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# Technology Acceptance Perspectives on User Satisfaction and Trust of E-Government Adoption

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**Abstract:** E-Government is a means for governments to use the most innovative Information Communication Technologies (ICTs) through electronic networks with more convenient access to government information and services. Governments all over the world are trying to increase their efficiency by using new technologies and providing online services which are described as the primary features of technological revolution. E-government services aims to provide citizens with more accessible, accurate, real-time and high quality services and information. This study aims to study the influences that the technology acceptance factors have on e-government services users' satisfaction. The theoretical model used in this study was technology acceptance model. Our model was tested using data collected from 389 participants and analyzed using structural equation modeling. The results show that public intentions toward e-government adoption are strongly and positively correlated and have influence with technology acceptance. The empirical results confirmed that perceived ease of use and perceived usefulness significantly determine individual attitudes toward e-government adoption, as well as confirming the significant effect of perceived ease of use of the Web on e-government adoption, which in turn affects perceived usefulness and intentions. Implications from these findings help government institutions to strategically frame their service model for broader e-government adoption. In addition, user satisfaction and trust with the e-government websites and perceptions of information, system and service were revealed to influence technology acceptance significantly.

**Key words:** Technology acceptance, user satisfaction, trust, e-government

## INTRODUCTION

The development of ICT in the past few years has impacted individuals as well as businesses in an insightful way. It is a precious and powerful tool driving development, supporting growth, promoting innovation and enhancing competitiveness (Chau and Hu, 2001). E-Government refers to the utilization of ICTs and other web-based communication technologies to improve and develop efficiency and effectiveness of service delivery in the public sector (Harris, 2000). E-Government provides the use of new technologies to facilitate the government operation and the distribution of government information and services. E-Government services are turning to Information Technology (IT) to improve business efficiency, service quality as well as attract new users. In addition, e-government aims at increasing efficiency and saving time, effort and cost. Customer satisfaction and customer maintenance are increasingly developing into key success factors in e-services (Agarwal *et al.*, 2009).

E-Government is adopted with the purpose of improving the services and delivery provided by the government to its citizens (Imran and Gregor, 2007). Customer acceptance of technology is a key driver determining the rate of change. Technology enables both customers and employees of the organization to be more effective and productive in receiving, providing and delivering electronic services. Technology does not only allow the formation of virtual or online teams for working closely together irrespective of geographical boundaries but also has the potential to outreach the customers around the world (Bitner *et al.*, 2010).

Today, the developed countries have adopted a new economic indicator, known as customer satisfaction for various industries because of its importance in economic prosperity of a nation (Sharbat and Amir, 2008). Customer satisfaction is an important component in customer retention. In the recent years the government's consideration of providing quality service to the citizens has become more important. The governments now are

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facing challenges to provide faster, better, cheaper and higher-quality services (Alvani and Riahi, 2003).

According to 'service gap theory' formulated by Parasuraman *et al.* (1985), the service quality can be understood as the gap and is the difference between customer service expectations and customer service perceptions. People will choose for cheaper method to transact when choosing between electronic and traditional services (Lichtenstein and Williamson, 2006; Huang, 2002). Web-based customer relationship empowers web sites with usable information and wider functionality of business services to provide a number of key advantages at reasonable costs compared to traditional channels. An organizations' ability to deliver a superior service quality has been established as a prerequisite for its success and survival in the current world. This success is said to be directly dependent on user satisfaction and, indirectly an outcome of the quality of service delivered or technology acceptance (Zeithaml, 2002; Abdullateef *et al.*, 2011). Research studies indicate that web service quality is an antecedent of e-customer satisfaction (Udo *et al.*, 2010). Technology Acceptance Model (TAM) can lead to build and measure an innovative e-service model that is applicable to evaluate the web based internet service quality (Davis, 1989).

The purpose of this study is to present the significance of e-government and the different factors that determine the acceptance of e-government.

## LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

**E-government:** E-government is use of ITs and Internet to apply transformation for citizens as well as businesses and government organizations to enhance service delivery to citizens, empowerment citizens, improve relationship with business and to increase efficiency of government agencies (The World Bank, 2007). Moon and Norris (2005) provides a definition that e-government is perceived as "means of delivering government information and service" (p.43). Isaac (2007) defined e-government as government's use of technology, particularly Web-based Internet applications, to enhance the access to and delivery of government information and service to citizens, business partners, employees, other agencies and government entities. Similarly, Fang (2002) defined e-government as a way for governments to use the most innovative ICTs, particularly Web-based Internet applications, to provide citizens and businesses

with more convenient access to government information and services, to improve the quality of the services and to provide greater opportunities to participate in democratic institutions and processes. Moreover, Carter and Belanger (2005) define e-government services as the use of ICT to enable and improve the efficiency of the government services that are provided to citizens, employees, businesses and agencies. According to Carter and Belanger (2005), e-government services increase the convenience and accessibility of government services and information to citizens. Nowadays, government organizations around the world are increasingly making their services available online. E-Government services become especially important provided its potential to reduce costs and improve service compared with traditional method of government service delivery (Gajendra *et al.*, 2012). Activating e-government in public daily life will establish a public-centric responsive services design for the people and engage citizens in a participatory service delivery process based on a connected governance concept. E-Government applications present a great opportunity to enhance public performance in different aspects such as constituent satisfaction, internal efficiency and operational equity. The major advantages gained from adopting e-government applications are cost saving, easiness of use and usefulness, increase customer service levels and gathering and publishing information to facilitate decision making and to create centralized decision making which will eliminate in-efficiencies and cost redundancies (Evans and Yen, 2006).

## USER SATISFACTION AND TRUST IN E-GOVERNMENT

Zeithaml (2002) defined user satisfaction as the assessment of a product or service in terms of whether that product or service has met their needs and expectations in online platform. Satisfaction has been shown to be positively related to loyalty and this effect also occurs in online environment. Shankar *et al.* (2003) indicated that the effect of satisfaction on loyalty is stronger online than offline. Satisfied users tend to have higher usage of service, possess strong interaction and are often keen to recommend the product or service to their acquaintances. Wolfinbarger and Gilly (2002), through focus group interviews, a content analysis and an online survey and uncovered four contributors to the online technology experience: Website design, reliability, privacy/security and customer service. User satisfaction

was also investigated by Ribbink *et al.* (2004). The results of their investigation revealed that when a user is satisfied with an online service provider and interacts frequently will increase the trust between them.

Trust can be defined as allowing individuals to willingly use services and behave in a socially responsible manner taking government characteristics into consideration (Al-Gahtani, 2011). The role of trust in e-government projects is discussed by different governments and global organizations. Song *et al.* (2007) declared four pillars for trusting e-services and they are: trust in technology, business drivers, social framework and legislative framework. Building trust is very important for building successful e-government projects since users who trust the Internet are more willing to adopt e-government services, therefore users can easily turn to online services when they trust the Internet technology.

Businesses that adopt e-government services depend on two main factors: users perceived quality of offline services and trust in the Internet technology. Trust in e-government significantly predicted the intention to use e-government services. Providing online services successfully demands citizens to disclose their personal information to be used by governmental organizations which have privileges to access such information. This situation builds some kinds of resistance from citizens' side who would withdraw themselves from getting the benefits of online services. Users, including citizens and businesses, have enough trust in governmental organizations despite the potential risks associated with online transactions (Beldad *et al.*, 2012). 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. In addition, 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. As a final point, access to computers and good computer skills will empower behavioral control of e-government services (Ozkan and Kanat, 2011).

## TECHNOLOGY ACCEPTANCE FACTORS IN E-GOVERNMENT

There are a number of factors that determine the acceptance of e-government services from both the public and civil servants. One of the most important theories in this arena is Technology Acceptance Model (TAM) which defines a means of using and adopting new technology by users by evaluating factors influencing the decision to accept new technologies (Davis, 1989). The TAM is based on ease of use and usefulness as the major predictors of attitude toward new technologies. Another perception adopted here is using online services by organizations and citizens based on the realization of its importance as compatibility and easiness to learn. Such conceptualization is depicted in a study by Lee *et al.* (2011) where they tried to measure users' satisfaction with both online and offline services offered by governmental departments and to identify factors which affect the attitude and acceptance of e-government services. Results indicated some support to the idea of reliable services provided manually that significantly improved the willingness of businesses to use e-services instead of using traditional services channels (Lee *at al.*, 2011). 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 (Lin *et al.*, 2011). Other factors related to the acceptance of new technology which were mentioned and discussed extensively 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 (Hung *et al.*, 2006).

## TECHNOLOGY ACCEPTANCE MODEL

**Theoretical foundation:** TAM displays how users accept and use new technology. The model describes the factors that influence users' decisions about how and when they will use new technology, particularly. Perceived usefulness was defined by Davis (1989) as "the degree to which a person believes that using a particular system would enhance his or her job performance". Perceived ease-of-use is defined as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989). TAM has been continuously studied and expanded. Several researchers have replicated Davis's study to provide evidence on the relationships between usefulness, ease of use and system use. Ease of use and usefulness are important factors in evaluating online service quality (Rod *et al.*, 2009). TAM is a valuable tool in forecasting satisfaction, improving customer service and improving service quality. TAM model hardly needs an introduction as it is well established in information system research. Introduced by

Davis *et al.* (1989) and Davis (1989), the model states that perceived usefulness and perceived ease of use jointly determine the user's behavioral intention to use the system. The model is an adaptation of the theory of reasoned action (Ajzen and Fishbein, 1980) and most famous for its parsimony and explanatory power. TAM has been extended in many directions: examples include antecedents of perceived ease of use (Venkatesh and Davis, 2000) and perceived usefulness (Venkatesh and Davis, 2000). The model has also been refined with moderating influences such as age and gender (Venkatesh *et al.*, 2003) and applied successfully in a diverse range of settings, including e-government. The model spawned a foundation of literature and now enjoys almost iconic status.

Technology advances that have resulted and will result into number of complicated advances could not have been imagined a decade ago (Bitner *et al.*, 2010). Hence customer expectations from these innovative technology-driven services do not fit the early models of service expectations. Attracting large volumes of customers needs a consistent delivery of high level service quality. For investigating e-service adoption, the theory of planned behavior is significant as it relates the causal link between Internet self-efficacy and e-serviceadoption (Ajzen, 2002). Prior research provides evidence that attitudes have a significant impact on intentions in the context of IT adoption and usage (Agarwal and Prasad, 1999; Chau and Hu, 2001; Taylor and Todd, 1995). Loyalty towards the online services arrives as a new, important variable in user acceptance research. Swaid and Wigand (2007) establish the concept

of e-service quality and their influence on intention to use and online loyalty. While theory of reasoned action and theory of planned behavior have the capability to explore the system usage by incorporating subjective norms and perceived behavioral controls with attitudes toward using technology, TAM is more appropriate to be applied in online contexts for several advantages. First, TAM is specific on information system usage for applying the concepts of ease of use and usefulness. Besides, TAM is more parsimonious. Furthermore, TAM is stronger in various information system applications.

## RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

The logical framework or research model on e-government adoption is shown in Fig. 1. The model has been developed based on broad literature review. The first part of the block is relating to the variables motivating individuals' to use e-government services. The variables are perceived ease of use, perceived usefulness and intention to use. In this case these variables act as dependent variables and e-government adoption acts as independent variable. The variables of second block are trust in e-government website, satisfaction and technology acceptance. These are the variables explaining the e-government adoption's effect on their environment. In this case, the variables act as independent variables and e-government adoption acts as dependant variable as shown in Fig. 2.
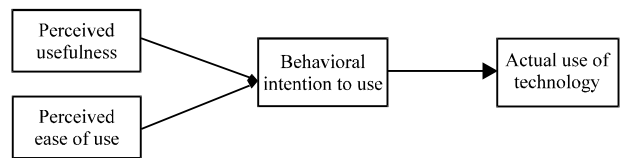


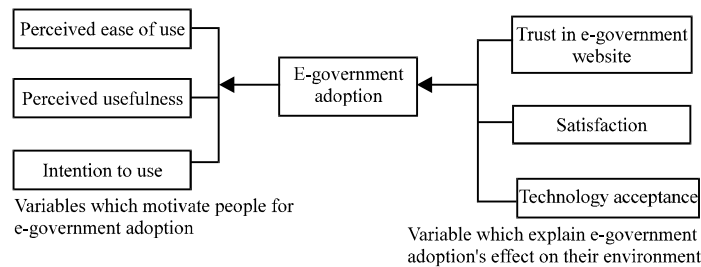Fig. 1: Technology acceptance model, Source: Davis *et al.* (1989)



Fig. 2: Research framework

## VARIABLES WHICH MOTIVATES INDIVIDUALS' FOR E-GOVERNMENT ADOPTION

**Perceived ease of use:** Perceived Ease of Use (PEU) means that a Person Believes Using the particular system or technology is not complicated (Venkatesh *et al.*, 2003). PEU use measures the extent to which a person assumes that using the new information system will be free of effort (Venkatesh and Bala, 2008). PEU and attitude towards using, the online portal also specifies a significant impact of PEU on perceived usefulness (PU). Davis (1989) differentiates between external variables for internal customer beliefs which is PEU standing for customer attitude towards the new system. TAM proposes that usefulness and ease of use are important factors in determining user attitude towards adopting a new technology. Ease of use consists of service quality, simplicity, visual factors, speed and innovativeness. Service quality, speed and simplicity should embrace in the ease of use category. A website's ease of use depends on various aspects such as ease of system management for the user, easy to keep basic operations in mind, website design efficiency level, error reduction percentage and user's overall satisfaction in the management area. Ease of use is an effective factor in user satisfaction in e-service. Thus, it might be said that ease of use is an effective factor in customer satisfaction of e-government services (Bavarsad and Mennatyan, 2013). Prior studies show PEU has a significant effect on usage intention, either directly or indirectly through its effect on PU (Davis, 1989; Venkatesh *et al.*, 2003; Venkatesh and Davis, 2000). A system perceived to be easier to use will facilitate more system use and is more likely to be accepted by users. In the context of e-government, people may find e-government services uneasy when the system is not easy to learn and easy to use. Information such as details of products or services, their benefits and usage guidelines needs to be provided as it will make easier for citizens to adopt e-government. Furthermore, the PEU helps in building trust with government as it may send a signal that governments have really put in thought about their end users. This leads to our first hypothesis:

- **H1:** E-government adoption significantly affects perceived ease of use in online technology

## PERCEIVED USEFULNESS

Perceived Usefulness (PU) which means that a person believes using the particular system or technology will improve their action (Venkatesh and Davis, 2000). As defined by Venkatesh and Bala (2008), PU is an indicator for the extent of job performance improvement perceived by a person who applies the innovative system. An individual's perceptions on usefulness of an IT depend on the extent to which they believe that using a specific technology leads to the improvement of their professional performance within an organization or helps better performance of tasks. Such a help may be realized through reducing task performance time or timely provision of information (Doll *et al.*, 1998). In e-government adoption, this performance refers to the usefulness of user's interaction with the website of the intended public organization and benefits they achieve through this interaction. Horton *et al.* (2001) believe that PU positively influences the intention to use e-government services. Lai and Piers (2010) found four success factors affecting users' satisfaction of e-government services while testing a model for assessment of acceptance of and satisfaction from e-government portal. They include: information quality, PU, system quality and social impacts. Byun and Finnie (2011) identified usefulness and perceived usability, website's proper design and ease of e-service use as the most important measures of customer satisfaction of e-government services. PU will influence their intention to accept and adopt a system (Bhatti, 2007; Kim *et al.*, 2007). In the context of e-government, one of the reasons people use e-government is that they find the systems useful to their transactions and saves their time as well. A number of studies have shown that PU is the primary predictor of IT usage (Davis, 1989; Davis *et al.*, 1989; Gefen *et al.*, 2003; Venkatesh *et al.*, 2003). Thus, we propose the following hypothesis:

- **H2:** E-Government adoption positively and directly influences perceived usefulness in online system

## INTENTION TO USE

TAM is based on the theory of reasoned action (TRA), which states that beliefs influence intentions and intentions influence one's actions (Ajzen, 2002). According to TAM, PU and PEU influence individual's intention towards system usage, which influences behavioral intention to use (ITU) a system. Perceptions of trustworthiness could also impact public ITU e-government services. Higher levels of PU will be positively related to higher levels of ITU e-government services. Public approach towards e-government service will increase if people perceive the service to be easy to use (Gajendra *et al.*, 2012). This indicates that it is essential for e-government services to be responsive. Moreover, a government web site should be easy to

locate. Information should be organized and presented based on public needs, allowing users to effortlessly find the information or services they request (Akman *et al.*, 2005). Higher levels of perceived compatibility are connected with increased intentions to adopt e-government initiatives. This states that people will be more willing to implement e-government services if these services are congruent with the way they intend to interact with others. Van Riel *et al.* (2001) found a strong positive effect of customers' overall satisfaction on the intention to continue using the Internet. Lin and Hsieh (2006) examined how technology readiness influences customers' perception and adoption of self-service technologies. Results indicate that technology readiness influences perceived self-service technologies, service quality and ITU. Theory of planned behavior (TPB) theorizes that an individual's behavior is determined by perceived behavioral control and behavioral intention (BI). BI in turn is jointly determined by attitude toward the behavior, subjective norm and perceived behavioral control (Ajzen, 2002). Evidence concerning the relation between intentions and behavior has been collected with respect to IT usage and acceptance, with much of the work done in the framework of the TRA, TPB and TAM. Davis *et al.* (1989) showed that ITU a word processor was a major determinant of usage behavior. Prior research provides evidence for the notion that attitudes have a significant impact on intentions in the context of e-government adoption and usage (Agarwal and Prasad, 1999; Chau and Hu, 2001; Davis *et al.*, 1989). Thus, this research proposes the following hypothesis:

- **H3:** E-Government adoption directly influences intention to use in online system

## E-GOVERNMENT ADOPTION

Warkentin *et al.* (2002) define adoption as the intention of people to involve in e-government to collect information and request services from the government. Carter and Belanger (2005) measure it as intent to implement, while Gilbert and Balestrini (2004) evaluate it as intention to use e-government services. Both willingness and intention to use could be considered as unidimensional measures of adoption. However, e-government adoption is a multi-dimensional variable. Adoption is a simple decision of using, or not using, electronic services. Effective e-government has the ability to generate new methods and avenues for participation in government, electronically threading together people, businesses and all levels of government in a country (Jaeger, 2003). The successful adoption of e-government

services is important for governments (Gupta *et al.*, 2008). Akman *et al.* (2005) explained that the success of e-government adoption depends on public efficiency.

E-government services offer public precision in the process of governance, such as prompt and efficient services, simplification of procedures and friendly attitudes of an individual (Gajendra *et al.*, 2012).

## VARIABLES WHICH EXPLAIN E-GOVERNMENT ADOPTION'S EFFECT ON THEIR ENVIRONMENT TRUST

Belanger *et al.* (2002) define trust as 'the perception of confidence in the electronic marketer's reliability and integrity'. People must have self-assurance in both the government and the related technologies. According to the Hart-Teeter national survey reported by Mcclure (2001), Americans consider that e-government has the prospective to improve the government operation but they have apprehension about sharing personal information with the government online, fearing that the data will be misused and their privacy will be disclosed (Mcclure, 2001). Other ethical issues such as privacy and security are critical issues in e-government trust (Belanger *et al.*, 2002; Belanger and Hiller, 2006). Extending the study of McKnight *et al.* (2002) establish measures for a multidimensional model of trust in e-government, focusing on users' initial trust in e-government websites. Initial trust refers to 'trust in an unfamiliar trustee, a relationship in which the actors do not yet have credible, meaningful information about, or affective bonds with, each other (McKnight *et al.*, 2002). In initial relationships, people use whatever information they have, such as perceptions of a web site, to make trust presumption. Since e-government is based on Internet which is an open network, security is an important factor in functions of e-government. Despite various technical advancements such as message encoding and digital signatures and certificates, customers are still concerned about the security of their transactions while using Internet. Information provided in a website during e-government may be abused by hackers (Behjati *et al.*, 2012). Trust in e-government websites plays a vital role in helping citizens overcome perceived risks which in turn has a significant impact on use intentions. Trust encompasses the intention of users to receive information, to provide information and to request e-government services. Previous studies identified the lack of trust as a major barrier to e-service adoption (Carter and Weerakkody, 2008). Therefore, we propose the following hypothesis:

- **H4:** Trust on e-government websites significantly affects e-government adoption

## SATISFACTION

The ability to deliver a higher service quality has been established as a prerequisite for its success and survival in online environment, this success is said to be, directly, dependent on user satisfaction and, indirectly, an outcome of the quality of service delivered (Zeithaml, 2002; Abdullateef *et al.*, 2011). If efficiently managed, e-government adoption has the capacity to assist in handling public queries and complaints more professionally. It will, however, deliver to its citizens both accurate and timely information, increasing its job performance and multiplying its service quality and user satisfaction. User satisfaction can be considered as the essence of success e-government adoption (Jamal and Naser, 2002). IT can help in improving service quality for customer satisfaction (Zhu *et al.*, 2002). Udo *et al.* (2010) indicate that web service quality is an antecedent of e-satisfaction. Customer satisfaction has many benefits for economic entities such that different studies show that increased satisfaction leads to reduced customer sensitivity towards price and increased effectiveness of reputation (Mansoori and Baradaran-Kazem-Zadeh, 2007). E-satisfaction has been defined as the preference for goods or services of e-government adoption. The Internet introduced the factors determining e-satisfaction as: information accessibility level, communication structure, individualization, integrated information and transactions (Negahdari, 2009). Users' experience of technology application might be the major criteria for evaluation of customer's satisfaction of the services provided by a e-government website (Gajendra *et al.*, 2012). This leads to our next hypothesis:

- **H5:** User satisfaction is directly and positively associated with e-government adoption

## TECHNOLOGY ACCEPTANCE

The quality of service plays an important role in technology acceptance (Reichheld and Schefter, 2000). It is important for service provider to understand the needs of the user and provide those needs. The e-government approach is based on public-focused that determine the online offering as well as information management and delivery to people (Stiftung, 2002). Parasuraman *et al.* (1985) have developed a level that measures the service quality in five dimensions-tangibles, reliability, responsiveness, assurance and empathy. Sureshchandar *et al.* (2002) have recognized five critical elements that are essential in measuring service quality for technology acceptance: core service or service product, human

element of service delivery, systemization of service delivery, tangibles of service and social responsibility. E-service quality for e-government could be measured in terms of quality of content provided on the website, the speed of the response to the public concerns with problem solving approach and the availability of public information. Overall service quality is a set of confirmed service quality dimensions that are derived out of desired congruency. Technological content is also being considered as factor that can influence the e-government services adoption. Technological improvement could lead to a better user experience in using the e-government services (Harris, 2000). Davis (1989) introduces an adaptation of TRA, the TAM, which is specifically meant to explain computer usage behavior. TAM uses TRA as a theoretical basis for specifying the causal linkages between two key beliefs: PU and PEU and users' attitudes, intentions and actual computer adoption behavior. If users consider the usages of e-government websites are easy and useful, they may be encouraged to use longer and form a positive attitude towards e-government adoption. Thus, we propose last hypothesis as:

- **H6:** Technology acceptance directly influences e-government adoption in Internet technology

## METHODS AND RESULTS

**Data collection:** This study was conducted from May to July 2013, in Nepal. The participants were employees of Nepal Telecom who are active internet service users and have wide knowledge on e-government. Online survey link was provided to participants to answer the questionnaires. The survey questionnaires were prepared from literature review. Pretest of the questionnaires was conducted with 25 participants to check the reliability and clarity of questionnaires. Pretest was performed for screening of questions i.e., select those which have clear meaning and understandable. The pilot test was performed with 28 IT experts. Some questions were modified as per the suggestion of participants to avoid confusions and to make reliable survey. Altogether 462 participants were requested for survey participation. The responses were received from 408 participants. Thus the response rate is 88.31%. Out of them 21 responses were discarded due to incomplete and invalid answers. Consequently, remaining 389 responses were used for data analysis. The survey contains 20 questionnaires and it takes 10 minutes to answer. Each item of a questionnaire was rated on a five point likert scale from "strongly agree" to "strongly disagree". Neutral was given the score of 3. Of all respondents, 61.5% were male, 38.5% were female. The age varies from 22 to 49. The average age is 23. Each

variable contains 4 items and altogether there are 28 items. Each construct is summarized as:

PEOU : Perceived ease of use
PU   : Perceived usefulness
ITU  : Intention to use
EGA  : E-Government adoption
TR   : Trust
SAT  : Satisfaction
TA   : Technology acceptance

## MEASUREMENT MODEL

**Construct validity:** To test the construct validity of items in the instrument, confirmatory factor analysis was performed and reliability of factors assessed using Cronbach's alpha (Cronbach, 1970). Construct validity was assessed using confirmatory factor analysis (CFA) to test the fit of the data to the model. Table 1 presents the factor loadings. The results of CFA indicated that the scales were not only reliable but also valid for the factors under study. Out of 28 items, 4 items were deleted due to lower factor loading less than 0.6. The deleted items are PU3, EGA2, SAT4 and TA1. Reliability of construct is how individuals respond and validity means what is supposed to measure. Individual item reliability can be checked by examining the factor loading of each item on its corresponding latent variable. The loading of all items should be higher than 0.707 (Barclay *et al.*, 1995). However, survey data highly depends upon the opinion of participants, so some fluctuation in result may take place. According to Manly (1994) loading above 0.6 is usually considered high and below 0.4 is low. If all measurement items are strongly significant with a value of over 0.60, then it will be a good model fit and all construct variables are valid. The proposed research model shows a good construct fit as all factor loadings are above 0.6. The research model is statistically significant and well constructed.

Table 1: Results of confirmatory factor analysis

| PEOU | PU | ITU | EGA | TR | SAT | TA |
|------|------|------|------|------|------|------|
| 0.87 | 0.93 | 0.83 | 0.95 | 0.87 | 0.92 | 0.85 |
| 0.92 | 0.87 | 0.88 | 0.92 | 0.86 | 0.85 | 0.90 |
| 0.83 | 0.90 | 0.94 | 0.87 | 0.84 | 0.91 | 0.86 |
| 0.85 |      | 0.88 |      | 0.90 | 0.91 |      |

Table 2: Cronbach alpha reliability coefficient

| Factor | Item | Cronbach $\alpha$ |
|------|------|------|
| PEOU | 4 | 0.882 |
| PU | 3 | 0.824 |
| ITU | 4 | 0.901 |
| EGA | 3 | 0.887 |
| TR | 4 | 0.912 |
| SAT | 3 | 0.838 |
| TA | 3 | 0.907 |

All of the measures employed in this study demonstrated excellent internal consistency, ranging from 0.824 to 0.912 (Table 2), thereby exceeding the reliability estimates ($\alpha = 0.70$).

## DISCRIMINANT VALIDITY

Discriminant validity was assessed by inspecting the correlations between the four factors (Bagozzi *et al.*, 1991). Table 3 shows the average variance extracted (AVE) for each factor and indicates that the questions for each factor correlated with each other but were below threshold for intercorrelating with other factors. Thus, the results indicate that discriminant and convergent validity of the measures are reasonable.

Table 4 shows a summary of the overall model fit measures. This model was found to be valid, as evidenced by the adequacy indices such as chi-square statistic, $\div 2$ (N = 389) = 262, p<0.01. The chi-square statistic is an intuitive index for measurement goodness of fit between data and model. As recommended by Hair *et al.* (2003), several other fit indices are examined. According to Gefen *et al.* (2000) and Hair *et al.* (2003), goodness of fit index (GFI), comparative fit index (CFI) and normed fit index (NFI) are best if above 0.90 and demonstrate marginal acceptance if above 0.80, adjusted goodness of fit index (AGFI) above 0.80 and root mean square residual (RMR) below 0.05. These fit indices indicate that the proposed measurement model exhibited a good fit with the data collected. This study was close enough to suggest that the model fit was reasonably adequate to assess the results for the structural model. Thus, we could proceed to examine the path coefficients of the structural model.

Table 3: Assessment of discriminant validity

| Factor | PEOU | PU | ITU | EGA | TR | SAT | TA |
|------|------|------|------|------|------|------|------|
| PEOU | **0.565** | | | | | | |
| PU | 0.432 | **0.572** | | | | | |
| ITU | 0.304 | 0.251 | **0.497** | | | | |
| EGA | 0.287 | 0.311 | 0.263 | **0.583** | | | |
| TR | 0.386 | 0.210 | 0.336 | 0.251 | **0.553** | | |
| SAT | 0.270 | 0.363 | 0.284 | 0.332 | 0.305 | **0.579** | |
| TA | 0.368 | 0.278 | 0.316 | 0.297 | 0.311 | 0.287 | **0.561** |

Diagonal entries: Average variance extracted, Non-diagonal entries: Shared variance

Table 4: Goodness of fit measures

| Fit measures | Values |
|------|------|
| Chi square | 0.262 |
| RMR | 0.470 |
| RMSEA | 0.670 |
| GFI | 0.887 |
| CFI | 0.920 |
| AGFI | 0.954 |
| NFI | 0.961 |

Comparative fit index (CFI), cut-off >0.90

Table 5: Hypotheses test results

| Hypothesis | T-Statistic | Path coefficient | Support |
|---|---|---|---|
| H1: EGA→PEU | 9.62** | 0.380 | Supported |
| H2: EGA→PU | 7.49** | 0.750 | Supported |
| H3: EGA→ITU | 1.32* | 0.037 | Not supported |
| H4: TR→EGA | 8.51** | 0.870 | Supported |
| H5: SAT→EGA | 11.30** | 0.490 | Supported |
| H6: TA→EGA | 6.48** | 0.530 | Supported |

*p<0.1, not significant; **t-value significant at p<0.01

## HYPOTHESES TESTING

This study employed a structural equation modeling approach to develop a model that represents the relationships among the seven factors in this study: perceived ease of use (PEOU), perceived usefulness (PU), intention to use (ITU), e-government adoption (EGA), trust (TR), satisfaction (SAT) and Technology Acceptance (TA) to use the e-government system. Table 5 shows the results of the hypotheses tests by confirming the presence of a statistically significant relationship in the predicted direction of the proposed research model. Overall, 5 out of 6 hypotheses were supported by the data. Consistent with prior research (Davis, 1989; Hu *et al.*, 1999), e-government adoption (EGA) had a significant effect on perceived ease of use (PEOU) with p<0.001. Similarly, e-government adoption (EGA) had a significant effect on perceived usefulness (PU) with p<0.001. All other hypotheses are supported except EGA with ITU. All t-statistics will be significant at p<0.001. If the probability value (p value) is less than the significance level, the null hypothesis is rejected. If the T value is greater than 2.63, then the path is significant at p<0.01. T value in between 2.63 and 1.96 is significant at p<0.05. Likewise, T value below 1.96 is not significant (p<0.01).

The structural model and hypotheses were tested by examining the path coefficients and their significance. Consistent with our hypotheses, EGA demonstrated a significant influence on PEU (path = 0.38). EGA demonstrated a significant influence on PU (path = 0.75). The link between EGA and ITU was non-significant (path = 0.037). TR provided significant influence with EGA (path = 0.87). Similarly, SAT made influence on EGA (path= 0.49) and TA has positive influence with EGA (path=0.53). This finding supports current research that demonstrates the strong relationship among constructs (Teo, 2009).

## DISCUSSION

It is a common experience of many e-government service providers that user acceptance provides well-articulated benefits. At the early stages of the adoption cycle, it is not unusual to observe many new technologies struggling to gain public acceptance. The results of this study indicate that users with higher Internet self-efficacy are more likely to use e-government services. Government organizations must reflect extrinsic as well as intrinsic motivation in user interface and functionality design of e-government services and improve their online services. Since the effect of content and appearance of information on users' satisfaction was confirmed, government organizations should try to upgrade the designs of their websites in an appropriate and user-friendly manner to increase users' satisfaction and create a good perception for them. Also, findings showed that public satisfaction as well as trust had a positive and significant effect on e-government adoption. According to the findings, the higher the ability of a website to provide government services, the more the satisfied users of those services. Also, public organizations and the government should try to encourage the people to use e-government services and attract their trust through upgrading e-service providing systems, effort to train and enhance citizens' awareness of such services, marketing and advertisement so that citizens feel secure and at ease having access to useful services with easy access and in attractive, user-friendly websites, which is followed by their increased satisfaction.

This study suggests that technology acceptance is a better indicator of e-government adoptions. In testing the model, we found that ease of use and usefulness toward e-government significantly and positively affect technology acceptance, confirming the theoretical postulation of TAM. Briefly, public attitudes toward e-government strongly determine their willingness to use the online services. The empirical results imply that people who emphasize the importance of information quality prefer to use e-government services in the Internet. Moreover, a reliable Web system that supports e-government functions could increase public intentions to acquire e-government services. Our study suggests that providing citizens with secure Web systems or increasing their perceptions of the usefulness would indirectly improve their acceptance of e-government via creating positive attitudes.

## THEORETICAL AND PRACTICAL IMPLICATIONS

This study provides information on how individuals have accepted new IT use and e-government adoption. It contributes to e-government literatures about factors affecting e-government acceptance and adoption. These factors are critical for the public decision on accepting e-government adoption. The TAM factors have positively

direct relationship with the users' intentions, acceptances and adoption of e-government services. Eventually, knowing this can promote the process of innovation diffusion in e-government services. From theoretical point of view, firstly this study successfully extended TAM in the context of e-service adoption Furthermore, from the findings of this research, it is concluded that the TAM is useful, although limited with the need for extension in predicting adoption of technology by research respondents. Its two facets of PEOU and PU were found valid in explaining respondents? adoption of e-services but were not the only factors influencing adoption. This finding is consistent with earlier findings with respect to the adoption of various new technology. The extended model of TAM provides clearer understanding of the factors influencing technology adoption and significantly contributes to the e-service literature.

The practical recommendations that follow from this study are normally restricted to a recalibration of the e-government website's audience; a recommendation that is not always easy to implement. Likewise, practical recommendations of some trust studies amount to increase trust but this is not very actionable. These studies can perhaps be extended by actionable variables that providers can adjust and manipulate and thereby increase trust.

## LIMITATIONS

The findings of this study are encouraging and useful; the present study has certain limitations and needs further researches. First, the model explained some extent of the variance in e-government adoption. The relatively low figure of the present study may partly be explained by its focus on e-government efficiency. Therefore, there is a need for further investigation on other factors, such as perceived compatibility, prior experience, system quality and information quality. Second, whether our findings could be generalized to all e-government services is unclear. Further research is necessary to verify the generalizability of our findings. Third, the data presented is cross-sectional, longitudinal data will be needed in the future to assess what factors will influence public decisions in continuing to use e-government services. Hartwick and Barki (1994) theorized and found support to the notion that voluntary use of IT is under an individual's control and likely to be based on attitudinal considerations, whereas mandatory use is also under an individual's control but is likely to based on normative considerations. Thus, further research is necessary to verify the differences between the voluntary and mandatory settings.

## CONCLUSION

It is suggested that future studies consider the factors affecting user satisfaction and trust of e-government services and within a larger population, as well as the effects of demographic and social variables of users' satisfaction of e-government services. All things considered, the current findings significantly enhance understanding of technology acceptance of e-government. Consideration of the factors identified should lead to more successful adoption of e-government. Results suggest citizens need to be provided with effortless and useful web interfaces and ITs. TAM is being used to investigate how e-government innovation has been accepted by individual and at organizational level. It is very interesting to study e-government acceptance and adoption based on TAM from the past research findings. TAM is well used for explaining users' intention and attitude and focusing on the perception of e-government usefulness and ease of use based on the concept that individual innovativeness positively moderates the relationship between the perceptions of relative advantage, ease of use and compatibility and decision to adopt innovation. Future research can further evaluate and analyze the technology acceptance of users towards online government from a larger perspective by creating a technology acceptance index for different product and service categories, extending the TAM to include other belief constructs and the moderating effects of demographic variables on the technology acceptance relationships.

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