E-GOVERNMENT ACCEPTANCE FACTORS: TRUST AND RISK

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Abstract

Governments, all over the world, are trying so hard to increase the efficiency of their departments by using automated systems, replacing traditional services and providing online service channels which could be described as the primary features of technological revolution. This paper identifies trust and risk as important factors that could affect the usage of e-government application in a way that more trust of e-government application will decrease fear of using it and reduce risk issue. In order to achieve the goal of this paper that focused on trust and risk as two important factors that affect Jordanians' intentions to use technology, an empirical test was conducted and resulted in moderate means regarding 5 major constructs.

Keywords: E-government, acceptance factors, risk, trust, empirical test, intention to use, Jordan

1. INTRODUCTION

Governments, all over the world, are trying so hard to increase the efficiency of their departments by using automated systems, replacing traditional services and providing online service channels which could be described as the primary features of technological revolution. Such revolution will improve the quality and quantity of services provided, save cost and time, encourage foreign investment, and many other benefits. The Internet showed positive impact on different aspects of life including business and at both personal and governmental levels. Information and Communication Technology (ICT) has played a major role in enhancing e-government services provision. Electronic government (e-government) provides quality service with needed convenience to citizens, businesses, and even public organizations utilizing different communication technologies. E-government aims at increasing efficiency and saving time, effort and finance [1]. The fulfillment of these goals depends on the acceptance of e-government services as a secure domain with time and effort savings.

E-government has started as a tool to enhance government performance in publishing information, communication and transactions with beneficiaries (citizens and businesses) through using ICT especially the Internet. Although public investment in e-government projects is growing substantially each year to enhance governance processes and services, yet citizens and businesses prefer to use traditional methods in a face-to-face fashion rather than using web based applications to perform their services [2]. These preferences are controlled by the lack of trust in online information transfer [3]. Unlike the traditional methods of interacting with governments, e-government services provision is unique due to the disparity and impersonal nature of communication in the Internet, where e-government architecture is organized as an Internet-computer based domain [4]. This paper examines two major factors (i.e. trust and risk) that could have a crucial impact on the success or failure of e-government, and how citizens can control these factors.

Technology acceptance domain included many factors that influence the degree of acceptance and diffusion of new technology. Factors like "usefulness", "ease of use", "trust", "risk", "social influence" and many others, showed significant impact on users' acceptance of e-government. While it is considered by some research to be positive, powerful and necessary need to develop and enhance our life styles, comparatively other research see it as a cumbersome, confusing, and an unnecessary tool [5]. Therefore, this paper will discuss the importance of e-government and why should people support it, the different factors that determine the acceptance of e-government, and discuss problems and suggestions that face e-government as a service mechanism. The rest of the paper will be organized as the following: The next section summarized related work. Then research method and data analysis are described. Finally conclusion and possible future work are provided.

2. LITERATURE REVIEW

Various studies on the acceptance of e-government applications have been published, where they aimed at identifying different factors that influence the degree of acceptance and how such factors

affect usage and diffusion of e-government applications. In this section, a closer look to e-government concepts will be presented with a deep focus on two behavioral factors (trust and risk) and how they are explored in the literature.

2.1 E-government Overview

The importance of e-government concept can be concluded from the many institutions that are concerned with e-government evolvement/importance, where they tried to find a comprehensive definition of the concept. The World Bank defined e-government as "using different information technologies like WAN and Internet to apply transformation for public (citizens and businesses) and government agencies to enhance service delivery to citizens, empowerment citizens, improve relationship with business and to increase efficiency of government agencies" [6]. Also, e-government can be defined as using web based applications to facilitate services to citizens by the government [7]. Finally, activating e-government in public daily life will build a civil-centric responsive services design for the public and engage citizens in a participatory service delivery process based on a connected governance concept [8].

E-government applications present a great opportunity to enhance public performance in different aspects like; constituent satisfaction, internal efficiency and operational equity. A field study of 151 agencies showed that the main public agencies' objectives that could be gained from e-government applications are the following: improving constituent satisfaction (the most important goal with 67%), extending constituent information access beyond business hour (50%), cost saving (48%), increasing constituents ability to perform self-service functions (48%), and extending constituent services access beyond business hour (46%) [9]. Objectives of e-government applications can be national, ministerial, agency, or project level with consideration to specificity of each sector and organization [10].
The major advantages gained from adopting e-government applications are the following: cost saving, easiness of use and usefulness [11], increase customer service levels, and gathering and publishing information to facilitate decision making and to create centralized decision making this will eliminate in-efficiencies and cost redundancies [12]. Despite all of these advantages, there is some kind of rejection of e-government applications by the public for different reasons like the possibility of hacking e-government personal information databases. Such risk can damage the relationship between the public (citizens and businesses) and governments. Lost or hacked information can cause harm for both the public and the government. Also, censorship by government department of publics publishing may restrict such activities [10].
Building successful e-government projects that meet the needs of citizens and ensure fulfilling the previously mentioned objectives is not easy as it seems. Many challenges are faced by governments in building a successful project and as listed by Ndou: First, ICT infrastructure: ranging from computer literacy to telecommunications equipment; Second, policy and legal framework to ensure the right of information and the legitimacy of e-government; Third, change management to avoid and control resistance; Fourth, partnership and collaboration between both public and private sectors to ensure providing high quality added value services, and between community and network creation; Fifth, setting up a well framed strategy, Finally, powerful leadership of the project to work as a motivator, supporter and influencer [13].
It is important to understand the benefits and drawbacks of e-government projects; the balance between studies exploring both sides will ensure that e-government is a tool for the future that will enhance service delivery efficiency, decrease cost, save time, reduce corruption among government departments, increase transparency, empower citizen, and much more benefits that will encourage public to adopt e-government projects [14].

2.2 E-government Acceptance Factors

There are different factors that determine the acceptance of e-government application from both the public and civil servants. One of the most important theories in this arena is Technology Acceptance Model (TAM) which states a means of using and adopting new technology by users by evaluating factors influencing the decision to accept new technologies [15]. The TAM is based on ease of use and usefulness as the major predictors of attitude toward new technologies. Another perspective adopted here is using online services by organizations and citizens based on the realization of its importance as compatibility and easiness to learn according to the Diffusion of Innovation theory. Such conceptualization is depicted in a study by Lee, Kim and Ahn, where they tried to measure users' satisfaction with Online/Offline services offered by governmental departments and to identify factors which affect the attitude and acceptance of e-government services. Over 5,000 companies,

3390 filed their tax reports by mailing or through traditional channels, only 1610 submitted online files, 863 random companies from the 3390 were selected. The researchers conducted phone surveys with a response rate of 25.8% and yielded 216 completed surveys. There were two categories of independent variables: quality variables "tangible, reliability, responsiveness, assurance, and empathy", and technological attitude variables. Measurements of trust in Internet technology are composed of three variables: government portal memberships, e-commerce usage, and website ownership. Results indicated some support to the idea of reliable services provided manually or traditionally that significantly improved the willingness of businesses to use e-services instead of using traditional services channels [11].
Other factors are proposed to influence the adoption of new technology are explored in the literature like information systems quality and information quality; such factors are theorized to affect perceived usefulness and perceived ease of use [16].
Other factors related to the acceptance of new technology which were mentioned and discussed widely before like compatibility, external influence, interpersonal influence, self-efficacy, perceived facilitating conditions, attitude, subjective norm, perceived behavioral control, intention to use, risk, personnel innovativeness, and trust [17]. This literature review will focus on trust and risk as the most important factors that affect adopting of e-government by public.

2.2.1 Trust in E-government

Trust can be defined as allowing individuals to willingly use e-government services and behave in a socially responsible manner for the fulfillment of trust after taking government characteristics into consideration [18]. Al-Gahtani conducted his research in Saudi Arabia utilizing 300 usable responses different backgrounds (faculty members, staff, and students). Results indicated that demographic variables have a direct impact on trust as acceptance factors. Age, gender, and educational level significantly influenced perceived trust and individual Internet use. Both gender and educational level significantly influenced perceived risk, individual work type influenced the effect on individual Internet use.

The role of trust in e-government projects is increasingly discussed by different governments and global organizations. UN 2007 global forum on reinventing government was "Built Trust in Government," another organization interested in trust is the International Council for Technology in Government Administration, where it chooses "the creation of trust through transformational government" as the conference theme which was held in Ireland in 2007. Song, Kobra and Yee declared four pillars for trusting e-services and they are: trust in technology, business drivers, social framework, and legislative framework [19]. Figure1 illustrates their argument.

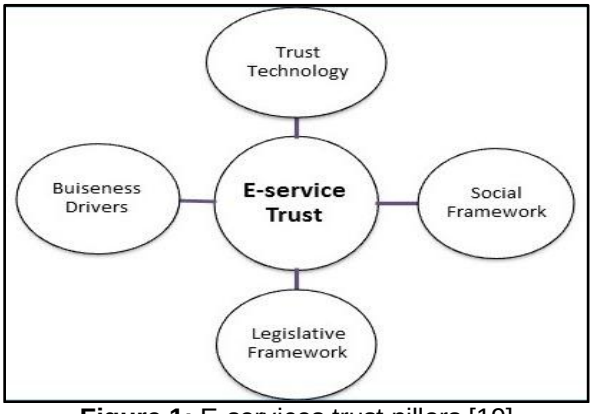

Figure 1: E-services trust pillars [19]

Building trust is a very important forward step for building successful e-government projects since users who trust the Internet are more willing to adopt e-government services, therefore users can easily switch to online services when they trust the Internet technology. Businesses that use e-government services depend on two main factors: users perceived quality of offline services and trust in the Internet technology. Balanced trust will focus on both positive and negative sides of e-services where e-services save time, money and effort, and at the same time have some risks like: uncertainty

about quality off services over the Internet, quantity of switching off services, cost of learning new technology, delayed schedules and needed resources to utilize the full benefit of e-government services [11].

Abu-Shanab and Al-Azzam differentiated between trust in technology/Internet and trust in government, where their empirical study showed that trust in e-government and trust in technology are both significant predictors of trust in e-government. Finally, trust in e-government significantly predicted the intention to use e-government services [20].

Providing online services successfully demands citizens to disclose their personal information to be used by governmental organizations or other organizations which have privileges to access such information. This situation builds some kinds of resistance from citizens' side who would deprive themselves from getting the benefits of online services. Users, including both citizens and businesses, have enough trust in governmental organizations despite the potential risks associated with online transactions [21]. Figure 2 states the relation between trust, intention to disclose personal information, and available e-government services:

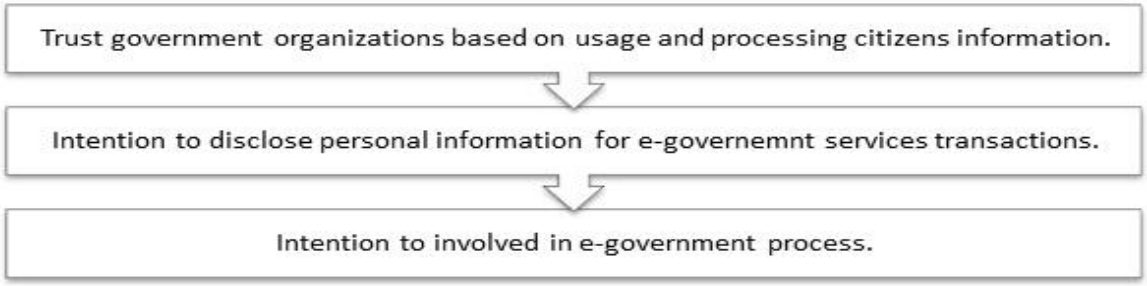

Figure 2: Relation between trust, disclose information and usage of e-government services [21]

There are different factors that influence e-government success. They can be categorized into three categories as shown in figure 3:

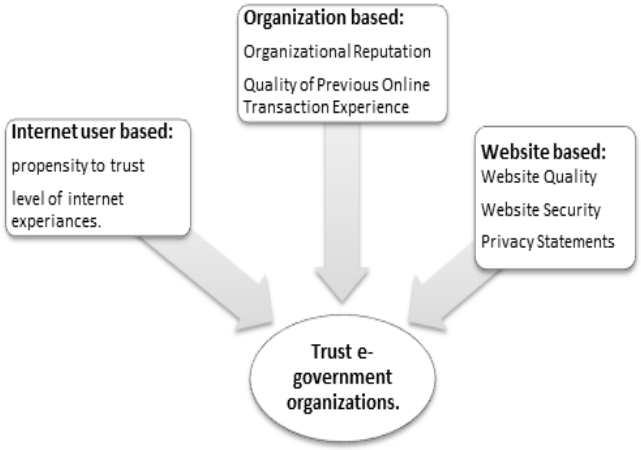

Figure 3: Three categories determine trust in e-government process [21]

Ozkan and Kanat hypothesized that trust in the Internet will have a positive effect on the attitude and perceived behavioral control of using an e-government service. Also, usefulness and ease of use of an e-Government service will empower the attitude toward the use of e-government service, and will have a positive effect on behavioral control of e-government services. Finally, access to computers and good computer skills will empower behavioral control of e-government services [22]

Considering the nature of trust dual transaction direction "input and output", two different phases of trust can be discussed: pre-use trust, and post-use trust. Pre-use trust is related to users who have not used technology yet, so there will be some resistance since they are not familiar with the potential risks of e-government. Post-use trust is related to experienced users with technologies, where such

users can evaluate properties of technologies and build their trust more accurately based on previous knowledge and experiences [23].
Hernandez-Ortega aimed at measuring organizational behavior and analyzing the role of trust in technology in the acceptance of e-invoicing. 1443 phone call were made with 1193 successfully respondents. Results indicated that perceived ease of use and security are significant for trust to exist. Therefore, businesses should consider that technology doesn't involve a great effort, and to increase trust, users' perceptions of ease of use of e-invoicing should be improved by utilizing a standardized data exchange and encourage the use of technology and lower the costs of learning. Finally, information transformation security will lead to information integrity and authenticity.

2.2.2 Risk of E-government

Obviously, different groups of users interact and gain benefits of e-government services to ensure long-term success of e-government projects. Because every e-government project and application is different from the other and each one of these applications has its own rules, procedures, specific stakeholders, and provides different benefits and services [24]. This will lead to diverse and rich communication environments controlled by users' acceptance of e-government applications. Based on that, risk becomes one of the important factors that balance advantages and disadvantages based on the good understanding of such environment.
Risk, as a technology acceptance factor, has an effect on different stakeholders: citizens have some fear of exposing personal information; businesses think about enterprises and electronic system influence; and governmental employees consider electronic services as a threat to their positions. On the other hand, the increase of familiarity with the computer and Internet experiences, jointly with the increase of familiarity with e-government services and public services procedures will lead to the increase of familiarity with e-government applications and will eventually reduce the fear of potential risks [5].
One of the barriers towards using e-government applications by employees is lacking the familiarity with computer and Internet experiences, especially if these applications are not user-friendly. Two solutions are available: either the user upgrades his computer literacy and Internet skills, or e-services should be designed and provided in a user-friendly fashion [5]. This will ensure decreasing e-government application fraud and increase public participation.
The following table shows strategies to decrease risks of electronic systems proposed by MacDonald, Smith and Appleton [25]:

Table 1: Strategies for decreasing electronic systems risks

1.1 Strategy	1.2 Description
1.3 Enhance knowledge of electronic systems	Increase public awareness of the e-government applications robustness and knowledge of right usage guidelines through early education starts from schools.
1.4 Beware of projects pitfalls	Interface and techniques will be more user friendly if used language, access information tools, delivering services channels…etc. taken into consideration when e-government applications developed.
1.5 Improve transparency and accountability in electronic systems	Allowing more public access, full information availability, and integrated service process among different departments.
1.6 Develop a formal marketing strategy	The principles and objectives of electronic systems should be shaped and supported by different media channels, like television and mobile to market e-government projects properly.

3. RESEARCH METHOD AND DATA ANALYSIS

This study tried to explore the factors affecting Jordanians' intentions to use technology, thus collected a pilot data from students to see if the survey designed is reliable and will yield valid results. The sample included (149) responses that depicted a demographic distribution as shown in the table below.

Table 2: Sample Demographics (Gender, age, education, Internet usage)

Gender	Count	%
Male	50	33.6%
Female	98	65.8%
Missing	1	0.7%
Total	149	100%
Age	Count	%
18-25	146	98%
26-50	3	2%
Total	149	100%
Education	Count	%
Bachelor	148	99.3%
Master	1	0.7%
Total	149	100%

Residence	Count	%
In City	72	48.3%
In Village (rural)	75	50.3%
Missing (Not reported)	2	1.3%
Total	149	100%
Internet Usage Rate Hours per week	Count	%
<12 hours	90	60.4%
12-24 hours	35	23.5%
>24 hours	23	15.4%
Missing (Not reported)	1	0.7%
Total	149	100%

On the other hand, the instrument included 19 items that measure the perceptions of Jordanians regarding certain directions in e-government. The measures were classified into 5 major variables and rated using a 5 point Likert scale, with 1 representing "totally disagree" and 5 representing "totally agree". The empirical test results indicate moderate means regarding the 5 major constructs and they are: intention to use e-government (mean=3.58), trust in the Internet (mean=2.77), trust in government (mean=3.06), risk perceptions (mean=2.95), and finally, activities to improve trust in e-government (mean=3,81). Finally, the lowest item used was "I don't trust e-government and its services through the Internet" (mean of Qb4=2.53), and the highest item was "Updating the contents of website regularly" (mean of Qe5=4.08). Table 3 shows the means of the items and the summated means of the 5 variables.

Table 3: Items means

#	**Item description**	**N**	**Min**	**Max**	**Mean**	**Std. Dev.**	**Total Variable Mean**
Qa1	I like to use the Internet for Collecting information about the government	147	1	5	3.69	1.14	**Intention to Use = 3.58**
Qa2	I like to use e-government application through the Internet	147	1	5	3.76	1.02	
Qa3	I like to interact with my government using the Internet through Jordanian e-government portal	145	1	5	3.70	1.04	
Qa4	I don't mind to present personal information to the Jordanian e-government portal	146	1	5	3.23	1.22	
Qb1	I trust Internet security and protection protocols, which increase my willingness to use services provided by Jordanian e-government portal	146	1	5	2.79	1.15	**Trust in the Internet = 2.77**
Qb2	I feel Jordanian e-government portal's technical and legal infrastructure protects enough personal information and data	146	1	5	3.01	1.03	
Qb3	In general, Internet is trusted tool that I can use to interact with e-government	146	1	5	2.79	1.13	
Qb4	In general, I don't trust e-government and its services through the Internet	146	1	5	**2.53**	1.02	

Table 3: Items means (continued)

#	Item description	N	Min	Max	Mean	Std. Dev.	Total Variable Mean
Qc1	I trust government's institutions and departments	145	1	5	3.12	1.16	**Trust in Government = 3.06**
Qc2	I trust government institutions and departments' abilities to provide e-services effectively and securely	145	1	5	3.10	1.04	
Qc3	I trust that citizens and their benefits has the highest priorities at governments institutions and departments	147	1	5	2.76	1.25	
Qc4	I think Jordanian e-government portal is reliable site	147	1	5	3.28	1.06	
Qd1	Using e-government services decision is crucial and critical to me	148	1	5	2.99	1.13	**Risk Perceptions = 2.95**
Qd2	In general, I think using the Internet to provide government services for citizens is insecure and threat citizens data and their documents secrecy	146	1	5	2.91	1.05	
Qe1	Using e-government forums to discuss different topics with public	146	1	5	3.66	1.07	**Activities to Improve Trust in e-Government = 3.81**
Qe2	Using e-government's surveys to find out public satisfaction rate and publish the result	144	1	5	3.74	1.05	
Qe3	Using e-government portal to communicate and add comment on the announced government activities	144	1	5	3.72	1.04	
Qe4	State government policies on people practices on e-government portal	145	1	5	3.83	0.99	
Qe5	Updating the contents of website regularly	145	1	5	**4.08**	1.03	

4. CONCLUSION

This paper has presented some basic and important ideas about e-government: a general overview, definitions, benefits and barriers, trust and risk as acceptance factors. Further details on trust and risk were mentioned and different views were illustrated. Various studies conducted to study e-government acceptance and determine different rules, phases, and categories. This paper identifies trust and risk as important factors that could affect the usage of e-government application in a way that more trust of e-government application will decrease fear of using it and reduce risk issue. An empirical test was conducted and resulted in moderate means regarding 5 major constructs.
It is recommended that larger and different sample be used and validate the instrument used. Also, the factors used are not comprehensive, other variable can be included and related to popular model like the technology acceptance model (usefulness and ease of use), or the theory of reasoned actions and its extensions (like social influence).

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