

E-GOVERNMENT ADOPTION: THE CHALLENGE OF DIGITAL DIVIDE BASED ON JORDANIANS' PERCEPTIONS

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Abstract

E-government initiatives are facing many challenges in reaching citizens and businesses. One of these challenges is the digital divide, which makes it difficult for citizens to access the Internet. The digital divide prevents citizens from using the e-government services based on three perceptions: infrastructure accessibility, knowledge and skill level, and perception level. This study tries to explore the perceptions of Jordanians in regard to the major digital divide categories: age, gender, accessibility, education, geography, and income. The literature was reviewed to understand the major issues of digital divide in relation to the three levels and build an instrument to measure citizens' perceptions regarding the six types of digital divide. A sample of 450 citizens filled the survey, where two types of statistical analysis were conducted. Data results and conclusions are depicted at the end of this paper.

Keywords: E-government, digital divide, technology penetration, e-government adoption, Jordan.

1. INTRODUCTION

Governments all over the world are facing one major challenge in promoting e-government initiatives. They strive for reaching an acceptable level of adoption, where many factors play a role in making the accessibility of the Internet more difficult. Governments are encouraging their citizens to access and use their public services through the Internet. To successfully do that, the Internet should be available for all categories of people and businesses. Such view is related to the digital divide.

The adoption process of electronic systems is researched extensively, where many theories and models were proposed to understand this issue. The major obstacle that prevents citizens from adopting a technology is the availability of such technology. The digital divide is viewed by researchers from three major sides: the accessibility divide, the knowledge and skill divide, and the perceptions of citizens divide (Orbicom, 2005; Abu-Shanab, 2013). The continuous improvements in information and

communication technologies (ICTs) is expected to increase the number of people who benefit from a wide range of services provided by governments through their e-government portals.

Governments try to reach citizens and civil society institutions through their open government initiatives. It is important to understand the role of e-government in society development, where governments try to provide their services in a convenient and accessible way. Reaching citizens is a tough job in a world of differences and diverse challenges.

E-government is defined in different ways based on different perspectives they represent (Almarabeh & AbuAli, 2010; Ndou, 2004, Abu-Shanab, 2013). But most researchers and specialists agreed that it is the utilization of ICTs to promote governance and improve services. In order to develop a successful e-government initiatives, governments will face several challenges like the provision of required infrastructure, legal and political barriers, people's computer literacy and ICT use, the level of trust people have in government and its new way of performing activities, security problems, and the digital divide problem (Almarabeh & AbuAli, 2010; Abu-Shanab, 2012).

To better understand the issues mentioned earlier, this paper tries to explore people's perceptions towards the problem of digital divide utilizing an empirical test. A thorough literature review is conducted to understand the major dimensions of digital divide and its relation to e-government. The rest of the paper is divided into four sections: the first section reviews the literature related to e-government and digital divide. The second describes the ICT Jordanian environment. The third section describes the data and analysis conducted, where discussion of issues is elaborated. Finally, conclusion and future work is provided at the end.

2. LITERATURE REVIEW

The path to successful e-government project is to open channels with citizens and provide the necessary infrastructure. The major environmental factors influencing e-government success are: social, infrastructural and governmental (Abu-Shanab, 2012). It is important to make available for citizens the necessary level and capacity of infrastructure. Based on the obligations of governments to provide services to citizens in an efficient way, the digital divide can be a crucial challenge that prevents government from reaching each citizen and institution.

Good governance means that the governments play and make it easy to perform its roles in the executive, judicial and legislative areas. Governments play a major role in societies as the administration of government functions and the facilitation of the two other roles (Costake, 2008). Also,

the digital divide will prevent people from participating and interacting with governments or exclude certain categories of the public from participating effectively in public activities (Pascual, 2003).

2.1. Social view of e-government

Abu-Shanab (2013) put forward a classification for the four major functions of e-government. Figure 1 depicts his view in this regard, where he claims that governments have four major arenas to play in: service provision, e-democracy and participation, public performance and social development and inclusion. The role of governments in sustaining societal development can range from its services provided to citizens to facilitating democratic initiatives. This wide range of activities calls for a better utilization of infrastructure available and for an open government concept application.

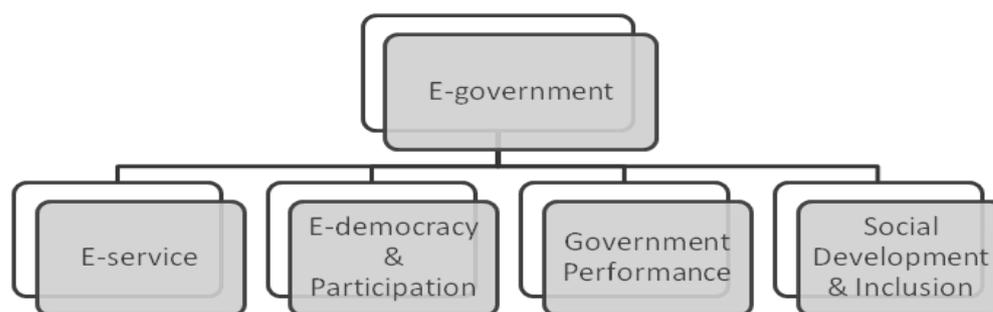


FIGURE 1 - DIMENSIONS OF E-GOVERNMENT (SOURCE: ABU-SHANAB, 2013, P 34)

Abu-Shanab and Al-Azzam (2012, p. 39) defined e-government as "the use of information and communication technology (ICT) and particularly the Internet to deliver information and services by the government to its customers." Also, e-government is the use of information and communication technologies, particularly Web-based internet applications to provide citizens and businesses with a convenient access to public information and services, to improve the quality of the services and strengthen government's drive toward effective governance and increased transparency to better manage a country's social and economic resources for development (Yanqing, 2010). Almarabeh and AbuAli (2010, p. 30) defined e-government as "government use of information and communication technologies to offer for citizens and businesses the opportunity to interact and conduct business with government by using different electronic media such as telephone touch pad, fax, smart cards, self-service kiosks, e-mail/Internet, and EDI".

Research classified e-government services into several categories based on to whom it provides services and benefits (citizens, public agencies, social and political organizations to citizens, business, employees and non-profit organizations). Government-to-Citizen (G2C), Citizen-to-Government (C2G), Government-to-Business (G2B), Business -to-Government (B2G), Government-to-Employee (G2E),

Government to-Government (G2G), and Government-to-Nonprofit (G2N) are examples of e-government categories (Riad, El-Bakry & El-Adl, 2010; Al-Naimat, Abdullah, Osman & Ahmad, 2012).

West (2005) emphasized the role of ICT in society development since the advent of telegraph and telephone to the explosion of the Internet and Web 2.0 tools. He emphasized the full two-way communication between governments and citizens and the interactivity aspects of such communication. The advent of social networks made ICT a major player in society evolvments. Information technology acts as an agent for changing how the society performs its political, economic and social activities. Governments are riding the wave of social networks to promote their services and open channels with citizens in a continuous dialogue (Khasawneh & Abu-Shanab, 2013). On the other hand, earlier societies resisted technology on the bases of its harmful influence like invasion of privacy, tracking, and unemployment (Baase, 2009).

Several governments try to employ ICT for improving their interactions with citizens through providing them with real time access to information and many e-services via the Internet (Guanghua, 2009). Such employment of ICT resulted in more effective, efficient, transparent and accountable government. Such adoption of ICTs has a significant impact on developing the society and will act as an enabler for changing society and building what we can call electronic society (e-society). It is important to furnish needed infrastructure for the intra-society interactions (among citizens and different civil society institutions). Groper (2004) stressed the concept of social capital, which he defines as the degree of interaction between citizens. Such capital can be augmented through the trust, flow of information, and the degree of problem solving within society. Finally, Groper concluded to the fact that digital divide is a barrier between societies and the wealth of such social capital.

Ndou (2004) introduced three critical transformation areas through which e-government plays a critical role in transforming and developing society; internally, where the adoption of ICT improves the efficiency and effectiveness of internal transactions conducted through the network of government and public agencies with minimum effort, time and cost needed. Secondly, externally, in which several opportunities are opened up for citizens to interact with governments and conduct activities electronically in more transparent ways. The last transformational area is relational area through which governments try to rebuild their relations with citizens in a way that make citizens trust in governments and their new ways of performing e-transactions, which results in fundamental changes in the way people live and societies function.

E-government will facilitate society development and transformation by focusing deeply on the following four elements: creating an environment that enhances all government's interactions with citizens,

developing skilled human resources through effective development program provided by e-government, building an information infrastructure that enables citizens to benefit from meaningful information available at e-government sites and helps them perform a wide range of activities, and concentrating on improving the ICT industry (Hanna, 2010). The focus on these elements will transform the way society functions and the way citizens view e-government initiatives which contribute to society development.

The change in society will be auctioned through few steps that start with making available needed ICT tools, through which ideas and thoughts are disseminated (Shirazi, 2012). The author proclaims that the purpose is providing information, which is a pre-requisite for engaging in a discourse that results in a social change.

2.2. E-government and the digital divide

Defining e-government to be a tool for providing public e-services means that governments need to facilitate the provision of such services to their citizens. It is important to make public services available to all sectors in a country, where sectors here have diverse implications. Based on such argument, many types of digital divide emerged in the literature like: people with disabilities digital divide (Seckin, 2010), gender digital divide (Minguez, 2006; Yao & Okoli, 2007; Subramanian, 2007; Tobola, 2010; AL-Rababah & Abu-Shanab, 2010), race digital divide (Enoch & Soker, 2006), age digital divide (Redsell & Nycyk, 2010; Enoch & Soker, 2006; Geana & Greiner, 2011), education digital divide (Eynon, 2009), and income digital divide (Seckin, 2010).

Relating e-government to digital divide is common in the literature (Khan, Moon, Zo & Rho, 2010). Digital divide is a dynamic and complex problem that was introduced in the mid-1990s especially for countries that have e-government initiatives based on the wide use of ICTs or utilizing the Internet as a dynamic channel of communication, providing citizens with the needed services and knowledge (Acilar, 2011). It can be defined as the gap between people who have an effective access to the Internet and other ICTs, and people who don't have (Sipior & Ward, 2005). On the other hand, digital divide goes beyond the physical access to the Internet or technology; it is the real access, reach and the socially responsible connectivity (Hill, Owns, Beynon-Davies & Williams, 2004). Researchers stressed that the digital divide is a joint barrier between technology and human factors (Obeidat & Abu-Shanab, 2010). Governments should resolve the issues related to digital divide to promote e-government initiatives.

Helbig, Gil-García and Ferro (2009) introduced three levels through which digital divide can be explored and using three approaches; in the first level, digital divide can be explored using a technology access approach, which differentiates between people who have access to technology and others who don't have. The second level, the multi-dimensional approach, in which several factors are considered when

exploring the digital divide like: the existence of different economic opportunities, the differences between developed and developing countries and people's technical skills. Seckin (2010) related digital divide to countries, geographic areas, gender, age, and other demographic factors. The last level explores digital divide using multiple-perspectives approach, in which people can be studied based on their values, beliefs, mental models and skills, also the impact of race, gender and ethnicity is considered. The literature shows that digital divide can be noticed internally (local digital divide) and externally (global digital divide).

Similar to this categorization, Orbicom (2005) classified digital divide into two types: access divide and skill divide. Access divide relates to physical barrier to technology, and the skill divide is the competencies needed to utilize the technology and the Internet. Also, Baker and Panagopoulos (2004) viewed the issue from users' perspective, where it relates to the physical reach to technology, the availability of suitable content, and the perceived utility of technology and its content.

Savic and Radojicic (2011) indicated that digital divide is a complex and difficult problem to conceptualize especially that each technology will have a digital divide issue based on how it will be investigated and the factors that are considered; the differences in people's needs, their skills and educational level. Such complexity can widen or limit the scope and impact of bridging digital divide challenges, which differs from one individual to another and from one country to another. On the other hand, thinking of digital divide only in terms of "have" or "have not" and ignoring the technological, social and human factors is becoming a challenge and rethinking of digital divide using multi-dimensional framework is needed (Comunello, 2010).

The digital divide can result from a deficiency in the ICT infrastructure in the country and the political will and leadership support (Hermana & Silfianti, 2011); the economic and income levels (UN Report, 2010); and education and literacy levels (Khan et al. 2010; UN Report, 2010). Finally, some research added technology type and cost as reasons that shape the digital divide (Dewan, Ganley & Kraemer, 2005). Based on that, researchers proposed different methods to measure the digital divide similar to the ratio of ICT services to population or ICT penetration to the GNP (Dewan, Ganley & Kraemer, 2005). Also, other methods for measuring the digital divide utilized mathematical equations or quantitative models (Billon, Lera-Lopez & Marco, 2010).

To bridge such phenomenon several methods can be used, the following are useful tips: formulating a well-balanced development strategy with continuous monitoring of information society, increasing the human resource power through strategic investment in education and ICT infrastructure, and the need for great focus on people's special needs and their perceptions (Savic & Radojicic, 2011).

2.3. *Digital divide perceptions*

Governments perceive digital divide in a way that differs from how citizens perceive it. From governments' side, the literature shows that digital divide can be perceived in one of four ways, which can be derived from the classical definitions of digital divide. The first way focuses on the gap between people who have an access to use ICT and those who don't have (Sipior & Ward, 2005). The second way focuses on people's ability to use ICT or the skill divide (Orbicom, 2005). The third one is based on the actual use of ICT that can be measured through monitoring how people consumed their online time and the extent to which they benefit from e-government services. Such view is in agreement with the view of Hill et al. (2004), which stresses the importance of aligning the ICT services with the social responsibility and requires a suitable use of technology that fits with the environment. The last way focused deeply on the impact of using ICT in changing the way governments work and the way people perform their activities.

Such implication is supported partially by previous work proposed by Baker and Panagopoulos (2004), where the authors emphasized the importance of citizens' perception of digital divide. Their view is related to more than interacting factor like the utility of technology and how it can serve citizens in certain situations and geographic area. Also, what governments perceive as shortcoming, might not be noticed by citizens and vice versa.

From citizen side, the literature indicates that everyone has a different perception regarding digital divide based on their needs, age, educational level and many other factors that differ from one individual to another and from a country to another.

3. DIGITAL DIVIDE IN JORDAN

Empirical research related to the digital divide in Jordan is not common, where the focus of research is more on the adoption of citizens or on conceptual research that explores the domain and its constituents. A study in Jordan utilized results of 50 interviews with women in rural areas and concluded that Jordan needs more efforts to improve the services offered for women and help them improve their lives (Al-Rababah & Abu-Shanab, 2010). The study focused on gender digital divide and neglected other categories mentioned earlier.

Research and reports related to the national movements in the area of digital divide focused more on the infrastructure capacity where many initiatives were put forward to improve the national capacity of the ICT sector. The first ICT initiative started in Jordan in 1999 and resulted in launching the REACH initiatives (1999-2005); such initiative outlines not only the current situation in Jordan but also the goals

that the Kingdom needs to achieve in relation to the Jordanian ICT sector (Ottoum & Suleiman, 2011). The REACH initiative was followed by the national ICT sector strategy (2007-2011) and another initiative that will be launched for (2012-2016). Also, the Ministry of education (the largest public sector employer) implemented a plan in the last 15 years that contributed in training teachers (ICDL and Intel certification) and connected most schools to the Internet. Other initiatives were implemented that connected the economic sector with the ICT capacities like: JUMP, JSMP, and the knowledge stations project which implemented more than 240 knowledge stations in remote areas (Abu-Shanab, 2013).

Nowadays, the ICT sector is a growing area that opened several opportunities for Jordan to leverage its competitive advantages over other countries in the region through launching several initiatives. These opportunities have significant impact on many sectors ranging from e-learning, through launching Jordan education initiatives and using ICT as a tool to reform education, to e-health initiatives through launching electronic health solutions royal initiative.

ICT sector is becoming the fastest growing sector in Jordan's economy through which its continuous improvements has significant contributions in developing the Jordanian environment in general and developing four main areas in particular: human resource development, technology utilization, socio-economic development and transformation to knowledge economy. Such steps are supported by the vision of king Abdullah II in transforming Jordan to become an important player in the international ICT sector.

4. DATA ANALYSIS AND DISCUSSION

4.1. The instrument used

The survey used in this study included three sections, the first included simple demographics. The second section included questions related to the use of technology and e-government portal utilizing a yes/no type questions. Finally, 6 questions related to the digital divide types were asked with a simple forced answer so the respondents will be forced to choose one of three options: similar, less than or better than. The researchers believed that a forced answer will discriminate properly the responses and would avoid the biases caused by a Likert scale.

The instrument used was built in Arabic language (the native language of subjects). The instrument validation process depended on a pilot test, where 172 students in a public university were utilized to validate the instrument and improve its statements. The work was presented in a local conference, where comments received contributed in improving the statements of the survey used.

4.2. The sample and sampling process

The sample used for this study included 450 Jordanians and sampled randomly in all sectors of the country. The demographics of the sample are shown in Table 1 below. Many of the surveys were filled by research assistants as an interview style with a focus on the last six questions.

TABLE 1 - SAMPLE DEMOGRAPHICS

Gender	Count	%	Residence	Count	%
Male	183	41.0%	In City	238	53.3%
Female	261	58.5%	In Village (rural areas)	164	36.8%
Not reported	2	0.5%	Not reported	44	9.9%
Total	446	100%	Total	172	100%

Age	Count	%	Education	Count	%
18 - 25 years	153	34.3%	High School or less	63	14.1%
>= 26 years	273	61.2%	Bachelor	313	70.2%
Not reported	20	4.5%	Master/PhD	65	14.6%
Total	446	100%	Not reported	5	1.1%
			Total	446	100%

As mentioned earlier, the survey included questions related to the use of ICT and e-government website. The descriptions of these questions are listed in Table 2 with the corresponding frequencies related to the number of subjects who answered yes/no to each question. In relations to the use and availability of ICT resources (Q1, 2, 3, 6, 7 & 14 in Table 2), Jordanians depicted high skill level in using computers (96.6%), high mobile phone acquisition (95.7%), high level of computer acquisition and ownership in homes (93.5%), high percentage emphasized the importance of having a high speed Internet (91.3%), and Internet use/access from home or work (91.0%).

Such result indicates the high infrastructure accessibility capacity and the availability of resources to access e-government portals. The item related to mobile phones does not indicate the capacity of that mobile to browse the Internet, which might be a limitation in the item statement or a need for extra items to be included in the survey.

The survey also included questions related to the use of e-government portal and services (Q8-16 in Table 2). Jordanians indicated that they heard about the e-government portal (68.6%), but did not browse it at the same level (34.1%, lesser percentage for using mobiles for browsing e-government portal 12.3%). Jordanians also preferred the use of electronic channel for their business (81.8%), and trust e-government systems (68.8%).

Results indicated that three items included a substantial size of missing responses (not reported): Q11, 12 & 13. Such result indicates that the three questions were challenging to the subjects as they did not

report any response; items are related to service use. It seems that Jordanians did not feel comfortable responding that they did not use the service, or prefer the service which they did not use or even have an idea about.

Such items should be analyzed more for statement or sequence within the survey in future research.

TABLE 2 - THE TECHNOLOGY AND WEBSITE USE

Item	Yes		No	
	#	%	#	%
1- Do you have the skill to use computers?	431	96.6	14	3.1
2- Do you own a computer at your home?	417	93.5	29	6.5
3- Do you use/access the Internet in Work/home?	406	91.0	40	9.0
4- Have you heard about the Jordan e-government portal?	306	68.6	138	30.9
5- Have you browsed the Jordan e-government portal?	152	34.1	287	64.3
6- Do you own a mobile phone?	427	95.7	18	4.0
7- Does your phone have the capability of browsing the Internet?	339	76.0	106	23.8
8- Have you uploaded the "e-gov. portal" application on your phone?	89	20.0	354	79.4
9- Have you browsed the e-gov. portal using your mobile phone?	55	12.3	391	87.7
10- Do you recognize/know any of the services offered by e-gov.?	142	31.8	304	68.2
11- Have you used such service? *	93	20.9	216	48.4
12- Do you think that e-gov. services save you time and effort? *	208	46.6	69	15.5
13- Do you have the desire to benefit from more e-gov. services? *	222	49.8	111	24.9
14- At your neighborhood, do you think that Internet speed is important?	407	91.3	37	8.3
15- Do you trust e-gov. systems?	307	68.8	134	30.0
16- Do you prefer the electronic channel to do your business/transactions?	365	81.8	76	17.0

Total values less than 446 or 100% are accounted for missing answers (not reported in surveys)

*Large size of missing data (responses not reported)

When comparing the results of the pilot test (students view) with the public view, the items that reflected a change in percentage are: 21.5% less heard about e-government portal (Q4), 14.3% more used it (maybe because they are workers and employees (Q5), 41% less recognize services offered (Q10), 20% less think that e-government services save time and effort (Q12), 20.5% less have the desire to benefit from such service (Q13), 16.5% more trust the e-government service (Q15), and 19% more prefer using e-channel (Q16).

The major objective of this study is to understand how Jordanians perceive the six dimensions of digital divide and is they discriminate any of the six categories. Subjects were asked to indicate whether each category should have a special level of service or not.

Table 3 shows the percentages of each response in accordance to each item and the description of each item stated.

TABLE 3 - THE DIGITAL DIVIDE PERCEPTIONS

A. Government should provide a service level at rural areas...					
Similar to cities		Less than cities		Better than cities	
Count	%	Count	%	Count	%
306	68.6	42	9.4	93	20.9

B. Government should provide a service level for women...					
Similar to men		Less than men		Better than men	
Count	%	Count	%	Count	%
307	68.8	48	10.8	90	20.2

C. Government should provide a service level for old citizens...					
Similar to young people		Less than young people		Better than young people	
Count	%	Count	%	Count	%
229	51.3	79	17.7	136	30.5

D. Government should provide a service level for educated citizens...					
Similar to not-educated people		Less than not-educated people		Better than not-educated people	
Count	%	Count	%	Count	%
191	42.8	28	6.3	225	50.4

E. Government should provide a service level for low income citizens...					
Similar to rich citizens		Less than rich citizens		Better than rich citizens	
Count	%	Count	%	Count	%
281	63.0	39	8.7	123	27.6

F. Government should provide a service level for citizens with special needs (handicapped)...					
Similar to normal citizens		Less than normal citizens		Better than normal citizens	
Count	%	Count	%	Count	%
236	52.9	15	3.4	193	43.3

Results indicated an equal level in service provision perception regarding three categories: geographic divide (rural vs. urban/city areas) (68.6%), gender divide (68.8%), and income divide (63.0%). Such result is in alignment with the pilot test result conducted on students.

Also, respondents were nearly indifferent regarding citizens with special-needs and if they deserve better services than normal people (52.9% responded with similar service, but 43.3% indicated a better service level).

Educated citizens deserve better service than not-educated people (50.4%, with 42.8% felt the service should be similar). Finally, 51.3% of subjects indicated a similar service to old/young citizens, while 30.5% indicated better service to old ones.

To make results more clear, the following categories were perceived to need similar or better service (asserting that none of the other dichotomous categories had a high percentage (all less than 17.7%)): rural areas, females, old citizens, educated citizens, lower income citizens, and handicapped citizens.

5. CONCLUSIONS AND FUTURE WORK

This study tried to utilize an instrument that measures citizens' perceptions towards the use of technology and e-government services, and the different types of digital divide (geographic, age, gender, income, education, and special needs). Results indicated high technology use and acquisition by Jordanians, which was portrayed by the sample in areas like owning and using computers and mobile phones, and having the skills necessary to use it. Such result indicates no problems in relation to the accessibility and knowledge and skills divide. Jordanians also asserted the importance of Internet speed (which indicates an issue of cost or coverage areas). Results also indicated that Jordanians trust e-government services and prefer using e-services more than traditional ones.

The major objective of this study is to understand how Jordanians perceive the six categories of digital divide. Governments try to focus on the capacity of infrastructure and knowledge and skills required to use the Internet and thus the e-government portal, neglecting the perceptual divide. In this study results indicated that some surprising results indicate that the perceptual divide might yield some contradictory directions in service provision. Our research indicated that Jordanian feel that a better or similar service should be provided for rural areas, females, old citizens, educated citizens, lower income citizens, and handicapped citizens.

This study extended our knowledge of the digital divide as a major barrier to e-government adoption, and provided to scientific community an instrument to do so. Future work should utilize this survey and try to replicate this work to reach more valid conclusions. Also, the items related to service use (Q11, 12 & 13) need to be explored more to see why subjects felt uncomfortable answering them (based on large missing data size). Finally, the digital divide is a complex concept that needs more exploration, where more types and dimensions can be explored further.

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