

A Survey on Factors Effecting Continuity the Use of Government' E-Services

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Abstract: The acceptance of technology by target groups had been studied as one of the important research axis during the past years at information technology area. E-government is mentioned as the use of Internet and World Wide Web for delivering effective and efficient information and services for citizens. This study devoted effort for developing an integrated model designed to predict and explain an individual's continuous use of government' e-services based on Technology Acceptance Model (TAM) and Diffusion of Innovation Theory (DOI) and trust factor to propose a new hybrid technology acceptance model. The participants are from citizens in Shiraz that use e-services for once or more and selected 191 responses as the sample finally. The results of data analysis by SAS and ordinal logistic show that perceived usefulness, perceived ease of use, compatibility and trust are determinants of Continuity the use of government' e-Services.

Key words: Government' E-Services, Trust, Diffusion of innovation Theory, Technology Acceptance Model.

INTRODUCTION

The rapid diffusion of the internet has radically changed the delivery services for citizens. e- government is Using technology especially web based applications by the government for improving access to information and delivering governmental services to citizens, business partners, deliver employees, other brokers and components of the government (Atashak & Mahzade, 2008: 12). By using e-government websites, citizens can get better services in a convenient way which is also faster than face-to-face services, from anywhere and at any time, citizens can access government information and services. Moreover, from the government side, the more citizens use these facilities, the more operation and management costs can be reduced (Sivaporn Wangpipatwong *et al.*, 2005).

As a result, various e-government initiatives have been taken with the objective to build services focused on citizen's needs and to provide more accessibility of government services to citizens (Papantoniou *et al.*, 2001). Therefore, it is important the successful adoption of new technologies helps governments to implement and deliver more efficient public services to the citizens.

However, low levels of user acceptance of these services are recognized as an endemic problem for government policy makers, government agencies, and e-Government services providers. Behavioral issues of e-Government research are markedly more important than technological ones. More empirical studies on user acceptance of e-government services are needed to assist governments in improving the effectiveness and quality of e-Government services. Now the need for discovering determinants of adopting e-services of Government is enormous, but few empirical studies can be found addressing the issue (Yaghoubi *et al.*, 2010: 37). With regard this and the investment done by government on delivering e-services for citizens, in according to The Economist Intelligence United Limited report Oct 2007, Iran was ranked in 37th out of 43th countries in world. Whiles in Asian countries, Hong Kong was ranked in 9th, Singapore in 10th and Taiwan in 11th (Lean *et al.*, 2009: 459). This report indicate that more study need to be done to analyze the factors influencing the continuance use of Government' e-Services among citizens in Iran. For this reason in this research attempted to determine the factors that influencing continuance use of government' e-Services among citizens of Shiraz.

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2- Theoretical Background:

The theoretical framework in this paper is comprised of three sections. The first section, addresses the current theories and models that can be used to explain citizens' acceptances of technology. Secondly, previous research on the critical factors which may have significant impact on the acceptance of government' e-services will be discussed. Finally, the review will be concluded by proposing a model which will be used to understand citizens' acceptance of government' e-services

2-1- Information Technology Acceptance:

2-1-1- Diffusion of Innovation Theory (DOI):

With regard to the Innovation Diffusion Theory, Rogers (1995) initially bases his analyses on five key variables: relative advantage, complexity, compatibility, trainability and observability. The first two concepts are similar, respectively, to the Perceived Usefulness and Perceived Ease of Use contained in Davis' TAM models (Hernandez *et al.*, 2009: 340; Moor & Benbasat, 1991). Relative advantage is the degree to which an innovation is seen as being superior to its predecessor. Complexity is the degree to which an innovation is seen by the potential adopter as being relatively difficult to use and understand (Rogers, 1995). The next factor, Compatibility is the extent to which the value of the innovation, it's experience in the past, and users' needs are consistent with each other (Tung *et al.*, 2009: 326), while the last two factors are of comparatively limited importance (Moore & Benbasat, 1991; Tornatzky & Klein, 1982). Trialability means how often or how much the innovation can be effectively tested. Observability is the extent to which others can see the innovation (Tung *et al.*, 2008).

Numerous studies have applied DOI to investigate acceptance e-government services and information systems (Lean *et al.*, 2009; Carter & Belanger, 2004; Carter & Belanger, 2003; Tung *et al.*, 2008). Chen *et al.*, 2002 combined the original technology acceptance model with the compatibility construct of innovation diffusion theory to evaluate and explain consumer behavior in the virtual store context. In addition, Wu and Wang (2007) integrated innovation diffusion theory, perceived risk and cost into the technology acceptance model to investigate the determinants of mobile commerce acceptance. They found that compatibility has a direct effect on perceived usefulness and behavioral intention to use.

2-2-2-Technology Acceptance Model (TAM):

Technology Acceptance Model (Davis *et al.*, 1989) adopts TRA's causal links to explain individual's IT acceptance behavior. It suggests that perceived usefulness (PU) and perceived ease of use (PEOU) of IT are major determinants of its usage. PU was defined as the degree of which a person believes that using a particular system would enhance his or her job performance and PEOU was defined as the degree, which a person believes that using a particular system would be free of effort. Both PU and PEOU are jointly influence citizens' intention (Lean *et al.*, 2009: 461).

TAM has been supported by a large number of empirical studies to investigate acceptance information systems (Legris *et al.*, 2003; Lederer *et al.*, 2000; Moon & Kim 2001; Gu *et al.*, 2009; Pavlou, 2003; Plouffe *et al.*, 2001; Leen *et al.*, 2009; Carter & Belanger, 2004), and it has been found that its ability to explain intention and attitude towards using IT is better than TRA and TPB (Mathieson, 1991). Gu *et al.*, 2009 found that PU and PEOU are determinants of behavioral intention to mobile banking. It is worth noting that Lean *et al.*, 2009 conducted a study on the factors influencing intention to use e-government services in Malaysia and results showed PU has direct positive significant relationship towards intention to use e-government service. Moreover, Ha and Stoel (2009) study demonstrated that, intention to use affected by PU. Chang (2008) used questionnaires of a total of 388 Taiwanese consumers with online auction experience and found that PU was the most influential in promoting intention to use auction website.

2-2- Determinants of TAM:

Many factors are seen to be influencing the acceptance of governments' e-services. It is important to take these factors into account. This study has taken additional factors related to acceptance and included them into the model as discussed below. The determinants of perceived ease of use are internet self-efficacy, facilitating conditions and quality of Internet connection and the determinants of perceived usefulness are social influence and awareness of Government' E-Services and its benefit. These factors discussed below.

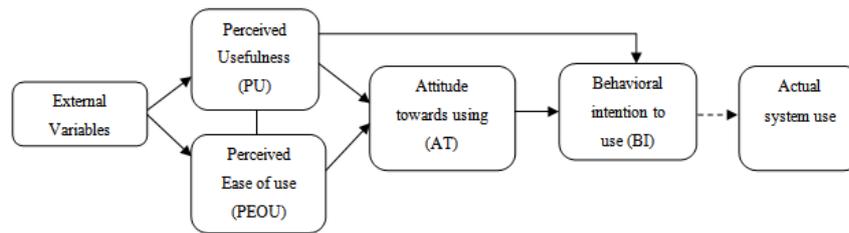


Fig. 1: Technology Acceptance Model (TAM) (Davis *et al.*, 1989).

2-2-1- Awareness of Government’ E-Services and its Benefit:

Howcroft *et al.* (2002), confirming that lack of awareness of online banking services and its benefits are found to be reasons for consumers’ reluctance to use the online banking services offered by banks. Al-Somali *et al.*, 2009 demonstrated the awareness of online banking and its benefit has significant effect on the perceived usefulness. According to Sathye (1999) the use of online banking services is quite a new experience to many customers and low awareness of online banking is a critical factor in causing customers not to adopt online banking. In relation to government’ e-Services, citizens with more awareness of government’ e-services and its benefit, more recognize usefulness of this e-services.

2-2-2- Quality of the Internet Connection:

Quality of the Internet connection is essential component for any Internet-based application. Since e-government services are provided online through the Internet and other digital means, therefore this factor should be consider as important parameter. It is worth noted, Almogbil’s (2005) study confirms that there is a significant relationship between the speed of Internet access and the use of online banking services. Moreover, Al-Somali *et al.*, (2009) found quality of the Internet connection has a positive relationship with PEOU.

2-2-3- Social Influence:

Venkatash and Morris (2000) confirm that social influence plays an important role in determining the acceptance and usage behavior of adopters of new ITs. Social influence is defined as a person’s perception that most people who are import to him think he should or should not perform the behavior in question (Fishbein *et al.*, 1975). Much empirical research indicates social influence has a positive effect on perceived usefulness (Gefen & Straub, 1997; Hsu & Lu, 2004; Taylor & Todd, 1995; Venkatash & Davis, 2000; Al-Somali *et al.*, 2009). Citizen will perceive e-government services to be useful, when they see colleagues, friends and family members use it and get a recommendation of using it from them.

2-2-4- Facilitating Conditions:

Facilitating conditions is defined as the external environments of helping users overcome barriers and hurdles to use a new IT (Lu *et al.*, 2003). Citizen will perceive e-government services to be easy to use when they recognize that there are environmental conditions to help them learn how to use e-services, although they cannot use it skillfully. It has a direct effect on perceived ease-of-use in e-store (Venkatash, 2000) and mobile banking (Gu *et al.*, 2009) and technology acceptance in education (Teo, 2009).

2-2-6- Internet self-Efficacy:

Internet self-efficacy or the belief in one’s capabilities to organize and execute courses of Internet actions required to produce given attainments, is a potentially important factor in efforts to use the e-services. This is perhaps not an important issue in offline e-service environments, where consumers learn how to make purchase at an early stage (Hsu & Chiu, 2004: 369). Internet self-efficacy is more important than computer self efficacy for using e-government websites and e-services (Almahamid, 2009).

2-2-5- Determinants of Trust:

Trust refers to the belief that the promise of another can be relied upon and that, in unforeseen circumstances, the other can be relied upon and According to Belanger *et al.*, 2002, users must have confident in both the Government and the enabling technologies. Privacy is reoccurring issues in e-commerce and e-government research (Belanger and Hiller, 2005; Chadwick, 2001; Miyazaki & Fernandez, 2001; Hoffman *et al.*, 1999, Lean *et al.*, 2009). Moreover in many studies, trust added to technology acceptance model and its

relationship with intention to use has been studied (Al-Somali *et al.*, 2009; Lean *et al.*, 2009; Tung *et al.*, 2009; Carter & Belanger, 2004).

This research adopts the theoretical framework proposed by Suh and Han (2003), which suggested that the determinants of trust were perception of privacy protection, perception of integrity data, perception of non-repudiation, perception of Authentication and perception of Confidentiality. Authentication ensures that the trading parties in an electronic transaction or communication are who they claim they are. Non-repudiation means that neither of the trading parties should be able to deny having participated in transaction after the fact. Confidentiality warrants that all communication between trading parties are restricted to the parties involved in the transaction. Privacy protection ensures that customers' personal information collected from their electronic transactions is protected from disclosure without permission. Data integrity means that data in transactions should not be created, intercepted, modified, or deleted illicitly.

3- Research Model:

Drawing upon the earlier discussion based on the theoretical background, this study investigated the factors influencing continuous use of g-Services using TAM, DOI and trust factor taking into account the effect of a few additional important control variables (e.g. quality of Internet connection, awareness of e-service and its benefits, social influence, internet self-efficacy, Facilitating Condition). Research model is illustrated in fig 1.

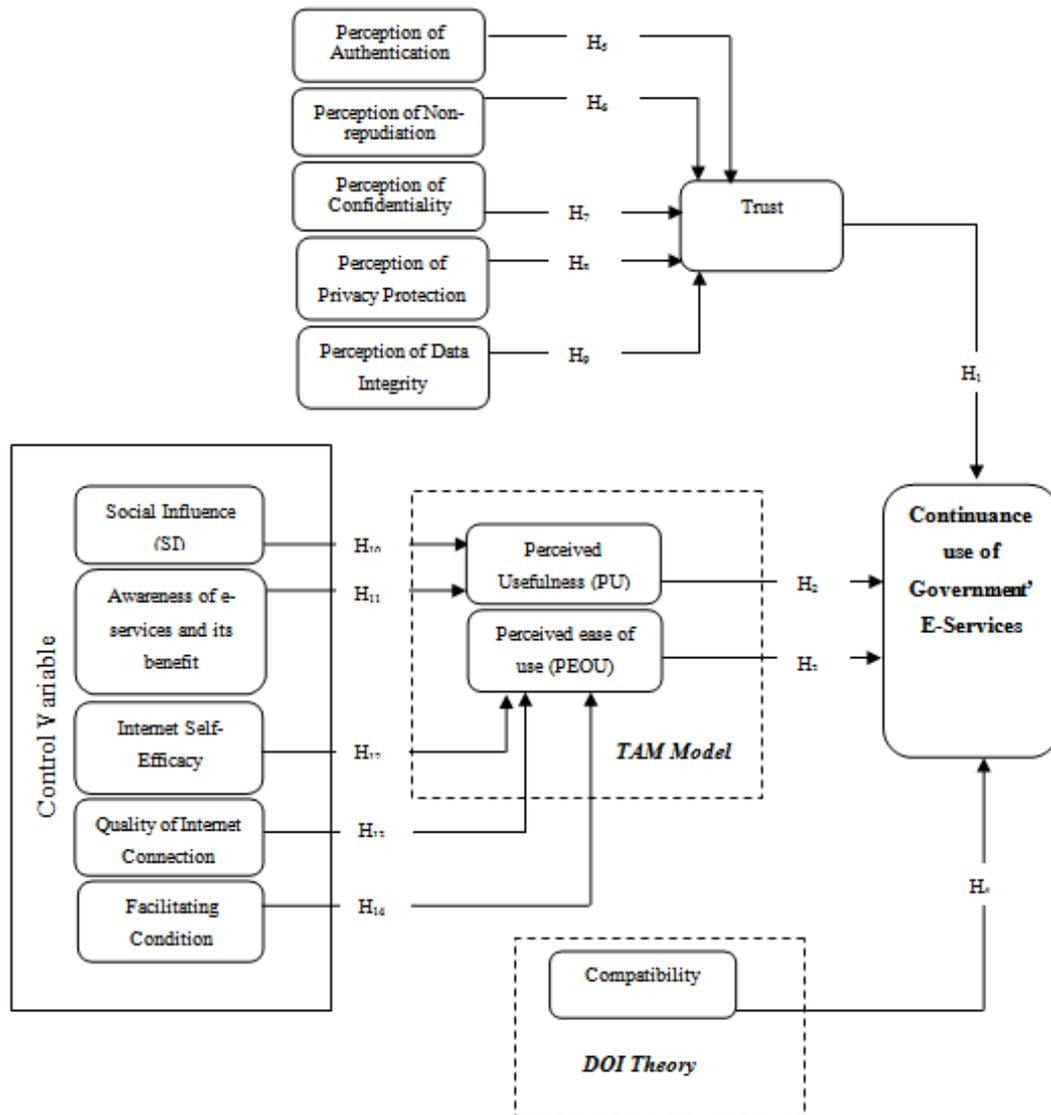


Fig. 2: Proposed research model.

4- Research Hypotheses:

In this study the following fourteen hypotheses will be addressed:

- H₁: Trust have a meaning relationship with Continuance use of Government’ e-Services
- H₂: Perceived Usefulness have a meaning relationship with Continuance use of Government’ e-Services
- H₃: Perceived ease of use have a meaning relationship with Continuance use of Government’ e-Services
- H₄: Compatibility have a meaning relationship with Continuance use of Government’ e-Services
- H₅: Perception of Authentication has a meaning relationship with trust
- H₆: Perception of Non- repudiation has a meaning relationship with trust.
- H₇: Perception of Confidentiality has a meaning relationship with trust
- H₈: Perception of Privacy Protection of has a meaning relationship with trust.
- H₉: Perception of Data Integrity has a meaning relationship with trust.
- H₁₀: Social Influence has a meaning relationship with Perceived Usefulness
- H₁₁: Awareness of Government’ e-services and its benefit have a meaning relationship with Perceived Usefulness
- H₁₂: Internet Self-Efficacy of citizens has a meaning relationship with Perceived ease of use
- H₁₃: Quality of Internet Connection has a meaning relationship with perceived ease of use
- H₁₄: Facilitating Conditions have a meaning relationship with perceived ease of use.

5- Methodology:

The data were collected using a paper questionnaire survey. The participants for this study were 241 citizens in Shiraz and 191 responses were collected. The citizens are who have used government’s e-services. The reliability of the questionnaire was measured by Cranach’ alpha as 0.91 and was acceptable. The items used in this survey, were adapted from previous studies. Each item is rated on a scale of 1 to 5 (Strongly Disagree to Strongly Agree). The measures of perceived usefulness and perceived ease of use were adapted from questionnaire of Suh and Han (2002), Moor and Benbast (1991) and Venkatesh and Davis (2000). The measures of compatibility were adapted from Karahanna and *et al.*, 1999, Fang and Shih (2004) and Rimenschneider and *et al.*, 2002 and The measures of trust were adapted from Suh and Han (2003).

6- Results:

6-1- Sample Demographics:

The demographic statistic indicated that female (53.4%) was more than male (46.6%). Regarding age distribution, people ages between eighteen and twenty-five dominate among respondents (51.8 % percent). Moreover, regarding educational level, respondents who have bachelors are dominant (50.3% percent). Table1 show Demographic profile of all respondents.

Table 1: Demographic profile of all respondents.

Variable		Count	Percentage
Gender	Male	89	46.6
	female	102	53.4
Age	18- 25 years old	99	51.8
	26-35 years old	79	41.4
	36-45 years old	10	5.2
	>46 years old	3	1.6
Education	Diploma and associated degree	72	37.7
	Bachelor	96	50.3
	Master or above	23	12
Frequency use of e-services	Daily	62	32.5
	Weekly	31	16.2
	Monthly	18	9.4
	Yearly	0	0
	When needed	80	41.9

6-2- Results of the Ordinal Logistic:

First of all, we make model on mediator variables (Trust, Perceived ease of use (PEOU), Perceived Usefulness (PU), Compatibility) and then on the main variable (Continuance use Government’ E-Services). For model fitting we used SAS 9.2 software.

In the first model, Trust (Y), is dependent variable and Perception of Privacy Protection (X₁), Perception of Non-repudiation (X₂), Perception of Authentication (X₃), Perception of Confidentiality (X₄), Perception of

Data Integrity (X_5) are explanatory variables. As in this model $R^2 = 0.38$, on the other hand, the explanatory variables explain 38 percent of the total variation of Trust.

SAS software, with Wald chi-square statistic, tests the effect of explanatory variable on the dependent variable. The results in the table 2 indicate that Perception of Privacy Protection and Perception of Non-repudiation have effected on Trust.

Table 2: Analysis of effect for model1.

Effect	Df	Wald Chi-square	Sign
Perception of Privacy Protection	3	13.6232	0.0035
Perception of Non-repudiation	3	8.3222	0.0398
Perception of Authentication	3	2.6403	0.4505
Perception of Confidentiality	4	6.9171	0.1403
Perception of Data Integrity	3	6.8824	0.0757

For finding how this effect is, SAS software use maximum likelihood estimate. However SAS estimate all choice for i ($i=1, 2, 3, 4$), we just used $i=2$ to easy interpreted the model. You can see all models in Appendix (A).

$$\log it(Y \leq 2) = 1.722 + 0.356X_{21} + 1.110X_{22} - 0.519X_{23} - 0.417X_{24} + 1.042X_{25}$$

The positive coefficient of Perception of Privacy Protection (X_1), indicate its positive effect on Trust (Y). $e^{\beta_{21}} = 4.089$ describes, for a subject more agree with Perception of Privacy Protection, the odds of being

more Trusted, are about 4 times as larger than the odds for a subject disagree with Perception of Privacy Protect. As Perception of Privacy Protect, the positive coefficient of Perception of Non-repudiation (X_2),

indicate its positive effect on Trust (Y). $e^{\beta_{22}} = 18.063$ describes, for a subject more agree with Perception of Non-repudiation, the odds of being more Trusted, are about 18 times as large than the odds for a subject disagree with Perception of Non-repudiation.

In the second model, Perceived ease of use (PEOU) (Y), is dependent variable and Facilitating Condition (X_1), Quality of Internet Connection (X_2), Internet Self-Efficacy (X_3), are explanatory variables. Internet Self-Efficacy (X_3) has normal distribution, thus it inter the model as continues variable. As in this model $R^2 = 0.52$, the explanatory variables explain 52 percent of the total variation of Perceived ease of use (PEOU).

The results in the table 2 indicate that Internet Self-Efficacy and Quality of Internet Connection have effected on Perceived ease of use (PEOU).

Table 2: Analysis of effect for model 2

Effect	Df	Wald Chi-square	Sign
Facilitating Condition	4	2.6370	0.6203
Quality of Internet Connection	3	11.5936	0.0089
Internet Self-Efficacy	1	15.3308	<.0001

$$\log it(Y \leq 2) = 0.968 - 0.379X_{21} + 0.079X_{22} + 0.949X_{23}$$

For $i=2$ model is in the form of bellow:

$$\log it(Y \leq 2) = 0.968 - 0.379X_{21} + 0.079X_{22} + 0.949X_{23}$$

The positive coefficient of two variables, Quality of Internet Connection (X_2) and Internet Self-Efficacy (X_3), indicate its positive effect on Perceived ease of use (PEOU). $e^{\beta_{22}} = 0.708$ describes, for a subject have more Quality of Internet Connection, the odds of having more Perceived ease of use, are 0.7 times as large

than the odds for a subject have less Quality of Internet Connection. $e^{\beta_3} = 2.583$ describe the odds of having more Perceived ease of use, increase about 2.5 times by one unit increase in Internet Self-Efficacy.

In the third model, Perceived Usefulness (PU) (Y), is dependent variable and Social Influence (SI) (X₁) and Awareness of Government' e-services and its benefit (X₂), are explanatory variables. As in this model R² = 0.23, the explanatory variables explain 23 percent of the total variation of Perceived Usefulness (PU).

The result in the table 3 indicate that Awareness of Government' e-services and its benefit has effected on Perceived Usefulness (PU).

Table 3: Analysis of effect for model 3.

Effect	Df	Wald Chi-square	Sign
Social Influence (SI)	3	2.9593	0.3979
Awareness of Government' E-services and its benefit	4	10.2984	0.0357

$$\log it(Y \leq 2) = 6.627 - 0.493X_{21} - 3.325X_{22}$$

For i=2 model is in the form of bellow:

$$\log it(Y \leq 2) = 4.770 + 0.096X_{11} + 0.491X_{22} + 0.121X_{23} + 0.536X_{24}$$

The negative coefficient of Awareness of Government' e-services and its benefit (X₂), indicate its negative effect on Perceived Usefulness (PU).

In the main model, Continuance use Government' E-Services (Y), is dependent variable and the dependent variables in the last three models are explanatory variables in this model. Thus, Trust (X₁), Perceived ease of use (PEOU) (X₂), Perceived Usefulness (PU) (X₃), Compatibility (X₄), are explanatory variables in the main model. As in this model R²= 0.52, the explanatory variables explain 52 percent of the total variation of Continuance use Government' E-Services.

The results in the table 4 indicate that all explanatory variables have effected on Continuance use Government' E-Services.

Table 4: Analysis of effect for model 4.

Effect	Df	Wald Chi-square	Sign
Trust	3	7.9326	0.0481
Perceived ease of use (PEOU)	3	9.0567	0.0285
Perceived Usefulness (PU)	3	8.1201	0.0459
Compatibility	3	14.2290	0.0026

$$\log it(Y \leq 2) = 4.770 + 0.096X_{11} + 0.491X_{22} + 0.121X_{23} + 0.536X_{24}$$

For i=2 model is in the form of bellow:

$$\log it(Y \leq 2) = 4.770 + 0.096X_{11} + 0.491X_{22} + 0.121X_{23} + 0.536X_{24}$$

The positive coefficient of all variables, indicate their positive effect on Continuance use Government' E-Services (Y). $e^{\beta_{21}} = 2.246$ describes, for a subject with more Trust, the odds of Continuance using Government' E-Services, are 2.25 times as large than the odds for a subject with less Trust. $e^{\beta_{22}} = 5.376$ describes, for a subject more Perceived ease of use (PEOU), the odds of Continuance using Government' E-Services, are 5.38 times as large than the odds for a subject less Perceived ease of use (PEOU). This odds for a subject more Perceived Usefulness (PU), are $e^{\beta_{23}} = 11.36$ times larger than a subject less Perceived Usefulness (PU) and for a subject with more Compatibility, are $e^{\beta_{24}} = 37.64$ time large than for a subject with less Compatibility.

7- Conclusion:

The study aims to identify factors that are influencing Continuance Use of government' E-Services among citizens in Shiraz. In this study, five important antecedents of trust were tested; they were Perception of Authentication, Perception of Non- repudiation, Perception of Confidentiality, Perception of Privacy Protection and Perception of Data Integrity. Among these five antecedents, only Perception of Non- repudiation and Perception of Privacy Protection were proven to have a meaning relationship with trust. This result supports the earlier finding by Lean *et al.*, 2009 and Suh and Han, 2003. In other hand, when citizens' perceived of Privacy Protection and Non- repudiation increase, the level of trust in continuance use of government' E-Services would be also increased.

Also, Awareness of government' e-services and its benefit have a meaning relationship with perceived usefulness. In other hand, when citizens are aware about the benefits, advantages and disadvantages of government' e-services, they more understand usefulness of e-services. This is consistent with the results from Al-Somali *et al.*, 2009. Also, social influence was found to have no meaning relationship with perceived usefulness. This is consistent with the result from Gu *et al.*, 2009.

The meaning relationship quality of Internet connection with perceived ease of use is consistent with previous research by Al-Somali *et al.*, 2009. In other word, citizens who have better quality of the Internet connection more understand ease of use of e-services.

Finally, based on the analysis, there were meaning relationships for perceived ease of use, perceived usefulness, trust and compatibility toward continuance use of government' e-services. The meaning relationship trust with continuance use is consistent with previous research by Jarvenpaa *et al.*, 1999; Gefen *et al.*, 2003; Tan and Teo (2000); Suh and Han (2003), Lean *et al.*, 2009 and Gu *et al.*, 2009. Also, The meaning relationship perceived ease of use with continuance use is consistent with previous research by Tang *et al.*, 2008; Gu *et al.*, 2009; Pan and Jordan-Marsh (2010) and the meaning relationship perceived usefulness with continuance use is consistent with previous research by Lean *et al.*, 2009; Carter and Belanger (2004); Tang *et al.*, 2009; Ha and Stoel (2009) Horst *et al.*, 2007. Finally, the meaning relationship compatibility with continuance use consistent with previous research by Carter and Belanger (2003), Carter and Belanger (2004), Tang *et al.*, 2008;

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Appendix A

Model 1:

```
proc logistic data = use;
class perception of privacy protection, perception of Non repudiation, perception of Authentication, perception of Confidentiality, perception of Data Integrity / desc ;
model trust (descending) = perception of privacy protection perception of Non repudiation perception of Authentication perception of Confidentiality perception of Data Integrity / link = clogit rsquare;
run;
```

$\ln\left(\frac{p(Y \leq 1)}{1 - p(Y \leq 1)}\right)$	Estimate	Standard Error	Wald Chi-square	Sign	Df	e^β
Intercept	-1.6297	0.6061	7.2298	0.0072	1	-
Perception of Privacy Protection	1.3574	0.4319	9.8767	0.0017	1	11.137
Perception of Non-repudiation	0.0527	0.4924	0.0114	0.9148	1	6.274
Perception of Authentication	0.4982	0.5780	0.7432	0.3886	1	1.175
Perception of Confidentiality	0.5960	1.2808	0.2165	0.6417	1	0.093
Perception of Data Integrity	2.1198	1.3542	2.4503	0.1175	1	481.959

Analysis of maximum likelihood estimate for $Y \leq 1$.

$$\log it(Y \leq 1) = -1.630 + 1.357X_{11} + 0.053X_{12} + 0.498X_{13} + 0.596X_{14} + 2.120X_{15}$$

$\ln\left(\frac{p(Y \leq 2)}{1 - p(Y \leq 2)}\right)$	Estimate	Standard Error	Wald Chi-square	Sign	Df	e^β
Intercept	1.7219	0.6050	8.1010	0.0044	1	-
Perception of Privacy Protection	0.3555	0.3472	1.0482	0.3059	1	4.089
Perception of Non-repudiation	1.1102	0.4035	7.5697	0.0059	1	18.063
Perception of Authentication	-0.5191	0.3889	1.7819	0.1819	1	0.425
Perception of Confidentiality	-0.4172	1.1665	0.1279	0.7206	1	0.034
Perception of Data Integrity	1.0416	1.3114	0.6309	0.4270	1	163.965

Analysis of maximum likelihood estimate for $Y \leq 2$.

$$\log it(Y \leq 2) = 1.722 + 0.356X_{21} + 1.110X_{22} - 0.519X_{23} - 0.417X_{24} + 1.042X_{25}$$

$\ln\left(\frac{p(Y \leq 3)}{1 - p(Y \leq 3)}\right)$	Estimate	Standard Error	Wald Chi-square	Sign	Df	e^β
Intercept	4.3342	0.8798	24.2690	<.0001	1	-
Perception of Privacy Protection	-0.6600	0.3461	3.6363	0.0565	1	1.481
Perception of Non-repudiation	0.6208	0.4275	2.1095	0.1464	1	11.073
Perception of Authentication	-0.3162	0.4109	0.5925	0.4415	1	0.520
Perception of Confidentiality	-0.7381	1.1695	0.3983	0.5280	1	0.024
Perception of Data Integrity	0.8966	1.3363	0.4502	0.5022	1	141.839

Analysis of maximum likelihood estimate for $Y \leq 3$.

Model 2:

proc logistic data = use;
 class Social Influence, Awareness of e-services and its benefit / desc ;
 model Perceived usefulness (descending) = Social Influence, Awareness of e-services and its benefit /link = clogit rsquare;
 run;

$$\log it(Y \leq 1) = -3.176 - 0.412X_{11} + 0.765X_{12} + 0.949X_{13}$$

$\ln\left(\frac{p(Y \leq 1)}{1 - p(Y \leq 1)}\right)$	Estimate	Standard Error	Wald Chi-square	Sign	Df	e^β
Intercept	-3.1760	1.0031	10.0252	0.0015	1	-
Facilitating Condition	-0.4118	0.4882	0.7115	0.3989	1	0.174
Quality of Internet Connection	0.7647	0.4393	3.0296	0.0818	1	1.647
Internet Self-Efficacy	0.9491	0.2424	15.3308	<.0001	1	2.583

Analysis of maximum likelihood estimate for $Y \leq 1$.

$$\log it(Y \leq 2) = 0.968 - 0.379X_{21} + 0.079X_{22} + 0.949X_{23}$$

$\ln\left(\frac{p(Y \leq 2)}{1 - p(Y \leq 2)}\right)$	Estimate	Standard Error	Wald Chi-square	Sign	Df	e^β
Intercept	0.9683	1.0384	0.8695	0.3511	1	-
Facilitating Condition	-0.3792	0.3784	1.0040	0.3164	1	0.179
Quality of Internet Connection	0.0788	0.4019	0.0384	0.8446	1	0.708
Internet Self-Efficacy	0.9491	0.2424	15.3308	<.0001	1	2.583

Analysis of maximum likelihood estimate for $Y \leq 2$.

$$\log it(Y \leq 3) = 2.417 - 0.511X_{31} - 0.952X_{32} + 0.949X_{33}$$

$\ln\left(\frac{p(Y \leq 3)}{1 - p(Y \leq 3)}\right)$	Estimate	Standard Error	Wald Chi-square	Sign	Df	e^β
Intercept	2.4166	1.3608	3.1537	0.0758	1	-
Facilitating Condition	-0.5107	0.3516	2.1092	0.1464	1	0.157
Quality of Internet Connection	-0.9519	0.4404	4.6716	0.0307	1	0.296
Internet Self-Efficacy	0.9491	0.2424	15.3308	<.0001	1	2.583

Analysis of maximum likelihood estimate for $Y \leq 3$.

Model 3:

proc logistic data = use;
 class Facilitating Conditions, quality of Internet connection / desc;
 model perceived ease of use (descending) = Facilitating Conditions, Internet self-efficacy, quality of Internet connection /link = clogit rsquare;
 run

$$\log it(Y \leq 1) = 3.540 + 0.789X_{11} - 1.748X_{12}$$

$\ln\left(\frac{p(Y \leq 1)}{1 - p(Y \leq 1)}\right)$	Estimate	Standard Error	Wald Chi-square	Sign	Df	e^β
Intercept	3.5404	190.8	0.0003	0.9852	1	-
Social Influence (SI)	0.7894	0.6190	1.6264	0.2022	1	2.117
Awareness of Government E-services and its benefit	-1.7476	190.8	0.0001	0.9927	1	<.0001

Analysis of maximum likelihood estimate for $Y \leq 1$.

$$\log it(Y \leq 2) = 6.627 - 0.493X_{21} - 3.325X_{22}$$

$\ln\left(\frac{p(Y \leq 2)}{1 - p(Y \leq 2)}\right)$	Estimate	Standard Error	Wald Chi-square	Sign	Df	e^β
Intercept	6.6273	190.8	0.0012	0.9723	1	-
Social Influence (SI)	-0.4933	0.2993	2.7163	0.0993	1	0.587
Awareness of Government E-services and its benefit	-3.3254	190.8	0.0003	0.9861	1	<.0001

Analysis of maximum likelihood estimate for $Y \leq 2$.

$$\log it(Y \leq 3) = 8.883 + 0.336X_{13} - 3.014X_{32}$$

$\ln\left(\frac{p(Y \leq 3)}{1 - p(Y \leq 3)}\right)$	Estimate	Standard Error	Wald Chi-square	Sign	Df	e^β
Intercept	8.8828	190.8	0.0022	0.9629	1	-
Social Influence (SI)	0.3356	0.3246	1.0685	0.3013	1	0.687
Awareness of Government' E-services and its benefit	-3.0141	190.8	0.0002	0.9874	1	<0.001

Analysis of maximum likelihood estimate for $Y \leq 3$.

Main model:

$$\log it(Y \leq 1) = 1.518 + 0.874X_{11} + 0.271X_{12} + 1.598X_{13} + 1.767X_{14}$$

$\ln\left(\frac{p(Y \leq 1)}{1 - p(Y \leq 1)}\right)$	Estimate	Standard Error	Wald Chi-square	Sign	Df	e^β
Intercept	1.5179	168.5	0.0001	0.9928	1	-
Trust	0.8737	0.4371	3.9948	0.0456	1	4.888
Perceived ease of use (PEOU)	0.2711	0.6951	0.1521	0.6965	1	11.524
Perceived Usefulness (PU)	1.5984	168.5	4.0005	0.0430	1	10.541
Compatibility	1.7665	0.5237	11.3787	0.0007	1	128.798

Analysis of maximum likelihood estimate for $Y \leq 1$.

$$\log it(Y \leq 2) = 4.770 + 0.096X_{11} + 0.491X_{22} + 0.121X_{23} + 0.536X_{24}$$

$\ln\left(\frac{p(Y \leq 2)}{1 - p(Y \leq 2)}\right)$	Estimate	Standard Error	Wald Chi-square	Sign	Df	e^β
Intercept	4.7698	168.5	0.0008	0.9774	1	-
Trust	0.0962	0.4247	3.0513	0.0418	1	2.246
Perceived ease of use (PEOU)	0.4914	0.6638	0.5480	0.4592	1	5.376
Perceived Usefulness (PU)	0.1206	168.5	4.0006	0.0405	1	11.356
Compatibility	0.5362	0.4718	1.2918	0.2557	1	37.637

Analysis of maximum likelihood estimate for $Y \leq 2$.

$$\log it(Y \leq 3) = +0.257X_{31} + 2.394X_{32} + 1.856X_{33} + 0.789X_{34}$$

$\ln\left(\frac{p(Y \leq 3)}{1 - p(Y \leq 3)}\right)$	Estimate	Standard Error	Wald Chi-square	Sign	Df	e^β
Intercept	0.000	0.000	-	-	-	-
Trust	0.2568	0.5621	0.2087	0.6478	1	1.578
Perceived ease of use (PEOU)	2.3936	1.1664	4.2115	0.0402	1	96.253
Perceived Usefulness (PU)	1.8557	168.5	0.0001	0.9912	1	<0.001
Compatibility	0.7890	0.4859	2.6372	0.1044	1	48.462

Analysis of maximum likelihood estimate for $Y \leq 3$.