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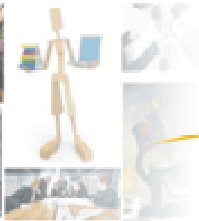
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Global Advanced Research Journal of Social Science (GARJSS) Vol. 5(1) pp. 001-010, September 2016  
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*Full Length Research Paper*

# A Framework for Usability of e-Government Services in Developing Countries

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Accepted 17 November, 2015

The use of ICT in government activities has become a common phenomenon in recent years. In the late 1990s, information technological developments in the field of public administration culminated into the concept of e-Government. Several benefits are presumed to be associated with E-Government services which basically translate to provision of direct services to users instead of/or in addition to traditional flow of paper work between the government and its citizens. However, despite these developments, most developing countries are yet to realize the full potential of e-Government initiatives have failed. This study sought to examine the requirements for effective usability of e-Government services. The findings indicate that the key requirements for e-Government service usability are provision of a noise free e-Government platform, articulation of e-Government goals and objectives to users, support for and prediction of future trends affecting e-Government initiatives, e-Government services being transferable across different contexts of application, support for system representation of strategic agendas and implementation efforts, provision of a functional representation of e-Government objectives and support for reusability and expandability of e-Government platforms. The paper proposes a framework that can be guide successful usability of e-Government services in developing countries.

**Keywords:** E-Government, Services, usability, Developing Countries, Uganda

## INTRODUCTION

The use of ICT in government activities has become a common phenomenon in recent years. In the late 1990s, information technological developments in the field of public administration culminated into the concept of e-Government. To date e-Government has been applied to support the unique activities of government, including Electronic Data Interchange (EDI), interactive voice

response, voice mail, email, web service delivery, virtual reality, and key public infrastructure. Services such as Government to Citizen (G2C), Government to Government (G2G), and Government to business (G2B) are synonymous in most countries (OCED, 2004; Bonham and Seifert, 2003; Evans and David, 2005). Several benefits are presumed to be associated with E-Government services which basically translate to provision of direct services to users instead of/or in addition to traditional flow of paper work between the government and its citizens (Ho, 2002; Netchaeva 2002; Whitson and Davis, 2001; UN, 2002; UN 2001). These

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include savings in terms of money and time. A fully-fledged E-Government service is expected to provide users with 'one-stop shopping' (Ho, 2002) to access and transact the information needed via a government website that is tailored to provide information irrespective of the various functional units of that particular government agency. In DCs, E-Government improves efficiency, increases transparency and accountability functions, convenient and faster access to services, in addition to democracy and lower administrative costs (Netchaeva, 2002). However, despite these developments, most developing countries are yet to realize the full potential of e-Government initiatives have failed. Heeks (2003) notes that more than one-third of initiatives are total failures and half are considered to be partial failures and roughly one seventh are successes.

Many factors have been advanced to explain why governments have failed to optimally use Government services. Kumar (2006) for example points out that the existing service delivery systems in public institutions have institutional structures that do not allow optimal e-Government service usability. There are also inappropriate models and/or frameworks to guide e-Government service usability. According to Gurp and Bosch (2001), a Framework is a partial design of an application in a given domain, leading towards its implementation. Frameworks can be classified as Application Frameworks and Domain Frameworks. Application Frameworks provide a whole range of functions required by any application, irrespective of its domain, such as a graphical user interface, database management or Internet connectivity while Domain support applications that belong to specific vertical domain such as Banking, Health, Transportation, or Public Services. This study sought to examine the requirements for e-Government usability in public service delivery and develop a framework that will guide usability of e-Government services in developing countries.

### **E-Government Service Delivery Categories**

Although e-Government encompasses a wide range of activities and actors, three distinct sectors can be identified and explained as; Government to Citizen (G2C), Government to Government (G2G) and Government to business (G2B). These are elaborated as follows:

#### **Government to Citizen (G2C)**

This sector is designed to facilitate citizen interaction with government as the primary goal of E-Government. It attempts to make transactions, such as renewing licenses and certifications, paying taxes, and applying for benefits, less time consuming and easier to carry out. It also often strives to enhance access to public information through the use of dissemination tools, such as Web sites

and/or computer kiosks. This category of service delivery focuses on the ability of the government and citizen to communicate information to each other in an efficient manner using electronic format. Other applications are data submission online to the government and e-democracy.

#### **Government to business (G2B)**

Government-to-Business (G2B) initiatives receive a significant amount of attention, in part because of the high enthusiasm of the private sector and the potential for reducing costs through improved procurement practices and increased competition. The G2B sector includes both the sale of surplus government goods to the public, as well as the procurement of goods and services. A practical application in this category is the online submission of company data into government databases (OCED, 2004).

#### **Government to Government (G2G)**

This sector represents the backbone of E-Government. Here governments at all levels must enhance and update their own internal systems and procedures before electronic transactions with citizens and businesses can be successful. G2G E-Government involves sharing data and conducting electronic exchanges between governmental actors. It involves both intra- and inter-agency exchanges at the national level, as well as exchanges between the national, provincial, and local levels (Bonham and Seifert, 2003). This sector aims at improving the efficiency of delivery when transacting information within the government itself, for example by using intranets for government employees, or with other governments. It allows the government to communicate efficiently by eliminating redundancies and duplication. Benefits such as crime detection like the ability to follow large exchanges of money via networks of banks, casinos and suspect organizations and charities may help the government to recover funds, trace criminals and predict terrorist activities (Evans and David, 2005).

#### **E-Government Service Usability**

Usability is the overall measurement of the satisfaction of interactions a user has with a product or system such as a Web site, software application, mobile technology, or user-operated device. Usability becomes increasingly important as more and more information, products, and services become available through electronic means (Bury and Oud, 2004). Usability can also be regarded as "the extent to which IT affords an effective and satisfying interaction to the intended users, performing the intended tasks within the intended environment at an acceptable cost" (Sweeney et al., 1993). Usability focuses on the needs of the user by promoting a user-centered approach

to website development which makes the task easier for the user. The success of a commercial or government site depends on its usability. When a company's site isn't very accessible to users, they can easily find (almost) the same information on the other site. However for web sites of the government other options often do not exist (Aerts and Gilis, 2005). Citizens will have no other possibility than to use the system government implements. Therefore, the role of the citizen is crucial and should be involved in the design and implementation of these e-systems (Oostveen and Besselaar, 2005). However, the aspect of 'accessibility' can't be neglected. Government officials should recognize equity and accessibility as important principles that adhere in the physical and virtual (e) worlds. It is not sufficient to place information and services online if there are barriers to their usage among various sectors of society (West, 2003). Consequently, E-Government solutions must include alternative delivery channels for people who can never use the most common process. These alternative delivery channels can also benefit all users who are temporarily unable to use the main E-Government channels (for instance due to power failures or system breakdown, or due to a user's temporary impairment) (Arch and Hardy, 2005).

In terms of web services and resources, usability is important because according to recent research (User Interface Engineering, 2001) people cannot find the information they seek on Web-sites about 60% of the time. Similarly, research by Manning et al. (1998) revealed that the consequence of bad site design is that the site will lose repeat visits from 40% of the users. This can lead to wasted time, reduced productivity, increased frustration, and loss of repeat visits and revenue, increased training and increased support costs.

Nielsen (1993) points out that usability is not a one-dimensional concept, but includes a number of components including; Learnability i.e. ease of learning to use the system; Efficiency i.e. improved productivity; Memorability i.e. users being able to return to the system after some period of not having used it without having to relearn everything afresh; Errors i.e. how easy it is to recover from errors; Satisfaction i.e. the system being able to satisfying users.

Vassilakis et al. (2003) identified four major requirements usability as; provision of the appropriate forms through which users would submit in their information, implementation of input validation checks, forwarding of collected data to the back-end system processing, and collection and notification of the results to each user. Vassilakis et al. (2003) further note that post implementation issues such as user identification credentials (usernames and passwords) for authentication with limited administration privileges and sufficient management tools for user management, database backup and recovery, batch generation of personalized e-mail messages, statistics reports, etc are important. However, to succeed with one-stop

government, the specific needs of the different user groups (i.e. citizens, businesses and other public administrations) need to be investigated and addressed. The ISO standards 13407 and 924 have been the basis for specifying the user requirements within E-Government:

a) *Services relevant for the user group (e.g. functionality)*: It should be clear for the user what each service is good for and how it works (functionality). Ideally, the user recognizes intuitively how to use the service (awareness), but additional help should be available if needed.

b) *Technical aspects at the user's site (e.g. security)*: The user is expected to have and be able to use certain technology. In case of an online one-stop-platform, the user is expected to have a browser and certain technical equipment. It should be mentioned that the level of technology demanded from the citizen should be as low as possible while the level for businesses and public authorities can be higher.

c) *Reliability*: The user should be able to rely on the way the system works and to count on its timeliness. Therefore, the system should be predictable, i.e. the user should not be surprised by the way the system reacts. Further, the system should inform the user that something is going on and what is going on (feedback). Finally, it should deliver the expected results within a reasonable, short time.

d) *Multilingualism*: The system should not be restricted to one single language. The user should be able to choose the language in which s/he wants to use the system. However, since multilinguality is a costly issue, a reasonable trade-off has to be defined for how many languages the system should offer in respect to the context it will be used.

## Usability Evaluation

Usability evaluation examines how users react to and interact with Web systems. Evaluation involves the employment of usability metrics to focus on two specific aspects of the experiences of users: their perceptions and their interactions with the system (Hert, 2001). The first type of metric allows a user to express personal impressions of a resource, such as satisfaction, utility, value, helpfulness, benefits, frustration, and self-efficacy (Dalrymple and Zweizig, 1992; Hert, 2001). The second type of metric provides a portrait of a user's interaction with a resource by monitoring the number of errors, the time necessary to complete specified tasks, and similar measures of the efficiency and effectiveness of the resource when being used (Hert, 2001).

An important fact also, confirmed by many experiments, is that nobody can foresee usability problems for a given user interface - not even usability experts. Usability experts may predict many usability

**Table 1.** Usability criteria matrix

Criteria Dimensions	Usability Criteria Models			
	ISO 1998	Nielsen (2003, 1999)	Teoh et al (2009)	Hassan and Li's (2005)
Easy Navigation	X	x	x	x
Accessibility	x	x	x	x
Screen Design	x	x	x	x
Media use	x	x	x	x
Interactivity	x	x	x	x
Consistency	x	x	x	x
Content usefulness	x	x	x	x
Customization	x			
Ease to use	x			

problems with a design, but about half of the predicted problems are false, in the sense that users don't feel they are problems. What is worse, the usability experts miss about half of the problems that real users experience (Cuomo and Bowen, 1994; Desurvire et al., 1992; Jeffries et al. 1991). Only some kind of testing with real users can reveal the usability problems. In order to correct the problems, we need to identify them early during development. As a result, usability

### **Developing e-Government services usability frameworks**

In the e-Government field there is a rapid growth in the development of e-services (Ancarini, 2005; Buckley 2003). Such an e-service is a public service mediated electronically through a user interface that is generally available. Public e-services can be used by citizens or company through G2C and G2B respectively. These users can be inexperienced and infrequent users of the public e-service. If e-services are to be used, they must be easy to use and be beneficial to the user. There exist several lists of usability design criteria. Examples of criteria lists are 10 Usability heuristics (Nielsen, 1993); Eight Golden Rules (Shneiderman, 1998); design guidelines for small screen devices (Kärkkäinen and Laarni, 2002); Context-aware mobile applications (Hakkila and Mantyjarvi, 2006) and Participatory Heuristic Evaluation (Muller et al, 1998). These lists are explicitly not web oriented.

Website usability has been a problem for e-Government development. Although international guidelines on webpage development are provided by World Wide Web Consortium (W3C, 2009) to help website administrators develop usable websites, they are often not followed (Gwardak and Pahlstorp, 2007). For example, Parajuli (2007) evaluated 17 websites of the Nepal government according to four criteria: transparency, interactivity, accessibility, and usability. Results regarding usability show that it was not so easy to navigate or search information on the Nepal

government websites because only 35 percent of websites provided a site map and 29 percent provided a search engine.

In literature, research related to any list belonging to the context of public e-services delivery is minimal. The importance of identifying different contexts is acknowledged by Henninger et al. (1995). They claim that "If the potential of usability guidelines as an interface design technique is to be fully realized, they need to be augmented with context-specific guidelines and examples that synthesize isolated guidelines into domain-specific solutions to design problems". However, ISO (1998), Nielsen (1999), SCANMIC model, and Hassan and Li (2005) have presented criteria for designing e-service usability. This is illustrated in the table 1 above:

### **E-Government Frameworks**

There are different models for e-Government. These models were developed by international companies or expert people who have experience in E-Government and can be categorized into four groups; i.e. described models, maturity models, process models and E-Government frameworks (Shahkooch and Abdollahi, 2007). Described models describe E-Government such as Broadcasting/Wider- Dissemination Model and Interactive-Service Model (Vikas, 2000). Maturity models present stages of E-Government development which are used to evaluate E-Government implementations such as Delloite Model (Turban et al., 2002). Process models present process of E-Government planning and show parameters and procedure of E-Government development planning such as Misra and Dingra Model [2002] and Heeks Model (2001) and E-Government frameworks such as Wimmer framework (2002), and Garcia and Pardo (2005) that guide the implementation and use of E-Government.

E-Government applications are usually set up for users external to public administration (citizens –G2C, businesses – G2B) as well as for internal users (G2G). Makolm (2006) points out that successful E-Government

does not only use Information Technology and put administrative services on the internet but implies reengineering administrative processes, reorganizing and restructuring public organizations and shifting the focus towards a citizen and customer-centered service provision. However, this view considers usability after the whole systems development process.

Harold et al (2001) suggests that systems are designed to be usable when there is a match between the product and the users under particular constraints and tasks. Usability, seen like this, depends on the world when the product is used not when it is designed. So if we want to design better products, foresight has to be used. In many cases, usability comes in at the time of evaluation, prototypes may be considerably advanced in development, so changes suggested by the results of evaluation may be too expensive to implement or strongly resisted because of the investment of time and effort in the existing system. Therefore to enhance the usability of an E-Government system, it is prudent to involve foresight so that usability is considered right away into the system development processes.

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Many researchers; Petri and Lena (2005), Eyal (2009), Al-badiet al (2010) note that software engineering is mainly concerned with the internal functionality of the product, while User-Centred Design (UCD) approach places the user, user tasks and user goals as the main concerns for the design and implementation of the product (Gould and Lewis, 1985; Nielsen, 1993). Currently, specific usability practices are not included

within software engineering models or in software engineering education and therefore, not well adopted in the industry. Beside the common on usability engineering, several studies (Carter, 1999; Constantine, 2001; Kane, 2003; Battle, 2005; Ferre et al., 2005; Zhang et al., 2005) have provided guidelines or proposed frameworks to assist developers incorporating usability activities into well-practiced and matured development models.

Vaki et al (2005) investigated usability in the complete lifecycle of the creation of digital applications such as web applications to develop procedural guidelines with the aim of helping institutions to build usable web applications to reinforce and maintain solid and long-term relationships with their end users. The guidelines were categorised as Conception and planning, specification and design, implementation and operation and use.

## DESCRIPTION OF THE RESEARCH METHODS USED

Both quantitative and qualitative research methods were used. Qualitative methods were used to collect data from government officials who also double as citizens and/or stakeholders. Secondary data were gathered from relevant literature from textbooks, journal articles, e-Government magazines and unpublished reports/articles on e-Government from company and /or public libraries. Literature review involved selecting, reading and relating relevant usability studies, and translating the studies into one another. A number of different usability criteria models were studied synthesized and analyzed by tabulating criteria against different suggested models. The criteria that were found in all models qualified to be a criterion for this study. This method was used because it gives the possibility to establish the number and variety of properties, qualities and habits found in different studies under different environments and study populations.

To identify the requirements for developing the framework a self-administered questionnaire was used. A survey considered Heads of IT departments and one other staff selected randomly from each IT department of the 20 Uganda Government Ministries enlisted on the National IT Backbone project in Kampala. Kampala is the centre of most government ministries and has the highest population density in Uganda. In addition, 1 member of staff in the IT departments of each ministry was selected randomly. Therefore the total sample used was 40. All the 40 questionnaires were returned and analyzed.

To design the framework for e-Government usability and public service delivery, a Unified Modeling Language (UML) tool was used. UML is object-oriented software used to design artifacts.

**Table 2.** Requirements for usability of e-Government services

Requirement	N	Min	Max	Mean
Provide a noise free representation of e-Government services	40	1	5	4.02
Enable identification and articulation of E-Government goals and objectives	40	1	5	4.43
Identify the gap between the present and the future states of e-Government deployment	40	1	5	4.51
Support prediction of future trends affecting e-Government initiatives	40	1	5	4.32
e-Government services should be transferable across different contexts of application	40	1	5	4.22
Support a system representation of strategic agendas and implementation efforts	40	1	5	4.17
Provide a functional representation of E-Government objectives	40	1	5	4.46
Support reusability and expandability of e-Government platforms	40	1	5	4.21

## FINDINGS

### Requirements for developing a Generic Framework for E-Government

E-Government deployment is influenced by diverse factors. Consequently, in developing a generic framework, a set of criteria that should inform and shape what factors constitute the framework, its requirements, and features, and how they are arranged and relate to each other is needed.

Data were collected on the requirements for successful usability of e-Government services using a 5 point likert scale i.e. 1=Strongly Disagree, 2=Agree, 3=Neutral, 4=Agree and 5=Strongly Agree. Descriptive means show that the respondents strongly agreed that for successful usability there should be provision of a noise free representation of e-Government services (Mean=4.02); Enable identification and articulation of E-Government goals and objectives (Mean=4.43); Identify the gap between the present and the future states of e-Government deployment (Mean=4.51); Support prediction of future trends affecting e-Government initiatives (Mean=4.32); e-Government services should be transferable across different contexts of application (4.22); Support a system representation of strategic agendas and implementation efforts (Mean=4.17); Provide a functional representation of E-Government objectives (4.46); Support reusability and expandability of e-Government platforms (4.21). Table 2 presents the requirements for usability of e-Government services:

## DISCUSSION OF THE REQUIREMENTS

### Provide a noise free representation of e-Government services

A noise free representation of a variety of stakeholders is an ideal to a high level framework that has the ability to capture a more objective representation of E-Government that can be shared and easily referenced across political, ideological, and technological boundaries with a common basis for informed discourse about issues relating to the

E-Government agenda. Otherwise a significant amount of "noise" and interference generated by political, social, and technological factors and agendas, are injected into the process of identifying, analyzing, and deciding what projects and processes to adopt in executing the E-Government program (Osborne and Gaebler, 1992). Furthermore are the technical jargons, definitions and issues found in the IS/IT field also obscure the true situation (Luftman, 1996) which disconnect the points of view of key participants.

### Enable identification and articulation of E-Government goals and objectives

Effective coordination and organization of an E-Government program requires a clear setting and understanding of goals and objectives a significant act that an administration can undertake in the reform process (Osborne and Gaebler, 1992). For maximum support and success, the vision must be shared and effectively communicated (Cufaude, 2003). This has a powerful effect on communication, understanding, commitment, integration and alignment of goals and objectives to different functional areas.

### Identify the gap between the present and the future states of e-Government deployment

Understanding and identifying the gap between current and future states are key elements in the strategic management process and provide an effective way of monitoring the progress of E-Government initiatives. Mapping the progress from "the way things are now" to "the way things ought to be" also allows decision makers to weigh the potential progress of each area against the level of future development required by the E-Government vision. It can also assist policymakers and administrators in analyzing the potential benefits and impacts of committing resources and implementation effort as they engage in the planning process. Beyond the determination of success and failure, the mapping of current reality against the mission statement of the future also generates the energy for change.

### **Support prediction of future trends affecting e-Government initiatives**

E-Government is a reform effort that is breaking new ground in many areas. For example, beyond the ability to access information and perform basic electronic transactions, citizens are demanding more customized products and services rather than acceding to the traditional public institution 'one size fits all' approaches (Osborne and Gaebler, 1992). The emphasis of technology-enabled service delivery shifted towards providing the right systems and services that users need. Trends are towards increasing functionality, specialization, and integration (Bertelsmann, 2001). In addition, Strategic foresight, coupled with an understanding of the technology and application changes required, is essential to managing internal and external operational and strategic constraints. Consequently, a framework for E-Government, acting as a diagnostic tool, should be helpful in predicting the impact of future trends and requirements.

### **E-Government services should be transferable across different contexts of application**

Every nation has its own functional, social, and administrative objectives to fulfill. As a result, each nation's vision will differ with respect to the strategic priorities of the policymakers and the jurisdiction they represent, giving a unique flavor and direction for each E-Government endeavor. Therefore, every E-Government program should be viewed and assessed with respect to its context of application (Corrocher and Ordanini, 2002). A greater understanding of motivations and resulting patterns of development in different settings can facilitate the process of comparing approaches and provide a rational means of setting the reform of public administration on course for efficiency and transparency, with clear orientation towards its citizens (Bertelsmann, 2001). It is vitally important to distinguish patterns of development and motivations for E-Government and identify transferable elements. This would be invaluable; given E-Government is an evolving and pioneering effort where all countries can be considered as being in the early stages of development (Pacific Council on International Policy, 2002). A generic framework that encapsulates these principles would go a long way to improve the discourse about how E-Government is being developed across different jurisdictions and contexts.

### **Support a system representation of strategic agendas and implementation efforts**

A system representation of E-Government is required to capture the system's nature of the concept. Systems are one of the common units of analyses within the E-Government endeavor. Systems must be balanced

across the implementation and are also an area where mapping efforts can be applied and gaps can be identified. The impact and effects of future needs and requirements also have a direct effect on the E-Government systems. Given that the operation of E-Government depends significantly on the effective management of a variety of systems, a generic framework should capture details of electronic government at this level.

### **Provide a functional representation of E-Government objectives**

Another common unit of analysis is at the functional level. Goals, objectives, and future needs and requirements are typically articulated in form of functional capacities. In addition, gaps in functionality provide the first indicators that the realization of the E-Government vision is not on course. Functional capacities are also used in the comparison of international efforts. To account for these realities the framework must maintain a capability to identify functional capabilities at a high level in a way that reflects the primary motivations and objectives of the overall E-Government program. Therefore, a functional representation of E-Government is a necessary requirement, supporting several types of analytical efforts. High-functioning government web portals are designed to search, classify, present and integrate relevant information. Applications integrate data at three levels of complexity: (1) information publishing and linking of existing web sites, (2) single agency transactions, and (3) transactions requiring integration of multiple agencies (Author, 2001). The highest functioning web portals have complete system integration across agencies whereas portals with the lowest level of functionality provide little more than access to forms and static bits of information. High-functioning portals create a true one-stop shop for citizens in terms of: usability, customization, openness, and transparency.

### **Support reusability and expandability of e-Government platforms**

The analysis and consideration of E-Government also has an implicit requirement for reusability and expandability. The mapping of current development against the future is an ongoing effort and must be periodically reviewed and revised. As a result, the generic framework also must be able to capture new data and information about new developments on an ongoing basis. It must classify and describe the ongoing activities at a high level and provide a functional representation that can aid in the planning and implementation process. With regards to the changing nature of E-Government, the framework should act as a "sliding window" that reveals the relationship between current initiatives and the overall vision.



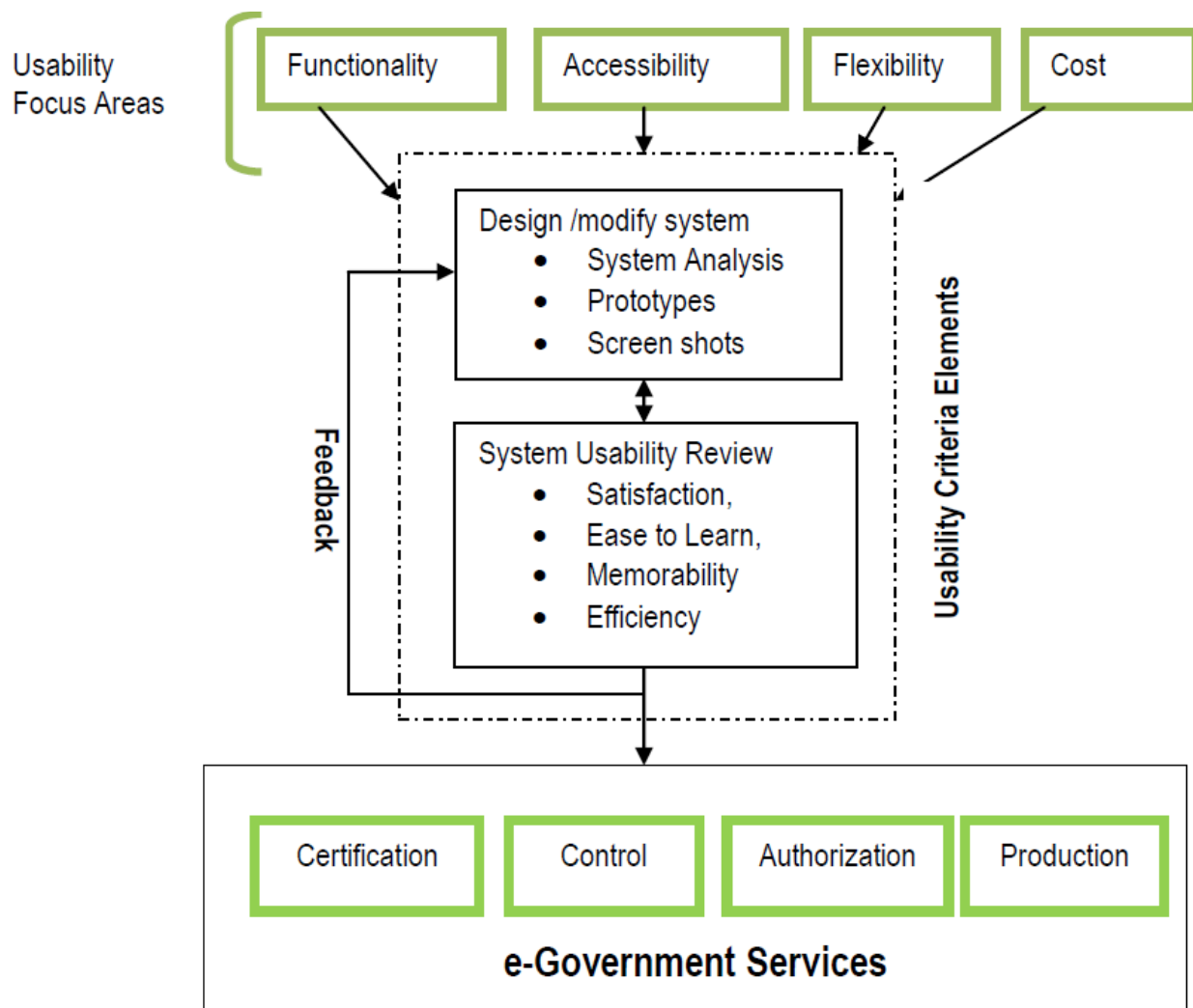


Figure 1. Framework for usability of e-Government services

## CONCLUSION

### Discussion, Conclusion and Recommendations

E-Government usability empowers Government stakeholders through public access to information resources and good governance. Many studies on usability have looked at usability from the viewpoint of the technology itself as compared to examining it from the user's perspective especially on the use of e-Government systems.

This research dealt with identifying the requirements from users which were used to design an e-Government services usability framework for developing countries. The first objective of the study was to identify the requirements for developing a framework for e-Government usability. Findings indicated that functionality dimensions e.g. service delivery mission/vision, bridging gaps of traditional methods, accepted web development

Standards, motivation and rewarding systems, flexibility and compatible user numbers; cost dimensions included initial investment, administration and maintenance, training, access, clarity, and awareness; flexibility requirements such as capturing new data and developments, review and control, multilingual, and speed of feedback; accessibility requirements such as alternative service delivery channels, navigation, and indiscriminate access and usability requirements such as ease to learn, error tolerance, satisfaction, efficiency, and consistency of user interfaces (memorability). Usability was also influenced by reliability and error tolerance, efficiency and consistency of user interfaces. The findings are inline agreement with the studies of Shackle (1991), Nielsen (1999) and Hakkila and Mantjarvi (2006).

About the criteria for designing e-Government usability frameworks, findings from literature indicate over 68 criteria for web usability. Hassan and Li (2001) identified

web usability criteria from content analysis of a list of over 65 criteria which he grouped into seven categories such as screen design, content, accessibility, navigation, media use, interactivity and consistency (SCANMIC Model). Other criteria lists included 10 Usability heuristics (Nielsen, 1993); Eight Golden Rules (Shneiderman, 1998); design guidelines for small screen devices (Karkkainen and Laarni, 2002); Context-aware mobile applications (Hakkila and Mantyjärvi, 2006) and Participatory Heuristic Evaluation (Muller et al, 1998). The criteria for E-Government usability are derived which are navigation, accessibility, screen design, media use, consistency, interactivity and content usefulness. These findings are in conformity with the findings of ISO (1998), Hassan and Li (2001) and Toah et al (2009). A procedure for the development of web applications was adopted from Calimere Usability guidelines because they reinforce and maintain solid and long-term relationships with their end users (Vaki et al, 2005).

The designed e-Government usability framework is simple, easy to use and systematic. The framework was designed based on the requirements gathered and analysed. The process of developing the framework focused on the theory of systems usability. The framework can support the successful usability.

### Limitations of the Study

The research was limited to identifying the requirements and designing e-Government service usability framework. The organisations that were covered were mainly Ugandan government Ministries. Results could be different if the study were conducted, say, including government agencies, citizens, NGOs, private sector or in other countries. The study population was limited by resources, and even the questions were limited to e-Government usability requirements and metrics/measures. Further, the framework was not validated. Framework development was not incorporated with other service delivery channels and forms of government like Mobile Government; SMS based public service delivery channels.

### Recommendations

Usability is an important factor in the deployment of a one stop Government approach for Electronic public service delivery in form of Government 2 Citizens (G2C), Government to Business (G2B) and Government to Government (G2G) in developing countries like Uganda. International Development partners such as United Nations, World Bank etc emphasis implementation of E-Government to enhance good governance and curb corruption. Ensuring E-Government usability through development of easily accessible, usable and low cost systems is vital and consideration of usability requirements and criteria in deployment of E-Government

services is recommended. The framework presented in this thesis provides a comprehensive guideline for the implementation and deployment of usable E-Government systems in different Ministries, but it is not exhaustive, for the ever changing usability requirements and technological environments. Furthermore, the usability requirement and criteria list have to be updated. A more detailed and expanded survey could be taken since the study involved only 2 respondents from each of the 20 Ministries in Uganda. Involvement of other Government Agencies such as Uganda Revenue Authority, Electro Commission, and National Information Technology Authority-Uganda etc could earn the list more weight and make the framework more usable.

Another possibility may be to try building a unified set of metaphors (or symbols) to be used on websites worldwide that are common to all countries, fully understood and do not offend anybody. This would resemble what traffic engineers/police managed to do in regards to the traffic/road rules or the "Highway Code" for road navigation and might reduce the work of localising websites since many features/icons would be the same.

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