Challenges to the Successful Implementation of e-Government Initiatives in Sub-Saharan Africa: A Literature Review

Quinta Nven-akeng Nkohkwo and M. Sirajul Islam
Örebro University, School of Business (Informatics), Sweden
nvenquin@yahoo.co.uk
sirajul.islam@oru.se

Abstract: With the dawn of the technological age due to the wide spread of information and communication technologies (ICTs), e-government is fast becoming of prime importance. This has prompted many governments (those of Sub-Saharan African - SSA included) to start thinking of going digital. This growing importance stems from the fact that e-government has the capability of promoting better governance, transparency, raising service performance and eliminating bottlenecks in the service delivery process. This paper is based on a literature review of the papers and documents relating to e-government and investigates the challenges to the successful implementation of e-government initiatives in all the 49 African countries in SSA for the period 2001 to 2012. In order to conduct a systematic review the guidelines suggested by Webster and Watson (2002) and Okoli and Schabram (2010) have been followed. In total 75 relevant articles and documents have been examined all of which have been published in leading journals, conferences proceedings, reports from governmental and non-governmental organizations. The results show that ICT infrastructure, human resources, legal framework, Internet access, the digital divide, and connectivity are among the most common themes on the challenges to the successful implementation of e-government initiatives in Sub-Saharan African countries. These themes are further grouped into six different aspects abbreviated as IF-POSH (Infrastructural, financial, political, organisational, socio-economic and human). Among these six aspects, infrastructural and human aspects are the most important challenges that the respective governments in SSA need to address prior to adopting implementation strategies. The study suggests that governments of the Sub-Saharan African countries can benefit from the advantages of e-government if they address these challenges collectively allowing for the sensitivity of certain socio-economic realities.

Keywords: ICTs, e-government, Sub-Saharan Africa, e-government Challenges, e-government implementation

1 Introduction

e-Government (or Electronic government) can be defined as the "*use of information and communication technologies to offer citizens and businesses the opportunity to interact and conduct business with government by using different electronic media such as telephone touch pad, fax, smart cards, self-service kiosks, e-mail / Internet, and EDI*" (Almarabeh and AbuAli, 2010: 30). In its simplest form, it is the application of information and communication technologies (ICTs) to deliver public services (Holmes, 2001). To this effect, e-government can be viewed as the administration, rules, regulations and frameworks organized by a government for service delivery as well as to communicate, co-ordinate and integrate processes within itself (Almarabeh and AbuAli, 2010).

The reason for the sudden rise in e-government practices in the contemporary world is due to the fact that e-government systems have the capability of promoting better governance (OECD, 2003). e-Government helps in achieving greater efficiency in government performance by raising service performance, and service delivery, by eliminating inefficient processes and reducing bottlenecks and red tape in the service delivery process as much as possible (Mutula, 2008). Furthermore, it is important to note that e-government initiatives are also aimed at improving government service delivery and citizen participation. In addition, most of the times the need for e-government is driven by a country's need for rationalization since e-government is considered to be cheaper, fewer people are needed to do the work and convenience. It is for this reason that Heeks (2006) talks about the 24/7 agency which is an extension of his previous idea on the 5Ws and 1H, which are Who, What, Where, When, Why and How. The 24/7 agency implies that for 24 hours a day during the seven days of a week citizens of any given country should have full access to government information at any moment and everywhere. This implies that the government should be one that is fully available to its citizens (Heeks, 2006). This is important. As Mutula (2008) argues, traditional government systems are characterized by transactions

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that involve more manual physical filing activities burdened by abundant movements of correspondences, duplication, wastage of paper, difficulty in accessing and managing data, loss of data and general inefficiency of operations.

However, despite the above mentioned benefits of e-government, the implementation of e-government initiatives in Sub-Saharan African countries have in most cases been failures. As reported by Heeks (2003), 35% of e-government projects in developing countries are total failures, 50% are partial failures, while the remaining 15% are successes. These figures show that there is a need for research to be done into the challenges to the successful implementation of e-government initiatives (Dada, 2006; Kaaya, 2004; Peters et al., 2004) in these Sub-Saharan African countries. Furthermore, according to Almarabeh and AbuAli (2010), huge failures have been recorded for a large proportion of e-government initiatives as they have failed to achieve promised goals. The challenges that hinder the successful implementation of e-government initiatives in the Sub-Saharan African countries lead to diversified implementation strategies at the various levels (Middleton, 2007). According to Mutula (2008), e-government initiatives in Sub-Saharan African countries seem to be far from reaching realization and attaining the purpose for which they are undertaken due to several challenges and stumbling blocks. Therefore, considering that implementing e-government is a continuing process (Almarabeh and AbuAli, 2010), the aim of this paper is to investigate the challenges to the successful implementation of e-government initiatives in Sub-Saharan Africa countries. In order to investigate this, we carried out a thorough content analysis of 67 papers as well as news articles, and postgraduate thesis relevant to all the 49 Sub-Saharan African countries for the period 2001-2012.

While this section briefly presents background and motivation of the main research agenda, the subsequent sections present the study context, research methodology, followed by a detailed presentation of the results, discussion and the conclusion.

2 Study context: Sub-Saharan Africa (SSA)

Sub-Saharan Africa (SSA) is a geographical term referring to the area of the African continent which lies to south of the Sahara or those African countries that are fully or partially located south of the Sahara (Wikipedia, 2012). Geographically, SSA covers an area of 24.3 million square kilometers, and the region has been separated by extremely harsh climate of the sparsely populated Sahara desert for about 5,400 (Science news, 1999). SSA comprises of 49 different African countries. According to the UNFPA (United Nations Population Fund), the SSA region has been facing serious economic, social and political challenges that make the region one of the poorest in the world, suffering from economic mismanagement, local corruption and inter-ethnic conflicts (Webster, 2012). According to Social Impact (2006), SSA remains the world's most pressing development challenge despite the signs of significant progress due to complex and inter-connected challenges such as curbing HIV/AIDS and malaria and preventing and resolving conflicts and decreasing corruption to spurring growth, strengthening democratic governance, raising health and education levels and protecting the environment. In addition to these challenges, according to UNFPA (2007), the region suffers from lack of information access and data on population issues which lead to constrains to sustainable development. With regard to e-government status in SSA region, Schuppan (2009:119) states that it is difficult to measure the exact status as the region is "*barely registered on the E-government radar screen and thus hardly any measureable E-Government data is available*", although there are some rankings on the individual countries available in UN annual e-government survey (UNDESA, 2012). According to UNDESA (2012), the e-government development index of Africa (excluding South Africa) is the lowest among the five regions of the world. In particular, from a global perspective SSA is highly underdeveloped in the implementation of e-government. Except some individual cases, such as South Africa, Internet access in SSA is scarce and the services relating to e-government are rare (Schuppan, 2009).

3 Research methodology

This paper is based on a comprehensive literature review. The initial stage of the review was to identify the intended goals and purpose of the review so as to ensure that the purpose of the review is clear to the readers (Okoli and Schabram, 2010). A typical literature review process comprises of different stages such as searching, collecting, prioritizing and reading with a purpose so as to seek out key issues and themes which are then presented and discussed as critically as possible (Wellington et al., 2005). In our case, the following procedures have been adopted:

3.1 Selection of papers

We systematically surveyed the literature relating to e-government published between the years 2001 and 2012. We started off with the leading e-government journals, followed by the six leading journals from the information system (IS) field contained in the Senior Scholar Basket of the Association for information systems and the top ten ICT4D journals listed in the ICT4D Journal Ranking Table by Heeks (2010). The leading e-government journals reviewed include but are not limited to:

- Electronic Journal of Electronic Government (EJEG)
- International Journal of Electronic Government Research
- Journal of Electronic Government
- Information Polity
- Journal of e-Governance
- Government Information Quarterly
- Journal of Government Information

The list of leading IS (Senior Scholars' Basket) journals reviewed are as follows:

- European Journal of Information Systems
- Information Systems Journal
- Information Systems Research
- Journal of AIS
- Journal of MIS
- MIS Quarterly

Also, we scanned the table of contents and list of references of these journals to identify other useful journals which we could not identify when using our key words. The time frame 2001-2012 was chosen as it was considered to be a reasonable range to search literature. Also, considering that e-government is an ever growing field, we considered this time frame as a good one which will enable us identify nothing but the recent journals and articles in the field to review. This search method helped us to set a boundary and enable us to get relevant articles.

3.2 Search procedure

We carried out a systematic search (Webster and Watson, 2002, p.4) as it was considered as a means through which literature that was suitable for this study could be better captured. In selecting the literature that was deemed useful for this study, attention was not placed on a single set of journals or geographical area (Webster and Watson, 2002). Search engines such as Google, Google Scholar, LibHub and web of science online databases, Ebscohost and Interscience amongst others were used. The web portals of the governments of the respective SSA countries and other news articles were explored so as to get their own perspective on the subject being studied. We choose the initial keywords: electronic government, e-government implementation, Sub-Saharan Africa, Challenges, ICT. After carrying out a preliminary search, these key words were further expanded to: developing countries, Africa, the use of ICT, barriers, African government, e-government and digital government.

Because search engines such as Google and Google scholar might not be enough to find relevant articles for our study, we decided to use other procedures. Furthermore, while reviewing these leading journals we went forward by identifying other articles with the help of other web sources so as to determine which of these articles should be part of the review. The snow ball method was also applied by examining the bibliographies of prior articles identified to see if relevant articles could be found. Also we thoroughly searched for relevant information for all the individual 49 Sub-Saharan African countries.
While this helped to get relevant information that was specific to a particular country, unfortunately no relevant journal or new articles was found for 20 out of the 49 Sub-Saharan African countries. These countries were: Chad, Republic of the Congo, Equatorial Guinea, South Sudan, Djibouti, Somalia, Malawi, Mauritius, Mozambique, Seychelles, Zimbabwe, Benin, Mali, Ivory Coast, Guinea, Guinea Bisau, Liberia, Mauritania, Sierra

Leone and Togo. While some relevant information was found for the remaining 29 countries, most of them were reports and news articles with very few based on academic study. The number of papers found for some countries was quite small. For example, in the case of Cameroon, only one relevant paper was found and this was a report. For Democratic Republic of Congo, four papers were found three of which were reports and one an academic study.

3.3 Data collection and analysis

After selecting the relevant papers for this study and using the above mentioned search procedure, the next challenge was collecting relevant articles from the papers found. The initial search came up with 120 articles which were later narrowed down to 75 from the period 2001 to 2012 (news articles, information from government portals, masters thesis and some international organizations included) based on usefulness and relevance to the study. These relevant articles were then systematically analyzed to come up with relevant themes for our study. As we read the abstracts of the selected papers, we came up with a database which further helped us to analyze the papers based on their themes and subject of discussion. In some cases, we also read the introduction of the papers as well as their conclusion to be able to vividly establish the usefulness of this paper to our study.

In order to analyze the data collected we started by designing a four column table containing the different papers found for each SSA country. The columns were the publication venue, author, year and the challenges mentioned in the paper. Next we designed a second table containing all the challenges we found for the period 2001 to 2012 (Please see Appendix 1). The challenges on this table were listed by year so as to make it easy to identify the changing trends and analyze the challenges found in the articles reviewed. On this table, numbers are used to indicate the number of times a challenge is mentioned in a particular year. Once this was done we further grouped these challenges based on the commonalities between them and this grouping resulted to six groups namely financial aspects, organizational aspects, political aspects, socio-economic aspects, human aspects and infrastructural aspects as presented below in Table 1 in the results section.
A concept-author table as suggested by Webster and Watson (2002) was also designed to present the six aspect groups and the respective authors (See Appendix 2).

It is worth mentioning that while we used a framework for reviewing literature, we did not use a conceptual framework for this study. This is because we wanted to leave the study open to give room for the collection of as many challenges as possible. Choosing a single conceptual framework might exclude some challenges which could limit the scope of the study.

4 Results & discussion

Looking at Appendix 1, it is evident that the challenges to the successful implementation of e-government initiatives in SSA are many. Although these challenges may vary from one SSA country to another, there are some commonalities. These commonalities in our opinion are due to the fact that the countries in this region share some socio-economic and geographical similarities.

The challenge "ICT infrastructure" particularly dominates the research on the challenges to the successful implementation of e-government initiatives in SSA. This is followed by human resources, legal framework, Internet access and connectivity, language, illiteracy, awareness and the digital divide amongst others (See Appendix 1). With ICT infrastructure being the most common theme, one could, based on this discovery, assert that this is the main challenge for e-government in SSA, an assertion which is supported by other researchers such as Ndou (2004) and Ebrahim and Irani (2005).
The challenges presented in Appendix 1 are further grouped based on their similarities which resulted to six different aspects such as infrastructural, financial, political, organizational, socio-economic, and human (IF-POSH). These aspects are presented in Table 1 in detail and in Figure 1 in a simplified form.

The different arrows used in Figure 1 indicate the fact that there is a relationship between different aspects and that they all impact one another in one way or another. For example there is a relationship between infrastructural aspects and human aspects because even if a country has the needed infrastructure, there is need for human skills to manage and run these infrastructures. The same applies to finance and infrastructure because finance is needed to purchase the needed infrastructures to enable the successful implementation of e-government initiatives and so on.

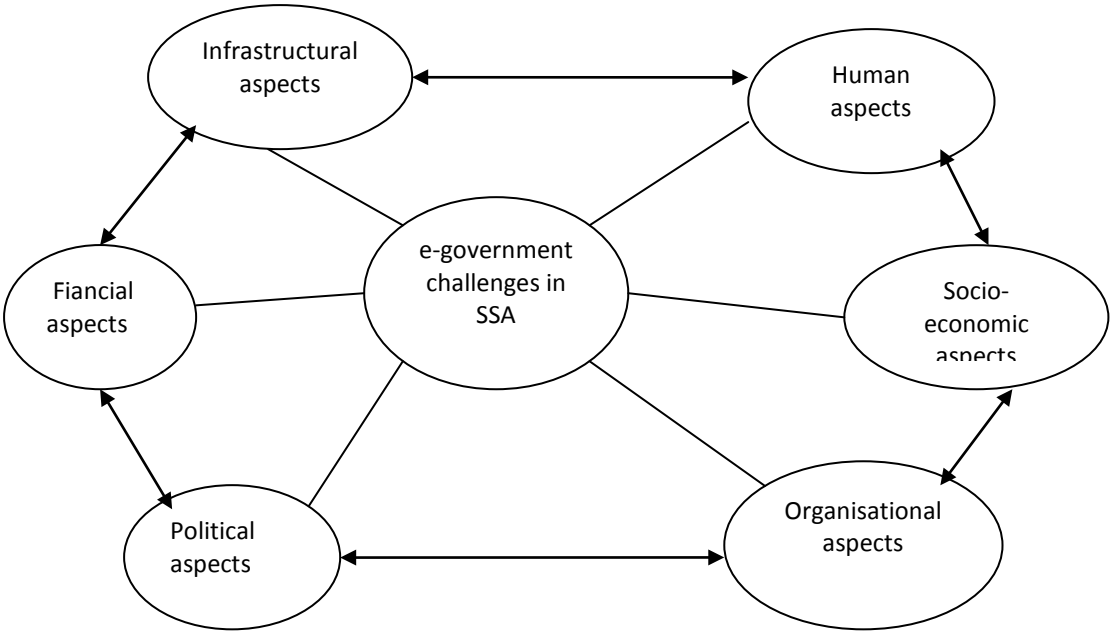

Figure 1: 'IF-POSH' – The thematic challenges on implementing e-government in SSA

Having discussed the components of the IF-POSH above; a look at the concept author matrix (See Appendix 2) enables us to make some further valuable remarks. The concept-author matrix presents the different themes and the authors who mention them. From the matrix, infrastructural aspects dominate the research on the challenges to the successful implementation of e-government initiatives in SSA. This is because they are cited by 55 different authors, followed by human aspects which are cited by 42 different authors, political aspects by 30 authors, organizational aspects by 26 authors, socio-economic aspects by 24 authors and the financial aspects by 21 authors.

Table 1: List of aspects with corresponding challenges

Aspects	*Challenges*
Financial aspects	Financial constrains, cost structure, Internet cost, and cost of e-government services.
Organizational aspects	Top management support, leadership, deficiency and implementation guidelines, recruitment of ICT personnel, change management, human capital development, lifelong learning, organizational motivation, information management, internal efficiency, non- contextualization of e-government practices, partnership between private and public sector, ability and commitment, disintegrated projects, e-government vision, evaluation framework, transparency, citizen inclusion.
Political aspects	Political situation**,** leadership**,** political administrative system, public administration reforms, legal framework, ICT roadmap, fiscal policy resources, procurement regulation, e-government policy execution, freedom of press, political will, data privacy legislation, e-government strategy, regulatory issues, data standards, national policy on the use of ICT
Socio-economic aspects	Illiteracy, economic development, culture, demography, digital culture, poverty, corruption,

	competition environment, language barriers, permanent availability and preservation/sustainability, appreciation of perceived IT value, benchmarking, communication, unemployment rate, E-literacy, accessibility
Human aspects	Awareness, human resources, attitude, learning content/resources, accessibility, trust, public support, knowledgeable personnel, gender in-equality, low citizen participation, training and capacity building, E-record readiness
Infrastructural aspects	ICT infrastructure, security, privacy, information sharing, interoperability, data possession, explicit reference to ICT access, power supply, Internet access and connectivity, scarcity of computers, digital divide, cyber security, collaborating systems, maintenance of government websites, tele-density, data systems

The different aspects presented in Table 1 above are discussed here below.

4.1 Infrastructural aspects

Under infrastructural aspects the most important themes found in this study (based on the number of times it is cited from 2001 to 2012) is "ICT Infrastructure", "Internet access and connectivity", "power supply".

Infrastructural aspects remain the main challenge for e-government (Ndou, 2004; Ebrahim and Irani, 2005). Infrastructure is a huge challenge as it is viewed by previous research (Bonham et al., 2001; Bourn, 2002; Dillon and Pelgrin, 2002; McClure, 2000; National Research Council, 2002) as a significant barrier to the provision of government services and transactions online. Unreliable IT infrastructure will further influence to degrade the e-government performance of the respective governments (Ebrahim and Irani, 2005). Unfortunately, the digital divide in developing countries (Adam 1996, ECA 2003, Mutula 2002, Mutula and Ahmadi 2000, UN 2002, UN 2001), makes it difficult to effect the deployment of ICT infrastructures which are appropriate for implementation of e-government (Ndou, 2004). This together with computer security, privacy and confidentiality of personal data poses a challenge to the implementation of e-government initiatives (Bonham et al. (2001); Gefen et al. (2002)) as most of developing countries (SSA countries inclusive) lack the laws which protect citizen privacy (Ndou, 2004).

4.2 Financial aspects

The most important themes found under this group are Funding and cost for e-government services. According to Ebrahim and Irani (2005: 606), the main source of finance in public sector organizations come from the central government, "*making it hard to control, and sometimes comes and goes in cycles of 'east and famine' that make it difficult to plan sustainable IT initiative such as e-government*" (Heeks, 1999). This is no different in the case of SSA where the Internet cost, cost of e-government services amongst other financial constrains pose a challenge to the successful implementation of e-government initiatives. This point is further strengthened by Norris et al. (2001) who assert that the results of an e-government survey that was conducted in 2000 in the USA showed the main barrier to the adoption/implementation of an e-government initiative for a public sector organization to be the lack of financial resources (Ebrahim and Irani, 2005). This shows the importance of finance and need for money to ease the provision of e-government services and the needed infrastructure.

4.3 Political Aspects

Leadership and political situation are the dominant themes here. It is important for government leadership to support e-government initiatives (Ebrahim and Irani, 2005; McClure, 2001), because as Ndou (2004: 16) asserts, "*Leadership is one of the main driving forces of every new and innovative project or initiative*." This is

because the implementation of an e-government initiative requires complex and large scale changes (Bonham et al., 2001; Burn and Robins, 2003).

Unfortunately due to the fact that some government officials view e-government as a challenge and threat to their position power and viability they become resistant to the idea of online transactions (Ebrahim et al., 2003; Sanchez et al., 2003). Such lack of support from politicians and high level bureaucrats poses a challenge for e-government and it sustainability, leading to underdeveloped e-government platforms (Schwester, 2009). This is true considering that for e-government initiatives to succeed there is need for laws and policies governing implementation to be put in place. However, this is often absent in developing countries possibly because of the lack of political will as politicians see this as a threat to their position as mentioned above.

These rules and policies are very important because according to Ndou (2004) there is need for a range of new rules, policies, laws and legislative changes which address electronic activities such as freedom of information, computer crime, property rights and copyright issues amongst other things. These laws are still absent in many developing countries (Ndou, 2004). It is important to have such laws and policy in place if e-government initiatives are to be implemented successfully as Lau (2003) states, there is need for laws which strengthen the adoption of digital technology for e-government to be a success.

4.4 Organizational Aspects

The most important themes found under the Organizational aspect were leadership and change management (See Appendix 1). In order to maintain the values, visions and values of all stakeholders in an e-government initiative, there is need for organizational skills and effective communication (Garnett, 1992; Sharma and Gupta, 2003). This poses a problem for countries in SSA whose governments are corrupt and might want to use ICTs for their own ends. This is true especially considering that government agencies in developing countries might view this as a threat to their viability and power, making them reluctant to promote the true objectives of e-government (Heeks, 2002; Kaaya, 2004; Sanchez et al., 2003). This thereby presents a huge challenge for the successful implementation of e-government initiatives as, according to Heeks (2002), e-government initiatives in Africa have met with total or partial failure because of the "people" factor. With such lack of organizational vision this would only pose as a challenge to the successful implementation of e-government initiatives.

4.5 Socio-economic aspects

According to Transparency International, six of the 10 most corrupt countries in the world are located in SSA (Hanson, 2009). Coupled with corruption, the poverty level of the region causes serious development challenges. In addition to being the poorest region in the world with a negative growth in per capita income during the last 25 years (Quina, 2008), a section of the 674 million people live here on less than USD 1 per day. These together with illiteracy and language barrier are the dominant themes in this group pose as a challenge.

This is so because ICT as well as other technology-based disciplines will better thrive in cultures with a mechanistic view of the world (Ojo, 1996). This probably explains the huge interest in the impact of culture on the adoption of ICT in developing countries in IT/IS literature by many researchers. Socio-cultural factors have become of great importance in ICT related developments in developing countries. This is especially true considering the fact that the manner in which technology is used by the policy makers or citizens of a country tends to be affected by patterns of individual behavior and cultural norms (West, 2004).

4.6 Human aspects

An analysis of awareness and training and capacity building, which are the two dominant themes under the Human aspects, reveals that the lack of ICT skills in the public sector is a major challenge for e-government initiatives (Ndou, 2004). This is the case especially in developing countries (SSA inclusive) where the lack of qualified staff is chronic and there are inadequate human resources training (UNPAN and ASPA, 2001). Although some governments may have IT staffs, according to Ebrahim and Irani (2005: 604), "*most of their training may not equip them to program industry-strength web-enabled applications*". Heeks (2002:102) asserts that the factors influencing the success of ICT implementation tend to be "*situation-specific*" or contingent. Heeks goes further to argue that, with the introduction of technology, there is a danger of lack of fit between the "tool" and the "task", a "design-actuality gap". Furthermore, according to Heeks (2002), there

is a 20-25% failure rate among ICT installation attempts in developing countries, failures attributed to technology planners failing to account for user expectations or, as Andrew and Petkov (2003, p. 83) put it, overlooking social context. This highlights the challenge posed by human factors to the implementation of e-government initiatives.

Of the above, the novel findings in this paper are the political and financial aspects. Unlike previous investigations by researchers on the challenges to the successful implementation of e-government in SSA such as Ifinedo (2006) which presents 3 different groups of challenges namely institutional problems, human capital problems and infrastructural problems, this study proposes two new aspects - financial and political.

5 Conclusion

The challenges to the successful implementation of e-government initiatives in SSA are explored in this study. A literature review was carried out in which we reviewed relevant papers and government web portals of SSA countries for the period 2001 to 2012. Based on this review, the following conclusions can be drawn:

- The most common challenges plaguing the successful implementation of e-government initiatives in SSA are ICT infrastructure along with other issues such as human resources, legal framework, Internet access and connectivity, digital divide, language and illiteracy.
- Being the central government as the main source of finance in public sector organization is a challenge which makes the implementation and sustainability of e-government initiatives difficult.
- The political situation and leadership of the countries in SSA pose a challenge. Leadership is not only an important driving force in the implementation of an innovative initiative, there also needs to be a political will which is missing in the case of SSA.
- There is need for organizational skills and effective communication to maintain the visions and values of all the stakeholders in an e-government initiative; and
- Lack of technological infrastructure is apparently one of the biggest challenges to the successful implementation of e-government initiatives in SSA countries.

It is, however, important to note that all these different aspects go hand in glove. For example there is a connection between the human factor and infrastructure because even if the necessary infrastructures are in place there is need for human contribution to ease the implementation which again is a deficiency in this region. In our view, no one challenge should be prioritized at the expense of the other. This is because although from the above discussion Infrastructural aspects dominate the literature they are not the sole challenge faced by these Sub-Saharan African countries. Rather the failure of e-government initiatives in these countries is caused by a combination of the different problems discussed in this paper, but in varying degrees depending on the individual country's socio-economic position. For governments in SSA to benefit from the advantages of e-government, these challenges should be looked in to collectively as they all impact on one another.

Considering that this research is based on adopting a certain type of search procedure, there could be a possibility that some papers that might have been equally useful have been missed. This does not however devalue the findings of this paper as it not only covers a wide time frame (2001-2012), the results also provide a picture of what the situation actually is in SSA in general. However there remains much room for more in-depth analysis on the individual SSA countries.

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Appendixes

Appendix 1: Challenges found for the period 2001 and 2011

Challenges	2001-06	2007	2008	2009	2010	2011	2012	n.d*	Total
ICT infrastructure	13	9	2	4	8	3	2	14	**55**
Human resources	4	4			3			7	**18**
Legal framework	3	4			5			2	**14**
Internet access/ connectivity	2		1	2	3	2	1	3	**14**
Illiteracy	2	1		1	4			6	**14**
Language barriers	1		1	1	4			8	**14**
Financial issues	1	1		2	5			5	**14**
Digital divide	4	3	1		2	1		2	**13**
Awareness	1	1	1		3			7	**13**
Training and capacity building	3	2		1	1		1	4	**12**
IT experts	1	2			1	1		6	**11**
Leadership	2	3		1	2	1		2	**11**
Trust	1		1	1	5			2	**10**
Power supply					4	2	1	3	**10**
Security	3			1	2			1	**7**
Gender inequality	3	3						4	**7**
Fiscal policies/resources	5	5			2		1		**7**
Privacy	3			1	1			1	**6**
Cost of e-overnment services					2			3	**5**
Accessibility	1			1	3				**5**
Attitude		2		1				1	**4**
Illiteracy	1				1			2	**4**
Change management	3			1					**4**
Resources	2	1						1	**4**
Low citizen participation								4	**4**
Partnership between private and public sector	3				1				**4**
Institutional challenges	1	1						2	**4**
Poverty		1	1					2	**4**
ICT strategy	4								**4**
Access to information	1							2	**3**
Regulatory issues								3	**3**
Political situation	1	1						1	**3**
Interoperability	1				1			1	**3**
E-literacy	1	1			1				**3**
Explicit reference to ICT access		1						1	**2**

Learning content/resources		2							**2**
ICT literacy					1			1	**2**
e-government strategy	1				1				**2**
Internet cost					2				**2**
Scarcity of computers					1	1			**2**
Political will				2					**2**
Human capacity					1	1			**2**
National policy on the use of ICT	1	1							**2**
Management and coordination		2							**2**
Fragmentation projects					1			1	**2**
Cyber security					1			1	**2**
Collaborating systems/mechanisms		2							**2**
Information access						1		1	**2**
Culture								2	**2**
Organizational compatibility								2	**2**
Transparency	1				1				**2**
Record management	1				1				**2**
Cost structure	1				1				**2**
Benchmarking	1				1				**2**
Permanent availability and preservation	1				1				**2**
Human capital development and life long learning	2				1				**3**
Social and cultural barrier					1				**1**
Public administration reforms				1	1				**2**
Data possession	1								**1**
Top management support								1	**1**
Procurement regulation		1							**1**
E-government policy execution	1								**1**
Freedom of press								1	**1**
Information sharing								1	**1**
Data privacy legislation								1	**1**
Organizational motivation	1								**1**
E-government capacity					1				**1**
Information management		1							**1**
Economic development				1					**1**
Demographic and social factors				1					**1**

Digital culture								1	**1**
Non-contextualization of e-government practices				1					**1**
Public support				1					**1**
Knowledgeable personnel	1								**1**
Ability and commitment	1								**1**
Access and knowledge	1								**1**
Acceptance and adoption issues								1	**1**
ICT roadmap								1	**1**
Financial constrains								1	**1**
Sustainability		1							**1**
Integration and harmonization of ICT systems		1							**1**
Citizen inclusion					1				**1**
E.government vision								1	**1**
Corruption				1				1	**2**
Maintenance of government websites	1								**1**
Lack of communication	1								**1**
E-record readiness					1				**1**
Tele-density					1				**1**
Unemployment rate					1				**1**
Evaluation framework		1							**1**
Internal efficiency								1	**1**
Appreciation of perceived IT value					1				**1**
E-championship		1							**1**
Political administrative system				2	1				**3**
Change management								1	**1**
Goals and objectives	1								**1**
Data standards	1								**1**
Competition environment								1	**1**
Data systems								1	**1**
Organizational resistance				1					**1**
Deficiency of implementation guidelines	1								**1**
Ownership and authority	1								**1**
Recruitment of ICT personnel								1	**1**
Total	**84**	**59**	**8**	**29**	**86**	**13**	**6**	**123**	**408**

* 'no date'

Appendix 2: Concept author matrix

Concept (with number of papers)	**Authors**
Financial aspects – 21	UNDP (n.d); Lam (2005); Ndou (2004); Bwalya (2009); Andoh-Baidoo and Agyepong (n.d); Centre for educational technology (CET, n.d); Misuraca (2007); Andriamampianina (2010); SIBANDA (2010); Hamdy (2007); Meyaki (2010); UN/ASPA (2001); Almarabeh and AbuAli (2010); Schwester (2009); Infodev (2002); Meyaki (2010); Ifinedo (2006), Bwalya (2009), Lwoga (2010), Hosman (2010), Plauche et al. (2010).
Organizational aspects – 26	Pudjianto and Hangjung (n.d); Fall (2007); Farrell (2007); Matavire et al. (2010); Nengomasha et al. (2010); Sensuse and Lusa (n.d); Ndou (2004); Kitaw (2006); Africainfoethics (n.d); Adeyemo (2011); Lam (2005); Schwester (2009); ; Bwalya (2009); Dada (2006); Infodev (2002); Almarabeh and AbuAli (2010); Ngulbe (2007); Farelo and Morris (n.d); Banza (2006); GNA (2006); Misuraca (2007); Josué (2007); UN/ASPA (2001); Hosman (2010); Bwalya (2009).
Political aspects – 28+2	Kitaw (2006); Mohamed (2010); Hamdy (2007); Fall (2007); Farrell (2007); Matavire et al. (2010); Nengomasha et al. (2010); Sensuse and Lusa (n.d); Ndou (2004); Africainfoethics (n.d); Adeyemo (2011); Lam (2005); Schwester (2009); Schuppan (2009); Dandjinou (2009); Teixeira (2010); Bwalya and Healy (2010); Andoh-Baidoo and Agyepong (n.d); Misuraca (2007); Andriamampianina (2010); Basu (2004); Almarabeh and AbuAli (2010); Isaacs (2007); Staff writer (n.d); Bwalya (2009); Centre for educational technology (CET, n.d); Banza (2006); Pudjianto and Hangjung (n.d); Bwalya (2009); Hosman (2010).
Socio-economic aspects – 24	Teixeira (2010); Bwalya and Healy (2010); Bwalya (2009); Yarney (2005); UNDP (n.d); Farrell (2007); Kitaw (2006); Africainfoethics (n.d); Mundy and Musa (2010); Ifinedo (2006); Teixeira (2010); Schuppan (2009); Sensuse and Lusa (n.d); Maumbe et al. (2008); Hamdy (2007); Pudjianto and Hangjung (n.d); Almarabeh and AbuAli (2010); Infodev (2002); Matavire et al. (2010); The Namibian (n.d); Ngulbe (2007); Lwoga (2010); Plauche et al. (2010); Bwalya (2009).
Human aspects – 42	Bwalya and Healy (2010); UNDP (n.d); Misuraca (2007); Nengomasha et al. (2010); Africainfoethics (n.d); Dada (2006); Isaacs (2007); Yarney (2005); Farrell (2007); Kitaw (2006); Farelo and Morris (n.d); Fall (2007); Adeyemo (2011); UN/ASPA (2001); Basu (2004); Sensuse and Lusa (n.d); Almarabeh and AbuAli (2010); Farrell (2007); Ifinedo (n.d); Bwalya (2009); Andoh-Baidoo and Agyepong (n.d); Infodev (2002); Maumbe et al. (2008); Sibanda (2010); Schwester (2009); GNA (2006); Hamdy (2007); Soré (2005); Josué (2007); KLOPPERS (2004); Dada (2006); Misuraca (2007); International Records Management Trust (2011); Andriamampianina (2010); Centre for educational technology (CET, n.d); Hosman (2010); Bwalya (2009); Dralega et al. (2010); Plauche et al. (2010), Chilemo (2008); McGrath and Maiye (2010); Ogembo et al. (2012).
Infrastructural aspects – 55	Teixeira (2010); Isaacs (2007); Africainfoethics (n.d); Bwalya and Healy (2010); Bwalya (2009); Andoh-Baidoo and Agyepong (n.d); Misuraca (2007); UNDP (n.d); Fall (2007); Banza (2006); Ngoma (n.d); Farrell (2007); Kitaw (2006); Kaaya (2004); Maumbe et al. (2008); International Records Management Trust (2011); Mohamed (2010); UNDESA(n.d); Andriamampianina (2010); Lin et al. (2011); Soré (2005); Kloppers (2004); Nengomasha et al. (2010); Adeyemo (2011); Schuppan (2009); Infodev (2002); Ndou (2004); Lam (2005); Basu (2004); Pudjianto and Hangjung (n.d); Dada (2006); Almarabeh and AbuAli (2010); Teixeira (2010); Infodev (2002); Schwester (2009); Ifinedo (2006); Viner (2007); Mundy and Musa (2010); Yarney (2005); Viner (2007); Lin et al. (2011); Centre for educational technology (CET, n.d); Meyaki (2010); Kaaya (2004); Sibanda (2010), Hamdy (2007); The Namibian (n.d); Sensuse and Lusa (n.d); Chilemo (2008); Bwalya (2009); Dralega et al. (2010); Hosman (2010); McGrath and Maiye (2010); Ogembo et al. (2012); Plauche et al. (2010); Lwoga (2010).