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An Empirical Investigation on the Adoption of e-Government in Developing Countries: The Case of Jordan

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Abstract

While e-Government has the potential to improve public administration effectiveness as well as efficiency by increasing convenience, performance and accessibility of different government services to citizens, the success of these initiatives is dependent not only on government support, but also on citizens' willingness to accept and adopt those e-government services. Although there is a great body of literature that discuss e-Government in developed countries, e-government in developing countries, in general, and Arab countries, in particular, has not received equal attention. The objective of this study is to determine the factors that influence the adoption of e-government services in a developing country, namely Jordan. An extended version of Technology Acceptance Model (TAM) is utilized as the theoretical base of this study. Overall, the study proposes that citizens' perceptions about e-Government services influence their attitude towards adopting e-government initiatives. A survey collected data from 853 online users of Jordan's e-government services. Using partial least squares (PLS) of structural equation modeling (SEM) analysis technique, the results show that all the four factors, namely: Perceived Credibility, Perceived Usefulness, Perceived Ease of Use and Computer Self Efficacy have significant effect on the adoption of e-government services in Jordan. Moreover, the study findings show that Perceived Ease of Use is the most important factor in predicting Jordanian citizens' adoption of e-government services. The research limitations, implications for research and practice are discussed.

Keywords: developing countries, e-Government, ICT adopting, Jordan, TAM

1. Introduction

It has become clear, especially in the last two decades, that there is a global shift towards electronic government with the objective to introduce radical changes to the traditional approach of public service delivery. E-Government is argued to be vital in developing the public sectors around the globe, as it assures more accountability and transparency (Chatfield & Alhujran, 2009). Grant and Chau (2004, p. 8) comprehensively defined E-Government "a broad-based transformation initiative, enabled by leveraging the capabilities of information and communication technology (ICT); (1) to develop and deliver high quality, seamless and integrated public services; (2) to enable effective constituent relationship management; and (3) to support the economic and social development goals of citizens, business, and civil society at local, state, national and international levels."

Given that e-government is an important area of information technology (IT) and information systems (IS) innovation, governments have been attempting to incorporate e-government into their existing information system applications and government processes (Alshehri & Drew, 2010). However, this initiative has put a pressure on governments, as it raised the citizen's expectations of government's ability and responsibility to offer new, effective, efficient and contemporary services over the Internet. For instance, citizens receive high standard electronic services from the private sector, and they believe such high standard services should also be provided by different governmental organizations. As such, a number of countries, in both developed and developing nations, have started e-Government initiatives which aim to provide citizens with better services and improved governmental procedures.

While some theoretical work that discusses e-Government adoption in developing countries has been reported (e.g. Al-Ghaith et al., 2010; Al-Shafi and Weerakkody, 2009; Almatarneh, 2011; Alghamdi et al., 2012;

Weerakkody et al., 2013), most attention related to this concept was discussed in developed nations (e.g. Irani et al., 2008; Dwivedi et al., 2011; Shareef et al., 2011; Hsieh et al., 2013; Krishnan et al., 2013). This is particularly true in the Western Asian region, where although large sums of money have been invested and different ICT programs have been launched, most Arab countries have faced a number of challenges that have slowed the implementation and adoption of their e-government initiatives (Al-Shafi & Weerakkody, 2008). The Hashemite Kingdom of Jordan is one such example. Jordan is a developing country that has started a number of ICT development initiatives in 2000. Worldwide, the UN e-government readiness report (2014) ranked Jordan's e-government project in the 79th place globally.

Al-Soud et al. (2014) postulated that the Jordanian National ICT Strategy (2007-2011) has set a number of objectives to develop the Jordanian ICT infrastructure. One of which was to increase the Internet penetration to 50% by 2011. To achieve this objective, the Government of Jordan had set a high priority goal to increase the demand for Internet usage by developing the e-Government sector. The main drivers are to provide more attractive Internet-based services and increase the number of relevant government-to-citizen (G2C) services delivered electronically (Int@j, 2011). Jordan managed to increase the Internet usage and penetration from 20% in 2007 to 29% in 2009 (TRC, 2009).

Some research concerning e-Government in Jordan was reported in the literature. For example, Al-Shibly and Tadros (2010) investigated factors which have an impact on e-Government acceptance by Jordanian employees. The results of their research indicated that system quality, information quality and perceived ease of use, are significant factors that contributes to e-Government acceptance in Jordan. However, Al-Soud et al. (2014) criticised their work by arguing that when assessing the maturity level of the Jordanian e-Government services, it is important to determine whether these factors are valid when it comes to Jordanian citizens and other e-Government users; and whether there are other factors that have a direct effect on e-Government acceptance in Jordan. Also, AL-Soud and Nakata (2010) examined different Jordanian governmental Websites and concluded that the Jordanian e-Government Websites lack consistency in terms of standards and features due to the absence of different features that could improve interaction with the users. The authors argued that this is most likely due to a lack of consideration for the citizens' expectations and needs. Just recently, Al-Soud et al. (2014) investigated Jordan's e-Government maturity level and addressed a number of key factors that hinder Jordan's e-Government development. The authors claimed that the citizen's interest in e-Government services is declining, as the citizens' level of awareness of e-Government and its services is still modest after more than ten years of the start of the e-Government initiative in Jordan. The authors also argued that citizens' attitude toward using e-Government services is changing and determined by various factors and issues, such as: citizen's preferences when dealing with e-government, citizen's attitude toward using various e-services, citizen's concerns and the required services.

Carter and Belanger (2005) argued that the success of e-Government initiatives is dependent not only government support, but also on citizens' willingness to accept and adopt those e-government services. This is called the "demand side" of e-Government, which examines the factors that promote and inhibit the adoption of e-government by citizens (Reddick et al., 2012). Without citizens' acceptability and adoption of e-Government services, such an initiative may not achieve its intended goals.

This study adopted an extended version of the technology acceptance model (TAM) to investigate factors that determine the adoption of e-government services in Jordan. The main research question of this paper is: What are the main factors that determine citizens' attitudes toward adopting e-Government services? It is believed that the findings of this study will help decision makers in Jordan, and other developing countries, to gain a better understanding of the factors that determine citizens' adoption of e-government services.

The paper is structured as follows. Following the Introduction, Section 2 provides (a) a brief background of TAM, as a theoretical foundation of this study, (b) an abbreviated past research on e-Government adoption, and (c) an overview the e-Government initiative in Jordan and the United Nations (UN) assessment of Jordan's e-Government development and readiness; Section 3 discusses the research model and hypotheses; Section 4 explains the research method; Section 5 presents the research results; and Section 6 summarises the hypothesis testing; followed by the research conclusions, limitations and future research.

2. Literature Review

2.1 Technology Acceptance Model (TAM)

Researchers in the field of Information Systems (IS) have for long been interested in investigating the theories and models that have the power in predicting and explaining behaviour (Venkatesh et al., 2003). Various models were developed, such as the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975), Innovation

Diffusion Theory (IDT) Rogers (1962, 1995), Theory of Planned Behaviour (TPB) (Ajzen, 1991), Diffusion of Innovation (DOI) Rogers (1995) and Technology Acceptance Model (TAM) (Davis, 1986). Each model has its own independent and dependent variables for user acceptance and there are some overlaps. However, most of the IT adoption works conducted earlier had adopted the technology acceptance model (TAM) to examine the user's intention for acceptance of technology. In their study of a total of 500 survey questionnaires, Adensina and Ayo (2010) found that TAM is the most widely used model for technology adoption.

TAM was developed by Davis (1986) to theorize the usage behavior of computer technology. The TAM was adopted from another popular theory called theory of reasoned action (TRA) from field of social psychology which explains a person's behavior through their intentions. Intention in turn is determined by two constructs: individual attitudes toward the behavior and social norms or the belief that specific individuals or a specific group would approve or disprove of the behavior. While TRA was theorized to explain general human behavior, TAM specifically explained the determinants of computer acceptance that are general and capable of explaining user behavior across a broad range of end-user computing technologies and the user population (Davis Bagozzi & Warshaw, 1989). TAM breaks down the TRA's attitude construct into two constructs: perceived usefulness (PU) and perceived ease of use (EU) to explain computer usage behavior. In fact, TAM proposes specifically to explain the determinants of information technology enduser's behavior towards information technology (Saade, Nebebe & Tan, 2007). In TAM, Davis (1989) proposes that the influence of external variables on intention is mediated by perceived ease of use (PEU) and perceived usefulness (PU). TAM also suggests that intention is directly related to actual usage behavior (Davis et al., 1989).

While TAM has received extensive support through validations, applications and replications for its power to predict use of IS and is considered to be the most robust and influential model explaining IS adoption behaviour (Davis, 1989; Davis et al., 1989; Lu et al., 2003), it has been found that TAM excludes some important sources of variance and does not consider challenges such as time or money constraints as factors that would prevent an individual from using an information system (Al-Shafi and Weerakkody, 2009). In addition, TAM has failed to provide meaningful information about the user acceptance of a particular technology due to its generality (Mathieson et al., 2001). Davis et al, (1989) compared the TAM with TRA in their study. The confluence of TAM and TRA led to a structure based on only three theoretical constructs: behaviour intention (BI), perceived usefulness (PU) and perceived ease of use (PEOU). Social norms (SN) were found to be weak as an important determinant of behavioural intention. While TRA and TPB theorised social norms as an important determinant of behavioural intention, TAM does not include the social norms as such, influence of social and control factors on behaviour. This is significant, as the model will miss a core and critical component of technology acceptance, as these factors are found to have a significant influence on IT usage behaviour (Mathieson, 1991; Taylor & Todd, 1995) and indeed are important determinants of behaviour in the TPB (Ajzen, 1991).

Researchers have found that original TAM variables may not adequately capture key beliefs that influence consumer attitudes toward e-commerce, for example, (Pavlou, 2003). As a result, TAM has been revised in many studies to fit a particular context of technology being investigated. One important and well-received revision of TAM has been the inclusion of social influence processes in predicting the usage behavior of a new technology by its users (Venktatesh and Davis, 2000). Venkatesh and Davis (2000) extended the original TAM model to explain perceived usefulness and usage intention in terms of social influence (e.g., subjective norms, voluntariness) and cognitive instrumental processes (e.g., job relevance, output quality). The extended model is referred to as TAM2. Later, Venkatesh et al. (2003) adopted a new model, UTAUT, which incorporates constructs from a number of other IT adoption theories/models. UTAUT was developed as a result of a review and synthesis of eight theories and models of IT adoption (Venkatesh et al., 2012). Since its original publication, UTAUT has been applied to the study of a variety of IT applications in both organizational and non-organizational settings that have contributed to fortifying its generalizability (Venkatesh et al., 2012). It should be noted though, that the application of UTAUT as raised a number of concerns in relation to it's applicability in non-Western countries (e.g. Al-Qeisi et al., 2015).

2.2 e-Government Adoption Research

Researchers have adopted various forms of TAM and UTAUT in order to investigate e-government adoption in different perspectives. Schaupp and Carter (2005), for example, examined the adoption of an e-voting system in the USA, and found only trust (in the internet and in the government) having a direct effect on the intention to use the system. Also, Sahu and Gupta (2007) investigated the adoption of an e-government application in the Indian Central Excise. With the exception of self-efficacy, top management support and voluntariness of use, the model factors were found to be significant predictors of the intention to use the investigated system.

A number of studies have investigated the adoption of e-government services in developed countries (Titah and Barki, 2006), whereas relatively little has been undertaken in developing countries (AlShihi, 2005). For example, Dimitrova and Chen (2006) studied the effects of socio-psychological factors on the adoption of e-government in the USA using both, TAM and DOI. The researchers identified perceived usefulness, perceived uncertainty and civic-mindedness as adoption factors. An online questionnaire was posted to a census-balanced sample of Internet users in the United States. The study results showed that perceived usefulness, perceived uncertainty and prior interest in government were associated with the adoption of e-government in the US.

In another study, Titah and Barki (2006) investigated the adoption of e-Government in public citizens in Australia using TAM. The research findings reported that perceived usefulness (PU), which has been validated to be the most reliable predictor of influencing IT adoption behaviors in private commercial organizations in the research literature, was found not significant in influencing e-Government adoption in public citizens. The authors questioned the validity of directly extending the TAM theory into studying e-Government adoption issues in public sectors.

Based on TPB theory, Hung, Chang and Yu (2006) examined the public's acceptance of the online tax filing and payment system (OTFPS), an e-government service in Taiwan. The authors proposed a comprehensive model to elicit users' salient attitudes towards e-government services using an e-mail questionnaire survey. They found that perceived usefulness, ease of use, perceived risk, trust, compatibility, external influence, interpersonal influence, self-efficacy and facilitating conditions were critical factors in the adoption of OTFPS in their study. In addition, Colesca and Dobrica (2008) extended TAM to understand the potential user's adoption behavior of e-government in Romania. The analysis of the study data revealed that the citizen's higher perception of usefulness, ease of use, quality and trust of e-government services directly enhanced their satisfaction and implicitly the level of adoption of e-government.

Based on a small sample of randomly selected senior citizens, Phang et al. (2005) studied the adoption of e-government by Chinese senior citizens based on TAM. The authors modelled compatibility, image and Internet safety perception as determinants of perceived usefulness and ease of use. The findings revealed that perceived ease of use and Internet safety influenced the senior citizens' perception of the usefulness of e-government; while cultural considerations, image and compatibility had less influence on the usefulness of IT as perceived by users. In addition, Suki and Ramayah (2010) investigated the influence of a number of factors on the acceptance of e-government services in Malaysia. They found that perceived usefulness, ease of use, compatibility, interpersonal influence, external influence, self-efficacy, facilitating conditions, attitude, subjective norms, perceived behavioral control and use intention to be significant determinants of the acceptance of e-government services.

In another study, Rokhman (2011) studied the acceptance of Indonesian Internet users to e-government services, in terms of relative advantage, image, compatibility, and ease to use variables. The research finding showed that there are more than 93 percent of the respondents have intention to adopt e-government. Also, relative advantage and compatibility variables were proven as useful factors to predict intention to use e-government, while the variables of image and ease to use is not proven.

Akman et al. (2005) studied the impact of gender and education in the use of e-government services in Turkey. The researchers argue that there are differences in gender, education and occupation between people using ICT. Different groups of people were surveyed in the public and private sectors. The study results showed that differences in gender and education had a significant impact on the adoption of e-government services. The researchers found that males used e-government information and services more than females. It was also reported that the level of education of survey participants increased, the interaction with e-government also increased.

In the Arab countries, Charbaji and Mikdashi (2003) explored the attitudes towards e-government of a sample of 220 graduate students at different universities in Lebanon, using a questionnaire with cognitive, affective and conative dimensions. The cognitive dimension refers to knowledge and awareness; the affective dimension to people's feelings towards e-government; and the conative dimension to the intention of using e-government. The findings showed a direct relationship between the cognitive and conative dimensions, while the dimension of affective feelings was found to be less influential.

In another study, AlShihi (2005) who investigated the development and adoption of e-government services in Oman. He interviewed employees in both the private and the public sector and surveyed different segments of Omani society. The author found a number of barriers to the uptake of e-government in the country which were related to users' lack of IT knowledge, awareness and motivation; the under-marketing of e-government plans

and initiatives; a lack of proper legislation and laws; and a lack of trust and confidence by users. However, the findings showed that culture had little effect on the adoption of e-government.

Al-Shafi and Weerakkody (2009) examined the factors affecting e-government adoption in the state of Qatar. They found effort expectancy and social influence to influence the intention to use e-government services, and use intention to influence actual use of the services. In Kuwait, ALAwadhi and Morris (2009) used a modified UTAUT model to e- government service adoption. They found performance expectancy and effort expectancy to influence use intention, and facilitating conditions and use intention to influence actual use of the service. They also found that greater Internet experience increased the effect of performance expectancy on use intention in the short run. Mouakket (2010) extended TAM model to study the factors that encourage citizens to adopt e-government in the United Arab Emirates (UAE). The results supported their model in predicating citizens' attitudes towards e-government program.

2.3 The Case of Jordan – Overview

The Hashemite Kingdom of Jordan currently presents an interesting case for examining the uptake of e-Government initiative. The Kingdom of Jordan is located in the Middle East, its capital is Amman. Jordan is a small country with very limited natural resources. The total population of Jordan is about nine millions with 91% are literate (Halaweh, 2011). The official language of Jordan is Arabic, while English is also spoken. Jordan is a lower middle income country, but is one which in recent years has been undertaking reforms to position for stabilised prosperity. Along with increased focus on infrastructure and education, developing a stronger private sector is part of the national strategic modernisation. Since the mid-1980s Jordan's per capita GDP has increased more than 500% as it has implemented policies to foster conditions favourable to technology transfer (Finston, 2007), ICT expansion and a global market orientation. With few natural resources, the knowledge based and services sectors are likely to dominate future economic development. Such industries rely heavily on effective adoption and deployment of ICTs, and, like the rest of the region, substantial growth in telecommunications infrastructure and ICT usage has been recently evident (Jordan Business, 2007).

It is noted that when King Abdullah II came to the throne in 1999, he supported the application of ICTs as an effective means to develop the economy and the social life of the Kingdom (Al-Jaghoub and Westrup, 2003). Since that time, the Jordanian government has worked its best to benefit from ICTs to effectively exploit the resources of the Kingdom and occupy a distinct position in the global and regional competitiveness (Mofleh, Wanous et al., 2008). In this regard, (Rabaai, 2009) argues that the Jordanian governments are highly interested in the application of ICTs to have a place in the global digital economy. Consequently, Jordan now is developing a strong ICT sector to be a competitive state in this regard (Al-Jaghoub and Westrup, 2003).

As the Kingdom of Jordan plays a vital role in the economic and political stability and prosperity of the Middle East, the economy of Jordan is strengthened by adopting a liberal economic policy that encourages other countries to invest in the country (Naser and Nuseibeh, 2008). Tubaishat et al. (2006) argue that, such liberal economy is reflected upon technology application and services where Jordan is distinguished in this regard from other Arab countries such as United Arab Emirates and Saudi Arabia.

The United Nations e-Government surveys have published different reports which have analyzed how governments of the world are employing their e-Government initiatives to support effectiveness, efficiency, and inclusiveness as the parameters of sustainable development efforts worldwide (UNPAN, 2012). These reports have been used in this paper to evaluate Jordan's performance in developing its e-Government program. When using the United Nations e-Government Readiness reports, it should always be kept in mind that the e-Government Readiness Index is a composite of three components, namely: Web measure (i.e. online services), telecommunication and the human capital (Al-Soud et al., 2014).

According to UNPAN (2012) the telecommunication infrastructure and human capital components (which have two-thirds of the total weight of the e-Government development index) have contributed in achieving higher rankings in the survey for developed countries, as these components require long-term investment. Hence, it is not surprising that the majority, if not all, of the top 25 positions in the rankings belong to high income countries due to their ability to invest in developing their e-Government Programs. However, this is not the case for the developing countries, although some of them have the financial ability to develop advanced e-Government initiatives due to lack of human capital and/or telecommunication infrastructure (Al-Soud et al., 2014).

In 2008, Jordan's performance has improved significantly since the 2005 survey, as it took a remarkable jump of 18 positions in the global ranking from being ranked 68th in 2005 to 50th in 2008. Jordan has attained a good growth in e-Government services since the 2005 survey and by being above the 2008 world average (0.4514) (Al-Soud et al., 2014). In terms of the e-participation index, for example, Jordan had the greatest move upwards

all over the world from being ranked 90th in 2005 to 15th in the 2008 survey. Al-Soud et al. (2014) argue that the Government of Jordan has invested in enhancing the national e-Government portal (www.jordan.gov.jo) which included features that increase citizen participation by having a formal online consultation section, where the government receives suggestions, questions and feedback from its citizens on government services and polices. Also, the King of Jordan has dedicated a personal Web site (www.kingabdullah.jo) to which citizens can send their views, suggestions and post opinions. According to the 2008 report, these were the main reasons behind this dramatic leap upwards (UNPAN, 2008).

In 2012 Jordan has been ranked 98 globally and 14 out of 17 of the Western Asia countries for the overall e-Government readiness index, with an overall index of 0.4884 out of 1.0, of which, 0.3922 for online service component, 0.2717 for telecommunication infrastructure component and 0.8013 for human capital component (UNPAN, 2012). This proves the lack of telecommunication infrastructure and online service delivery in Jordan infrastructure (Al-Soud et al., 2014). Nonetheless, Jordan has made some improvement in 2014 compared to data shown in 2012 report. In 2014, Jordan was ranked 79 globally and 13 out of 17 of the Western Asia countries, with an overall index of 0.5278 out of 1.0, of which, 0.5197 for online service component, 0.3104 for telecommunication infrastructure component and 0.7202 for human capital component. While it is a noticeable improvement, Jordan ranking in 2014 is still below its ranking in 2010, as the 2010 report shows that Jordan global ranking is 51, with an overall ranking index of 0.5278 out of 1.0, of which, 0.1813 for online service component, 0.0596 for telecommunication infrastructure component and 0.2869 for human capital component (UNPAN, 2010).

While Jordan is ranked among high E-Government Development Index (EGDI) in 2014 report, there is a considerable opportunity to continue to advance its e-government development. With clear strategies, smart investment in ICT infrastructure, continued investment in primary, secondary and tertiary education, as well as through radical transformation in offering online public services, governments can achieve more to follow the upward trend (UNPAN, 2014, p. 16).

Jordan's e-Government online service component still needs more enhancements. The online services index, that attempts to capture a country's performance in a single "internationally comparable" value by applying a four-level maturity model (Stage 1, emerging of online service; Stage 2, enhancement of the online service; Stage 3, advance to a transactional level with many services available online; and finally Stage 4, connected Web of integrated functions and services) (UNPAN, 2010).

Despite some improvements shown in 2014 report, with an overall online service index of 0.5197 out of 1.0, of which, 91% 41% 21% 50% for Stage1, 2, 3, and 4 respectively; as compared to 2012 data, with an overall online service index of 0.3922, of which, 91% 41% 21% 50% for the same stages. There are many reasons that may have contributed to this shortage of online transactional services in Jordan and many developing countries; these include: lack of development of national financial systems; absence of e-payment systems; absence of adequate regulatory and legal systems to control electronic payments by credit card, debit card, or some other e-payment method; lack of high level of security to allow e-transactions and e-payments; and having other priorities such as investing in telecommunication infrastructure (UNPAN, 2012).

However, Jordan's e-Government has improved since 2010, to some extent, and its decline in the UNe-Government ranking is not an indication that there are no improvements (UNPAN, 2005, 2008, 2010, 2012 and 2014). One of these improvements, for example, was launching an SMS services portal , which aimed at increasing the channels of communications between citizens and governments. It is now recognised as the most prevalent communication tool with all segments of the Jordanian community, helping in enhancing the quality and efficiency of governmental services. It provides citizens with two types of services: (i) push messages by governmental institutions and departments such as reminders and awareness campaigns; and (ii) pull messages that are sent by citizens as an SMS inquiry and are automatically responded to by the relevant governmental department (UNPAN, 2014). However, these improvements were not enough for Jordan to compete with other countries, especially in Western Asia region, which achieved better scores due to their steady development in the telecommunication infrastructure and Web services components. Jordan's human capital component was always a supportive element and has contributed in having better ranking among the world in general and sub-regional countries in particular (Al-Soud et al., 2014, p. 604).

3. The Research Model and Hypotheses

As discussed previously, while TAM has been extensively used in different contexts in IS research, TAM has been criticised for (1) not providing meaningful information about the user acceptance of a particular technology due to its generality (Mathieson et al., 2001), and (2) not including the social norms such as influence of social

and control factors on behaviour. This is significant, as the model will miss a core and critical component of technology acceptance, as these factors are found to have a significant influence on IT usage behaviour. For instance, other researchers have found that original TAM constructs may not adequately capture key beliefs that influence consumer attitudes toward the adoption of different ICTs.

Based on various recent TAM studies, this research in adopting an extended TAM with the inclusion of two additional constructs, namely: 'perceived credibility' and 'computer self-efficacy'. Individual differences factors such as self-efficacy incorporated into the TAM was found to have significant effects on intention through PEU and PU and perceived credibility in internet banking usage (Wang et al., 2003). Trust and perceived risks have also been examined in TAM previous research but have shown mixed findings (Kim et al. 2001 and Pavlou, 2001). Perceived credibility is the first dimension of trust as defined by Lindskold, (1978). Behavioral intentions may be defined as a measure of the strength of one's intention to perform a specific behavior such as the use/adoption of an IS (Fishbein & Ajzen, 1975). Figure 1 depicts the research model of this study.

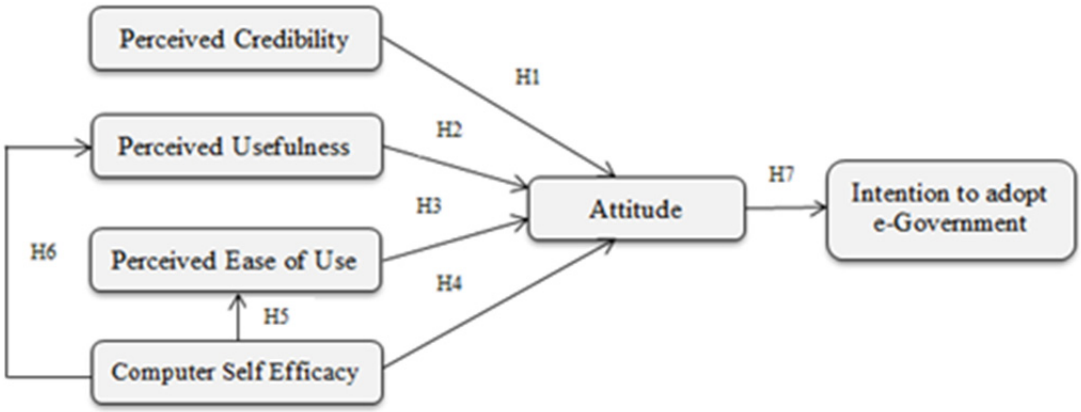

Figure 1. The Research Model

Perceived Credibility

For the purpose of this study, perceived credibility (PC) indicates the perception of protection of user's transaction details and personal data against illegal entrance. According to Hanudin (2007), perceived credibility is a key indicator of behavioral intention to use an IS. Perceived credibility refers to two important dimensions which are security and privacy. Security is defined as the protection of information or systems from unsanctioned intrusions or outflows, while privacy is the protection of various types of data that are collected (with or without the knowledge of the users) during users' interactions with the internet (Hoffman et al., 1999). Oni and Ayo (2010) tested empirically and proved that Perceived Credibility (PC) have positive impact on Perceived Ease of Use (PEOU), Perceived Usefulness (PU) and customer attitude. Nysveen et al, (2005) also found perceived credibility had a significant effect on intention. The usage intention (i.e. attitude of e-government services) could be affected by users' perceptions of credibility regarding security and privacy issues. Thus, to study the effect of perceived credibility on user's acceptance of e-government services in Jordan, the study makes the following hypothesis:

H1: Perceived credibility has positive impact on users' attitude of e-government services in Jordan

Perceived Usefulness

Perceived usefulness is defined as the extent to which a person believes that using a particular system will enhance his or her job performance Davis (1989). Subramanian (1994) found that perceived usefulness had significant correlation with attitude toward usage behavior. This finding was later confirmed by Fu, Farn, and Chao (2006) and Norazah, Ramayah,and Norbayah (2008) who found that behavioral intention was largely driven by perceived usefulness. There has been extensive body of literature in the IS community that provides evidence of the significant effect of perceived usefulness on usage intention (e.g. Taylor & Todd, 1995; Venkatesh & Davis, 2000). Perceived usefulness was found to be significant constructs in the e-Government adoption literature (e.g. Carter & Belanger, 2005). As a result, the following hypothesis was made:

H2: Perceived usefulness use has a positive effect on users' attitude of e-government services in Jordan

Perceived Ease of Use

Perceived ease of use is another major determinant of attitude toward use in the TAM model. Davis (1989, p.320) defined Perceived Ease of Use (PEU) as "the degree to which a person believes that engaging in online transactions would be free of effort". PEU is the fundamental determinant for the acceptance and use of IT in general (Moon and Kim, 2001). This finding was later confirmed by other researchers (e.g. Fagan, Wooldridge, & Neill, 2008; Jahangir & Begum, 2008; Hsu, Wang, & Chiu, 2009; Ramayah, Chin, Norazah, & Amlus, 2005) who found PEU to have positively influenced the behavioural intention to use different IS applications. More specifically, perceived ease of use was found to be significant constructs in the e-Government adoption literature (e.g. Carter & Belanger, 2005). These results suggest the following hypothesis:

H3: Perceived ease of use has a positive effect on users' attitude of e-government services in Jordan

Computer Self Efficacy

Self-efficacy is one's belief in his or her ability to execute a particular task or behavior (Bandura, 1986). For instance, computer self-efficacy (CSE) measures one's confidence in mastering a new technology (Compeau & Higgings, 1995). If a person has high CSE, then he/she will be successful in using the technology, and if a person shows low CSE, then he/she may believe will have difficulty using the technology purposefully (Lai, 2008). Venkatesh and Davis (1996) found that CSE acts as a determinant of perceived ease of use both before and after hands-on use with a system (Venkatesh & Davis, 1996). CSE is considered as one of the external variable in TAM model and it plays a vital role in shaping an individual's feeling and behaviour (Compeau & Higgings, 1995). Eastin (2002) revealed that computer self-efficacy have a significant impact on customer attitude and played important role in the e-commerce adoption processes. Also, Hanudin (2007) found that there is a causal link between computer self-efficacy and perceived ease of use. In fact, CSE would lead to more favourable behavioural intention through its influence on PU and PE (Wang et al., 2003 and Pikkarainen et al., 2004). Other TAM researchers have found an influence of CSE on the TAM (Chen et al., 2002; Downey, 2006; Strong et al., 2006, Saade and Kira, 2009). As a result, to investigate the effect of computer self-efficacy on user's acceptance of e-government services in Jordan, this study hypothesizes the following:

H4: Computer self-efficacy has a positive impact on users' attitude of e-government services in Jordan.

H5: Computer self-efficacy has a positive impact on perceived ease of use of e-government services in Jordan.

H6: Computer self-efficacy has a positive impact on perceived usefulness of e-government services in Jordan.

User Attitude

Karjaluoto et al. (2002) defined attitude as the users' desirability to use the system. Fishbein and Ajzen (1975) classified Attitude into two constructs: attitude toward the object and attitude toward the behavior. The latter refers to a person's evaluation of a specified behavior. In TAM context, attitude is defined as the mediating affective response between usefulness and ease of use beliefs and intentions to use a target system (Suki & Ramayah, 2010). Davis (1989) stated that a prospective user's overall attitude toward using a given system is an antecedent to intentions to adopt. Suki and Ramayah (2010, p. 399) stated that "As an innovative system, e-Government is still in its infancy. Large numbers of users simply do not exist in many countries and regions. An investigation of attitudes toward using e-Government and identification of its relationship with intention to use is more appropriate and practically valuable for predicting usage behaviour". Thus, to investigate the effect of users' attitude on users' acceptance and adoption of e-government services in Jordan, this study hypothesizes:

H7: Users' attitude has a positive impact on intention to adopt e-government services in Jordan.

4. The Research Method

The data reported in this study is part of larger research effort aimed at investigating e-Government initiative in Jordan. Table 1 shows the operationalized definitions of different variables as well as the questionnaire items used in the research model and their sources. A seven point Likert scale with anchors of strongly disagree to strongly agree was used to measure each item.

Table 1. Definitions and measurement items of the constructs used in this study

Perceived Credibility	Perceived credibility indicates the perception of protection of user's transaction details and personal data against illegal entrance		Oni and Ayo (2010)
	Items		
	PC1	Using e-government services would not divulge my privacy.	Yang (2007)
	PC2	Information and News on e-government sites are more credible	
	PC3	I would find e-government services reliable in conducting my transactions.	
	PC4	I would find e-government services kept my information confidential.	
Perceived Usefulness	The degree to which a person believes that using a particular technology will enhance his performance.		Davis (1989)
	Items		
	PU1	Using e-government services would enable me to accomplish my tasks more quickly	Davis (1989)
	PU2	Using e-government services would make it easier for me to carry out my tasks	
	PU3	I would find e-government services useful	
	PU4	Overall, I would find using e-government services to be advantageous	
Perceived Ease of Use	The degree to which person believes that using a particular system would be free of effort.		Davis (1989)
	Items		
	PEU1	Using the e-government services is easy for me	Davis (1989)
	PEU2	It is easy for me to become skillful at the use of the e-government services	
	PEU3	Overall, I find the use of e-government services easy	
Computer Self Efficacy	Individuals' judgment of their capabilities to use computers in diverse situations.		Thatcher and Perrewe (2002)
	Items		
	CSE1	I am confident of using e-government services if I have only the online instructions for reference.	Lee et al. (2003)
	CSE2	I am confident of using e-government services even if there is no one around to show me how to do it.	
	CSE3	I am confident of using e-government services even if I have never used such a system before.	
	CSE4	I believe I have the ability to install and configure the software to access e-government services	
Attitude	Attitude towards behavior is made up of beliefs about engaging in the behavior and the associated evaluation of the belief.		Fishbein and Ajzen (1975)
	Items		
	ATT1	Using e-government services is a good idea	Lee et al. (2003)
	ATT2	I would feel that using e-government services is pleasant	
	ATT3	In my opinion, it would be desirable to use e-government services	
	ATT4	In my view, using e-government services is a wise idea	
Intention to Use	Intention to use refers to the extent to which individuals would like to use e-government services		Gupta et al. (2008)
	Items		
	IU1	I would use e-government services for my different governmental transactions	Cheng et al. (2006), Jahangir and Begum (2008)
	IU2	Using e-government services for handling my governmental related transactions is something I would do	
	IU3	I would see myself using e-government services for handling my governmental related transactions	

A total of 853 usable survey responses were collected and examined. Only 38.7 percent of respondents are females while majority of 61.3 percent are males. 6.33 percent of the respondent is aged less than 18 years; 26.61

percent were aged between 18-25, 42.79 percent were age between 26-30 years; 16.06 percent were aged between 31-40 and only 8.21 percent were above 40 years of age. Most of the respondents have been using e-government services between 1–3 years with 37.75 percent, while only 6.45 percent have been using e-government services for more than 10 years. Table 2 shows a snapshot of the respondents' demographic data.

Table 2. Demographic data of the respondents

Data	Frequency	Percentage
Gender		
Male	523	61.3
Female	330	38.7
Total	853	100.0
Age		
Less than 18 years	54	6.33
18 – 25 years	227	26.61
26 – 30 years	365	42.79
31 - 40 years	137	16.06
More than 40 years	70	8.21
Total	853	100.0
e-Government services usage		
Less than a year	112	13.13
1–3 years	322	37.75
4–7 years	259	30.36
8–10 years	105	12.31
more than 10 years	55	6.45
Total	853	100.0

5. Research Results

Partial Least Square (PLS) of structure equation modelling was used to analyze the data of this study. PLS method is used for small sample since it used boot-strapping methods (Gupta et al., 2008). The research model presented in Figure 1 was analyzed using SmartPLS 3.0 (Ringle, Wende, & Will, 2014)..Validation of PLS models involve a two-step process: 1) assessing the outer (measurement) model and (2) assessing the inner (path) model. The reliability and validity of the outer-model need to be established before the inner-model is examined (Henseler et al., 2009).

5.1 The Measurement Model

Tests for internal consistency, items' loadings, convergent validity and discriminant validity were conducted. Internal consistency reliability and indicators reliability were also evaluated. Specifically, Cronbach's Alpha (Cronbach, 1951), Composite Reliability (Werts et al., 1974) and examination of item loadings (Carmines & Zeller, 1979) cross-loadings (e.g. Yoo & Alavi, 2001) and average variances extracted (AVE) (Fornell & Larcker, 1981) were used. The results are shown in Table 3.

Table 3. Items loading, Cronbach's alpha, Composite reliability and AVE

Items	Loading	Cronbach's Alpha	Composite Reliability	AVE
PC1	0.9556			
PC2	0.9887			
PC3	0.9774			
PC4	0.9255			
Perceived Credibility		**0.9417**	**0.9729**	**0.9547**
PU1	0.9785			
PU2	0.9335			
PU3	0.9572			
PU4	0.9844			

Perceived Usefulness		**0.9627**	**0.9833**	**0.8926**
PEU1	0.9365			
PEU2	0.9422			
PEU3	0.9843			
Perceived Ease of Use		**0.9552**	**0.9746**	**0.8814**
CSE1	0.9118			
CSE2	0.9531			
CSE3	0.9722			
CSE4	0.9455			
Computer Self Efficacy		**0.9211**	**0.9604**	**0.9462**
ATT1	0.9668			
ATT2	0.9427			
ATT3	0.9566			
ATT4	0.9822			
Attitude		**0.9359**	**0.9720**	**0.9312**
IU1	0.9139			
IU2	0.9660			
IU3	0.9766			
Intention to Use		**0.9108**	**0.9664**	**0.9174**

Table 4 provides evidence of the discriminant validity of the item scales used in this study. The bolded items in the matrix diagonals, representing the square roots of the AVEs, are greater in all cases than the off-diagonal elements in their corresponding row and column, supporting the discriminant validity of the item scales.

Table 4. Discriminant validity (inter-correlations) of the item scales

	Perceived Credibility	Perceived Usefulness	Perceived Ease of Use	Computer Self Efficacy	Attitude	Intention to Use
Perceived Credibility	**0.9771**					
Perceived Usefulness	0.2548	**0.9448**				
Perceived Ease of Use	0.1147	0.2942	**0.9388**			
Computer Self Efficacy	0.2247	0.3541	0.2095	**0.9727**		
Attitude	0.2169	0.4184	0.2376	0.3249	**0.9651**	
Intention to Use	0.3221	0.2937	0.4823	0.2214	0.3297	**0.9578**

The convergent validity of the item scales were assessed by extracting the factor loadings (and cross loadings) of all items to their respective construct. These results, shown in Table 5, indicate that all items loaded: (1) on their respective construct from a lower bound of 0.9118 to an upper bound of 0.9887 and (2) more highly on their respective construct than on any other construct (the non-bolded factor loadings). A common rule of thumb to indicate convergent validity is that all items should load greater than 0.7 on their own construct, and should load more highly on their respective construct than on the other constructs (e.g. Yoo & Alavi, 2001).

Table 5. Factor loadings (bolded) and cross loadings

Items	Perceived Credibility	Perceived Usefulness	Perceived Ease of Use	Computer Self Efficacy	Attitude	Intention to Use
PC1	**0.9556**	0.4667	0.2984	0.1187	0.3266	0.4832
PC2	**0.9887**	0.4764	0.3241	0.3289	0.5498	0.5459
PC3	**0.9774**	0.5002	0.5412	0.4137	0.2214	0.4169
PC4	**0.9255**	0.3721	0.4197	0.5512	0.3514	0.2111
PU1	0.3328	**0.9785**	0.5276	0.5412	0.1292	0.4829

PU2	0.2841	**0.9335**	0.5235	0.2298	0.1421	0.5970
PU3	0.1983	**0.9572**	0.6948	0.4561	0.4429	0.4167
PU4	0.2689	**0.9844**	0.3248	0.5594	0.5997	0.3597
PEU1	0.3469	0.2547	**0.9365**	0.6210	0.3279	0.2103
PEU2	0.3642	0.1037	**0.9422**	0.6484	0.4600	0.5003
PEU3	0.2294	0.1433	**0.9843**	0.5278	0.5694	0.5186
CSE1	0.3628	0.5240	0.3281	**0.9118**	0.3364	0.2591
CSE2	0.2691	0.3819	0.6240	**0.9531**	0.4003	0.1008
CSE3	0.4183	0.4795	0.1062	**0.9722**	0.3617	0.6125
CSE4	0.3418	0.3273	0.3681	**0.9455**	0.2098	0.4168
ATT1	0.2159	0.6749	0.5841	0.2009	**0.9668**	0.2655
ATT2	0.3629	0.4297	0.4419	0.3291	**0.9427**	0.4257
ATT3	0.2586	0.1617	0.3649	0.3622	**0.9566**	0.6541
ATT4	0.3670	0.2474	0.6629	0.2648	**0.9822**	0.2150
IU1	0.4520	0.6418	0.2698	0.2059	0.5039	**0.9139**
IU2	0.4908	0.5413	0.3369	0.3604	0.4390	**0.9660**
IU3	0.2203	0. 6548	0.5529	0.4419	0.3329	**0.9766**

5.3 The Structural Model

Based on the suggestions of Chin (1998), the assessment of the structural model entails: Estimates for path coefficients (β), Determination of coefficient (R^2), and Estimates for total effects.

The first step in assessing the structural model, using PLS, should be based on the path coefficient's (β) direction algebraic sign, magnitude and significance (Chin, 1998, 2010; Götz et al., 2010; Henseler et al., 2009; Urbach & Ahlemann, 2010) (Note 1).

In PLS, the individual path coefficients of the structural model can be interpreted as standardised beta coefficients of ordinary least squares regressions (Henseler et al., 2009, p. 304). Path coefficients should exceed .100 to account for a certain impact within the structural model (Nils Urbach & Ahlemann, 2010). Furthermore, path coefficients should be significant at least at the .050 level (Henseler et al., 2009; Urbach & Ahlemann, 2010). Figure 2 shows the structural model results. All beta path coefficients (β) are positive (i.e. in the expected direction) and statistically significant (at $p < 0.05$).

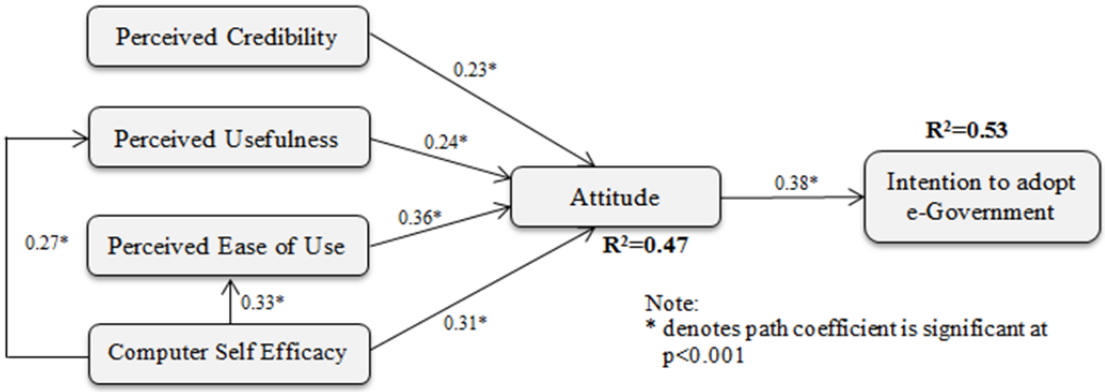

Figure 2. The Structural Model

Since the main purpose of the structural model is to assess the relationships between hypothetical constructs (Götz et al., 2010), the most essential criterion for the assessment of the structural model is the coefficient of determination (R^2) of each of the constructs in the model. R^2 values should be sufficiently high for the model to have a minimum level of explanatory power (Chin, 1998, 2010; Götz et al., 2010; Henseler et al., 2009; Urbach & Ahlemann, 2010). In PLS, R^2 values represent *"the amount of variance in the construct in question that is explained by the model"* (Chin, 2010, p. 674). Chin (1998) considers R^2 values of approximately 0.67, 0.33, and 0.19 as substantial, moderate and weak respectively. The R^2 values of this study are shown in Figure 2.

Interestingly, some researchers (e.g. Albers, 2010; Henseler et al., 2009) claim that the significance of high direct inner path model relationships (i.e. Estimates for path coefficients (β)) is no longer of interest to researchers and practitioners. Rather, they suggest, the sum of all direct and indirect effects of a particular construct on another construct should be the subject of evaluating the structural model. Table 6 displays the *total effects* on the four predicted constructs. The strongest effect on the intention to use the e-Government services is the Perceived Ease of Use (0.5584). It also has the strongest effect on attitude (0.6521).

Table 6. Total effect of the Structural Model

	Attitude	Intention to Use
Perceived Credibility	0.3505	0.1150
Perceived Credibility	0.5019	0.3369
Perceived Ease of Use	0.6521	0.5584
Computer Self Efficacy	0.3254	0.2322

6.0 Hypothesis Testing

The empirical tests of the extended TAM model were able to identify constructs determining the intention to adopt of e-government services. All the study hypotheses were established and confirmed with the results. Table 7 presents the hypotheses and outcomes.

Table 7. Summary of hypotheses testing

Hypotheses	Findings
H1: Perceived credibility has positive impact on users' attitude of e-government services in Jordan	beta = 0.23, $p < 0.001$
H2: Perceived usefulness use has a positive effect on users' attitude of e-government services in Jordan	beta = 0.24, $p < 0.001$
H3: Perceived ease of use has a positive effect on users' attitude of e-government services in Jordan	beta = 0.36, $p < 0.001$
H4: Computer self-efficacy has a positive impact on users' attitude of e-government services in Jordan.	beta = 0.31, $p < 0.001$
H5: Computer self-efficacy has a positive impact on perceived ease of use of e-government services in Jordan.	beta = 0.33, $p < 0.001$
H6: Computer self-efficacy has a positive impact on perceived usefulness of e-government services in Jordan.	beta = 0.27, $p < 0.001$
H7: Users' attitude has a positive impact on intention to adopt e-government services in Jordan.	beta = 0.38, $p < 0.001$

7. Conclusion, Limitations and Future Research

With most developing countries deploying different e-Government initiatives with the hope to achieve advanced levels of e-Government services and improve public administration by increasing convenience, performance and accessibility of different government services to citizens, it is argued that the success of these initiatives is dependent not only on government support, but also on citizens' willingness to accept and adopt those e-government services.

This study examined the factors that influence the adoption of e-government services in developing countries by using Jordan as an exemplar. An extended version of Technology Acceptance Model (TAM) was utilized as the study's theoretical backbone. The results demonstrated that e-Government services adoption can be explained in terms of perceived usefulness, perceived ease of use, computer self-efficacy and perceived credibility. Additionally, the results of this study show that the perceived usefulness and perceived ease of use of e-government services are impacted by computer self-efficacy. However, Perceived Ease of Ease was the major factor in determining Jordanian citizens' attitude towards the adoption of e-Government services.

This research, like any other, has its own set of limitations. First, the scope of the study (i.e. the number of respondent) may not reflect the perceptions of all Jordanian citizens' in relation to the adoption of e-government

services. Second, this study did not take a cross-cultural approach. These limitations may hinder the generalizability of the study findings. Third, this study did not investigate citizens' satisfaction with each of the e-Government services. Fourth, the study did not examine the quality of the e-Government services that citizens utilize. Satisfaction with as well as the quality of e-Government services may promote adoption.

Future research in other developing countries is needed to further investigate the determinants of adopting of e-government services. Future research should look into various moderators such as age, culture and gender that may affect the factors of e-government adoption. Also, additional research could possibly conduct a survey examining citizens' satisfaction with- and the quality of- e-Government services in developing countries.

Despite the abovementioned limitations, it is believed that this study makes a valuable addition to the e-Government body of knowledge in the developing countries, and provides useful implications for both theory and practice. This study is novel in attempting to extend TAM to investigate e-government adoption, from citizens' point of view, in developing countries and used Jordan as an exemplar. The findings of this study can also provide useful insights to decision makers. In order to retain and enhance e-Government services adoption, decision makers should: (1) conduct attractive awareness campaigns to target potential users properly; (2) emphasize the usefulness of e-Government; (3) increase the availability of necessary hardware and software for e-Government services use; (4) increase the availability of resources, such as Internet access, support and user guidance especially in places where less advantaged citizens are found; (5) enhance e-Government services security measures; and (6) improve user interface of e-Government services and provide a user-friendly interface.

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Note

Note 1. Structural paths, whose sign is in keeping with a priori postulated algebraic signs, provide a partial empirical validation of the theoretically assumed relationships between latent variables (Götz, et al., 2010; Henseler, et al., 2009). Paths, whose signs are contrary to the theoretically assumed relationship, do not support the pre-postulated hypotheses (Götz, et al., 2010; Nils Urbach & Ahlemann, 2010). Also, a path coefficient's magnitude indicates the strength of the relationship between two LVs (Götz, et al., 2010; Henseler, et al., 2009; Nils Urbach & Ahlemann, 2010).