ADOPTION AND USE OF E-GOVERNMENT SERVICES: THE CASE OF ROMANIA

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ABSTRACT

National governments have been makeing significant attempts to make theirits services and information available on the Internet. However, the success of these efforts depends, to a great extent, on how well the targeted users for such services, citizens in general, make use of them. For this reason, the purpose of the presented study was to identify what factors could affect the citizens' adoption of e-government services, analyzing the case of Romania. According to the UN e-government survey conducted in 2008, Romania comes under mid range countries by utilization of e-government (percent of utilization 37%). Romania's national portal www.e-guvernare.ro aims at progressively making all services and information accessible through the portal. The study is an extension of the Technology Acceptance Model. The proposed model was validated using data collected from 481 citizens. The results provided substantial support for most all proposed hypotheses and showed the significance of the extended constructs.

KEYWORDS: e government, citizen's adoption, Technology Acceptance Model

RESUMEN

Los gobiernos nacionales hacen importantes esfuerzos para quehacer sus servicios e y informaciónes se encuentren disponibles en Internet. Sin embargo, el éxito de estos esfuerzos depende, en gran medida, de qué tan biencómo los usuarios a los que van dirigidos tales serviciosde e gobierno servicios, los ciudadanos en general, hacenr uso de ellos. Porara esta razón, el propósito del presente artíiculo es de identificar los factores que podrían afectar la adopción de los servicios de gobierno electrónicos,. analizando el caso de Rumania. De acuerdoConforme con la encuesta sobre gobiernos electrónicos de UN investigación E-government realizada de UN en 2008, Rumania está entre los países con un nivel medio de desarrollo del E-gobiernogobierno electrónico (porcentaje de utilización 37%). El portal nacional de Rumania portal nacional – www.guvernare.ro - tiene comopor objeto hacer accesibles progresivamente todos los servicios y la información accesible a través del portal. El estudio es una extensión del Modelo de Aceptación de Tecnología. El modelo propuesto fue validado con datos recogidos de 481 ciudadanos.

1. INTRODUCTION

In the entire world, the modernization of public services through the adoption of information and communication technologies is in motion. There are, all around us, evidences of a universal shift toward modern online public services (e-services) and a dynamic e-business environment. This has caused governments and public sector organizations around the globe to take notice of this phenomenon, become aware of its potentials and consequently utilize them, thereby triggering investments into e-services. The resulting benefits can be diverse and long lasting such as, among others, less corruption,

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increased transparency, better delivery of government services to citizens, improved interactions with business and industry, greater convenience, citizen empowerment through access to information, growth of revenues, cost reductions, and more efficient government management, among otherst.

However, the success of these efforts depends, to a great extent, on how well the targeted users for such services, citizens in general, make use of them. While the e-government serves to present a single face for all types of visitors, , the service needs to differ among the government's many customers. For example, local residents might expect to find information on local or state government contacts, social services, educational institutions. Businesses might expect to find information on taxes, contracts, procurement, and requests for proposals. Visitors to the area might expect to find information on recreational activities, hotels, restaurants, and other businesses, as well as a calendar of local events. Others may be looking for employment opportunities, local ordinances, and other information. In order to fulfillachieve the needs of all types of users, the designers have to first understand the different requirements that users expect, and then relate these characteristics to the design features.

Literature in the field has mentioned different reasons for the adoption of e-government [1]: political, economical, social and managerial reasons. From the political point of view, e-government is used to provide public information services with the goal to increase citizen participation in political processes. Economical reasons include lower cost channels of communication with citizens, increased resource efficiency, improved service quality, reduced turnaround times, improved access to services and availability of new services. The social benefits of e-government include better delivery of government services. Public services can be more readily brought to all citizens, particularly those with special needs and the elderly by enabling citizens to obtain government information through web portals at any time and from any location equipped with Internet access. The managerial reasons behind the adoption of e-government include reforming the public sector, leading to more efficient government management with increased accountability and transparency. This can help reduce corruption and prevent many (but not all) of the human errors that manual processing entails. For employees and managers, it can bring convenience and efficiency.

Opposingte to these many claimed benefits, a number of studies have argued that e-government has not yet fulfilled its promises. The UN E-Government Survey [27] used a composite "Web Measure Index" to evaluate the aptitude of 192 governments around the world to employ e-government as a tool to inform, interact, transact and network. This survey confirmed that the vast majority of countries have a long road ahead to fully implement e-government services, especially at the transactional and connected phases. Furthermore, some researchers point out that the provision of e-government services is still far from reaching full effectiveness [13]; [17] while a number of researchers argue that many issues such as privacy and security remain as barriers for e-government [16],[19].

2. LITERATURE REVIEW

E-government services are provided using information and communication technologies. Consequently, theories on information technology adoption are relevant to understand the adoption of e-government. Generally, these theories take one of three possible approaches: a diffusion approach, an adoption approach or a domestication approach [30].

Adoption researchers typically describe and explain the acceptance decision of individual users applying different social theories of decision-making. In 1989, based on the Theory of Reasoned Action (TRA) [3], Fred Davis developed the Technology Acceptance Model (TAM) to explain how users come to accept and use a technology [9]. The main elements of Davis's TAM model are "perceived usefulness" (the degree to which a person believes that using a particular system would enhance his or her job performance) and "perceived ease of use" (the degree to which a person believes that using a particular system would be free from effort).

To present a more complete picture of the acceptance process, Venkatesh, Morris, Davis and Davis [28] created an integrated model called Unified Theory of Acceptance and Use of Technology (UTAUT), in

which were merged eight models previously used in the information technology literature were merged. UTAUT helps managers assess the likelihood of success for new technologies as well as understand the drivers of technology acceptance.

In the framework of the **diffusion approach,** Everett Rogers' [22] develops the theory of Diffusion Of Innovations (DOI) with the goal to analyze of the characteristics of technology adopters. These characteristics include the relative advantage, complexity, image, visibility, compatibility, results demonstrability, and voluntariness of use of the innovation. Certain key constructs in innovation diffusion theory are analogous to the constructs in TAM (relative advantage is similar to perceived usefulness, complexity is similar to perceived ease of use).

Domestication researchers study the adoption, use and domestication of technology in society with a particular focus on the societal consequences of technology domestication [26].
Based on these theories, a number of studies have investigated the adoption of e-government services. Carter and Belanger [6], [7], investigated the effects of the relative advantage, compatibility, ease of use and image with regards to the citizen's intention to use e-government services. They adopted the theory of Diffusion Of Innovations Theory and examined the most relevant factors that affect the intention of citizens in using e-government services. Findings from this study reveal that perceived ease of use, compatibility, and trustworthiness are important constructs when predicting intentions to use the state e-government services.

Wangpipatwong, Chutimaskul and Papasratorn [31] explored which factors influence the adoption of e-Government websites regarding information quality and system quality aspects. The findings showed that all explored characteristics of information quality significantly influence the adoption of e-Government websites. Accuracy, relevancy, and completeness were more significant than timeliness and precision. Efficiency was the most significant factor.

Choudrie and Dwivedi [8] examined the citizens' awareness and adoption of e-government initiatives in the United Kingdom. The findings revealed that citizens with home broadband access are more likely to be aware of and adopt e-government services. The study also found that the demographic characteristics of citizens such as the age, gender, education, and social class have an imperative role in explaining the citizen's awareness and adoption of e-government services.

Dimitrova and Chen [10] examined the effects of socio-psychological factors on the adoption of e-government in the US by combining two theoretical perspectives, the Technology Acceptance Model and the Diffusion Of Innovations. The findings showed that perceived usefulness, perceived uncertainty and prior interest in government were associated with the adoption of e-government in the US.
While the literature review has identified a number of factors that determine the adoption of e-government services in countries all around the world, there is non't any study concerning the adoption of e-government services in Romania. So, the purpose of the presented research was to assess and test the factors that are related to e-government adoption in Romania.

3. E-GOVERNMENT IN ROMANIA

The Romanian government has been making significant attempts to develop a proper framework for the development of e-Government. Important steps were made in the development of the national e-Government infrastructure. An e-Government portal - www.e-guvernare.ro - was launched in September 2003, providing a one-stop shop to public services online, and incorporating a transactional platform enabling users to register for interactive and transactional services. Romania's national portal received in 2003 an achievement award from the World Summit of the Information Society for its comprehensiveness and innovation and aims at progressively making all services and information accessible through the portal.

Since 2003, a fast-developing infrastructure made it possible for the Romanian government to deliver a number of interactive and transactional services online, such as VAT declaration, a fully operational e-procurement platform, submission of statistical information, electronic payment of social security contributions and of local taxes, advanced job search facility and civil service recruitment platform.

According to the UN e-government survey conducted in 2008 [27], Romania comes under mid range countries by utilization of e-government (percent of utilization 37%). This level of e-government usage suggests that a big part of the adult population remain outside of the world of digital government. It also proves that Romania needs to increase its efforts to encourage potential users to use the available online e-government services

4. THE STUDY

In orderther to achieve the objective of the research - to explore the factors that determine the adoption of e-government services in Romania – we made an analysis to establish which theory is most suitable for the Romanian context. We had in view the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology.

TAM has been extensively used to analyze citizen's acceptance in various e-government researches. It is based on the belief that individual factors affecting the user's decision whether to accept or reject an e-government service can be identified and measured. TAM sees perceived ease of use and perceived usefulness as fundamental determinants of user acceptance. These two variables influence intention to use an e-government service, which, in turn, correlates with actual use. The model uses measurement scales for both ease of use and usefulness.

Although it has already been used in other e-government acceptance studies [1], UTAUT does not seemed to be easily adapted for our purposes. The model is best used to measure technology acceptance in companies. Two of its six variables rely heavily on the technology being introduced in an organization. Some of the criteria suggested to measure "social influence" include help of the senior management, and organizational support for the new technology. "Voluntariness of use" measures whether technology is compulsory in the job, to what extent it is required by the boss, or expected by supervisors.

Because many e-government services are designed to be used in the citizens' everyday life, we decided that the use of TAM to predict user acceptance in this field seems more appropriate. When used in new fields of study, TAM often needs to be adapted or expanded to suit the characteristics of the specific service. According to Serenko and Bontis [24], the major advantage of TAM is that it can be extended by using domain-specific constructs when used with newer technologies.

So, the next step was to identify the user acceptance constructors for e-government. Defining acceptance constructors however is only the beginning of the TAM process. The next step involves developing multi-item scales to measure each constructor. Various stakeholders may require different criteria to measure each constructor, hence the need for a customized set of measures for e-government.

Based on the existing research literature, a list of e-government acceptance constructors was identified: *perceived ease of use*, *perceived usefulness*, *perceived trust*, *perceived quality*, *demographic factors*, *user satisfaction* and *e-government adoption.* Subsequently, specific criteria measuring each constructor were devised (see table I) using:

- the authors' previous research, in which identified the features used to evaluate e-government systems;
- adaptation of some criteria used in the related studies
- analysis of features of other e-fields, including e-commerce.

- the results of some empirical studies on citizens' satisfaction in e-government

E-GOVERNMENT

Constructor	Criteria
Perceived Ease of Use (PEU)	Usability (How do you perceive the easiness of use of an e-government service?)
	Navigation (How easily navigate around an e-Government website?)
	Accessibility (Does e-Government websites provide access for persons with disabilities?)
	Helpfulness (Do you receive the expected assistance when you need it?)
Perceived Usefulness (PU)	Content (Does e-government service provide the precise information you need?)
	Timeliness (Usually the e-government services provide up-to-date information?)
	Transparency (Does e-Government websites enable you to actively give your opinion to the government?)
	Pricing (Are there any savings (time, money) using e-government services?)
	Accountability (Are you able to communicate with government officials through e-government services?)
Perceived Trust (PT)	Trustworthiness (Do you feel that the e-government services providers are trustworthy?)
	Privacy (Do you feel confident about your privacy protection when using an e-government service?)
	Security (Do you feel your transaction is secure when using an e-government service?)
	Risk (Do you believe that there could be negative consequences from using e-government services?)
Perceived quality (PQ)	Accuracy (Does e-government services provide accurate information?)
	Reliability (Does e-government services provide reliable information?)
	Relevancy (Does e-government services provide relevant information?)
	Easiness (Does e-government services provide easy-to-understand information?)
User´s satisfaction (US)	Overall satisfaction (Are you satisfied using e-government services?)
	Content satisfaction (Are you satisfied with the content of e-government services)
	Interface satisfaction (Are you satisfied with the interface of e-government services?)
	Speed satisfaction (Are you satisfied with the speed of e-government services)
	Quality satisfaction (Are you satisfied with the quality of e-government services?)
	Security satisfaction (Are you satisfied with the security of e-government services?)
Demographic factors (DF)	Gender
	Age
	Education
	Income
	Years of Internet use
E-government adoption (EA)	Willingness to use (I have a positive attitude towards using e-government services)
	Intent to use (Do you use/intent to use e-government services?)
	Frequency of use (How often do you use e-government services?)

Table I. Criteria used to measure the users' acceptance constructors for

Based on the discussion above, the proposed research model is presented in Ffigure 1.
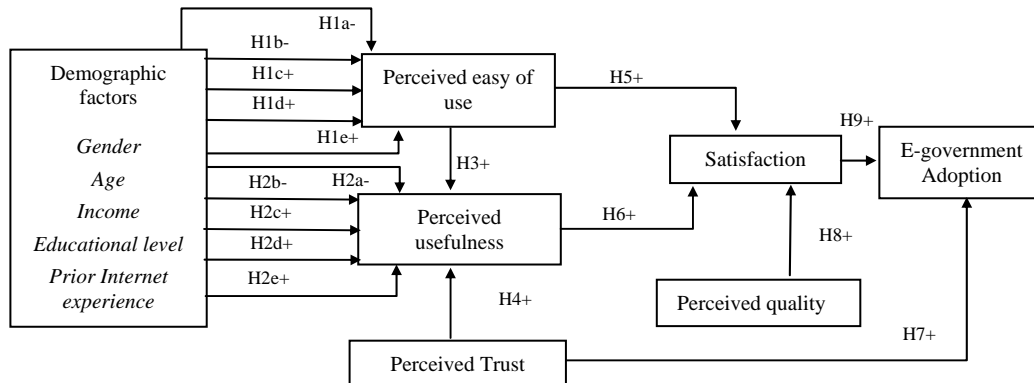

Figure 1. The research model

Understanding the factors that cause the e-government adoption and acceptance would be of great value for the successful design, implementation and deployment of e-government services, so, in our study, we hypothesize that:

H1: The demographic factors have a significant effect on perceived easy of use of an e-government service.

    H1a: Women will rate the perceived ease of use of e-government services lower than men will.

    H1b: Older people will rate the perceived ease of use of e-government services lower than the young people

    H1c: Educational level will have a positive effect on perceived easy of use of e-government services.

    H1d: Income will have a positive effect on perceived easy of use of e-government services

    H1e: The prior experience in using Internet will have a positive effect on perceived easy of use of e-government services.

H2: The demographic factors have a significant effect on perceived usefulness of an e-government service

    H2a: Women will rate the perceived usefulness of e-government services lower than men will.

    H2b: Older people will rate the perceived usefulness of e-government services lower than the young people

    H2c: Educational level will have a positive effect on perceived usefulness of e-government services.

    H2d: Income will have a positive effect on perceived usefulness of e-government services

    H2e: The prior experience in using Internet will have a positive effect on perceived usefulness of e-government services.

H3: Perceived ease of use of an e-government service will positively influence perceived usefulness of an e-government service

H4: High perceived trust on an e-government service will lead to increased perceived usefulness

H5: Perceived easy of use while using an e-government service has a positive effect on satisfaction

H6: Perceived usefulness while using an e-government service has a positive effect on satisfaction

H7: High perceived trust on an e-government service will lead to increased e-government adoption.

H8: Increased perceived quality will lead to increased satisfaction in e-government services.

H9: User's satisfaction has a positive effect on the adoption of an e-government service

5. METHODOLOGY

To test the research model for this study, a survey was conducted. A questionnaire was designed to gather the necessary information. Each item in the model had a corresponding question. The questionnaire was composed of 30 questions, unambiguous and easy for respondents to complete. Davis's [9] original measurement scales for perceived usefulness and perceived ease of use included seven levels. The seven-point scale was used by other researchers in their studies [14], [24], so the proposed model followed the convention since it has been validated in previous researches. Each item of the questionnaire was measured on a seven-point Likert scale with end points of "strongly agree" (7) and "strongly disagree" (1). The questionnaire was administered to 530 citizens in all Romanian districts. 507 responses were received. After eliminating incomplete responses, we selected 481 usable responses as the sample.

In order to confirm that sample group represents a population, we conducted the chi-square fitness validation. The result shows that sample group represents a population well.

Table II shows the profile of the demography of the respondents to the survey. The proportion of gender of participants is almost equal. Most of them agedare between 21−40 years of age (39.29%), have finished the high school (58.42%), work in the state sector (27.86%), have an monthly income between 401 and 600 Euro (36.38%) and have between 3 and 10 years of experience in Internet use (49.27%).

Measure	Item	Frequency	Percentage
Gender (G)	Male	243	50.52%
	Female	238	49.48%
Age (A)	<20	84	17.46%
	21-40	189	39.29%
	41-60	177	36.80%
	>60	31	6.44%
Occupation (O)	Private sector employee	122	25.36%
	State enterprise employee	134	27.86%
	Government employee	43	8.94%
	Students	65	13.51%
	Unemployed	19	3.95%
	Retiree	27	5.61%

	Others	71	14.76%
Education (EL)	Middle school or less	48	9.98%
	High school	281	58.42%
	College or more	152	31.60%
Income per month (I)	< 200 Euro	73	15.18%
	201-400 Euro	121	25.16%
	401-600 Euro	175	36.38%
	601-1000 Euro	89	18.50%
	>1000 Euro	23	4.78%
Years of Internet use (IE)	No experience	80	16.63%
	<3 years	30	6.24%
	3-10 years	193	40.12%
	>10 years	178	37.01%

Table II. Demographic profile of respondents

Romanian citizens are interested in e-government opportunities. They believe that e-government can improve the way government operates and empower them to be more involved in government. But their concerns are clear, and their familiarity still is still relatively low. Concerning the use of e-government services, 42.20% (203 persons) of the respondents declared they have experienced these services at national or local level. 34% of the respondents who do not n't use e-government services can generally be characterized as older and poorer. They also tend to be less well educated. Throughout our analyses, the results for income and education were generally very symmetrical: the better educated and wealthier one is, the more one can be expected to use e-government services. 33.81% of non-e-government users say that the reason whythat they do not interact with the government online is that it is hard to find the website for what they want.

When aAsked about which sites they visited most frequently, 33.99% of e-government users said it was national webWeb sites and 41.87% said it was local sites. The rest either said they frequented all types of sites equally or did notn't know what sites they visited most often.

Among users who say they have used e-government services, 1.97% say they use such services every day, 15.27% say they visit several times a week, 34.48% say they visit several times a month, and 48.28% say they visit just a few times a year.

In terms of experience level, the most common mentioned experience is about searching for information (86.21%), followed by downloading forms (60.59%). The percent of citizens that initiated an on- line transaction with a public institution is very low (3.45%). E-government users search a variety of items on government sites, including material about what public administration do, the facts that are contained in government databases and documents, information related to civic issues, and insights into the business climate or opportunities in various communities.

Based on the information obtained from the survey, before testing the proposed model, we performed a validity and reliability analysis to verify how closely the measurement results met the objectives of this study.

Reliability is an assessment of the degree of consistency between multiple measurements of a variable. One type of diagnostic measure that is widely used and employed here is the Cronbach's alpha. The generally agreed upon lower limit for Cronbach's alpha is 0.70 [18]. The results of the reliability analysis are presented in Table III. As the table shows, the reliability analysis gave alpha coefficients exceeding .70, which are regarded as acceptable reliability coefficients. Hence, the results demonstrate that the questionnaire is a reliable measurement instrument.

Construct (number of items)	Cronbach's Alpha
PEU (4)	0.739
PU (4)	0.821
PT (4)	0.823
PQ (4)	0.901
US (6)	0.842
DF (5)	0.879
EA (3)	0.815

Table III. Reliability analysis

A correlation analysis was then run based on each of these constructs, and the results are reported in Table IV. As it can be seen from the matrix, there is a significant relationship between the e-government adoption (EA) and the rest of constructs, although the relationship varies in strength from one construct to the next. Overall, the correlations provided confidence that the measures were functioning effectively.

Constructs	PEU	PU	PT	PQ	US	DF	EA
PEU	1						
PU	0.594	1					
PT	0.307	0.312	1				
PQ	0.322	0.419	0.453	1			
US	0.581	0.528	0.394	0.721	1		
DF	0.385	0.487	0.442	0.379	0.402	1	
EA	0.580	0.625	0.597	0.432	0.684	0.537	1

Table IV. Correlation of constructs

To test the hypotheses we conducted multiple regression analysis. In Table V, we summarize the findings regarding the research hypotheses. The analysis proved that 3 hypotheses are supported and 2 hypotheses are partially supported. Figure 2 is a graphical depiction of the analysis results.

| Hypotheses	Variable	β	Significance	Supported
H1a	DF-G	0.255	0.0548	NO
H1b	DF-A	-0.054	0.0023	YES
H1c	DF-I	0.093	0.0721	NO
H1d	DF-EL	0.348	0.0539	YES
H1e	DF-IE	0.237	0.0014	YES
H2a	DF-G	0.234	0.0535	NO
H2b	DF-A	-0.103	0.0083	YES
H2c	DF-I	0.291	0.0629	NO
H2d	DF-EL	0.382	0.0079	YES
H2e	DF-IE	0.295	0.0042	YES
H3	PEU	0.348	0.0054	YES
H4	PT	0.431	0.0052	YES
H5	PEU	0.277	0.0034	YES
H6	PU	0.452	0.0023	YES
H7	PT	0.412	0.0037	YES
H8	PQ	0.353	0.0012	YES
H9	US	0.415	0.0049	YES

p<0.05

Table V. Hypothesis results
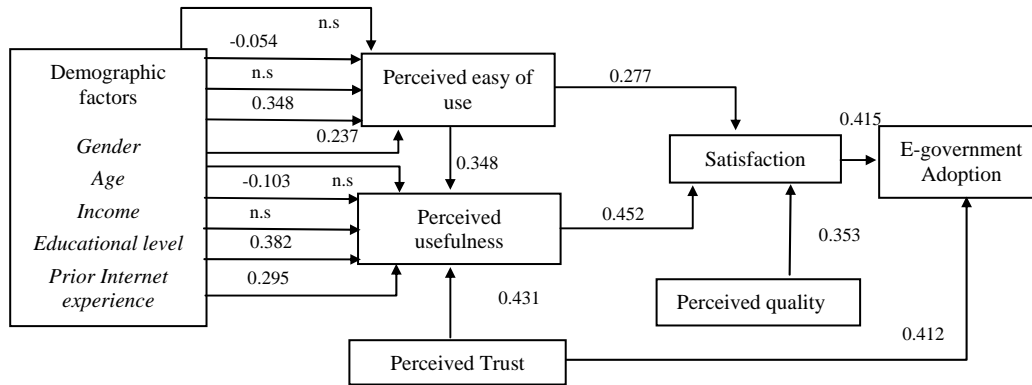
Figure 2. Model testing results

6. DISCUSSTION

The study confirms many of the hypotheses proposed in the model. Perceived easy of use, usefulness and quality impact citizens satisfaction, and ultimately the adoption of e-government. The original TAM posited that the effects of ease of use and usefulness beliefs on usage were mediated by attitude toward using the system. Satisfaction is commonly recognized as a quasi-attitudinal construct and often considered fully as an attitude. As a result, satisfaction plays a similar, if not identical, role to that of attitude in technology usage. Although excluded from most TAM studies, we argue for the inclusion of satisfaction as an attitudinal construct on the basis of the e-government context. Satisfaction, as an attitudinal construct, will partially mediate the effect of usefulness, easy of use and quality on intentions to continue using a given e-government service.

Another objective of the study was to determine the influence of demographic factors on e-government adoption. From the demographic variables, the education level is the most significant (H1d: 0.348 and H2: 0.382). Apparently, more highly educated people find government websites to provide more information. On the other hand, it might confirm that the content of the government web sites is more st accessible to more highly educated people. The β value for Age (for both perceived usefulness and easy of use constructors) is negative, meaning that younger respondents were more likely to adopt e-government services than the elders. Younger respondents tend to be more open to the idea of using e-government services than older respondents. This finding is consistent with previous research in this area, which found that age has statistically significant effects on the decision to adopt e-government. The study fails to attest the importance of gender and income in influencing both perceived ease of use and usefulness, and indirectly the e-government adoption.

Previous Internet experience appears to have a determinant effect on perceived easy of use and usefulness. More experienced users tend to seek more value from Internet services. This is plausible given the fact that experience helps reduce the cost of searching information. Users with prior Internet experience, especially if satisfied, would be more likely to use e-government services.

The study shows empirical evidence that perceived trust is a statistically significant factor influencing users' decision to adopt and use e-government. This finding is important because it provides useful strategic implications for the implementation of e-government services in the future. To adopt e-gGovernment processes, citizens must have the intention to "engage in e-gGovernment", which encompasses the intentions to receive information, to provide information, and to request e-gGovernment services. Without confidence and trust in the e-government services, processes, procedures, and other aspects of government, the vision of fully electronic service delivery will remain a challenging target.

7. CONCLUSIONS

This study provides an understanding of the factors that facilitate the adoption of e-government services. The analysis revealed that the citizen's higher perception of usefulness, ease of use, quality and trust of e-government services directly enhanced their satisfaction and implicitly the level of adoption of e-government. For an effective adoption of the e-government services, widespread and attractive awareness campaigns should be conducted, targeting potential users properly to inform them about the real benefits they would be gained.

Before drawing definitive conclusions from these results, it is important to consider the study's limitations. The questionnaire approach is not free fromof subjectivity in the respondent and was taken at one point in time. The uUser´s reactions change in time and may depend on the environment.

The objective of this study was to extend TAM to understand the potential user's adoption behavior of e-government. Such user acceptance model can be used by e-government services providers to predict the adoption of their new solutions. In the design stage, such evaluations can be used to identify and address user requirements, and, therefore, shape a new service. Services already deployed may be improved. Information gathered in the survey can be used to better understand understand the users' preferences, and the reasons for lack of acceptance of some e-government services. The scales will not only indicate which of the factors are fulfilled overall, but analysis of responses to each criterion may be useful to identify very specific areas of improvement. Moreover, it enables meaningful comparisons of various systems.

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