Evaluating E-Government Websites in Jordan

Accessibility, Usability, Transparency and Responsiveness

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Abstract - **Investigating e-government Web-based services and evaluating its development has become one of the evolving research areas in the information systems field. After a decade of launching the e-government program in Jordan, we examined thirty governmental Websites in terms of their accessibility, usability, transparency, and responsiveness to citizens' request. This study found that the majority of the Websites are still in the early stages of development, and there is a noticeable lack in Websites readiness for moving-up to the advanced level fundamental for providing transactional services. Based on the evaluation results and through a manual testing, it was found the majority of the Websites do not employ the same design, where there should be consistent and should be using the same standards and features.**

Keywords-E-Government; Jordan; user-centric; Websites; Web-based services;

I. INTRODUCTION

The last decade has witnessed a tremendous revolution in information and communication technologies (ICTs). This has changed the life of people as well as the ways of interaction between the governments and their citizens. These changes, in turn, are rapidly being transformed into new forms of government, namely, electronic government or "e-government". As a result, there is an increasing growth in the number of government Websites. Efficient and effective implementation and development of government Websites require an understanding of whether they are tailored to meet users' expectations under the citizen-centric approach, and the barriers that might hinder these Websites to provide the desired services through the Internet [5]. E-government will contribute to improving the efficiency of governments; improving interaction channels between government and public, facilitating economic development, reducing costs, and meeting citizens' expectations for service delivery, by facilitating the process of administrative procedures [4, 6, 18]. It has the potential to overcome challenges faced by the public sector [18]. However, the efforts of Jordan and many of the developing countries to achieve their e-government objectives are not fulfilled, due to the insufficient developments of e-government [9]. Through e-government, the amount of government information and services moving online is increasing more than ever [5]. Therefore,

government agencies need to design their Websites to ensure that (1) a universal access is afforded to all users, (2) Websites and their features are functioning in a proper way, (3) Websites are interacting with users, and (4) Websites are responding to users' requests. Even though there seems to be a substantial growth in the development of e-government services in Jordan [24], it is unclear whether citizens will make use of such services. Doubtlessly, the success and acceptance of e-government initiatives are subject to citizens' acceptance, willingness and intention to use these newly offered services. Many variables influence user acceptance of a new technology in different settings, such as: user acceptance of computers [10], consumers' adoption of online shopping [16], and citizens' willingness to adopt e-government [8]. This research explored the current condition of government Websites in Jordan through an evaluation process using a combination of methods, with the aim of making contribution in two aspects: to evaluate Jordan's government Websites readiness to provide services online, and to investigate in issues affecting their development and usage, such as: accessibility, functionality, and responsiveness issues. Furthermore, the study complemented some previous studies on e-government Websites and its readiness in Jordan [2, 3, 11, 17].

II. WEB-BASED E-GOVERNMENT SERVICES

This research is concerned with Web-based e-government services, where there is ambiguity in the definition of Web-based e-government services. However, it is included in many e-government definitions and it is possible to come up with a definition derived from a mixture of uses in the literature. E-government is defined as "utilizing the Internet and the World-Wide-Web for delivering government information and services to citizens" [23, p.1]. Evans and Yen [12] argued that e-government is the use of computers and the Web as a communication tool between governments and citizens. Actually, the use of Internet and the World Wide Web is not the only way of delivering e-government services, although they are the most effective ways. Therefore, a definition for "Web-based e-government services" is needed. Web-based e-government service has been defined as the information and services provided to public on government Websites [20]. However,

we believe that the process of publishing information online is a service in itself; as it saves time and cost for the citizen. Therefore, Web-based e-government service is the use of the Internet and Websites as a channel for delivering governmental services. Most of the government agencies that provide e-services focus on service delivery without sufficiently considering user needs, which include ease of use, ability to access and find desired content, and the ability to navigate and use the site for particular purposes [5].

III. DATA COLLECTION AND METHODS

Bertot and Jaeger [5] crystallized three methodologies that can act as key elements of user-centered evaluations of e-government Websites: functionality, usability, and accessibility testing. In this study we examined the accessibility, usability, transparency, and responsiveness of thirty Jordanian government Websites and their readiness to deliver government services online. The evaluation involved twenty three ministries (all ministries in Jordan that have Websites online) and the official Website of e-government (www.jordan.gov.jo) and six governmental institutions and departments (all that provide e-services via the official Website of e-government). The evaluation consisted of three stages: in stage I we tested the Websites' accessibility alongside other technical issues using an automatic evaluation tool "SortSite 3.0" [1] (the evaluation was undertaken between 21st and 23rd June 2010), in stage II we tested Websites' usability and transparency manually by visiting each Website and check the existence of features that support usability and transparency (the evaluation was undertaken between 21st and 23rd June 2010); in stage III we tested Websites' responsiveness to citizens' request by sending an e-mail to each Website asking a question as requesting information (the e-mail sent on 21st June 2010; responses till 5th July 2010 were considered).

A number of studies have investigated the accessibility of the e-government Websites in different countries [1, 22]. Most studies of e-government Websites have primarily or exclusively used automated testing tools. For the most part, previous studies have relied on free automated testing software, such as Bobby, Wave, SortSite, InFocus, A-Prompt, etc., which are designed to check Websites for errors that might cause accessibility problems. Although such testing software is useful in terms of identifying elements as accessible or inaccessible, they do not address the issues of functionality or usability, and miss many accessibility problems that a person can identify, as well as other limitations in the evaluation of e-government Websites. As such, the use of a multi-method approach for evaluating is needed. This combination of methods was intended to be complementary, with each individual method having its own strengths and providing a different perspective.

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[1] SortSite 3.0: http://www.powermapper.com/products/sortsite/vpat.htm

IV. JORDANIAN GOVERNMENT WEBSITE EVALUATION

Since Jordan's e-government initiative is still in its formative years, it is an ideal time to evaluate the readiness of Web-based service delivery and reveal differences that exist across the Websites of ministries and government departments. E-government projects involving Web publishing may cost thousands of dollars (20 to 200), and millions of dollars to build online service delivery portals [6]. This huge investment in e-government projects normally requires an evaluation process to assure objective achievements and revealing problems that hinders progress. The evaluation processes include testing the accessibility of each Website automatically using an automatic accessibility evaluation tool, and then testing each Website manually to explore their usability, transparency and responsiveness.

A. Stage I: Website Accessibility

Although there are many Web accessibility testing tools available, there is no universal agreement on which software is more suitable for accessibility evaluation. This study attempts to find out issues alongside accessibility such as compatibility, technical errors, search engine optimization, and usability. Among the tools available, "SortSite 3.0" offers the ability to test these issues in addition to testing the Website accessibility, and it has been used to evaluate the Websites' accessibility, usability, compatibility with W3C standards, compliance with EU and US laws, broken links, and search engine optimization. Since it is not related to the context of the study "compliance" was not considered. Websites were examined to find out how accessible they are with reference to the Web Content Accessibility Guidelines 1.0 (WCAG) published by the World Wide Web Consortium (W3C). There are two main outputs for SortSite tool; 'better than average' or 'worse than average', based on global standards.

TABLE I. WEBSITES EVALUATED 'WORSE THAN AVERAGE'

Checkpoint	%	Checkpoint	%
Overall Quality	33	Search	0
Errors – Broken links	37	W3C Standards	47
Accessibility	7	Usability	3
Compatibility	7		

As shown in Table I, 37% of the Websites were evaluated worse than global average in terms of errors and broken links, while 7% were evaluated worse than average for accessibility and the same percentage for compatibility with different browsers. None of the examined Websites was evaluated worse than average in terms of search capability, while 47% of the Websites were evaluated worse than average in terms of their compatibility with the W3C standards, which is problematic for a government Website. The automatic testing exposes that only 3% of the Websites were evaluated worse than average in terms of usability.

Brajnik [7] surveyed 11 automated evaluation tools, but revealed that these tools address only part of usability issues, such as download time and validation of HTML syntax; he also claims that most tools assess only a limited set of usability features that can be detected electronically. For that reason, a manual examination is needed, which can be done through manual testing of Website usability features.

B. Stage II: Websites Usability and Transparency

Websites usability and transparency are two of the key aspects of Websites functionality [14]. A manual testing of each Website has been used to find out whether the Websites are usable and transparent or not. Usability involves the ease with which users learn to manage the system and memorise basic functions. Nielsen [19] suggested that Website usability "is a quality attribute that assesses how easy user interfaces are to use" and claimed that an application perceived to be easier to use is more likely to be accepted. Flavian et al [13] proposed that Website usability reflects the perceived ease of navigating the site and conducting other tasks. As a result, the more the Website is usable the more it will be accepted and used by users. Website usability is a key quality issue; it enables users to find the desired information and complete their tasks more effectively through using the Website features, choosing the right actions, and navigating to the right pages. It should enable users to intuitively access and employ the features of a site to navigate the Website and find the desired information [5, 14]. Usability considers many factors such as: the ease of understanding the Website structure, functions, interface, and contents observed by the user; the simplicity of use of the website in its initial stages; the speed with which the users can find the item they are looking for; and the perceived ease of site navigation [13].

To evaluate the usability of the Websites, we examined the features that increased their ease of use, which will make the process of navigation and finding the desired information effortlessly. The Websites were examined manually for the presence of 12 features: offices phone numbers, offices address, online publications, external links to other sites, delivery of information in multiple ways (audio clips, video clips), availability of bi-lingual information, site map, frequently asked questions, online services, email address, search capability, and broadcast of events. These selected features were adapted from previous studies [14, 22]. These features can help in providing online information and services effectively to citizens and other users. Such features are commonplace in citizen-centric Websites, and they call it "citizen-centric features" [20]. Table II shows the percentage of the Websites provide each feature.

TABLE II.   WEBSITES OFFERING VARIOUS FEATURES

Website feature	%	Website feature	%
Offices Phone Numbers	97	Site Map	80
Offices Address Info	80	Freq Asked Questions (FAQs)	53
Online Publications	97	Online Services	33
External Links to Other Sites	97	E-mail Address	87
Delivery of Info in multiple ways	17	Search Capability	90
Bi-lingual	70	Broadcast of Events	73

Contact Information: 97% provide their offices' landline numbers while 80% provide their office address. *Online Publications and External links to other Websites*: this feature makes it easier for the user to obtain further information when needed. 97% provide online downloadable publications, and the same percentage of Websites provides external links to other related Websites given the user additional sources of information. *Delivery of Information in Multiple Ways:* only 17% deliver information in multiple ways such as video clips or audio clips or even images and diagrams. A detailed analysis of 1,813 state and federal government Websites in USA revealed that only 5% of the surveyed Websites provided audio clips and only 4% of them provided video clips [22]. Hence, designers did not consider these modern and attractive ways of providing information to Website users. *Bi-lingual Websites:* the official language of Jordan is Arabic, but English is used widely in commerce, government, universities, medicine, and among many people. Learning Arabic and English are mandatory at both public and private schools and universities. Therefore, it is important for Websites to be bi-lingual. 70% of the Websites have their pages in both Arabic and English.

Site Map and FAQs: site map is a supportive feature. It helps users and search engine find pages easily by listing pages of Websites, typically organised in a hierarchical style. 80% provided this feature. Another supportive feature is a list of "Frequently Asked Questions (FAQs)" with official answers to reduce the work load on frontline employees by saving their time which is consumed everyday in answering basic and repeated questions about services and procedures, 53% provided this feature. *Online Services* were counted in the following four cases: (1) the user could download a form for a service and send it back for completion; (2) the user could submit his/her data online; (3) the user could search the agency database for his/her information; (4) the entire transaction could be finished online. 33% provided online services (23% provide non-transactional services and only 10% provide transactional services). *E-mail address;* presence of e-mail addresses is one of the key features; it provides the Website user with choices to contact the government agency electronically by providing a correct e-mail address. 87% provided e-mail address on their Web pages. An interesting observation was, the Ministry of Interior's e-mail address provided was incorrect (the published address is: info@moi.jo while the correct one is: info@moi.gov.jo). *Search Capability and Broadcasting of Events*: these features can increase the ease of use in terms of finding the desired information in an efficient manner. 90% of Websites had a search capability and are all functional. Another way in which Websites can be more usable is by offering live broadcasts of important or latest news and events. 73% offer live broadcasting of events. None of the

Websites has provided all selected features for usability testing. However, out of 12 selected, 6 provided 11 features, 6 provided 10 features, and another 6 provided 9 features. As a result, 60% of the Websites scored more than 9 out of 12 (9 is the mean of the total score). Furthermore, testing usability in stage I revealed that 97% of the Websites were better than average in terms of usability. Thus, Jordanian government Websites are well on their way to be a high quality Websites in terms of usability.

Website *transparency* refers to the ease with which users can assess the authenticity of the Website content [14]. To measure the transparency of Websites we manually examined the features and content designed to confirm the authenticity of the Website and its content, which will affect the users' trust in government Websites. The features examined are dates of last update, name of person or agency responsible for content and available contact information for them, and a name of person or agency responsible for technical support and contact information (See Table III).

TABLE III. WEBSITES PROVIDES TRANSPARENCY FEATURES

Feature	No. of Websites providing the feature	%
Dates of last updates	3	10
Name of Website content manager	26	86.6
Contact information for Website content manager	25	83.3
Name of Website technical support manager	17	56.6
Contact information for Website technical support manager	16	53.3

Only three Websites provide dates of last update, which would make the Website user wonder whether the available information are still valid. The majority of Websites provide a name and contact information for the Website content manager, while nearly half provides a name and contact information for the Website technical support manager. As a result, this would affect the users' trust in the authenticity of the Website content and the government transparency.

C. Stage III: Websites Responsiveness to Citizens

To examine responsiveness to citizen requests, a unified email was sent to each Website using the e-mail address available on "Contact us" feature. The message was short, asking a simple question: "Hello there, I am trying to find out when your offices are open. Could you let me know the official hours your offices are open? Thanks for your help". Disappointedly, only 4 Websites responded to the e-mail. To some extent, the lack of responsiveness will mean to users that the ministry or government department does not want to be contacted via Internet; thus they fail in their attempt to employ the Internet as a means of connecting with users. This failure in responding to users' request for information marks an interaction failure to reach out to users that may be unwilling or unable to contact that government agency physically, by phone, or by post. Responding to

users' request for information is a vital means of connecting the people with government. Such a basic responding mechanism should be more effective in order to increase users' reliability on government Website.

TABLE IV. WEBSITES' RESPONSIVENESS TO CITIZEN REQUEST

Responsiveness	No. of agencies	%	Comments
Respond with desired answer	4	13	3 agencies respond within a day and 1 agency respond after 2 days
Respond with no answer	4	13	An automatic reply message "The recipient's mailbox is full and can't accept messages"
No response within 1 month	22	74	No response within 1 month

V. DISCUSSION

All the surveyed Websites failed one or more of W3C's accessibility measures and thus many disabled people may find it impossible to access them. This may be problematic in view of the fact that it is the government responsibility to assure e-government access to the entire eligible population, including people with low income and disabilities [8]. United Nations Global e-Government Survey Report 2010 measured the online service index. The components of this index are: emerging information services, enhanced information services, transaction services, and connected approach. With an online service index value of 0.5333 out of 1.0000, Jordan ranked 22 among 184 countries by scoring 50 points for emerging information services, 44 points for enhanced information services, 57 points for transaction services, and 17 points for connected approach. As a developing country with limited resources, Jordan has made great strides in development of online services during the last few years [24]. The Jordanian government is concentrating on achieving high level of online services, believing that e-government success can be achieved by enabling a complicated service online [18]. However, Internet users in Jordan have a modest demand (39%) at the informative level of e-government, and the level of demand is dramatically decreased as the services level increases [17]. Thus, the government should concentrate on achieving high quality low level informative services before progressing to advanced services [17], to determine the users' needs and to build a constructive relationship with citizens.

Obviously, designers tend to focus on Website features that would enhance its usability. However, after visiting each Website the majority does not employ the same standard design; it is significant aspect that government Websites should be consistent and shares the same features that appear on their homepage. Hence, users will not struggle to find the right information at the right time in an efficient manner while visiting different governmental Websites. Majority of the Websites did not contain FAQs, and many do not provide information in multiple ways. This decreases the ease of use and reduces the coherence. Users become frustrated over these Websites if there is hindrance to seamlessly locate information and complete transactions, which in turn

decreases intention to adopt e-government services in the future [8]. Therefore, the usability features should rise in priority while designing the Websites. Many researchers have considered trust as a key factor affecting the ones' intention to use e-government services [8, 13, 15, 21]. While Government trust is associated with the level of its transparency [21], it is necessarily to design transparent Websites in order to increase the users' trust in the information available and in the e-government as an alternative way of interacting with government. After testing the Websites responsiveness, the concerns were that only 13% of the Websites responded to our request for information. West [22] tested the responsiveness of 1,813 state and federal government Websites and argued that it is important to have e-mail addresses available on government Websites, but they serve no purpose unless someone actually reads and responds to the received messages. The responsiveness test revealed that over 90% of email queries sent received responses [22]. Research showed that, individuals with more concern about responsiveness are less satisfied [21]. By interacting with government electronically, citizens expect a quick and desired response; otherwise they will get a negative experience of using e-services. Welch et al. [21] agreed that citizens' experiences and satisfaction is positively associated with e-services demand. This confirms other research findings that if citizens have a positive experience with e-services, they will be more likely to use it again; and they will probably share this positive experience with others, thus encouraging adoption [8].

This research, like any other, has its share of limitations. Firstly, the Websites selected do not represent all the Websites involved in e-government in Jordan but only the major ones, namely the ministry web pages. Secondly, the usability and transparency features selected may not be the most important features for e-government Websites although they were adapted in previous similar studies. Despite the fact that a limited number of government Websites were evaluated, it considers all the ministries that have responsibilities for one or more departments, agencies, commissions or other smaller executive, managerial or administrative institutions. Thus, the paper reviewed the current condition of the Jordanian Web-based e-government services based on a representative set of samples.

VI. Conclusion

This study investigated the readiness and functionality of e-government Websites in Jordan by examining thirty Websites in terms of their accessibility, usability, transparency, and responsiveness to citizens' request. The variation between Websites was obvious; there is a need to set up unified standards for all Websites that intended to provide online services to public in order to minimize the confusion for users in using different services provided by the same government. The evaluation indicates that Jordan's e-government is still in the informative level of service delivery, and the Website evaluation revealed that Websites suffers from a lack of consistency in the standards and

features; what is more Websites had a very low percentage of responsiveness. Testing the Websites' usability and transparency has revealed a lack of consideration of citizens' expectations and needs through the absence of various features which facilitate users' interaction process. Future work includes further extension of evaluation process to include other Website evaluation methods such as WebQual instrument, citizen survey, and other qualitative methods such as focus group and interviews.

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