International Journal of Information Management 39 (2018) 20–29

Contents lists available at ScienceDirect

International Journal of Information Management

journal homepage: www.elsevier.com/locate/ijinfomgt

A usability assessment of e-government websites in Sub-Saharan Africa

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ARTICLE INFO

Keywords:
E-government
Usability
Sub-Saharan Africa
Websites

ABSTRACT

E-government holds enormous potential for improving the administrative efficiency of public institutions, encouraging democratic governance, and building trust between citizens/private sector and governments. However, most e-government initiatives to date have failed to attain their full potential, because they are increasingly plagued by usability issues. Consequently, there have been increasing calls for evaluating the usability of e-government websites, as they are widely considered to be the primary platform for government interaction with citizens. This study, therefore, seeks to contribute to extant knowledge by evaluating the usability of e-government websites from Sub-Saharan Africa (SSA). This is particularly important as little is known about the usability of e-government websites in the region, and worst still, it is the least advanced region in terms of e-government development. This study evaluated a total of 279 e-government websites from 31 SSA countries. The findings showed that most e-government websites in SSA were characterised by poor usability. The average usability score for the websites was 36.2%, with the most usable website having a score of only 64.8%. The study also showed that the usability of e-government websites was positively associated with the E-Government Development Index (EGDI) and the E-Participation Index (EPI).

1. Introduction

Evidence from the private sector over the years has increasingly demonstrated the significant power of information and communication technologies (ICTs), especially in transforming how businesses interact with and deliver value to customers, as can be seen from the massive success of electronic businesses activities (Huang & Benyoucef, 2014). It is, therefore, not surprising that government at all levels (i.e. federal/state, regional and local) are trying to replicate such success stories for their institutions by tapping into the power of ICTs, particularly the internet and web technologies, to deliver better quality services to citizens and increase their organizational effectiveness. This espousal of ICTs by governments is what is generally termed as electronic government or simply e-government. One of the key factors that motivate the use of e-government solutions among different government institutions is the strong aspiration to foster higher levels of citizen satisfaction and trust in governments (Bannister & Connolly, 2011; Kumar, Sachan & Mukherjee, 2017; Porumbescu, 2016). As such, governments are increasingly depending on public-facing internet technologies, such as websites' to improve government information and service delivery to citizens (Karkin & Janssen, 2014; Porumbescu, 2016). Hui, Xiaolin and Jianying (2014) noted that e-government websites have become so popular such that almost every country around the globe has implemented at least one e-government website. However, citizen acceptance and utilisation of these e-government websites are still a challenge for many governments, as many e-government websites fail to meet user expectations (Huang & Benyoucef, 2014; Venkatesh, Hoehle & Aljafari, 2017). Consequently, researchers and practitioners have increasingly called upon governments to carefully consider improving the usability of their e-government websites as a means to address this challenge. This is necessary as usability has been widely shown to affect citizen's adoption and use of e-government websites (AlFawwaz, 2012; Huang & Benyoucef, 2014; Venkatesh et al., 2017; Youngblood & Mackiewicz, 2012). Websites that are poorly designed from a usability perspective might reduce their use, as poor usability negatively affects day-to-day website interaction (Baker, 2009; Clemmensen & Katre, 2012).

As mentioned, it has been widely argued that usability plays a central role in the success of e-government systems (Ansari, Baqar, Hassan & Saeed, 2016; Venkatesh, Hoehle & Aljafari, 2014). It has been one of the main factors accounting for the failure of many e-government projects (Asiimwe & Lim, 2010). Consequently, e-government website usability has been a key research area over the past decade (AlFawwaz, 2012; Asiimwe & Lim, 2010; Baker, 2009; Clemmensen & Katre, 2012; Donker-Kuijer, Jong & Lentz, 2010; Huang & Benyoucef, 2014; Kirui & Kemei, 2014; Venkatesh et al., 2014; Youngblood & Mackiewicz, 2012). According to Huang and Benyoucef (2014), even though e-government has seen enormous growth, it will only attain its full potential if existing

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https://doi.org/10.1016/j.ijinfomgt.2017.11.003
Received 27 September 2017; Accepted 4 November 2017
Available online 25 November 2017

and emerging usability barriers are identified and addressed. As such, developing world regions like Sub-Saharan Africa (SSA) could significantly benefit from developing usable e-government websites as a means to improve the growth of e-government in the region, given that it lags behind all other regions with respect to e-government development (UNDESA, 2016).

However, while e-government usability plays a vital role in the success of e-government initiatives, there is still limited knowledge on the usability of e-government websites in SSA (Kirui & Kemei, 2014). This is a critical concern as researchers (Asiimwe & Lim, 2010; Kituyi & Anjoga, 2013; Kirui & Kemei, 2014) have pointed out the need for specific developing world-based studies on examining e-government usability. The challenges in developing countries differ from those highlighted in existing literature from the developed world. Furthermore, albeit the literature widely postulates that e-government efforts will stifle if e-government websites are not optimally designed to have good usability (Baker, 2009; Clemmensen & Katre, 2012), there is little empirical evidence on whether countries that are more advanced in e-government development are better off with regards to developing usable e-government websites, given that e-government websites are seen as the fundamental platform for interaction between governments and citizens (Karkin & Janssen, 2014). Consequently, the main purpose of this study is to evaluate the usability of e-government websites in SSA countries, and compare the usability outcomes against the overall e-government development in these countries.

2. Literature review

2.1. E-government development in SSA

SSA is the geographical area on the African continent that lies south of the Sahara desert and consist of 49 countries. These 49 countries include all African countries that are located either partially or fully to the south of the Saharan desert. In other words, SSA can be seen as all African countries, excluding the five North African Arab nations (i.e. Algeria, Egypt, Libya, Morocco, and Tunisia). SSA is historically known as “Black Africa”, a name devised as a means to delineate it from the northern parts of Africa primarily occupied by Arabs (Tyler & Gopal, 2010). World Bank (2016) data estimates the population of SSA at the end of 2015 to be over 1.001 billion people. The most populated country in SSA is Nigeria, with an estimated population of 183 million, while the least populated is Seychelles, with an estimated population of 93 thousand (World Bank, 2016).

The growing importance of e-government in SSA can be seen in the increasing number of SSA governments rolling out roadmaps for e-government implementation. Some of the SSA countries that have rolled out national agendas for e-government include Botswana, Kenya, Mauritius, Mozambique, Namibia, Senegal, Seychelles, and South Africa. Even though some African countries have not rolled out complete e-government roadmaps, almost all countries have implemented at least one e-government website portal (Rorissa & Demissie, 2010; UNDESA, 2016). Existing classifications (Affisco & Soliman, 2006) of e-government development usually rank the state of e-government into four key categories, namely: (1) publishing (web presence), (2) interacting, (3) transacting, and (4) transforming (integration).

While evidence on the state of e–government in Africa is limited, some studies (Dombeu, 2009; Ngulube, 2007; Rorissa & Demissie, 2010; Schuppan, 2009), however, have attempted to document the levels of e-government on the continent. A common finding from all these studies is the fact that most of the e-government websites in SSA were at the lower end of e-government development (web presence or interacting). Moreover, the general posture of e-government development as a whole in SSA is comparatively lower than the rest of the world, as shown by the United Nations E-government Development Surveys (UNDESA, 2016). However, in the world of technology, constant change is inevitable and there is a high possibility that e-government websites in SSA have significantly evolved since the last of these studies was done. Likewise, the UN E-government Development Surveys have also shown progress in e-government development in SSA between 2010 and 2016, albeit lower than other regions (UNDESA, 2016).

2.2. E-government website usability

Usability has been widely defined in the field of human-computer interaction (HCI) following the ISO 9241-11 standards in which usability refers to “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use” (ISO/IEC, 1998). This definition covers a wide range of products and has been customised in some instances to suit a specific context. In accordance with the ISO definition, Venkatesh et al. (2014, p. 670) defines e-government usability as “the extent to which a website can be used by citizens to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified e-government service context.” The context is based on how the system is used and the circumstances surrounding its use. In a specific context, a given usability dimension might be more or less important (Harvey, Stanton, Pickering, McDonald & Zheng, 2011).

Extant usability literature in the context of e-government websites has mostly focused on two well-formulated sets of heuristics, namely Nielsen’s usability heuristics (Nielsen & Molich, 1990; Nielsen, 1994) and the six-dimensional framework (Baker, 2009). The Nielsen heuristics initially developed by Nielsen and Molich (1990), and further refined by Nielsen (1994), have been widely published and used for usability evaluation. These heuristics consist of 10 items that were primarily developed for the usability evaluation of user interfaces. These items include the visibility of system status, match between system and the real world, user control and freedom, consistency and standards, error prevention, recognition rather than recall, flexibility and efficiency of use, aesthetic and minimalist design, help users recognise, diagnose, and recover from errors, and help and documentation (Nielsen, 1994).

Since its creation over two decades ago, these heuristics have been shown to be applicable to a wide range of ICT systems (Donker-Kuijer et al., 2010; Huang & Brooks, 2011). Nonetheless, researchers over the years have increasingly found the need to modify or extend the original Nielsen heuristics in order to increase their applicability in different contexts, including e-government websites (Ansari et al., 2016; Delopoulos, 2015; Garcia, Maciel & Pinto, 2005; Huang & Brooks, 2011).

Unlike the Nielsen heuristics, the six-dimensional framework was developed specifically for heuristic evaluation of e-government websites (Baker, 2009). The development of this framework was based on the aggregation of numerous usability variables over the years (Baker, 2004; Baker, 2007, 2009; Roach and Cayer, 2007; Stowers, 2002). This framework (Fig. 1) was first introduced by Stowers (2002) and later modified by Baker in 2004, 2007 and 2009.

The dimensions included in the framework are online services, user-help and feedback, legitimacy, navigation, accessibility, and information architecture (Baker, 2009). Even though not all e-government website usability studies have directly followed this six-dimensional framework approach as provided in Fig. 1, the different usability heuristics that such studies adopted (e.g. Al-Khalifa, 2010; Asiimwe & Lim, 2010; Al-Soud & Nakata, 2011; Asiimwe & Lim, 2010; Byun & Finnie, 2011; Eidaroos, Probets & Dearnley, 2009; Harfoushi, AlFawwaz, Obiedat, Faris, & Al-Sayyed, 2012; King & Youngblood, 2016; Kinsell & DaCosta, 2014; Kituyi & Anjoga, 2013; Maheshwari, Kumar, Kumar, & Sharan, 2007; Venkatesh et al., 2014) were often subsets of these six dimensions, as can be seen in Table 1.

The comprehensiveness of the six-dimensional framework and its specific focus on e-government website usability makes it a suitable heuristics evaluation framework for evaluating the usability of e-government websites in SSA. Additionally, Web Content Accessibility

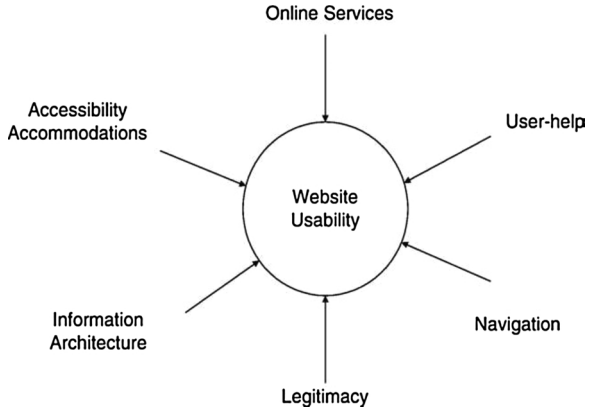

Fig. 1. Six-dimensional usability framework.
Source: Baker (2009), p. 84.

Guidelines (WCAG) 2.0 incorporated Nielsen's heuristics (Moreno, Martinez & Ruiz-Mezcua, 2009). Therefore, if the accessibility dimension of the six-dimensional framework is evaluated based on the WCAG 2.0 standard, then Nielsen's heuristics were incorporated into the six-dimensional framework. In this way, the two most widely used heuristics for e-government website evaluation would have been taken into account. Consequently, this study focused on the six-dimensional framework for examining e-government usability, with the accessibility dimension based on the WCAG 2.0 standard. A summary of the six dimensions is provided in Table 2.

2.3. Usability of E-government websites in SSA

As mentioned, usability remains an important factor in fostering the successful adoption and utilisation of e-government, yet, there is limited evidence on the state of e-government usability in SSA – the region least developed in terms of e-government around the world. However, over the past 15 years, several researchers have attempted to examine the level of e-government usability across several countries in SSA.

Kaaya (2004) evaluated the usability of 98 e-government websites from three SSA countries (Uganda, Kenya & Tanzania). During this time, most of the e-government websites were still in the early stages of development and were plagued by numerous usability issues. The author attributed the poor state of usability to the fact that many of the e-government website developers were still undergoing a learning experience, as e-government implementation was new. Kaaya (2004) also attributed some of the usability issues to the lack of permanent IT staff to maintain the e-government websites.

Another study by Asiimwe and Lim (2010) evaluated the state of usability in Uganda by examining four e-government websites (Ministry of Health, Ministry of Education and Sports, Ministry of Justice and Constitutional Affairs, and Ministry of Foreign Affairs). The authors concluded that most usability aspects were poor, with only limited aspects of the system partially usable. Some of the lacking features identified included interactivity, accessibility features, search tools, sitemap, help or FAQ pages, and legal policies (Asiimwe & Lim, 2010). Translating these factors to the six-factor dimensional framework for e-government usability, it becomes evident that e-government websites in Uganda were lacking in aspects of online services, accessibility, information architecture, user-help, and legitimacy.

Using laboratory usability testing methods to evaluate 12 e-government websites in Kenya, Kinuthia (2013) concluded that e-government website portals in Kenya were characterised by poor usability. Most of the usability issues identified were at the level of the website design. The websites were also reported to have broken links, poor use of fonts and poor text to background contrast. Moreover, the websites had poor navigation and were not regularly updated. Additionally, the users reported poor levels of overall user experiences with the websites.

Research from South Africa (SA) also identified poor usability aspects in the websites that were evaluated (Korsten & Bothma, 2005; Pretorius & Calitz,2014). After examining the usability of the South African Government online portal (www.gov.za), Korsten and Bothma (2005) concluded that the website failed to meet numerous usability criteria and also did not adequately provide a good navigational and architectural system for users to optimally find and access the information they required. However, since then several changes might have occurred, as the policy guidelines for SA government websites established in 2012 clearly stipulated that usability guidelines and principles should be followed for all SA websites (Government Communication and Information System, 2012). Consequently, there is a need for new studies that can evaluate the current state of e-government usability in SA. However, Pretorius and Calitz (2014) argued that usability standards were not yet implemented as best practices in the country's local, provincial and national government websites. Nonetheless, some local governments in SA have shown continued commitment to improving e-government usability. For example, in 2012, the Western Cape Government completed the construction of a usability laboratory devoted to evaluating and enhancing the usability of e-government websites in the province (Pretorius & Calitz, 2014). Likewise, in 2013, the EThekwini Municipality in the KwaZulu-Natal province of SA commissioned a tender for the usability evaluation of the municipality's website (www.durban.gov.za). This indicates a

Table 1
E-government website usability studies that used heuristics associated with the sis-dimensional framework.

Study	Dimensions associated with selected heuristics	Usability evaluation method
Al-Khalifa (2010)	Navigation, user-help & feedback	Heuristic evaluation
Al-Soud and Nakata (2011)	Accessibility accommodation, navigation, online services, user-help & feedback	Automated testing and content evaluation
Asiimwe and Lim (2010)	Legitimacy, User-help & feedback	Feature inspection
Baker (2007)	All six dimensions	Heuristic evaluation
Bouazza and Chebi (2016)	All six dimensions	Heuristic evaluation
Byun and Finnie (2011)	Navigation, online services, user-help & feedback	User testing
Cai (2010)	All six dimensions	Heuristic evaluation
Dan et al. (2013)	All six dimensions	Heuristic evaluation
Eidaroos et al. (2009)	Accessibility accommodation, legitimacy, navigation, online services, user-help & feedback	Heuristic evaluation
Harfoushi et al. (2012)	Information architecture, navigation, user-help & feedback	Heuristic evaluation
King and Youngblood (2016)	Accessibility accommodation, user-help & feedback	Heuristic evaluation and automated testing
Kinsell and DaCosta (2014)	Navigation, online services, user-help & feedback	Usability checklist
Kituyi and Anjoga (2013)	Accessibility accommodation, navigation, online services, user-help & feedback	Usability survey
Maheshwari et al. (2007)	Accessibility accommodation, legitimacy, navigation, online services, user-help & feedback	Conceptual model
Roach and Cayer (2010)	All six dimensions	Heuristic evaluation
Roach (2007)	All six dimensions	Heuristic evaluation
Venkatesh et al. (2014)	User-help & feedback	User survey based on selected heuristics
Youngblood and Youngblood (2013)	Accessibility accommodation, navigation	Heuristic evaluation and automated testing

Table 2
Description of the six usability dimensions.

Usability Dimension	Description
Accessibility	Website accessibility refers to the capability of making websites accessible to a wide array of possible users, regardless of their technical aptitude or possible disabilities. This should ensure that all users have equal access to information and functionality (Olalere & Lazar, 2011). According to Alexander (2003), website accessibility can be defined as "an approach to web design that aims for maximal inclusion, both in terms of people who use websites, and the technologies that are utilised in the process". As indicated above, accessibility in the context of this study is based on WCAG 2.0.
Information architecture	The concept of information architecture in e-government usability (based on the six-dimensional framework) concentrates on the aspects relating to organising, shaping, and classifying/categorising information in an effective way. According to Roach and Cayer (2010), information architecture refers to the fundamental organisation and presentation of a website, especially in presenting the services and functions of the website. The website features associated with information architecture include agencies/departments, audience-focused/centric, branch of government, branding/structure/metaphor, personalised/customisable features and services (Baker, 2009; Dan et al., 2013; Roach & Cayer, 2010).
Legitimacy	Legitimacy provides credible evidence to users that a given website is meant for official government affairs. Roach and Cayer (2010) explicated that legitimacy features assure users that their privacy and security needs are being addressed because the website is authenticated as a credible electronic replica of the physical government office. As such, it is imperative to ensure that legitimacy features are made visible throughout the e-government website. Legitimacy features associated with e-government usability include: authentication password/digital sign, contact information, disclaimer statements, privacy policy, security policy and webmaster contact (Baker, 2009; Dan et al., 2013; Roach & Cayer, 2010; Stowers, 2002).
Navigation	Navigation is the attribute of an e-government website that allows a user to explore the website towards specific locations. Navigation can also be viewed as the ability of users to efficiently and effectively access and find information within a system (Venkatesh et al., 2014). With e-government websites, this often includes clicking on the different hyperlinks to access e-government services and information. It is imperative to ensure that websites are designed with organised menus through which users can easily navigate (Venkatesh et al., 2014). Some common navigation features used for evaluating e-government websites include e-government services, links to contact information, links to other agencies and navigation tools (Baker, 2009; Roach & Cayer, 2010).
Online services	The online services dimension of e-government usability concentrates on the value of the content and information available to users, as well as the ability of users to complete a required task on the website. Baker (2009) describes the online services dimension as the task that e-government users can complete electronically via an e-government website 24/7 using the internet. Researchers (Baker, 2009; Roach & Cayer, 2010) have outlined some of the variables associated with this dimension to include basic information, chat areas/message boards, communications with officials, documents/publications, downloadable forms, e-commerce applications, e-mail updates, employment information, interactive databases, interactive forms, and multimedia applications.
User-help and feedback	User-help and feedback is the usability dimension that supports a user's usage of the system by providing assistance on how to use the system and how to access the required information and services. Website features that have been attributed to user-help and feedback in prior literature (Baker, 2009; Dan et al., 2013; Roach & Cayer, 2010) include information about the site, e-mail us, feedback, foreign language, index, personal digital assistant (PDA)/wireless, and search capabilities.

commitment to improving usability in the country, possibly showing that government departments are continuously recognising the importance of usability in the success of e-government.

Some studies (Adepoju, Shehu & Baker, 2016; Costa, Fernandes, Neves, Duarte, Hijón-Neira & Carriço, 2013; Kuzma, Dorothy & Oestreicher, 2009; Verkijika & De Wet, 2017) in SSA have only focused on the accessibility dimension of e-government websites. Verkijika and De Wet (2017) evaluated 217 national level e-government websites from 31 SSA countries and established that none of the websites adhered to all accessibility guidelines, with the homepages having an average of 14 accessibility issues. Adepoju et al. (2016) evaluated 34 state-level government websites in Nigeria and found that none of the websites fully met the evaluated accessibility WCAG 2.0 standards. Also, Costa et al. (2013) evaluated government websites in three SSA countries (i.e. Angola, Mozambique and SA) and established that government websites in all the three countries were plagued by accessibility issues. Kuzma et al. (2009) examined the accessibility of government websites in four SSA countries (i.e. SA, Namibia, Liberia and Kenya) and concluded that all the countries had a large number of errors for each of the accessibility priority levels. Nonetheless, out of the 24 SSA government websites evaluated in these four countries, there were two (one for Namibia and one for Kenya) that met all the accessibility criteria. It is important to note that the study by Kuzma et al. (2009) was based on WCAG 1.0 which has become obsolete as a result of numerous calls for governments to upgrade to WCAG 2.0 compliance.

3. Methodology

3.1. Usability evaluation

This study made use of heuristic evaluation and automated usability methods, with heuristic evaluation being the dominant usability evaluation method. Heuristic evaluation is a usability evaluation method whereby usability experts or other stakeholders appraise a user interface based on some set of predefined rules or principles (Wilson, 2014). On the other hand, automated usability testing entails using a software-based system with predefined guidelines (developed by experts) to evaluate an interface in order to identify areas of compliance or non-compliance with the stated guidelines. Heuristic evaluation has been widely used in e-government usability studies for in-depth usability inspections, because the method has proved to be very effective, easy and quick, especially when evaluating numerous websites (Baker, 2009; Garcia et al., 2005; Huang & Benyoucef, 2014; Youngblood & Mackiewicz, 2012). Even though heuristic evaluation is an expert-based method, existing evidence (Botella, Alarcon & Penalver, 2013; Garcia et al., 2005; Huang and Benyoucef, 2014) indicates that the method can be effectively used by both experts and novices to identify usability problems. Additionally, Fogg (2003) explicates that heuristic evaluations can be performed by a single inspector, although the effectiveness habitually increases with more inspectors. As such, this study used five inspectors in line with recommendations from the general usability literature (Tan, Liu & Bishu., 2009). All of these evaluators have at least a Bachelor's degree in Computer Science/Information Technology and were considered to possess more than novice capabilities in heuristic evaluation.

The heuristics used for this study were adopted from the improved six-dimensional usability framework by Baker (2009). The initial heuristics were created by Stowers (2002) and were further extended by other researchers resulting in a total of 87 variables for the six dimensions (Baker, 2004). Baker (2009) later provided a set of enhanced heuristics by using triangulation to reduce the 87 variables to 37 across the six usability dimensions. The 37 variables composed of 22 dichotomous and 15 scale variables. Dichotomous variables are evaluated as dummy variables whereby the availability of a variable on a websites receives a score of one or otherwise zero. The scale variables, on the other hand, are evaluated using Guttmann-type scales. The final computation of the scores are weighted across the six dimensions to provide a percentage score, making it easy to compare usability levels across different e-government websites.

Automated usability evaluation was used to supplement the heuristic evaluation. Some variables were evaluated using automated software and then the outcome was converted into a dichotomous score or a scale score using Guttmann-type scales. For example, accessibility was evaluated using Functional Accessibility Evaluator 2.0 and the results were converted into a Guttmann-scale. Both the heuristic evaluation and automated testing were conducted concurrently and the results triangulated to form an overall usability score.

3.2. Selection of websites

Prior to selection of the websites for this study, a review of e-government websites in SSA countries was conducted to identify countries that could be eligible for the study. The first eligibility criterion was for the SSA country in question to have e-government websites implemented in either English or French. These were the two languages that evaluators could understand and effectively judge the authenticity and content of an e-government website. Following this criteria, eight SSA countries (Eritrea, Somalia, Angola, Mozambique, Sao Tome and Principe, Cape Verde, Sudan and Mauritania) were eliminated because their e-government websites were neither in English nor French. Secondly, a decision was made to select 9 e-government websites from each country. This was in order to have a representative number of websites from a given country, while also maintaining a manageable total number of websites for evaluation. Due to the manual nature of heuristic evaluation the manageable part was important. With this criterion, ten other SSA countries (Guinea, Swaziland, South Sudan, Togo, Guinea-Bissau, Niger, Equatorial Guinea, Central African Republic, Congo, and Comoros) were eliminated because the number of identified e-government websites from each of the countries was too small to consider.

Consequently, a total of 31 countries were eligible for the study, resulting in 279 e-government websites being evaluated. The list of eligible countries is presented in Table 3. The selected websites from each country included seven national level and two local government websites. The national level websites were grouped around seven government ministries as a means to ensure consistency across the different countries. These different ministries included the Ministries of Finance, Education, Health, Tourism, Labour, International Affairs and the website of the Presidency.

3.3. Secondary data

Secondary data for e-government development and e-participation was obtained from the 2016 E-government Development Survey (UNDESA, 2016). The E-government development Index (EGDI) was used as the data for gauging the progress of e-government development, while the E-participation Index (EPI) was used to capture government's promotion of citizens' participation in inclusive governance. The EGDI is composed of three dimensions, namely: Online Service Index (OSI), Telecommunication Infrastructure Index (TII), and the Human Capital Index (HCI). The normalised scores for each of these dimensions are computed and then combined, with each dimension making up one-third of the EGDI. The following equation is used to compute the EGDI:

$$EGDI = \frac{1}{3}(OSI_{normalised} + TII_{normalised} + HCI_{normalised})$$

The EGDI has been generally commended for its easy and direct computation, which makes it easy to understand, use and reproduce (Whitmore, 2012; Zhao, Shen, & Collier, 2014).

The EPI is a supplementary index to the EGDI with a focus on the use of online services in three domains, namely e-information sharing, e-consulting, and e-decision-making (UNDESA, 2016). E-information sharing refers to governments' use of online services to facilitate access to information for citizens. E-consulting focuses on citizen engagement in areas of public policy and service delivery. Lastly, e-decision making entails government's engagement of citizens in decision-making processes, especially in the co-design of policies and production and delivery of e-services. E-participation has been widely noted as a key aspect of e-government initiatives that focus primarily on the delivery of public values (Bannister & Connolly, 2014; Cordella & Bonina,2012).

4. Data analysis and discussion

4.1. Usability evaluation of six dimensions

The results (Table 3) for each country depict the data computed from the nine websites evaluated per country. The data is ordered in alphabetical order by country. In each of the usability dimensions, the minimum possible score was 0, while the maximum possibly score was 16.67 (Baker, 2009).

4.1.1. Online services

The results in Table 3 show that only 8 out of the 31 SSA countries had a mean online services score of up to 50% (8.34) of the possible attainable score (16.67). This clearly indicates that most of the e-government websites in SSA have poor usability with respect to the dimension of online services. The top 8 countries in order of performance (mean scores) from top to bottom are SA (13.0), Uganda (11.0), Rwanda (10.6), Mauritius (9.4), Kenya (9.2), United Republic of Tanzania (9.1), Senegal (9.0) and Lesotho (8.4).

Comparing these scores with those from e-government websites in other regions clearly place most SSA countries worse off in the dimension of online services. For example, in Israel, Dan et al. (2013) found that the average online services score for the evaluated websites was 11.0, placing it second to South Africa in SSA. Likewise, the mean online services score for websites in the US evaluated by Baker (2007) was 13.7 placing the US at the top of all SSA countries in the sample, even though it represents the state of US websites over 10 years ago.

The overall mean score for all the 279 evaluated websites was 7.6 with a median score of 7.7, depicting that at least 50% of all the websites scored far less than half of the possible scores for online services. This is a critical concern as online services are a vital component of e-government development. Baker (2009) argued that the online services dimension was one of the most critical dimensions of e-government usability as it defined the relative value of an e-government website. This is because e-government websites will have no utility to users if they cannot perform the services that are required on the websites (Baker, 2009).

4.1.2. User-help and feedback

From Table 3, it is observed that the overall mean score of the user-help and feedback dimension for all the evaluated SSA e-government websites was 6.3 with a median of 7.7. This is troublesome because at least half of the websites obtained less than 50% of the possible attainable scores for the user-help and feedback dimension. More disturbing was the fact that 3 websites had a score of 0, which was surprising as it is inappropriate to develop an e-government website without any user-help and feedback capability. These 3 websites each come from Uganda, Zimbabwe and Zambia. This clearly showed that much effort is needed to bring SSA e-government websites up to date with respect to the provision of user-help and feedback capabilities as a means of enhancing their usability.

In Israel, Dan et al. (2013) established a mean of 8.9 and a median of 9.4 for the evaluated websites. This is similar to the e-government websites in the US evaluated by Baker (2007) and those in Trinidad and Tobago evaluated by Roach and Cayer (2010). For the USA, the mean was 10.2 and the median was 10.4, while for Trinidad and Tobago, the mean was 8.9 and the median was 11.2. This clearly suggests that in terms of user-help and feedback functionality, e-government websites in Israel, USA and Trinidad and Tobago performed better than SSA e-government websites.

Table 3
Usability dimensions for e-government websites in Selected SSA countries.

SSA Country	Online Services			User-Help			Navigation			Legitimacy			Information Architecture			Accessibility		
	M	*MD*	*SD*	*M*	*MD*	*SD*	*M*	*MD*	*SD*	*M*	*MD*	*SD*	*M*	*MD*	*SD*	*M*	*MD*	*SD*
Benin	5.7	5.8	2.3	5.0	3.9	3.5	5.6	6.1	2.3	6.0	5.6	3.6	4.6	4.2	1.7	2.6	2.08	2.7
Botswana	8.1	7.7	3.2	5.4	3.9	3.6	6.6	6.1	2.5	6.5	7.0	2.4	5.7	5.6	3.1	5.3	6.25	4.4
Burkina Faso	7.6	7.1	1.8	7.4	7.7	2.0	6.6	6.1	2.0	4.6	4.2	0.7	4.5	4.2	1.2	2.3	2.08	1.9
Burundi	6.2	7.1	3.4	5.1	2.6	3.6	4.4	4.6	2.2	4.5	4.2	0.9	4.2	4.2	1.4	4.2	4.17	3.3
Cameroon	6.3	6.4	2.3	7.0	7.7	2.7	7.1	7.6	2.4	6.0	5.6	3.1	5.6	5.6	1.2	3.2	2.08	3.3
Chad	5.6	5.8	2.1	6.1	7.7	3.0	6.4	6.1	3.0	4.9	5.6	1.0	4.6	5.6	1.2	3.2	2.08	3.6
Côte d'Ivoire	8.1	8.3	3.3	4.7	3.9	2.7	5.6	4.6	1.7	4.8	5.6	1.2	6.0	5.6	1.6	1.2	0	2.4
DRC	7.2	7.7	2.9	4.8	3.9	2.8	5.6	6.1	1.7	4.9	5.6	1.4	4.5	4.2	1.4	2.3	2.08	2.6
Djibouti	6.7	6.4	2.5	4.7	3.9	2.8	5.4	4.6	3.3	4.5	4.2	0.9	4.2	4.2	1.4	2.6	2.08	3.4
Ethiopia	8.0	7.7	2.7	10.4	10.3	3.0	6.7	6.1	3.0	8.5	5.6	4.9	7.7	7.0	4.1	4.6	2.08	4.3
Gabon	5.1	5.1	1.6	8.3	7.7	0.9	8.9	9.1	2.9	7.4	5.6	3.9	5.3	5.6	0.6	2.6	2.08	1.7
Gambia	5.1	5.1	3.1	5.4	5.1	2.5	4.6	4.6	2.5	5.3	5.6	0.6	4.9	5.6	2.2	3.9	4.17	2.6
Ghana	6.6	7.1	2.4	6.6	7.7	4.4	6.1	7.6	3.1	4.5	4.2	1.2	5.3	5.6	0.9	3.0	2.08	3.3
Kenya	9.2	10.3	4.2	9.3	9.0	2.7	8.3	9.1	2.2	5.9	5.6	2.3	6.2	5.6	2.1	4.2	4.17	3.0
Lesotho	8.4	9.0	1.2	5.4	3.9	3.2	3.9	4.6	2.5	4.8	5.6	1.0	6.2	5.6	1.0	5.3	6.25	4.4
Liberia	7.7	9.6	3.5	7.7	7.7	3.4	5.6	7.6	2.8	5.3	5.6	0.9	5.9	5.6	1.9	1.6	0	3.4
Madagascar	7.3	8.3	3.5	5.7	6.4	2.8	4.0	3.0	3.2	4.5	4.2	1.7	4.2	4.2	1.2	2.3	2.08	2.6
Malawi	7.0	7.1	1.7	6.7	7.7	3.4	6.4	6.1	3.6	4.3	4.2	0.5	5.1	5.6	2.0	3.7	4.17	2.3
Mali	7.3	7.7	2.9	3.7	2.6	2.3	5.6	6.1	2.5	5.4	5.6	1.1	4.6	4.2	1.8	4.2	4.17	3.5
Mauritius	9.4	9.6	2.3	8.0	9.0	2.2	8.8	9.1	2.2	12.2	13.9	3.8	6.5	7.0	1.8	4.6	4.17	3.3
Namibia	7.0	6.4	4.4	4.4	2.6	3.2	4.4	3.0	3.4	5.4	5.6	1.5	5.4	5.6	2.8	5.8	4.17	4.8
Nigeria	6.4	6.4	3.4	6.4	5.1	3.3	6.1	6.1	3.2	4.8	4.2	2.7	5.1	5.6	0.7	3.5	2.08	3.0
Rwanda	10.6	10.3	2.3	7.7	7.7	3.4	8.1	9.1	2.7	5.9	5.6	0.6	7.1	7.0	2.2	6.7	8.34	3.7
Senegal	9.0	9.6	2.0	7.6	9.0	2.3	7.9	7.6	2.1	6.8	5.6	3.0	5.4	5.6	0.8	2.1	2.08	3.3
Seychelles	6.8	6.4	3.4	6.4	7.7	3.1	5.9	4.6	2.6	4.5	4.2	0.9	5.7	5.6	1.9	1.4	2.08	1.5
Sierra Leone	6.6	5.1	3.6	5.3	3.9	2.4	5.7	6.1	3.3	5.6	5.6	2.3	5.1	4.2	1.4	3.2	2.08	3.9
South Africa	13.0	12.8	2.0	8.0	7.7	2.3	9.1	9.1	1.1	7.9	7.0	3.3	6.0	5.6	0.7	1.2	0	1.5
Tanzania	9.1	9.0	2.4	6.8	7.7	3.0	6.7	7.6	2.6	5.4	4.2	2.3	5.6	5.6	1.0	1.2	2.08	1.1
Uganda	11.0	11.5	3.2	5.8	6.4	3.7	6.6	7.6	3.9	7.1	5.6	3.3	5.9	5.6	1.4	2.3	2.08	2.4
Zambia	6.6	5.8	3.1	5.0	3.9	3.5	5.7	6.1	2.9	4.3	4.2	0.8	4.6	5.6	1.2	4.4	4.17	3.8
Zimbabwe	7.3	5.8	3.7	5.3	3.9	3.5	5.1	6.1	2.5	3.9	2.8	2.4	6.0	5.6	1.4	4.9	4.17	3.6
All countries	7.6	7.7	3.2	6.3	7.7	3.2	6.2	6.1	2.9	5.7	5.6	2.7	5.4	5.6	1.9	3.3	2.1	3.3

Notes: The information in the table is sorted in alphabetic order of the selected countries. DRC = Democratic Republic of the Congo. M = Mean; MD = Median; SD = Standard Deviation.

The poor state of user-help and feedback features on SSA e-government websites is worrying, as these features are particularly important for e-government websites in SSA, given that the region is characterised by low ICT literacy (Mukhongo, 2015). Prior literature (Asianzu & Maiga, 2012; Bwalya & Healy,2010) from SSA has shown that ICT literacy played a vital role in enhancing the adoption of e-government services. However, because of the low ICT literacy rates in SSA, many people in the region might require help to access an e-government service. For example, Mukhongo (2015) elucidated that in some SSA countries like SA, Kenya and Nigeria, where many people had access to internet-enabled phones and even free internet service during promotion hours, most of them were unable to use the internet because of low literacy rates. Nonetheless, the gap could be bridged by including user-help features as they provide a user with guidance on how to easily navigate a website. As such, because of the low ICT literacy rates in SSA, ensuring that user-help and feedback features are incorporated in the development of e-government websites should be of utmost importance to ensure that novice internet users could still be able to access e-government services. Furthermore, given that user-help features are necessary for improving ease of use (Baker, 2007) and since ease of use has been shown to significantly influence e-government adoption in SSA (Lin, Fofanah & Liang, 2011), it is vital for user-help features to be included in SSA e-government websites.

4.1.3. Navigation

Table 3 depicts that the mean navigation score for all the evaluated e-government websites was 6.2 with a median score of 6.0. This clearly indicates that most of the SSA e-government websites performed quite poor with respect to navigation. Also, only three countries (South Africa, Gabon and Mauritius) had mean navigation scores up to 50% of the possible attainable score of 16.67, even though in these countries there were still e-government websites that scored below 5 out of 16.67 for the weighted navigation scores. This is not a good trend, as navigation has been noted to be one of the most important usability dimensions of e-government websites (Youngblood & Mackiewicz, 2012).

For websites evaluated by Baker (2007) in the US, the mean navigation score was 13.3. Similarly, Dan et al. (2013) found in Israel that the mean navigation score for the evaluated e-government websites was 12.2, while Roach and Cayer (2010) in Trinidad and Tobago found the mean navigation score to be 13.3. While e-government websites from other regions seemed to provide better navigation, SSA e-government websites perform poorly with respect to navigation. Most of the e-government websites in SSA were basic information disseminating portals for citizens. However, to access this information, citizens needed to navigate to the pages containing the desired information. As such, navigation is crucial to accessing information and thus vital in the usefulness of SSA e-government websites.

4.1.4. Legitimacy

From Table 3, it is seen that only two countries (Mauritius and Ethiopia) had mean scores (8.8 and 8.5 respectively) that were more than 50% of the possible attainable weighted legitimacy score of 16.67. However, the median score for Ethiopia was only 5.6, depicting that at least half of the evaluated e-government websites from Ethiopia had very poor legitimacy scores. The overall mean legitimacy score for all the 279 evaluated websites was 5.7 with a median score of 5.6. These scores are lower compared to that of e-government websites from non-SSA countries. For example, the following mean scores have been obtained from e-government website evaluations in prior studies: 6.6 in Trinidad and Tobago (Roach & Cayer, 2010); 8.9 in Israel (Dan et al., 2013); and 11.7 in the US (Baker, 2007).

Given that the legitimacy of e-government websites is solely based

on gaining citizen trust regarding the information and services delivered via the e-government websites (Roach, 2007), it remains imperative for this dimension to be significantly improved, as citizen trust directly impacts the success of e-government initiatives (Asianzu & Maiga, 2012). The low scores are very discouraging, as more than half of the evaluated e-government websites were basically at what could be considered a *pitiable state* of legitimacy. Legitimacy efforts need to be one of the aspects that take centre stage in e-government development due to its influence on citizen trust. Without trust, there will be no citizen-to-government online interaction and so e-government initiatives will be more likely to fail (Karkin & Janssen, 2014).

4.1.5. Information architecture

From Table 3, it is observed that on average all the countries performed poorly with respect to the information architecture dimension, as none of them had a mean score close 50% of the possible attainable weighted score for this dimension. The overall average for all 279 evaluated websites was 5.4, with a median score of 5.6. This performance was disturbing, as half of the websites scored less than a third (5.6) of the possible attainable score for this dimension. Comparing this with other parts of the world clearly indicates how much the findings are dismaying. In Trinidad and Tobago, Roach and Cayer (2010) found a mean of 11.2, while in Israel, Dan et al. (2013) found a mean of 8.1 for the evaluated websites. For the websites in the US evaluated by Baker (2007), the mean score for information architecture was 9.5.

Research has shown that there is an increasing need for providing citizen-centric e-government services and that this could be attained through improvements in website information architecture features like personalisation, customisation and provision of audience focused areas (Baker, 2009; Dan et al., 2013; Roach & Cayer, 2010). These are the same information architecture features that have been evaluated and found to be lacking in most SSA e-government websites. Consequently, governments in SSA need to start rethinking the information architecture of their websites if they were to significantly improve the delivery of citizen-centric e-services.

4.1.6. Accessibility

From Table 3, it is observed that all the SSA countries performed quite poor in accessibility, as well as none of the countries had a mean score that was up to 50% of the possible attainable score of 16.67. The mean score for all the 279 evaluated SSA e-government websites was 3.34, with a median score of 2.08. Moreover, all the selected countries had at least one website scoring 0 in accessibility. These findings are further supported by prior studies in SSA that have increasingly shown that SSA e-government websites are characterised by poor accessibility (Adepoju et al., 2016; Costa et al., 2013; Kuzma et al., 2009; Verkijika & De Wet, 2017). The critically poor accessibility levels of SSA e-government websites is clearly a dismal situation, especially as e-government website accessibility is considered as one of the important public values of e-government websites (Karkin & Janssen, 2014; Karunasena & Deng, 2012).

4.2. Overall usability scores

Table 4 shows the average overall usability scores for each of the 31 SSA countries. The overall usability scores were computed as a percentage by summing the scores from each of the 6 usability dimensions (6 * 16.67, summing up to 100%) presented in Table 3, as each dimension had an equal weight (Baker, 2009). The best performing website had an overall usability score of 64.82%, while the worst performing website had an overall usability score of 10.79%. The top five scoring countries (based on the mean scores) were Mauritius (50.73), SA (47.82), Ethiopia (47.27), Rwanda (46.37), and Kenya (44.05), while the worst five countries are Zambia (31.04), Burundi (30.81), Gambia (30.03), Madagascar (29.71) and Djibouti (29.57). Only Mauritius had a mean score above 50% indicating that the SSA e-government websites performed extremely poor in respect of the overall usability.

Table 4
Overall usability scores of e-government websites for selected SSA countries.

SSA Country	Min	Max	Mean*	Median	ST. Dev	Skewness	Kurtosis
Mauritius	33.26	59.21	50.73	53.28	9.7	−1.2	0.08
South Africa	36.75	60.91	47.82	45.46	8	0.42	−0.56
Ethiopia	29.14	64.82	47.27	52.56	12.27	−0.18	−1.48
Rwanda	29.43	58.53	46.37	47.95	8.61	−0.73	0.86
Kenya	27.45	57.13	44.05	43.75	8.51	−0.44	1.18
Uganda	24.03	55.6	40.63	40.24	9.27	−0.35	0.47
Senegal	28.48	51.89	40.23	40.47	6.74	0.05	0.64
Gabon	29.97	56.36	39.66	39.35	8	1.02	1.52
Botswana	27.01	53.65	38.83	37.85	9.27	0.46	−0.83
United Republic of Tanzania	25.92	48.15	36.72	36.06	6.58	0.21	0.21
Cameroon	28.48	53.73	36.42	31.33	8.82	1.19	0.24
Lesotho	25.04	44.62	35.02	33.51	6.87	0.24	−1.25
Burkina Faso	24.3	42.57	35	36.34	5.02	−1.02	2.48
Liberia	16.26	44.73	34.91	38.57	9.31	−1.18	0.66
Nigeria	23.75	45.36	34.68	34.29	6.79	0.1	−0.26
Malawi	18.18	44.82	34.1	34.95	8.32	−0.85	0.45
Namibia	10.79	54.29	33.88	36.21	13.65	−0.38	−0.43
Sierra Leone	13.36	49.7	33.49	37.8	12	−0.35	−0.97
Mali	17.26	43.55	33.23	31.65	9.17	−0.43	−0.89
Ghana	16.16	43.93	33.04	37.62	10.16	−0.69	−0.93
Zimbabwe	16.26	54.11	32.76	29.63	11.67	0.65	0.15
Seychelles	23.35	43.91	32.47	33.33	6.96	0.35	−0.8
Chad	25.08	40.1	32.25	31.44	484	0.15	0.63
Côte d'Ivoire	18.95	37.71	31.55	32.4	5.7	−1.33	2.61
Democratic Republic of the Congo	20.5	38.89	31.3	29.89	6.13	−0.39	−0.61
Benin	20.47	49.79	31.12	30.37	9.1	1.05	0.98
Zambia	17.86	36.3	31.04	33.46	5.77	−1.75	3.11
Burundi	18.42	43.58	30.81	32.35	9.29	−0.18	−1.84
Gambia	18.19	39.9	30.03	32.81	8.32	−0.42	−1.66
Madagascar	15.03	45.37	29.71	32.22	933	−0.33	0.44
Djibouti	16.39	51.45	29.57	28.39	9.67	1.44	3.46
All countries	10.79	64.82	36.20	35.79	10.08	0.22	−0.08

The overall mean for all 279 evaluated SSA e-government websites was 36.20%, with a median of 35.79%. The overall usability of SSA e-government websites was poor compared to that of other regions. Baker (2007) recorded a mean usability score of 69.4% for evaluated US e-government websites, while Dan et al. (2013) documented a mean usability score of 59.5% for Israeli e-government websites. Similarly, Rauch and Cayer (2010) found an overall usability score of 54% for e-government websites in Trinidad and Tobago.

The low level of usability among e-government websites in SSA is worrying, as prior evidence suggested that poor usability resulted in the failure of e-government systems (AlFawwaz, 2012; Asiimwe & Lim, 2010; Bwalya & Healy, 2010; Kirui & Kemei, 2014). This poor state of usability in SSA also supports the views of Huang & Benyoucef (2014) that, although numerous insights have been derived from existing e-government usability studies, current e-government systems were still besieged by several usability problems.

4.3. The association of usability with e-government development

As indicated earlier indicated, many researchers (Ansari et al., 2016; Donker-Kuijer et al., 2010; Venkatesh et al., 2014) have theorised the association between e-government development and usability, based on the central role that usability plays in the success of e-government systems. This assumption was tested for the 31 SSA countries in this study and the results of the association are presented in Fig. 2 below.

In Fig. 2, it is observed that the correlation between the EGDI and

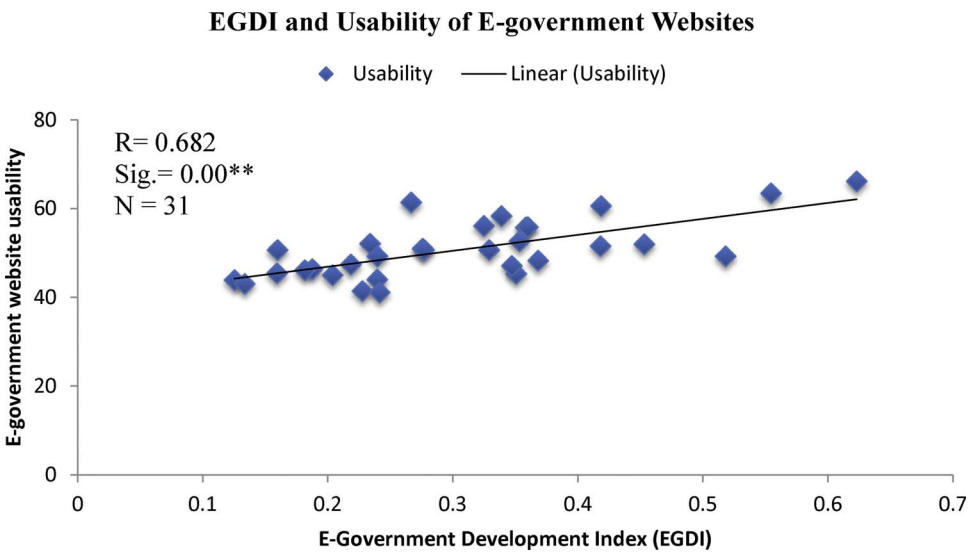

Fig. 2. Correlation between EGDI and the overall usability scores.

the usability of e-government websites across the 31 SSA countries was 0.682 (significant at 1%). The significant positive correlation supports the association between usability and e-government development postulated in prior literature (Ansari et al., 2016; Baker, 2009; Venkatesh et al., 2014).

4.4. Relationship between e-government website usability and EPI

With e-government development now focused on delivering public values, especially via e-government websites (UNDESA, 2016), it is imperative to further determine if usability is taken seriously by governments providing public values via e-government websites. To investigate this association, this study used the EPI as a proxy for e-government's public values.

The UN E-Government Development Survey evaluated e-participation tools on national e-government websites. As such, the EPI is a good reflection of the public values of e-government websites as it encapsulates aspects like citizen engagement, development of trust, responsiveness and quality of information and services. The association between the EPI and the usability of e-government websites in presented in Fig. 3 above. The figure shows the correlation between the 2016 EPI and the overall usability scores for the 31 SSA countries. The strong positive correlation of 0.754 (significant at 1%) clearly indicates that usability has a strong association with delivering public values via e-government websites.

5. Limitations of the study and future research

This study had three key limitations. Firstly, this study used heuristic evaluation and automated testing without including user-based methods. This posed a limitation to the comprehensiveness of the identified usability issues, as some usability issues could only be found primarily through user-testing methods (Tan et al., 2009). Nevertheless, prior e-government usability studies (AlFawwaz, 2012; Venkatesh et al., 2014) based on user-testing methods have found limitations in the number of websites that could be evaluated due to time constraints, with most focusing on only about 1–5 of these websites. Since this study needed to provide a comprehensive evaluation of the usability of e-government websites in SSA, a significant number of websites was required for evaluation and such a large number could not possibly undergo user-testing within a reasonable timeframe and with the available resources. Additionally, heuristic evaluation has been known to be effective and to identify over 70% of usability issues (Tan et al., 2009). Future studies in different SSA countries could, therefore, use user-based methods to evaluate the usability of the websites to consolidate the present literature with the identification of usability issues from the

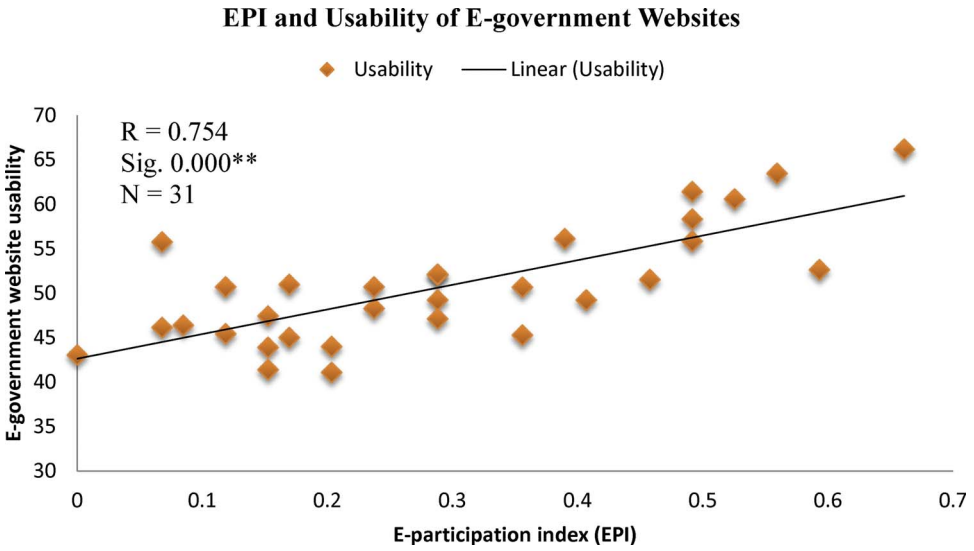

Fig. 3. Correlation between EPI and the overall usability scores.

user's perspective.

Secondly, the fact that only SSA countries with e-government websites implemented in English or French were included in the study limits the generalisation of the findings across all SSA countries. However, the selected countries were a good reflection of different stages in e-government development in the region, as the sample included countries in the top, middle and bottom tier of e-government development based on the EGDI for SSA countries. Also, even though selecting nine websites per country was vital to ensure that a manageable number of websites was collected for evaluation, taking only nine websites from a country like Kenya, with over 100 e-government websites, might provide a limited understanding of the complete picture of e-government website usability in the country. Future studies from SSA countries not included in the sample could evaluate their e-government websites and compare the findings against the outcome of this study to provide further understanding of e-government usability in the region. Likewise, country-based studies can increase the number of websites to evaluate in future studies in order to provide a more comprehensive picture of e-government website usability in the selected SSA country.

Lastly, it was observed during the usability evaluation of e-government websites in SSA that some governments were updating their websites. At times, this delayed the evaluation process until the downtime was over (the highest experienced downtown was over a week). However, this updating process was experienced for only 4 out of the 279 evaluated websites. The continuous updating of e-government websites by governments suggested that e-government websites were evolving regularly and so the state of usability of a website a month ago might not be an actual representation of its current state. The implication of this is that the current study should be seen as a snapshot of the state of usability at the time of the study, as things change constantly in such a technological context. As such, future studies could use a similar approach to compare results with the findings of this study to determine the progress made by SSA governments in enhancing the usability of their websites.

6. Contributions of the study

The study provided both theoretical and practical contributions. With regards to the theoretical contribution, this study (to the best our knowledge) was the first comprehensive e-government website usability evaluation in SSA both in terms of the countries covered and the total number of websites evaluated. This study came amidst calls from several researchers in SSA (Asiimwe & Lim, 2010; Kirui & Kemei, 2014) on the need for conducting e-government website usability studies in the region, given the dearth of research in the SSA context. Moreover, the association between usability and e-government development as a whole has been widely implied in prior studies based on the supposed role of usability in improving the success of e-government initiatives (Baker, 2009; Clemmensen & Katre, 2012). However, there has been little or no empirical evidence to suggest that countries with e-government systems (such as e-government websites) that were more advanced in usability were better off in terms of e-government development as a whole. This study, therefore, made valuable contributions by showing that e-government website usability was positive and significantly correlated to both the EGDI and the EPI. While it is important to note that correlation does not imply causality, the findings nonetheless suggest that SSA countries working hard to improve their e-government development posture are also recognising the need to have e-government websites with good usability.

With regards to the practical contribution, researchers (Asiimwe & Lim, 2010; Bwalya &Healy, 2010; Kirui & Kemei,2014) have highlighted that poor usability was a key contributing factor to the failure of e-governments initiatives. Given that e-government websites have been noted to be the primary platform for government delivery of information and services to citizens, evaluating the usability of these websites is of utmost importance in ensuring e-government progress. However, usability issues in SSA cannot be addressed if there is limited understanding of extant usability issues plaguing e-government websites in the region. As such, the outcome of this study has shown areas of concern in SSA in general, and for specific SSA countries in particular. Consequently, government IT professionals could use the areas of concern for their specific countries (Table 3), as a starting point for improving the usability of their e-government websites.

7. Conclusion

Research on the usability of e-government websites has gained prominence over the past decade in both the developed and developing world. This has been widely propagated by the increasing recognition of the significant role of usability in the success of e-government projects (AlFawwaz, 2012; Asiimwe & Lim, 2010; Huang & Benyoucef, 2014; Venkatesh et al., 2017; Youngblood & Mackiewicz, 2012). However, in SSA, a region characterised by poor e-government development, little was known of the usability of e-government websites in most of the region's countries. The findings from this study indicated that the overall usability of e-government websites in the region was quite poor, with e-government websites from most countries performing very badly in accessibility, information architecture, legitimacy, navigation, user-help and feedback and online services respectively.

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