digital repositories are not devised.

Reliable digital repositories provide the possibility of ensuring the long-term preservation and accessibility of records and information created and captured by e-government activities in sub-Saharan Africa. The question is: What is required to maintain these digital repositories and keep the collections intact? What best practices should be developed and implemented to keep these digital objects accessible and processable? For how long should these records be kept? At first glance, the answers appear to be as simple as the questions. According to Lee (2011:5), these challenges would be better served "through communication across institutional and professional boundaries". Libraries and archives have a long history of organising knowledge and making it accessible. Recently, they both started focusing on web-based archiving, that is, identifying and harvesting materials available from the web (Brown 2006). They have begun to realise that websites are not permanent and that, "once taken down or changed they are often lost" (Jefferies 1212). In fact, nothing is permanent in managing online information. At times websites get restructured, change names, become extinct or are merged with other organisations or agencies. What information does a typical government website contain?

The mediation of e-government by digital technologies presents many technical challenges for the long-term preservation of data. Creating, keeping and using authentic evidence of government activities on the web also cause complex problems for the managers of such information. The rate of software and hardware obsolescence is high. Electronic media is inherently fragile. Electronic information is highly vulnerable to loss through neglect or mismanagement (Cunningham 2011:84). Benign neglect is not an option when managing electronic records. Unlike paper records, electronic records should be actively managed across their entire lifespan by making regular backup copies on portable media, and by migrating records to new software platforms. In some cases the electronic information on the web may be the only evidence of particular activities or interactions. Maintenance of this evidence is necessary to keep track of societal interests, history and the collective memory. Societies in sSA are likely to suffer from digital amnesia if nothing is done now to give attention to the management of digital information on various websites. One of the key management elements is

digital archiving, as articulated by the groundbreaking article of Rothenberg (1995). Digital archiving does not seem to be considered a critical professional issue in sSA. Consequently, sSA is falling down the slippery slope and into a digital dark age because of failing to pay serious attention to digital archiving. Managing electronic records is analogous with living in the "wild frontier" (McDonald 2005) and the electronic records themselves are "ghosts in our machines" (Cunningham 2011).

2 STATEMENT OF THE PROBLEM

Today's information technology systems (ITs) play a crucial role in making information available (Del Sordo, Orelli & Padovani 2012:701). The implementation of governmental programmes may benefit from the utilisation of information technologies. Archival institutions in sSA lack the capacity to provide advice and assistance to creators of electronic records on the appraisal and disposal of electronic records. We run a risk that many government websites that are archived may lack metadata that can help inform and document disposal decisions. Although previous studies focused on, and described the implementation of e-government in sub-Saharan Africa from different perspectives (Hood 1983), the focus has been primarily on topics such as networks, IT security and legal frameworks, web development, portals/government-public interface applications, ICT human resources development and training, mainstreaming of e-government activities and various legal issues (e.g. Bwalya & Zulu 2012). Yet, there seems to be some missing links: Firstly, to what extent is vital government information in sub-Saharan Africa being preserved online for the present and the future? And secondly, what national initiatives should be undertaken to ensure the accessibility of information over time? The underlying assumption of our analysis is that developing trusted digital repositories will preserve the information into the future and sustain e-government.

3 MANAGEMENT OF E-ASSETS: SCENARIO IN SSA

National archival institutions and national libraries have a role to document and preserve their respective countries' documentary heritage. Not much, however, has been done to deal with concerns related to facilitating the capture and preservation of long-term access to government records and publications in an information-and-communication-technologies-driven environment. Some of the factors enumerated below, demonstrate that sub-Saharan Africa's position is unenviable when it comes to dealing with digital objects and artefacts in an attempt to guarantee that the continent does not slip into the digital dark ages. Typical issues include:

- the absence of a government-wide framework for managing electronic information resources

- inadequate political will to deal with the technical, financial, legal and political challenges of providing permanent public access to published electronic government information and records
- the absence of dedicated government departments assigned the responsibility for the preservation of electronic government information
- an inadequate awareness of management responsibilities
- a dearth of national strategies for the identification, collection and preservation of online publications and electronic records
- the failure to actively collect and preserve various types of online information
- failure to designate responsibilities for archiving online government publications and records
- the failure by national libraries and national archival institutions to closely collaborate in order to keep electronic resources safe for people in sSA, now and in the future
- limited initiatives at the national libraries and national archives to identify, collect, store and preserve online publications and organisational records
- the failure to provide archivists and librarians with the necessary standards and guidelines to enable them to effectively collect, describe and preserve online government information and records
- a lack of research on the challenges associated with identifying, collecting, storing and preserving online publications and organisational records
- the prevalence of limited infrastructure, policies, procedures and staff skills for collecting and preserving online information
- the lack of communication between information technology personnel, on the one hand, and archivists and librarians on the other, resulting in the design of systems that do not promote their collecting mandate
- the fact that librarians and archivists have difficulties in identifying and locating government online information and records
- the limited risk assessment of digital collections by librarians and archivists
- an inadequate awareness of the totality of what government is publishing online
- the fact that legal deposit legislation does not include electronic publications that incorporate online publications and websites
- the fact that legislation that is relevant to government online activity, has not been holistically appraised (e.g. archives and freedom of information legislation, electronic and privacy laws, etc.)

- the poor awareness among the public in many countries of "e-permanence" initiatives
- the fact that the prohibitive costs associated with ensuring long-term access to digital information as compared to paper-based materials, has not been adequately assessed
- the fact that no additional funding has been provided to undertake collection preservation of online records and publications
- the lack of a sustainable repositories project
- the failure to properly assess critical risks related to digital preservation
- the low level of awareness, among creators of government information and records, of the importance of keeping online information accessible for the present and future generations
- an acute shortage of staff with the awareness and skills to develop and implement strategies for preserving the national heritage online
- the failure of library and archival courses to cover digital preservation in a meaningful way

The present scenario can only mean that substantial amounts of information and records are being lost, and that this will continue in the foreseeable future unless drastic steps are not taken to address the situation. The scenario sketched in the foregoing, is in stark contrast with what is happening in Australia, for example, (Cunningham 2005), Malaysia (Mokhtar & Yusof 2009) where significant progress has been made to safeguard government electronic information, and by conducting research and implementing projects for the protection of government online publications and e-records.

4 TRUSTWORTHY REPOSITORIES

Trustworthy digital repositories "provide reliable, long-term access of managed digital resources to its designated community, now and into the future" (Trusted Digital Repositories 2002). Such repositories can reliably store, migrate and provide access to digital collections (Dale & Ambacher 2007). The Open Archival Information System (OAIS) Reference Model, which is now an ISO Standard (14721), provides a useful digital preservation tool. The threats and risks to digital repositories are numerous. According to Rosenthal et al (2005) the threats to digital repositories include media failure, hardware failure, software failure, communication errors, failure of network services, media and hardware obsolescence, software obsolescence, operator error, natural disasters, external attacks, internal attacks, economic failure and organisational failure. These factors should be considered and monitored when creating trusted repositories. As opposed to institutional repositories, open-access repositories, digital preservation repositories and digital archives, the primary purpose or explicit priority of

trusted repositories is data-preservation (Dale & Ambacher 2007). In order to determine the trustworthiness of a digital repository, we need to consider the following:

- its means of governance, which should be "explicit, tangible, and [based on a] long-term commitment to [comply] with prevailing standards, policies, and practices" (Dale & Ambacher 2007)
- the organisational structure required to support the various functions
- the creation of staffing policies to ensure trained staff capable of sustaining the digital repository
- the development of policies and procedures: current written policies should be reviewed at regular intervals
- its financial fitness and sustainability: business planning processes should be in place to sustain the repository over time
- data security issues: security needs should be assessed and implemented
- the necessary technological infrastructure: adequate hardware and software should be provided and these systems must conform to ISO 17799

5 CONCLUSION AND RECOMMENDATIONS

Little is known about the software that is used to create and store some of the records on government websites. This knowledge is important because many software products are developed with built-in proprietary dependencies which may have adverse effects on access and the preservation of the websites. According to the International Council on Archives (2008), systems of capturing and managing electronic records should rely on open standards and technological neutrality. Librarians and archivists should be advocates of the use open-source applications. They should also play an active role in influencing governments to create and manage the evidence of democratic governance in ways that facilitate its accessibility and long-term preservation.

This is an important exercise because there is no political power without proper control of the archive, if not of the collective memory. Effective democratisation can always be measured by one essential criterion: the participation in, and access to the archive, its constitution and its interpretation (Derrida 1996:4).

Ultimately, societies in sub-Saharan Africa will be unable to access and interpret their cultural heritage if steps are not taken to preserve it in the long term. Availability in perpetuity, of authentic and reliable information, is fundamental to effective democracy, governance and civic participation. Action must be taken to avoid the loss of information that is generated electronically and to make it available to the people in sSA, both now and in the future. In addition to the role that archivists and librarians should play in preventing SSA to slide into the digital dark ages

> ... there is an urgent need for politicians, heads of government departments and other key policy-makers, educators, publishers, academics and the general public to realise the magnitude and the gravity of the situation before us. We must find the collective will and adequate resources to implement policies and practices that will safeguard our online heritage and keep it safe (Cunningham 2005:314).

Whatever steps are taken to safeguard digital resources now and in the future, these should be guided and driven by clear and comprehensive policies. The effective implementation of appropriate policies will require political will and funding.

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