

## **FACTORS INFLUENCING THE USER ACCEPTANCE E- GOVERNMENT SERVICES**

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### **Abstract**

e-Governance is a system where the information is being integrated with the help of communication technology for the maintenance of public administration with ease. It helps in bringing forth good governance in a quicker and transparent manner. For successful implementation of e-government services government agencies should identify the factors that influence the willingness to adopt e-government services. This paper uses Technology Acceptance Model (TAM), Diffusion of Innovation (DOI) and Website quality are the major determinants of intention to use e-government services. A model containing the constructs of TAM, website quality and Relative Advantage is used to study the adoption of e-government services. The results reveal that website quality and TAM has a strong positive influence on Relative advantage which further leads to intention to use e-government services.

Key words: e-Government services, TAM, Relative Advantage, Website Quality, Intention to Use.

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## 1. INTRODUCTION

India's growth in the field of Information Communication Technology (ICT) is fast paced and registered significant milestones. According to the National e-governance policy of the Government of India, the purpose of e-governance is to make all Government services accessible to the common man in his locality, through common service delivery outlets or through various self service portals and to ensure efficiency, transparency, and reliability of such services at affordable costs. E-Governance uses application of Information and communication technology for delivering and integration of various Government services and systems between Government to citizen (G2C), Government to Business (G2B), Government to Government (G2G) and Government to Employees (G2E) (Carter and Belanger, 2003; Tan et al., 2005). Lee et al. (2005) described e-Government is mainly used for building better government-to-citizen (G2C) relations for government services, similar to the function of Customer Relationship Management (CRM) in the business sector. Lam W., 2005, in his study "Barriers to e-government integration" reports an e-government service provides greater efficiency, accountability, transparency and citizen empowerment.

According to the E-Government Development index (EGDI) of the United Nations Member States, India is ranked 96 among world with EGDI value 0.5669 whereas the top 10 countries show EGDI greater than 0.8783 (United Nations of e-Government Development Database, 2018). The average internet penetration rate of the top ranked countries is significantly at a high level of above 80 percentage whereas in India it is only 34.1 percentage, that means the internet penetration rate is also influencing the adoption of e-governance in India.

E-Government Development index incorporates the access characteristics, such as the infrastructure and educational levels, to reflect how a country is using information technologies to promote the access of ICT applications among its people. The EGDI is a composite measure of three important dimensions of e-government, namely: provision of online services, telecommunication connectivity and human capacity. (United Nations e-Government Development, 2018). In Kerala, even though the first IT Park and first electronic enterprise has started in 2008 the adaption of e-services among the public is poor and is only 1.4 percentages in

2016-17. (*Performance Report of Dept of IT, Government of Kerala*). Hence it is significant to identify the factors influencing the adaptation of e-government services in Kerala.

Various studies in the field of e-Governance domain reveal that Technology acceptance Model (TAM) (*Davis, 1989*) is frequently used in technology adoption research in ICT applications. (*Wang, 2002; Al-adawi et al., 2005; Sahu and Gupta, 2007; Belanche et al., 2010*). Perceived usefulness and Perceived ease of use constructs [Technology Acceptance Model (TAM), *Davis 1989*] had strong positive effect towards the acceptance of e- government services. In a study of user acceptance of e-government services in Jordan, *Charbaji (2003) et al.* indicated that people's awareness on e-government service strongly influence the user acceptance. *Pradeep Mittal et al* identified that Low IT literacy, User friendliness of the web sites or website quality, lack of self confidence on technology provided by the government, Ease of Use, Usefulness and lack of awareness in people are the main social and environmental challenges in implementation of e-governance in India. This study analyses the effect of TAM constructs perceived Ease of use, Perceived Usefulness along with Website quality on intention to use e-government services.

## **2. REVIEW OF LITERATURE**

### **2.1 Technology Acceptance Model (TAM)**

*Davis' (1989)* Technology Acceptance Model (TAM) has been widely used in many countries to examine technology acceptance in e-governance. TAM was adapted from Theory of Reasoned Action (TRA) developed by *Ajzen and Fishbein (1980)*. This theory is in the field of social psychology used to model user acceptance of information systems. *Davis (1989)* identified that the aim of TAM is to provide an explanation of the determinants of computer acceptance in general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations. Perceived ease of use and perceived usefulness, are the two fundamental constructs of TAM, which is considered as important in determining the individuals' acceptance and use of Information Technology. Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of physical and mental effort" and perceived usefulness of the system as "the degree to which a person believes that using a particular system would enhance his or her job performance" (*Karavasilis, I et al ,2010*).

## 2.2 Diffusion of Innovation (DOI)

Research on the diffusion of innovation has been widely applied in disciplines such as communication, marketing, and information technology. An innovation is an idea, practice or object that is perceived as new by an individual or another unit of adoption (*Rogers, 1995, p. 11*). Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system (*Rogers, 1995, p. 5*). The theory is modified and the properties of innovations within the concept of information systems were refined by *Moore and Benbasat (1991)*. These factors are relative advantage, compatibility, complexity, trialability, and observability. Relative advantage is the extent to which an innovation is perceived to better the idea it substitutes. According to Diffusion of Innovation (DOI) theory, the rate of diffusion is affected by an innovation's relative advantage, complexity, compatibility, triability, and observability. *Tornatzky & Klein (1982)* in their meta-analysis of research on adoption of innovations, argue that trialability and observability are not related constructs of technology adoption. *Carter and Belangar (2003)* conducted a pilot study of G2C adoption using Diffusion of Innovation Theory and found perceived relative advantage and compatibility as significant factors in predicting citizens' intention to use e-government services.

*Lean et. al. (2009)* in order to measure the intention of Malaysian citizens to use e-government services, a theoretical framework was developed. The proposed model was based on Technology Acceptance Model and Diffusion of Innovation. The findings showed that trust, perceived usefulness, perceived relative advantage and perceived image had a significant relationship with citizens' intention to adopt e-government services.

## 2.3 Website Quality

*Hong and Tam (2006)* pointed out that perceived ease of use and perceived usefulness may not completely explain an individuals behavioural intention to use a technology. They argued that website quality is also associated with technology acceptance. In a study conducted in Maharashtra (India), *Iyer & Srivastava (2014)* proposed a theoretical model to determine major factors, which affect the intention to adopt e-Government services especially through the e-Government portal, it is found that website design and quality had a strong positive association among the people to use e-Government services.

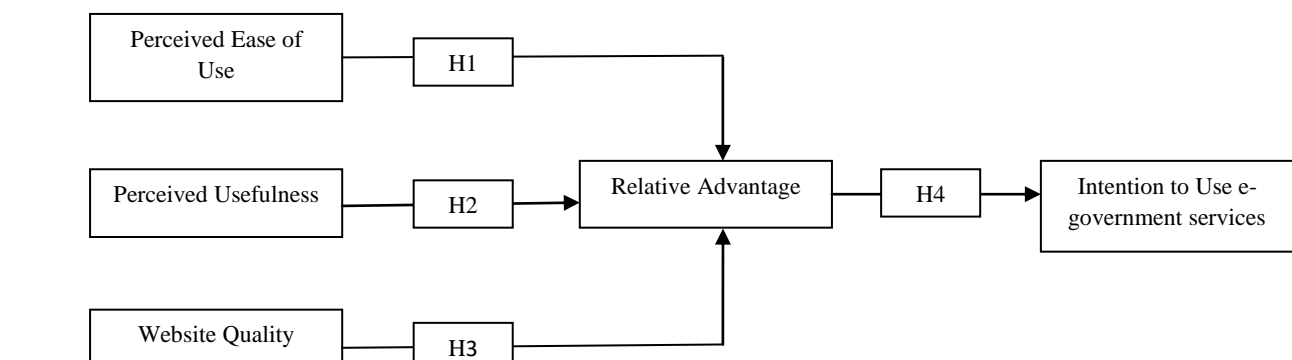
Although much research supports the TAM as an excellent model to explain the acceptance of ICT related applications, many empirical studies recommend integrating TAM with other theories to cope with rapid changes in the technology and improve specificity and explanatory power (*Carter & Belanger, 2003*). TAM and DOI are similar in some constructs and complement each another to examine the adoption of technology. Researchers indicate that the constructs employed in TAM are fundamentally a subset of perceived innovation characteristics, thus, the integration of these two theories could provide an even stronger model than either standing alone.

In the previous sections, various literatures have been reviewed to understand the user acceptance of e-governance in different countries including India. The research shows that TAM constructs viz Perceived ease of Use and Perceived Usefulness along with website Quality contributed positively towards the user acceptance of e-governance, but only a dearth of studies were available to analyses the effect TAM constructs on DOI and further how it leads to intention to use. In the present study, an integrated model of TAM constructs along with Website Quality is tested among Indian citizens, in the state of Kerala, in order to evaluate how far these factors influence the DOI and further leads to intention to use e-governance services.

### 3. Research Model and hypothesis

This paper proposes a model which combines the theory of both the Technology acceptance model (TAM) and Diffusion of Innovation (DOI). The influence of Perceived Ease of Use and Perceived Usefulness constructs of TAM on the relative advantage construct of DOI is tested and further it explores how it leads to Intention to use e-Government service. The influence of website quality is also examined.

**Fig 1: Conceptual Research Model**



### 3.1 Hypothesis

H<sub>0</sub> 1: Perceived Ease of Use (PEOU) has a positive influence on relative advantage of using e-government services.

H<sub>0</sub> 2: Perceived Usefulness (PU) has a positive influence on relative advantage of using e-government services.

H<sub>0</sub> 3 :Web site Quality (WQ) of e-government web sites has a positive influence on relative advantage of using e-government services.

H<sub>0</sub> 4: Relative advantage of using e-government services has a positive influence on intention to use e-government services.

## 4. RESEARCH METHOD

The research study was conducted using a survey questionnaire. People who are using Internet were chosen to be surveyed. The reason is that the poor usage of e-Government service in developing countries had a close relationship with the “digital divide” (*Mofleh and Wanous,2008*).Therefore, the research focuses on people who are electronically capable of accessing internet services. Samples have been selected from the internet users of Trivandrum and Ernakulum districts of Kerala. The rationale behind the selection is that these are the two cities among 100 cities identified by Government of India under the national e-governance plan for the implementation of smart city project. Hence it has been decided to select samples from these districts in order to assess the acceptance of e-governance.

In Ernakulum district, 10 villages from rural area and 3 municipalities & 7 corporation wards from urban area were selected through lottery method. Similarly 10 villages in rural and 2 municipalities & 10 wards from urban area were identified for collection of data from Trivandrum. The sample size was arrived at using the Krejcie and Morgan’s formula. The maximum sample size required as per Krejcie and Morgan’s table is 384 at 95% confidence level. Multistage sampling method has been used for administering the questionnaire. A total of 425 respondents were selected to be included in the sample and 398 questionnaires were used for final analysis after discarding the incomplete samples.

The questionnaire used in this study is adopted from previous studies with appropriate changes in the Indian context. Likert rating scale was used for measuring constructs. The scale uses a five point rating from “1” to “5”, where “5” represents “Strongly Agree” and “1” represents “Strongly Disagree”. The scale used for the measurement of the constructs Perceived ease of Use, Perceived Usefulness and Intention to use was adopted from study of Davis (1989) and Carter and Be’langer (2003). The scale used for measuring Website quality and Relative advantage is adopted from Sang et. al. (2009). The reliability test was carried out on a sample of 45 respondents collected from Trivandrum District using Spearman-Brown split-half method. The values ranging from 0.652 to 0.823 support for the further study to be authentic.

## 5. RESULTS AND ANALYSIS

AMOS Version 20 was used to analyse the data. The hypothesized model was first subjected to validity and reliability check, followed by Structural Equation Modeling for testing the hypothesis.

### 5.1 Reliability and Validity

Confirmatory factor analysis (CFA) was used for testing the construct validity. CFA involves examining the convergent validity, discriminant validity. Convergent validity refers to the extent to which the items under each construct are actually used for measuring the same construct. It is estimated by the item factor loadings, Composite Reliability, and Average Variance Extracted (*Fornell C & Larcker, D.F*). The individual item reliability was tested on its corresponding constructs and found that the factor loadings are above the threshold value of 0.55 (*Teo et al, 2008*). Also the Average Variance extracted (AVE) has been examined for each construct and presented in Table 1. AVE for a construct gives the ratio of individual constructs variance to the total variance. The observed values are all above the recommended value of above 0.50 (*Hair, J.F et al. 1998*)

**Table 1: Composite reliability (CR) and Average Variance Extracted (AVE)**

Item	CR	AVE
Perceived Ease of Use	0.827	0.554
Perceived Usefulness	0.743	0.580
Web site Quality	0.761	0.609
Relative Advantage	0.746	0.594
Intention to Use	0.613	0.570

Table 2 shows the inter construct correlations for verifying the discriminant validity. It shows that the estimated correlation between all constructs shows recommended cut off value of below 0.9 (Hair, J.F et al.1998) and it establishes the discriminant validity for the proposed model.

**Table 2: Inter construct correlations**

	PEOU	PU	WQ	RA	INT
Perceived Ease of Use (PEOU)					
Perceived Usefulness (PU)	0.550				
Web site Quality (WQ)	0.700	0.471			
Relative Advantage (RA)	0.701	0.607	0.319		
Intention to Use (INT)	0.404	0.377	0.628	0.809	

## 5.2 Model Testing

The first step in model testing is to estimate the goodness-of-fit of the research model. Table 3 shows the observed values and the recommended values of goodness-of-fit. The recommended values were arrived from the previous studies ( Hair, J.F et al.1998). Goodness-of-fit index (GFI), Normed fit index (NFI), Comparative fit index (CFI), and the Root-mean-square error of approximation (RMSEA). All of the fit indices in Table 3 indicate that the structural model has a good fit.

**Table 3: Analysis of Goodness of Fit for the Research Model**

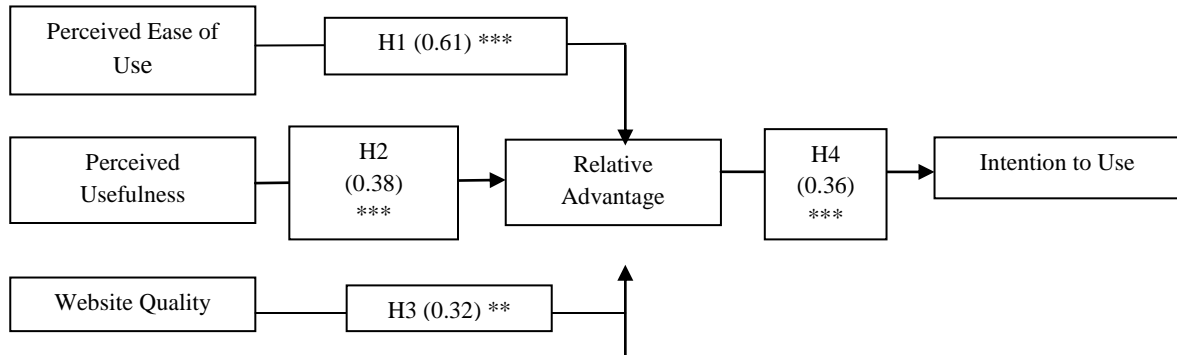
Fit Indices	Recommended Value	Research Model
Chi-square/d.f	$\leq 3.0$	2.74
GFI	$\geq 0.80$	0.831
AGFI	$\geq 0.80$	0.81
NFI	$\geq 0.90$	0.91
RMSEA	$\leq 0.08$	0.07
CFI	$\geq 0.90$	0.91

The second step in model estimation is to examine the path coefficients of each association of between constructs in the research model. Figure 2 presents the research model after validation



along with the hypotheses. The standardized path coefficients of the structure model are shown in the fig 2.

**Fig 2: Research Model after validation**



\*\*\* denotes significance at  $p < 0.01$

\*\* denotes significance at  $p < 0.05$

### 5.3 Findings and Interpretation

The proposed conceptual model was mostly supported by the empirical data. Path analysis results from Fig. 2 provide strong support for all the hypotheses. The result of each hypothesis is summarized in Table 4.

**Table 4: Path Analysis**

Hypothesis	Relationship	Path Coefficient ( $\beta$ )	P value	Result
H <sub>0</sub> 1	PEOU $\longrightarrow$ RA	0.38	**	Supported
H <sub>0</sub> 2	PU $\longrightarrow$ RA	0.61	***	Supported
H <sub>0</sub> 3	WQ $\longrightarrow$ RA.	0.32	**	Supported
H <sub>0</sub> 4	RA $\longrightarrow$ INT	0.56	***	Supported

- The Hypothesis H<sub>0</sub> 1, Perceived Ease of Use (PEOU) has a positive influence on relative advantage of using e-government services ( $\beta=0.38, p < 0.05$ ) is supported since the ease of access

of any system compared to the one which is presently using will definitely increase the adoption of the e-government services. The study supports the previous research on the same field that the PEOU had a positive effect on Intention to use (*Vankitesh and Davis, 2000*) and *Karavasilis, I. et al, 2010*).

- The hypothesis H<sub>0</sub> 2, Perceived Usefulness (PU) has a positive Influence on Relative Advantage ( $\beta=0.61, p<0.05$ ) is strongly supported and this finding confirms the positive relationship suggested by *Agarwal and Prasad, 1998*. However PU has a stronger positive influence compared to PEOU since the path coefficient shows a higher value of 0.61.
- The web site quality in the study also shows positive influence on relative advantage since H<sub>0</sub> 3, Web site Quality (WQ) of e-government web sites has a positive influence on relative advantage of using e-government services is supported ( $\beta=0.32, p<0.05$ ). This is because an interactive e-government web site with up-to-date information can attract the citizens to make use of the full potential of e-government services through self-service portal.
- Hypothesis H<sub>0</sub> 4, Relative advantage of using e-government services has a positive influence on intention to use e-government services is supported in this study ( $\beta=0.56, p<0.01$ ). Even though the PEOU and PU of Technology Acceptance model has explained the adoption behavior of e-government system, after the adoption a user can gain a lot of relative and absolute benefits ranging from convenience availability, cost savings, time savings and accessibility from anywhere (*Mahmud Akhter Shareef et al., 2010*). This study also confirms the same.

#### 5.4 Suggestions

- Government agencies should make sure that Citizens need to be aware of using the e-government system and the factors which influence the adoption of e-government services before switching over from the traditional government office system of working.
- The study also helps the policy makers to identify the prominent predictors of intention to use and to develop strategies for increasing the adoption of e-government services in Kerala. This will help the citizens to get information from government web sites, which will increase the satisfaction and ultimately leads to adoption of e-government services.
- Government agencies may conduct more training programs and should focus the benefits of e-Government systems and to help users to understand the relative advantage of using e-services over existing traditional systems.

## 6. CONCLUSION

This study tries to identify the most prominent predictors of adoption of e-government services availed by the citizens of Kerala. Previous researches show that constructs of TAM (Davis, 1986) and DOI (Rogers, 1995) are the useful predictors of Intention to use in ICT adoption. This paper made an effort to measure the contribution of website quality, Perceived ease of Use (PEOU), Perceived Usefulness (PU) on relative advantage (RA) and further how it leads to user acceptance of e-government services. The results indicate that PU is a stronger predictor of relative advantage compared to PEOU. Also the study reveals RA has a strong positive influence on Intention to Use.

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