DETERMINANTS OF INTENTION TO USE GOVERNMENT WEB SITES IN KYRGYZ REPUBLIC

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─**Abstract**─

The use of internet technologies by governments increases day by day. Since citizens are the active users of the services, provided by governments via Internet, the goal of this study is to determine the factors that influence intention to use government e-services in the Kyrgyz Republic. In this study, effects of use intentions, perceived usefulness and perceived ease of use, defined by Technology Acceptance Model (TAM), Relative Advantage, Compatibility and Image, defined by Diffusion of Innovation Model (DOI) and Trustworthiness Model were examined. In addition, for the research model, the relevant constructs from Unified Theory of Acceptance and Use of Technology (UTAUT) were combined. In the research, we used a qualitative analysis utilizing questionnaires among citizens of Bishkek city, the capital of the Kyrgyz Republic.The results showed that in case of the Kyrgyz Republic, of all factors, including demographic profiles, perceived ease of use of e-services and compatibility of using web technologies with citizens' lifestyle are the main factors influencing their intention to use government e-services.

Key Words: *e-government, Technology Acceptance Model, Diffusion of Innovation Model, Unified Theory of Acceptance and Use of Technology, Trustworthiness Model, Kyrgyz Republic*

JEL Classification: C12, C25, O39

1. INTRODUCTION

E-government can be defined as delivery of government institutions' services through the use of technology, specifically web-based Internet applications, to citizens, business partners, employees, other agencies and government entities (McClure, 2000). To become efficient, these services should meet quality standards. Henriksson et al., (2007) proposed to measure the quality of government web sites according to six main categories, which are security and privacy of users, usability of services, their content, services provided, citizen participation and features of services. Online government services reduce time and cost of procedures, and are more accurate than traditional services. Mostly, they are targeted to the citizens of a country. Thus, while developing e-services, government should take into account citizens' perceptions and willingness to use these services.

To measure citizens' intention to use e-services, and particularly government e-services, many models, such as Technology Acceptance Model (TAM) by Davis (1989), Diffusion of Innovation (DOI) Model by Rogers (2003), and Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003) have been proposed. On the other hand, many studies suggest that cultural and historical background has an effect on factors influencing users' attitude toward internet behavior of users (Hoffman et al., 2000; Park & Jun, 2003; Nakamura, 2013; Gordon & Hornbrook, 2016). The study is a pilot study that aims to determine factors which define users' preferences in the Kyrgyz Republic, given the cultural and historical background of the country. Therefore, a new model was proposed based on the TAM, DOI and UTAUT models, which best determines the user behaviour in the country.

2. LITERATURE REVIEW

Technology Acceptance Model, proposed by Davis (1989), assumed two specific variables, perceived usefulness and perceived ease of use, to be fundamental determinants of user acceptance. For each of these scales, author defined six factors. This model and its modifications has been further used in many studies for decades, such as (Koufaris, 2002; Bröhl et al., 2016). Further this model was modified by Venkatesh & Davis (2000) and a new model was called TAM2. In this model, new scales such as subjective norm, voluntariness, image, job relevance, output quality and result demonstrability were included. In Wangpipatwong et al. (2008) the perceived usefulness, perceived ease of use and

citizen's computer self-efficacy were found to be factors influencing citizens' intention to use e-government in Taiwan. In Jordan, factors such as trust in the internet, relative advantage, compatibility and perceived ease of use had no significant effect on the intention to use e-government websites, while perceived usefulness, trust in government, beliefs, complexity, website design were significant (Alomari et al., 2012).

Diffusion of Innovation (DOI) model was developed by Rogers (2003). Main elements of the model are relative advantage, compatibility and image. The model was adopted by many researchers for evaluating users' attitudes toward educational (Bennett & Bennett, 2003; Borrego et al., 2010), corporate (Al-Jabri & Sohail, 2012; Mustonen- Ollila & Lyytinen, 2003) and e-government e-services in the United States (Carter & Bélanger, 2005; Dimitrova & Chen, 2006), Singapore (Tung & Rieck, 2005) and in Asian countries (Xiaoming & Kay, 2004).

In 2003, Venkatesh et al. (2003) proposed a Unified Theory of Acceptance and Use of Technology (UTAUT), which was further extended by Venkatesh et al. (2012). The main components of the models are: performance expectancy, effort expectancy, social influence, behavioral intention, facilitating conditions and user behavior. To measure each of these factors, the models suggests 2-4 questions concerning use of a given e-service. The model was validated by Oshlyansky et al. (2007) and Wang & Shih (2009). In AbuShanab & Pearson (2007) and Martins et al. (2014), internet banking services in Jordan and Portugal, respectively, were analyzed. Also, the model was used for comparing acceptance of technology in different countries (Venkatesh & Zhang, 2010).

In 2008, Bélanger & Carter (2008) proposed a model of e-government trust, which was composed of four factors: trust in internet, trust in government, perceived risks and persons' disposition to trust. The trust was defined as one of the factors influencing the users' intention to use e-services in business (Lee et al., 2011; Beatty et al., 2011), as well as in e-government (Bannister & Connolly, 2011; Alomari et al., 2012; Colesca, 2015).

3. METHOD

3.1. Participants and Procedure

In the study, a target group was defined as active users of Internet who have an experience in using government services. The sample consisted of 49 respondents of age between 18 and 40 years old.

For this study, the items were selected from Technology Acceptance Model (TAM) by Davis (1989), Diffusion of Innovation (DOI) Model by Rogers (2003), Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003) and e-government trust model by Bélanger & Carter (2008) to determine the main factors, that influence the intention to use e-services in the Kyrgyz Republic. Questionnaires were prepared utilizing Google forms and responses were collected through online survey. Questionnaires were distributed via social networks. In the description of questionnaire, the target group of the survey was defined as those who had an experience on interacting with government using their online services. Collected answers were analyzed using SPSS package.

3.2. Factor Analysis

For this study, a survey was conducted. In the questionnaire, there were 39 Likert-type scale questions and demographic questions included. Based on these questions, in this section, the factor analysis was conducted to see the main factors defining intention to use e-government in the Kyrgyz Republic. A principal components factor analysis was used to test construct validity of used scales and a confirmatory factor analysis of the use intention, perceived ease of use, perceived usefulness, compatibility, image, trust to internet, trust to government and risks items was performed with varimax rotation. Factor loadings are shown on the Table 3. The proposed construct resulted in eight distinct factors, however, some items were loaded in different factors than in the original models. Factor loadings for all variables were greater than 0.397.

Table 1. Factor loadings

Rotated Component Matrix[a]								
	Component							
	1	2	3	4	5	6	7	8
risks12	.812							
risks13	.802							
risks11	.781							
risks16	.773							
risks15	.706							
risks14	.661							
risks10	.397							
use2		.871						
use1		.736						
pu1		.713						
use5		.694						
use3		.694						
use4		.506						
im3			.929					
im1			.888					
im5			.818					
im2			.806					
trust_s3				.771				
trust_s4				.755				
trust3				.753				
trust2				.740				
trust1				.633				
peou3					.838			
peou2					.776			
peou1					.768			
peou5					.764			
risks4						.808		
risks2						.772		
risks5						.718		
risks3						.717		
risks1						.450		
c2							.734	
c3							.715	
c1							.669	
pu3							.495	
risks8								.872
risks7								.835
risks9								.681
risks6								.589
Cumulative percentage of variances explained								69.387

According to the results of the factor analysis, there are 8 main factors:

- In Factor 1, there are items on risks of using web resources such as fear of hacker attacks and its negative consequences for end users are collected.
- Factor 2 consists of use intention items and one item on perceived usefulness. Questions are highlighting willingness of users to use governmental web resources.
- Factor 3 is on the impact of using and interacting with government via internet of the image of a person. This factor consists of four items.
- Factor 4 combines items from two close sub-factors, which are – trust to internet and trust to government and consists of five items.
- Factor 5 includes all four items on the perceived ease of use.
- Factor 6 consists of five items on believes that sharing information with government through internet will not have negative effects.
- Factor 7 includes items on compatibility of interacting with government web resources via internet with users' lifestyle. Also, in this factor there is one question from perceived usefulness, which is about effectiveness of interacting with government via internet. Overall, there are four items.
- Factor 8 included items risks6, risks7, risks8, risks9, which are about fear of personal information leakages.

Cumulative percentage of variances explained by these 8 factors is 69.387.

To evaluate the reliability of questionnaire, the internal consistency was assessed by computing Cronbach's Alpha. These coefficients are represented for each of the constructs in Table 2.

Table 2. Scale Reliability

	Reliability Statistics	
	Cronbach's Alpha	N of Items
f1_fears	.868	7
f2_use_intention	.866	6
f3_image	.917	4
f4_trust	.891	5
f5_peou	.876	4
f6_risks	.867	5
f7_compatibility	.791	4

The values range from 0.791 (for compatibility) to 0.917 (for image). Given the exploratory nature of the study, validity and reliability of the scales were deemed adequate.

3.3. Research Questions

Based on the results of the factors analysis, where the e-government service adoption factors were determined, research questions for this study were defined as follows:

H1. The demographic factors have a significant effect on e-government service adoption factors.

> **H1a:** The gender of respondents have a significant effect on e-government service adoption factors.

> **H1b:** The age of respondents have a significant effect on e-government service adoption factors.

> **H1c:** Educational level of respondents have a significant effect on e-government service adoption factors.

> **H1d:** Income of respondents have a significant effect on e-government service adoption factors.

> **H1e:** The internet usage experience of respondents has a significant effect on e-government service adoption factors.

H2. The factors defined by factor analysis have a significant effect on intention of citizens to use government e-services.

Thus, there are two main research questions; the first question consists of four sub-questions and the second – into eight sub-questions.

4. RESULTS

4.1. Demographic Overview

In this study, a target group was defined as active users of Internet who have an experience in using government services. Total sample comprise 49 respondents of age between 18 and 40, 42.9% are males and 57.1% - females. Mostly, respondents are residents of the Bishkek city – 87.8% with bachelor degree and higher (Table 3).

Table 3. Demographic profile of respondents

Category	Sub-categories	Percentages %	Frequency
Gender	Male	42.9	21
	Female	57.1	28
Age	18-20 years old	8.2	4
	21-24 years old	20.4	10
	25-30 years old	24.5	12
	Over 30 years old	6.1	3
Region of completing secondary education	Batken	14.3	7
	Osh	12.2	6
	Djalal-Abad	6.1	3
	Talas	2	1
	Naryn	18.4	9
	Issyk-Kul	14.3	7
	Chuy	18.4	9
	Bishkek	14.3	7
Current location	Chuy region	6.1	3
	Bishkek city	87.8	43
	abroad	6.1	3
Education	Secondary	8.2	4
	Incomplete higher	22.4	11
	Bachelor	12.2	6
	Master	36.7	18
	PhD	20.4	10
Education type	Social	30.6	15
	Technical	69.4	34
Internet usage	1-5 years	12.2	6
	6-10 years	26.5	13
	11-15 years	36.7	18
	Over 15 years	4.1	2

Among respondents, 69.4% have a technical background, and 30.6% - social. More than 40% of respondents have more than 10 years of internet usage experience.

4.3. Research Model

4.3.1. Dependencies of factors on demographics.

First, dependencies of the determined factors on the demographic data were investigated. Hypotheses were tested against 7 factors. The results were obtained using Multivariate Analysis of Variances (MANOVA). Results are given in the Table 4.

Table 4. Significance of demographics on factors

Factors	gender	age	region	Live_now	edu_level	speciality	income	internet_use
F1_fears								
F2_use_intentions							0.002	0.013
F3_image	0.068							
F4_trust								0.017
F5_peou					0.043			0.065
F6_risks								
F7_compatibility		0.085					0.009	0.000

H1a hypothesis was formulated as "The gender of respondents have a significant effect on e-government service adoption factors". As it can be seen from the table, out of seven factors, this hypothesis was rejected for all factors excluding Image factor. H1b hypothesis – "The age of respondents have a significant effect on e-government service adoption factors" was significant for compatibility factor. H1c hypothesis – "Educational level of respondents have a significant effect on e-government service adoption factors" was found to be significant for the perceived ease of use. H1d factor – "Income of respondents have a significant effect on e-government service adoption factors" has effect on use intentions and compatibility factors. H1e hypothesis – "The internet usage experience of respondents have a significant effect on e-government service adoption factors" was found to be significant in four factors, which are – use intentions, perceived ease of use, trust and compatibility factors.

4.3.2. Level 2 dependencies.

In this section, we are aimed to find secondary factors influencing the intention of citizens to use government e-services. H2 hypothesis was on the effect of the factors defined by factor analysis on citizens intention to use government e-services. For this, regression analysis was carried out. Results are given at the Table 5.

Table 5. Regression model coefficients for the dependent variable F2 – intention to use

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
5	(Constant)	.404	.638		.633	.530
	f5_peou	.277	.128	.267	2.164	.036
	f7_compatibility	.625	.157	.490	3.972	.000
a. Dependent Variable: f2_use_intention						

The results show that factors having effect on the intention to use are perceived ease of use of the governmental internet services and compatibility of the internet technologies with citizens' life-style, with *p* values being 0.036 and 0.000, respectively.

5. DISCUSSIONS AND CONCLUSION

The aim of this study was to find out the factors affecting citizens' intention to use government online services. Starting from the September 23, 1994, with the launch of "Concept of Creation and Development of Information Network of the Kyrgyz Republic", there has been a process of e-services integration in the country. People's perception of these e-services is an important factor defining e-government development in the country Thus, the intention of citizens to use online services became an important issue.

According to the latest report of the UN on the e-government development index (UN, 2016), the Kyrgyz Republic is among countries with High E-Participation Index (0.5932), which shows quality and usefulness of information and services provided by a country's government for the purpose of engaging its citizens in public policy issues (Palvia & Sharma, 2007). The Human Capital Component, which is a composite of adult literacy rate and gross enrollment ratio, was equal to 0.7508 (UN, 2016). According to the reports of UN on e-government development, e-government development index in the Kyrgyz Republic raised from 0.327 in 2003 to 0.4969 in 2016, while e-participation index - from 0.034 in 2003 (UN, 2003) to 0.5932 in 2016.

The results of the current study revealed that, for factor 1 – fears, none of the demographic factors are significant. Income level and internet use have significant difference on intentions to use government web sites. This result could be expected, since the lower the level of income, the lower the opportunity for computer literacy and use of e-services get. The same can be said about internet use experience of citizens – the more citizens have been using Internet, the more

they are aware of advantages that e-services can offer. Difference in gender in image was also found to be significant. Male respondents consider use of government e-services to have more positive effect for their image than females. Trust to government websites depends on how long respondents use Internet – the more year respondents use internet the lower their trust to the government e-services are. Though, this result can be further extended to all online services. Perceived ease of use depends on the educational level of users and on the period of time they use internet. This result is also quite straightforward, since the more educated a person is and the more experienced he is in using internet, the easier for him/her to become a skilled user of any software. For evaluation of risks, none of demographic variables were found significant. The last factor – compatibility with technology, depends on 3 factors, which are the age of respondents, their income and internet usage duration. The lowest compatibility level is among the youngest group of respondents; it was increasing as age of respondent increases and the highest level was among respondents of age 25-30. However, compatibility with technology of people older than 30 years lowers compared to 25-30 age group respondents. The impact of respondents' income on their compatibility with technology is straightforward – the higher the income the more they feel compatible with technology. This is due to the financial component, which defines access to information technology in the country (Muhametjanova & Cagiltay, 2016). The most interesting result was obtained on the analysis of the impact of internet use duration of citizens on their compatibility with technologies. Results of test carried out showed that the more experience people have on internet use, the less they feel compatible with technologies. One of the possible explanations of this phenomenon is that experienced users are aware of the fast development in the field of information technology. However, further research is needed to give explicit explanation.

The test of the hypothesis H2 – on the factors affecting the intention of citizens to use government e-services, revealed that only two factors are statistically significant in determining the citizens' intention to use – perceived ease of use of these services and compatibility of citizens with information technology. To be more precise, citizens have low intention to use e-services (0.404 out of 5). However, with the rise of perceived ease of use of e-services, the intention to use them increases by 0.277. Compatibility has higher effect: the rise of compatibility of users with technology gives rise to their intention to use e-services by 0.625. Thus, for an average citizen with compatibility of 3 points, who evaluate the e-

services' ease of use as 3 points, his intention to use government e-services would be equal to 3.11 out of 5 points. The formula can be given as follows:

$$Intention\ to\ use = 0.404 + 0.277*PEOU + 0.625*Compatibility.$$

This study shows that respondents are not willing to use government e-services if they are not easy to use. In contrast, respondents perceiving e-services easy are willing to use. The model, obtained in the Kyrgyz Republic, is consistent with those in other Asian countries such as Phang et al. (2005) in Singapore, Hussein et al. (2011) in Malaysia, Rehman et al. (2016) in Pakistan.

To conclude, the intention to use e-services is very low in the Kyrgyz Republic. In Verdegem & Verleye (2009), a model which includes other factors such as Awareness of e-government services, was included. In the case of the Kyrgyz Republic, we assume that this factor would have a high impact, since the problem of awareness is of current interest in the country.

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