Adoption of E-Government Services in Ukraine

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Abstract

In order to identify factors affecting e-government services adoption, a survey questionnaire and case study interviews were conducted to collect research data from 409 e-ready Ukrainians. The results of the mixed methods research confirmed eight factors, which seemed to be responsible for low adoption rates of e-government services in Ukraine, namely awareness, computer literacy, perceived ease of use, perceived usefulness, perceived public value, the individual cultural value preferences for uncertainty avoidance, trust in the government, and trust in the Internet.

The adoption of e-Government services amongst e-ready citizens in Ukraine was reported to be 56.5 percent or 23.6 percent of all legal-aged Ukrainians. Overall, the level of development of e-government in the Ukraine was found to be low.

The TAM-based research model explained 42 percent of the variance in the behavioral intentions of e-ready citizens towards the use of e-government services.

Eight out of ten hypothesized relationships were accepted.

Keywords: Ukraine, public administration, e-government, adoption, e-ready citizens, technology acceptance model (TAM), mixed methods (MM) research design

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การใช้บริการของภาครัฐผ่านเครือข่ายอิเล็กทรอนิกส์ของประชากรในประเทศยูเครน

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บทคัดย่อ

ผู้วิจัยได้ใช้แบบสำรวจความคิดเห็นและการสัมภาษณ์ กรณีศึกษา เพื่อระบุปัจจัยที่ส่งผลต่อการใช้บริการของภาครัฐผ่านเครือข่ายอิเล็กทรอนิกส์ โดยสำรวจจากกลุ่มตัวอย่างประชากรยูเครน จำนวน 409 คน ผลสำรวจจากการใช้ระเบียบวิธีการวิจัยแบบผสมชี้ให้เห็นถึงปัจจัยที่ส่งผลกระทบต่อการใช้บริการของภาครัฐผ่านเครือข่ายอิเล็กทรอนิกส์จำนวน 8 ปัจจัย ได้แก่ การตระหนักถึงการให้บริการของภาครัฐผ่านเครือข่ายอิเล็กทรอนิกส์ ความรู้ในการใช้คอมพิวเตอร์ การรับรู้ถึงความสะดวกในการใช้บริการ การรับรู้ถึงประโยชน์ในการใช้บริการ การรับรู้ถึงคุณค่าของภาครัฐ ค่านิยมทางวัฒนธรรมของปัจเจกบุคคลในการเลือกที่จะหลีกเลี่ยงความไม่แน่นอน ความไว้วางใจรัฐบาล และความไว้วางใจอินเทอร์เน็ต

ร้อยละ 56.5 ของกลุ่มตัวอย่างตอบว่า ใช้บริการของภาครัฐผ่านเครือข่ายอิเล็กทรอนิกส์คิดเป็นร้อยละ 23.6 ของประชากรยูเครนทั้งหมดที่บรรลุนิติภาวะ โดยในภาพรวม ระดับการพัฒนาการให้บริการของภาครัฐผ่านเครือข่ายอิเล็กทรอนิกส์ในประเทศยูเครนอยู่ในระดับต่ำ

ตัวแบบการยอมรับการใช้เทคโนโลยีสารสนเทศ (TAM) สามารถอธิบายความแปรปรวนร้อยละ 42 ของความตั้งใจที่จะใช้บริการผ่านเครือข่ายอิเล็กทรอนิกส์ของภาครัฐ

8 ใน 10 ของสมมติฐานความสัมพันธ์ ได้รับการยอมรับ

คำสำคัญ: ประเทศยูเครน การบริหารรัฐกิจ การให้บริการของภาครัฐผ่านเครือข่ายอิเล็กทรอนิกส์ การนำมาใช้ ประชากรที่มีความรู้ในการใช้งานผ่านเครือข่ายอิเล็กทรอนิกส์ ทฤษฎีการยอมรับการใช้เทคโนโลยีสารสนเทศ (TAM) ระเบียบวิธีการวิจัยแบบผสม (MM)

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Introduction

The Internet, which emerged at the conclusion of the 20th century and its subsequent development, has changed and will continue to change our lives, our ways of communication, sharing information, working, learning, and governing. It also created an opportunity for the governments to use information and communication technologies (ICT) for delivering information and services to the clientele (Nixon, Koutrakou & Rawal, 2010). Accordingly, the use of ICTs and Internet for delivering government services to various recipients and stakeholders is called e-government (Alshomrani, 2012). Some important benefits that e-government offers to public administration are effective public management, greater efficiency, time and cost savings as well as increased transparency and accountability (Joseph & Kitlan, 2008; Reddick, 2012). According to Brown, there are at least four main areas where "E-Government has lasting impacts on public administration: citizen-centered service, information as a public resource, new skills and working relationships, and accountability and management models" (Brown, 2005). The main distinctive characteristic of electronic compared to traditional government is its focus on the clientele: citizens, businesses, and organizations. Focus on citizens made available more profound involvement of them into democratic dialogue with governments, allowed to create more relevant, personalized and increasingly cost-effective services as well as enhanced practice of the citizenship (Nixon et al., 2010: 19).

The changes to the governmental environment in the late 1990s urged for even further incorporation of ICTs into the work of governments and was seen by politicians and public managers as a way of reforming public administration (Homburg, 2008: 88). On the other hand, the perspectives to reap off the potential benefits offered by e-government, were forcing governments all around the world, including Ukraine, to develop and deploy requested services. However, analyzing the state of development of e-government projects in the world, Heeks (2006: 3) concluded that most of them failed. Most e-government initiatives fail due to the low adoption and underutilization. Similarly, Carter and Bélanger (2005: 5) believed

that the acceptance of e-government services depends upon citizen willingness to adopt them. To conclude, in words of Venkatesh and Davis (2000: 200), the "user acceptance of information technology ... remains a complex, elusive, yet extremely important phenomenon."

It became evident that since e-government influences the public administration and at the same time depends on the willingness of clientele to use it, the low rates of its adoption will ultimately affect the quality of public administration. The problem is exacerbated by the fact that "the progress and outcomes of the implementation of e-government in developing countries has not been adequately studied" (Yimbo, 2011: iv). While a large portion of the e-government adoption academic literature to date has focused on the national and local governments' adoption of e-government, relatively little is known about why, and under what circumstances, citizens adopt e-government services (Carter & Bélanger, 2005; Choudrie & Dwivedi, 2005; Gilbert, Pierre & Darren, 2004; Reddick, 2005). There is also a lack of empirical research that considers the behavioral intentions of the recipients of e-government services (Hung, Chang & Yu, 2006). As with regards to Ukraine, this researcher could not find any studies conducted in Ukraine on this topic except official government reports. The absence of systematic research was also confirmed in this researcher's private correspondence with a number of officials and scholars that are working on or are familiar with the field of e-government in Ukraine.

Despite the fact that Ukraine has capable human resources, developed ICT infrastructure, a sufficient legislative base and, according to ForUm (2013), strong support from the President and the Government of Ukraine, the 2014 e-government development index measured by the UN Public Administration Programme, was one of the lowest in Europe: No.87 out of 193 surveyed countries (DESA, 2014: 203). According to Kolesnichenko, the e-government in Ukraine is mainly limited to updating the official websites of the government (the "paper" government is still winning over the electronic), and most Ukrainians have not heard of e-government (Kolesnichenko, 2014: 53). For more than 10 years after it

began, "Ukraine's e-government is still on paper" (Khmara, Kifenko & Tymchenko, 2013). All these clearly identify that implementation of e-government in Ukraine is facing certain problems and, since "e-government is likely to succeed only if there is strong demand and support from the majority of the population" (Lee & Oh, 2011), it is very likely that these problems related to the low rates of adoption of e-Government services by Ukrainians.

Accordingly, this research investigates the challenges and barriers that influence the adoption of e-government services in Ukraine by addressing the following research questions:

- What are the factors affecting the adoption of e-government services in Ukraine from e-ready citizens' perspectives?

- What is the current state of the adoption of e-government services in Ukraine?

It would seem that in order to answer at least one of these questions, it might be reasonable to peruse the findings of the studies that were conducted in other countries. However, the simple transfer of the results will not be possible in view of the availability of a number of reasons, which differ from country to country and arise from social, technological, political, organizational, and economic settings (Alateyah, Crowder & Wills, 2012; Alshehri & Drew, 2010; Verma et al., 2012). Such a variety of challenges and conditions does not allow one to draw up a single universal prescription of successful e-government but suggests the need for an individual approach and caution to be taken by governments while planning their national e-government programs. There is also factor of cultural values that, according to Bardi and Schwartz (2003), are associated with shaping and predicting adoption behaviors. Akkaya, Wolf, and Krcmar (2012) believed that "National culture shapes perception of the citizens thus facilitates or impedes adoption of new technologies." Culture, along with other "research settings" related factors, is thought to play an important role in the adoption of new technologies in work by Han (2003: 28).

Cross-sectional in its nature, this study believed to be the first of its kind conducted in Ukraine. According to Reddick (2005), studies of this type belong to a second stream of studies on e-government that examine the adoption of e-government services from a demand-side perspective.

Literature Review

E-Government and Stages of Its Development

Some important preconditions for the emergence of e-government were the fast development of ICT and the Internet at the turn of the century and the processes of globalization.

An important outgrowth of the information explosion accompanying globalization was the emergence of electronic government, an umbrella term which variously describes the integration of disparate data sources into one-stop websites or portals to improve access and communication between governments, businesses, citizens, and other related interests (Milakovich, 2012: 9).

Since the Internet takes its origins in USA, it would be logical to assume that the term e-government has the same roots.

Because e-government is not a one-step process or process that can be implemented as a single project, several models have been proposed in the attempt to describe the processes of the development of e-government. Despite different names used by authors for each stage of the development, the meaning usually remains the same and according to Jayashree and Marthandan (2010: 2208), "Most of the models confer [sic] with the first four stages viz., Web presence, interaction, transaction, and transformation."

Definitions and Classifications of E-Government

The reviewed literature seems to be lacking a comprehensive definition of e-government. Rather, it presents the various aspects of it (such as technological, social, political, managerial and organizational) individually or, to some degree, in combination. There is no universal and widely accepted definition of what e-government is (Halchin, 2004; Lowery, 2001; Yildiz, 2007). Lowery (2001: 1) explains this fact by referring to differences in "community's values, goals, and culture." A clear and complete definition would be particularly useful for developing countries, as it will guide them on how to maximize the productive use of the resources and efforts for implementation of e-government projects.

In this regard, this researcher would like to define e-government as a new way of organizing the governance of society, which implies openness and transparency, and effectiveness and competency in developing and providing governmental services to all entities of society, whereas "e" refers to ICT as a means of supporting this effort. Such a definition indicates the main objective of e-government, some of its general concepts, as well as indicates the means to support the idea.

Many researchers, when explaining what e-government is, have suggested a classification of e-government applications based on different categories of intended recipients and stakeholders of the governmental services. As result, four general types of e-government relations have been used to classify the interactions between governments and their various stakeholders such as government-to-government (G2G), government-to-employees (G2E), government-to-businesses (G2B), and government-to-citizens (G2C) (Gupta, Dasgupta & Gupta, 2008). The ultimate aim of government-to-citizens relationship is to create a citizen-centric government, which empowers citizens by enhancing their participation via different communication and interaction channels. The current research investigates citizens' perceptions towards e-government and indicates the main interest of study on the demand-side of G2C relationship.

Adoption of E-Government

According to the E-Government Survey 2014 by DESA (2014), governments of the 100 percent of the United Nations member states have already established an online presence. However, the widespread of e-government websites and services provided by governments via Internet does not mean that they were widely used: there is a low level of citizen's adoption of e-government services (Belanger & Carter, 2008; Carter & Belanger, 2004; Choudrie & Dwivedi, 2005; Jen-Ruei, Cheng-Kiang & Wen-Pin, 2006; Kumar et al., 2007; Wang, 2002). In spite of the presence of the large number of research that investigates how new technologies stimulate people's intentions to use them and what factors affecting those intentions (Davis, Bagozzi & Warshaw, 1989), there is not too much known about why and under what circumstances citizens decide to adopt e-government services (Kumar et al., 2007; Reddick, 2005).

This researcher also failed to find a clear definition of what the adoption of e-government services means. According to Fishbein and Ajzen (1975), an individual's adoption behavior is determined by his/her behavioral intentions. Rogers (1995: 21) described adoption of innovations as a process that includes the generation, development, and implementation of new ideas that could "lead to either adoption … or to rejection." Similarly, Kim and Crowston (2011: 3) used three stages of adoption process (pre-adoption, adoption, and post-adoption) to describe the continued use behavior of ICT and defining adoption "as a user's initial acceptance of an object." Drawing an analogy with these propositions, the researcher suggests that the process of e-government adoption also could be described as a three-stage process that includes original appearance, further development and acceptance, followed by actual use. Since e-government is not a new idea for Ukraine, the first stage is not relevant and the processes of the adoption of e-government could be described using a combination of behavioral intentions to use and the actual use of e-government services. The researcher has defined e-government adoption as a superimposition of its actual use onto the behavioral intentions to use e-government services.

Theories of the Adoption of E-Government

Because very often e-government is defined as a provision of governmental and public services with the active use of the Internet and ICT, when studying the factors affecting the adoption of e-government services, researchers often refer to the large body of research on adoption of ICT. Numerous theories and models that are trying to explain the individual's adoption and acceptance of new technologies could be fitted into two main streams based on their theoretical foundation. While the first stream investigates behavioral intentions towards use of new technologies, the second investigates the diffusion of new technologies within organizations and societies. The theory of reasoned action of Fishbein and Ajzen (1975), technology acceptance model of Davis, et al. (1989), and theory of planned behavior of Ajzen (1991) are good examples of the first stream, whereas the diffusion of innovation theory of Rogers (1995) is a good example of the second (Abdalla, 2012: 47). The same theories and models were often used to explain the adoption of electronic services provided by governments. However, despite all this effort, accordingly to Alhujran, "e-government adoption research currently lacks a comprehensive conceptual framework for explaining citizen adoption of e-Government services" (Alhujran, 2009: iii).

E-Government-Related Studies and Findings

Research on e-government is taking place all around the globe, with its focus shifted from developed to developing countries of Southeast Asia and the Middle East. This researcher managed to find only one research on e-government conducted in Ukraine by Karachay (2009), dedicated to an exploration of the impact of e-government on the processes of political changes and the democratization of Ukrainian society. The absence of systematic research on this topic in Ukraine was also confirmed by representatives of the scientific society and professionals that are working in this field in Ukraine and with whom the researcher communicated in the course of conducting research.

Approximately 60 percent of all reviewed during literature review research were quantitative, 25 to 30 percent were qualitative, and only 10 to 15 percent used mixed methods research. The mixed methods research has been especially predominant in recent years. The types of data collection employed in most of the research were various surveys, secondary data analyses, quantitative and qualitative case studies, and interviews. This corresponds with the findings of Rana, Williams, Dwivedi, and Williams (2012: 48) who, while analyzing 70 studies on e-government found that the survey approach was used in 61 studies. Surprisingly, in most surveys, the research data were collected using the application of non-probability techniques and from insufficient (from the researcher's point of view) sizes of samples.

Most of the reviewed research employed convenience sampling techniques and collected research data from homogenous samples made up of employees, students, alumni. Most of the quantitative research built their conceptual frameworks around original TAM model and reported their predictable power varying from 34 up to 86 percent.

The vast majority of the research was concerned with the supply side of the e-government and a relatively smaller part was concerned with users' perceptions or the demand side of the phenomenon.

E-Government in Ukraine

The real start to the well-directed effort towards development of e-government in Ukraine was given by the Decree of the President of Ukraine on the 1st of August 2002, No. 683 "On Additional Measures to Ensure Transparency in the Activities of Public Authorities." Now, judging from the information from the governmental sources, Ukraine is showing promising growth in the delivery of public services over the Internet, which is manifested in: the active creation of governmental websites and portals; conducting various research through web-forums, blogs and pools; seeking feedback from citizens on various issues; the introduction of electronic voting and election systems; transferring the flow of documentation online, and so on.

However, Ukrainian's 87th rank in the e-government development index, reported by DESA (2014: 203) in 2014, suggests that Ukraine continues to lag behind other industrialized countries in the development and implementation of e-government. According to Kolesnichenko (2014: 54) "Ukraine is only at the beginning of the second phase of e-government development: not all initiatives of the first phase fully implemented."

The major obstacles to the development of e-government in Ukraine are limited availability of the Internet, inadequate legal framework, lack of funds to support processes of informatization, and the conservatism and bureaucracy (Matijeva, 2011). Very similar factors were identified by Asanova (2006), such as economic and ICT limitations, an exclusion from power and distrust of it, and the preference of personal interactions, which have not allowed e-government to reach or to evoke a response from the majority of the population, especially at the regional level. Merkulova and Kononova (2011) suggested that the authorities have not yet realized the need for a change dictated by a paradigm shift. Scholars have also suggested that Ukrainian society is predominated by skepticism towards the idea that ICT could provide an effective means of delivering and replacing government services. The manner of implementing the concept of e-governance in Ukraine, particularly the lack of thorough planning and absence of clear goals and visual results, also has not assisted in the acceptance of e-government, as it creates a deficiency of understanding and trust between the people and the government.

It became obvious that there is a clear need for a qualitative upgrade of the whole system by introducing new forms and methods of management and modern ICT-based tools, one of which is e-governance (Civil Society Leadership Network, 2013).

Research Framework

In course of the literature review it was found that the technology acceptance model was the most popular and commonly used model to study user adoption of e-government applications and information systems (Carter & Weerakkody, 2008: 474; Rana et al., 2012: 47).

Often, the core constructs of the original TAM model were tested along with a number of external variables. The most frequently used external variables were trust, trustworthiness, culture, computer self-efficacy, and relative advantage. Usually, such "extended" models reported higher than the original TAM model predictable powers. For example, in a study by Vrček and Klačmer (2014), the research model accounted for 83 percent of the variance in the intention to use. In a study by Wang (2002), the extended TAM model accounted for 62 percent of the variance in behavioral intentions, whereas studies by Schaupp and Carter (2005), Carter and Bélanger (2005) that combined constructs of the TAM and DOI models, reported 76 and 86 percent accordingly. Taking into account these considerations, the researcher decided to reuse the highly predictive model developed by Vrček and Klačmer (2014).

While developing comprehensive model of the e-government adoption, Warkentin, Gefen, Pavlou and Rose (2002: 161) were guided by considerations that "culture is likely to contribute to the adoption or resistance to e-government." Leidner and Kayworth (2006), while reviewing 82 cross-cultural IT studies, found that the factor of culture represented by one or more Hofstede's cultural dimensions, was part of the research model in 51 studies. Guided by these findings and research by Alhujran (2009), the researcher included in the conceptual framework the two external factors of power distance and uncertainty avoidance, factors that were also found to be significant in the study by Al-Hujran, Al-dalahmeh and Aloudat (2011). Understanding that originally, Hofstede's cultural dimensions meant to measure inter-countries cultural differences, the researcher referred to the factors of uncertainty avoidance and power distance as the individual cultural value preferences of individuals for uncertainty avoidance and for power distance.

Another external factor that was found to be a significant determinant of the citizens' perceptions of usefulness and ease of use of e-government services in a study of Alhujran (2009), and which the researcher decided to include into the research model, was the factor of perceived public value. Combining all of these findings resulted in the development of the research model (for the quantitative phase of the study) presented in Figure 1 below.
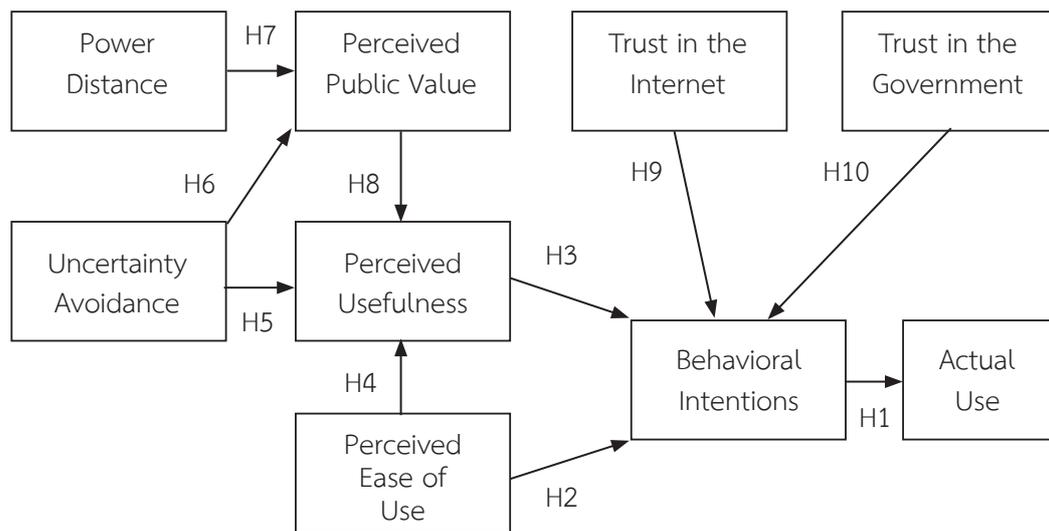

Figure 1. Extended TAM Model

The extended TAM model represents the researcher's presumptions concerning how citizens come to accept and use e-government services and serves as the theoretical foundation of the study. This model, which accounted for previous research, points out the relationships between the variables that the researcher sets out to investigate in a systematic way by proposing the following hypotheses:

H1: There is a direct and positive relationship between behavioral intentions and actual use (BI-USE).

H2: There is a direct and positive relationship between perceived ease of use and behavioral intentions (PEU-BI).

H3: There is a direct and positive relationship between perceived usefulness and behavioral intentions (PUI-BI).

H4: There is a direct and positive relationship between perceived ease of use and the perceived usefulness (PEU-PUI).

H5: There is a direct and positive relationship between individual cultural value preferences for uncertainty avoidance and perceived usefulness (UAI-PUI).

H6: There is a direct and positive relationship between individual cultural value preferences for uncertainty avoidance and perceived public value (UAI-PPV).

H7: There is a direct and positive relationship between individual cultural value preferences for power distance and perceived public value (PDI-PPV).

H8: There is a direct and positive relationship between perceived public value and perceived usefulness (PPV-PUI).

H9: There is a direct and positive relationship between trust in the Internet and behavioral intention (TOI-BI).

H10: There is a direct and positive relationship between trust in the government and behavioral intention (TOG-BI).

Research Methodology

The note by Holliday (2002: 7), that "to understand human affairs it is insufficient to rely on quantitative survey and statistics, and necessary instead to delve deep into the subjective qualities that govern behavior," implied that quantitative and qualitative techniques of conducting scientific research could be used together. Similarly, Babbie (2010: 25) suggested "a complete understanding of a topic often requires both techniques." Combination of quantitative and qualitative methods, especially their strongest points, at different stages of the scientific research, lead to the development of various mixed methods research designs (Teddlie & Tashakkori, 2009). Guided by these considerations, the researcher decided to use the MM research design, particularly sequential (according to notational system by Morse (1991)) explanatory MM research design where less-dominant qualitative phase follows after dominant quantitative phase. Research that incorporates two complementary phases into a single study was defined as a two-phase study (Plano Clark & Creswell, 2008).

During the quantitative phase, the researcher used a face-to-face and online self-administered survey questionnaire to collect the research data from the representative sample of e-ready citizens whereas during the qualitative phase, the researcher conducted a series of fuce-to face interviews with selected e-ready individuals.

E-Ready Citizens

This research focuses on the perceptions and attitudes of e-ready citizens regarding the adoption of e-government services and thus, e-ready citizens of Ukraine were the unit of analysis in this study. In order to identify the size of the population of 15,274,752 e-ready citizens (total number of Internet users minus number of all Internet users younger than 18 years old), statistical information provided by Miniwatts Marketing Group (2012) were used. Defining e-ready citizens as legal-aged Internet users, potential recipients of government and public services provided in electronic form over the Internet, the researcher deliberately excluded from the research all non-Internet users and those Internet users below 18 years old, whose age would require adult or guardian supervision (see Figure 2 for references).

The Whole Population of Ukraine 44,291,413 (July 2014)		All Government Services 100%	
Internet Users 41.8%			
E-ready Citizens > 18 year old. 34.5% of total	USE		Traditionally Delivered Government Services
	Not USE	Government Services	
	USE via the AGENT		
Non-Internet Users 58.2%			

Figure 2. Graphical Interpretation of E-ready Citizens.

Contrary to many other definitions of e-readiness found in the literature, one proposed by the researcher not only clearly identifies the current and potential e-government service users, but it also suggests a way of quantifying them.

Population Sampling

The quantitative phase of the research used the nonprobability quota sampling technique that in many regards recalls stratified random sampling (probability sampling) and which, according to Babbie (2010: 194), "addresses the issue of representativeness." The size of the sample, calculated with statistical formula at 95 percent of confidence level and five percent of confidence interval for the targeted population of 15,274,752 e-ready Ukrainians, would be 384. The researcher decided to collect data from 400 e-ready citizens, members of four age groups without differentiation by gender, social, racial, ethnic, professional or other characteristics.

The qualitative phase of the research employed a purposive sampling technique. According to Plano Clark and Creswell (2008: 200), this technique is mainly used in qualitative research and particularly useful because it allows selecting members of the sample based on specific purposes associated with research question. In order to obtain a more reliable picture of the current status of e-government development in Ukraine, and to gain a deeper insight into the phenomenon, interviews were conducted with those that were directly involved with the development, implementation or evaluation of e-government in Ukraine, employees of selected government offices and other organizations. Out of nine e-ready citizens selected for the interviews, four were male and five were female 28 to 40 years of age. To ensure the homogeneity of MM research and to provide a good basis for triangulation of the findings, the same unit of analysis used in both phases of the research.

Research Instruments and Data Collection

The survey questionnaire written in the Ukrainian language, which was used in the quantitative phase of the research, was comprised of 56 close-ended questions, designed with proper wording, responsive formatting, and a structured layout. Each construct of the model was represented by five questions measured on five-point Likert scale. Positive and negative questions were used to avoid having all negatives on one side and all positives on the other side, thus helping to prevent the HALO effect. The collection of the survey data was performed using a mixed mode: 100 surveys were distributed online with the help of Google Forms and 300 surveys were distributed using a face-to-face self-administered survey to e-ready citizens in three Ukrainian cities.

Twelve semi-structured interview questions guided the interviews during the qualitative phase of the research and meant to explore the participants' experiences and perceptions regarding the adoption of e-government services in Ukraine. The participants were interviewed in sequential order during the face-to-face interviews held mostly in the interviewees' offices at their workplace between May and June 2015. The languages of the interviews were Ukrainian and Russian. The findings from the quantitative phase were used to identify the patterns and to group the data, which later were analyzed for similarities and differences in between case analyses. The approach where the researcher "Looks for patterns appearing across several observations that typically represent different cases under study called cross-case analysis" (Babbie, 2010: 395).

Results

Sample Demographics

Out of 381 questionnaires accepted for the furtheranalyses,242 were collected from themales and 139 from the females; 366 respondents reported having a college or higher degree; 124 were employed in the private sector, 95 were self-employed or business owners, and 64 were public sector employees; 118 respondents reported relatively high earnings, more than twice the average monthly earning in Ukraine as on February 2015 according to data from Trading Economics (2015).

Internet Usage

Most of the respondents, or 365 individuals, have been using the Internet for more than three years. Almost all of respondents, or 364 individuals, were accessing the Internet every day, approximately equally from their homes and offices, and only 10, most frequently accessed the Internet in Internet cafés. Another important finding regarding Internet use was that most of the respondents, or 273 individuals, accessed the Internet from mobile devices such as laptops, tablets, and mobile phones.

E-Government Services Use

There were 37 respondents to survey questionnaire who reported non-use of e-government services at all, another 250 respondents preferred traditional to electronic government services. Only for 36 individuals, almost all government services were delivered electronically. There were only four (out of nine) interviewees who reported higher than average use of electronic government service.

Reliability and Validity Tests

The measures of average shared variance (ASV), maximum shared variance (MSV), average variance extracted (AVE), and composite reliability (CR) were used to confirm the validity and reliability of the instrument. The results of the tests presented in Table 1, according to the benchmarks suggested by Hair, Black, Babin and Anderson (2010), confirmed reliability (CR > .7) as well as the convergent (CR > AVE, and AVE > .5) and discriminant (MSV < AVE and ASV < AVE) validity ofthe research instrument.

Table 1. Validity and Reliability Tests

Factor	CR	AVE	MSV	ASV
UAI	.758	.611	.560	.185
TOG	.931	.729	.158	.067
PUI	.911	.672	.321	.176
USE	.801	.506	.049	.022
PEU	.816	.596	.346	.159
PDI	.760	.514	.172	.098
TOI	.797	.579	.540	.151
BI	.814	.593	.560	.212
PPV	.839	.636	.540	.235

Conclusion: the measurement scales used in survey were sufficiently reliable and valid and thus, were accepted for the further analysis.

Structural Equation Modeling (SEM)

The study adopted a two-step approach for conducting SEM suggested by Anderson and Gerbing (1988). In the first step, the measurement model related to the research data was established and its validity was confirmed. In the second step, the structural model, which describes relationships between the dependent and independent variables, was used to measure the strengths of relationships between variables and to test the hypotheses.

Measuring the Goodness-of-Fit (GOF)

The initial eight GOF indices measuring the absolute, incremental, and parsimonious fit of the measurement model from different perspectives suggested that the measurement model could be improved. By applying covariance modification indices prompted by AMOS, the researcher determined that the measurement model fit the data well, all loadings were statistically significant (> .5, Hair et al. (2010)) and in the predicted directions. A summary of the GOF indices is presented in Table 2.

Table 2. GOF Indices for Initial and Revised Measurement Models

Measures	Absolute Fit			Incremental Model Fit				Parsimonious Fit
Benchmark	GFI	RMSEA	SRMR	AGFI	CFI	NFI	TLI	χ^2/df
	≥ .90	< .05	≤ .08	≥ .90	≥ .90	≥ .90	≥ .90	< 3.00
Measurement Model	.92	.03	.04	.90	.97	.92	.97	1.45
	$\chi^2 = 492.42, df = 338, p = .000$							
Structural Model	.89	.05	.06	.86	.94	.89	.93	2.03
	$\chi^2 = 741.51, df = 352, p = .000$							

Note: Goodness-of-fit index (GFI); root mean square error of approximation (RMSEA); the standardized root means square residual (SRMR); adjusted goodness-of-fir index (AGFI); comparative fit index (CFI); normed fit index (NFI); Tucker Lewis index (TLI); chi-square (χ^2); degrees of freedom (df). Acceptable "good fit" benchmarks recommended by Hair, et al. (2010), Kline (2011) and Byrne (2010).

Measurement Model Invariance

To ensure that the factor structure and the factor loadings of the composite variables are satisfactory equivalent across the groups, it would be necessary to test configural and metric invariance during CFA (Gaskin, 2015). In order to conduct the test, the researcher created two different groups by splitting the data along the lines of gender. Non-significant p-values for the chi-square difference test confirmed that the groups were invariant and not different at the model level; however, they may have been different at the path level. The results of the multi-group moderation test confirmed that most of the z-scores were not significantly different between groups, allowing for the conclusion that the measurement model was invariant and did not need to be refined or revised and thus could be used in further study.

Common Latent Factor (CLF) Test

The researcher used two different methods to test for a common method bias (CMB): Harman's single factor test and the CLF test: the results of both confirmed that there was no evidence in the CMB presence in the measurement model.

Assessing Structural Model Fit

The values of the five GOF indices of the final structural model were above the suggested benchmark, while the values of three were very close to it (GFI (.89), AGFI (.86) and the NFI (.89) (see Table 2 for references).

Guided by the recommendation of Hair, et al. (2010), that a threshold of > .80 for GOF indices sometimes is permissible and of Gaskin (2015), that it is difficult to achieve an ideal fit of the model if the sample size is large, the researcher accepted the structural model without any further modifications.

Hypothesis Testing

The results of the regression weight analysis presented in Table 3 report on the standardized paths coefficients and their statistical significance: six out of ten paths were significant at the .005 level whereas two were at the .05 level. The results of bootstrapping confirmed the significance of only six estimators. However, according to Hair, et al. (2010), when the critical ratio (C.R./t-value) is higher than 1.96 for an estimate, the parameter coefficient value is statistically significant at the .05 level.

Table 3. Regression Weights and Hypothesis Testing

Relationships			Estimates	*SE*	*CR*	***p***	β	Bootstrap, *p*	Hypothesis	Results
USE	<---	BI	.26	.11	2.27	.023	.15	.019	H1	Accepted
BI	<---	PEU	.18	.05	3.67	***	.24	.004	H2	Accepted
BI	<---	PUI	.48	.06	7.51	***	.45	.000	H3	Accepted
PUI	<---	PEU	.02	.04	.32	.747	.02	.605	H4	Rejected
PUI	<---	UAI	.43	.08	5.48	***	.47	.005	H5	Accepted
PPV	<---	UAI	.56	.08	6.64	***	.48	.003	H6	Accepted
PPV	<---	PDI	.17	.05	3.03	.002	.19	.674	H7	Accepted
PUI	<---	PPV	.21	.05	4.09	***	.27	.482	H8	Accepted
BI	<---	TOI	.10	.04	2.65	.008	.15	.023	H9	Accepted
BI	<---	TOG	.01	.04	.22	.828	.01	.752	H10	Rejected

Eight out of ten regression paths were confirmed to be statistically significant, having regression weights ranging from .15 to .48 and a positive direction of the relationships. Accordingly, eight out of the ten hypotheses were accepted.

Verification of Findings

Overall, the ability of the research model to predict 42 percent of the variance in behavioral intentions corresponds with studies by Pin-Yu, Naiyi, Fung-Wu, and Chung-Wei (2003), Wangpipatwong, Chutimaskul and Papasratorn (2008), Alhujran (2009), Almahamid, McAdams, Taher Al and Mo'Taz (2010), Al-Hujran, et al. (2011), and Teck and Yin-Fah (2012) reviewed in the course of the literature review and considered to be acceptable as for the TAM-based model. Contrary to many other studies (such as by Alhujran, 2009; Azmi, Kamarulzaman and Hamid, 2012; Jen-Ruei et al., 2006; Pin-Yu et al., 2003; Wang, 2002; Wangpipatwong et al., 2008), the factor of perceived ease of use did not correlate with the factor of perceived usefulness. Then, similarly to many other studies

(such as by Almahamid et al., 2010; Azmi et al., 2012; Jen-Ruei et al., 2006; Pin-Yu et al., 2003; Wangpipatwong et al., 2008), the factor of perceived usefulness was better in predicting behavioral intentions ($\beta = .45$, $\beta = .05$) compared to perceived ease of use ($\beta = .24$, $\rho = .05$).

The structural model presented in Figure 1 explained only two percent of the variance in the actual use, which was considerably lower than R2 values of the other dependent variables. This indicates that the model was not suitable for studying the actual use of e-government services. On the other hand, the model proved to be good for studying behavioral intentions.

Case Studies: Interviews

Analysis of the data collected during interviews with nine e-ready Ukrainians allowed for the identification of five factors which affect the actual use of e-government services in Ukraine, namely: awareness, trust in the government, trust in e-government, computer literacy, and data protection. In order to verify if these findings were meaningful, the researcher turned his attention to the literature, which suggested that all of them, to a different degree, were part of the earlier studies.

For instance, Al-Shboul, Rababah, Al-Shboul, Ghnemat, and Al-Saqqa (2014) reported awareness to be one of the most important factors that determines the success of e-government initiatives. Similarly, Al-Jaghoub, Al-Yaseen, and Al-Hourani (2010: 1) reported that problems with the acceptance of e-government services in developing countries were because "awareness of e-Government did not reach the required level."

The factor of trust along with its different dimensions such as trust in the Internet, trust in the government etc. were also part of the research models in a number of studies reviewed in course of the literature review, for instance these by Alhujran (2009), Alsaif (2014), Carter and Bélanger (2005), Vrček and Klačmer (2014), and many others.

The factor computer self-efficacy (conceptually similar to computer literacy) was found to have a significant effect on behavioral intentions of citizens in studies by Wang (2002), Hung, et al. (2006), and Wangpipatwong, et al. (2008).

The factors data protection and privacy were found to be the strongest determinant of e-government services use in study by Akkaya, et al. (2012).

As the part of the research design, the interviewees had to comment on findings from the quantitative phase of the research, confirming five out of the seven factors to be relevant and important for understanding the problems related to the adoption of e-government services. Confirmed factors were perceived usefulness, perceived ease of use, perceived public value, individual cultural value preferences for uncertainty avoidance and power distance.

Seven out of nine interviewees negatively evaluated the state of development of e-government in Ukraine giving to it, in the words of Interviewee 3, "three out of ten points." Only four out of nine interviewees preferred electronic to traditionally delivered government services.

Discussion

While quantitative study very well handled the identification of the factors affecting behavioral intentions, qualitative study was good in identification the factors affecting actual use of e-government services. The TAM-based research model, used in the quantitative phase, was found to be not useful to study the actual use of e-government services. It seems that the "perceptional" independent variables of the original and extended TAM models better suited the measurement of behavioral intentions rather than "tangible" actual use. Similarly, the qualitative phase of the research, where the interviewees had difficulty in differentiating behavioral intentions from actual use, was not good to study the behavioral intentions. Neither quantitative nor qualitative study conducted alone would be able to spot these issues and to provide a comprehensive answer to the research questions. This, once again, confirmed the correctness of choosing the MM research design for this study.

Answers to Research Questions

What are the Factors Affecting the Adoption of E-Government Services in Ukraine from E-Ready Citizens' Perspectives?

The triangulation of the findings from both phases of the research resulted in the identification of eight factors that greatly affecting the adoption of e-government services in Ukraine: awareness, computer literacy, perceived ease of use, perceived usefulness, perceived public value, trust in the government, trust in the Internet, and the individual cultural value preferences for uncertainty avoidance. The findings also suggested the number of relationships that lead to development of the comprehensive model of adoption presented in Figure 3 below.

The model proposes to measure behavioral intentions and actual use separately and considers them as two dimensions of the higher-order factor of adoption. The upper part of the model built on the results from the quantitative phase of the research whereas the lower part built on the findings from its qualitative phase. Results of both phases of the current study confirmed that both dependent variables of the model were well predicted by correspondent independent variables and therefore, there is no reason to doubt the viability of the model.
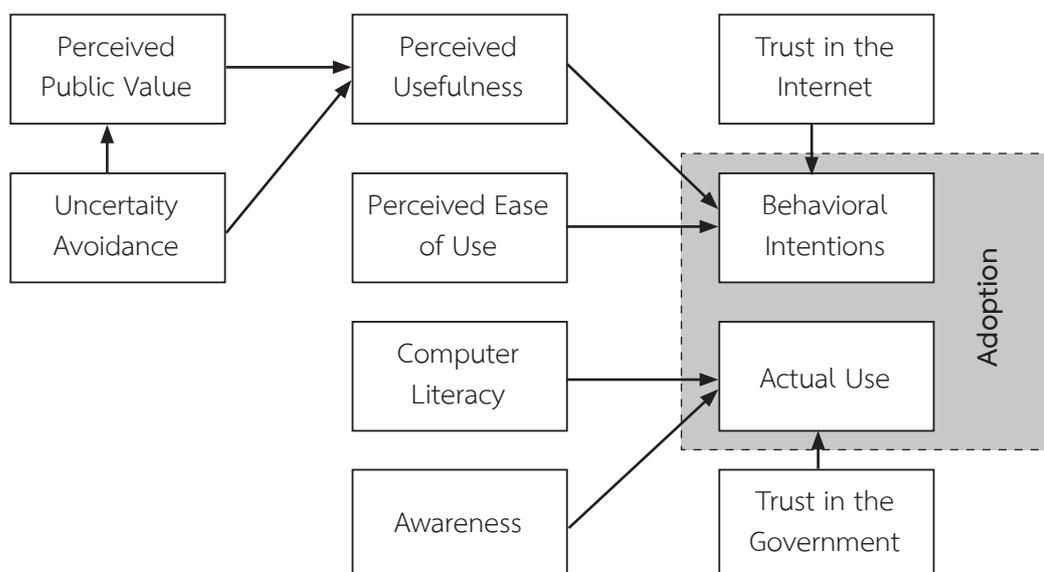

Figure 3. Comprehensive Model of Adoption

What is the Current State of Adoption of E-Government Services in Ukraine?

The extended TAM model used in the QUAN phase could explain 42 percent of the variances in behavioral intentions and only two percent of the variances in actual use, which made the researcher think that defining adoption as a superimposition of actual use onto behavioral intentions towards the use of e-government services was a mistake. However, if the current study intended to measure the adoption of e-government services only in terms of behavioral intentions, as it was suggested by Fishbein and Ajzen (1975) and other scholars, after conducting the quantitative analyses, the researcher had to conclude that the adoption rates of e-government services in Ukraine were extremely high. This would be confirmed by the descriptive statistics of the items that were meant to measure behavioral intentions: all five items showed high values of their means, ranging from 3.70 to 4.12. The number of e-ready citizens, whose behavioral intentions were to increase the use of e-government services, was ranging from 66.4 to 92.1 percent (on average 78.8 percent). However, if the overall adoption rates of e-government services were high (up to 92.1 percent), then how to explain the low rates of actual use reported by quantitative and qualitative studies? At the same time, results of the QUAN and QUAL studies confirmed that only 24.6 to 44.0 percent of e-ready citizens accordingly (on average 34.3 percent) used more e-government than traditional services.

On the other hand, provided that the definition of adoption used in this research was correct and both factors, behavioral intentions and actual use, determine the adoption, it is logical to assume that the e-government service adoption rates in Ukraine was 56.5 percent (the sum of the average values for behavioral intentions and actual use divided by two). This number corresponds with 55.1 percent of all e-government service users reported during the QUAN phase of the research. Accordingly, the adoption rates amongst all legal-aged Ukrainians would be 23.6 percent.

Limitations and Delimitations of the Research

The theoretical framework of the research was built on the constructs of the original TAM model, and despite the researcher's effort to address some known limitations of the original TAM model; he failed to overcome the most obvious and often reported drawback in the literature, namely, its low predictive power.

The fact that the study was cross-sectional in its nature, while not affecting the research findings, still limited the timeframe of their relevance and applicability. Similarly, the place of conducting study makes the research findings "settings bounded", i.e., relevant in only the Ukrainian context.

The study looked only into one particular dimension of e-government, viz., government-to-citizens, which was studied from the perspectives of the demand side only. This makes research findings important only for explaining this one type of governmental relationships.

Since the population of the e-ready citizens was unknown, this researcher had to apply non-probability sampling techniques in order to identify 409 respondents for the survey questionnaire and interviews, which made the generalization of the findings questionable.

Finally, the research considered only Ukrainian citizens, even though other nationals in Ukraine are also potential users of e-government, without taking into account potential cultural, economic, and educational diversity of the population.

Nevertheless, all these and other possible limitations and delimitations of the research could be easily ignored given the scientific value of the study and taking into account that it was the first of its kind of research conducted in Ukraine.

Conclusions

The essence of at least two factors, awareness and computer literacy, which were found to be significant influences on the actual use, seemed to be easy to understand and "tangible" in its nature. This made the researcher believe that these factors have a good chance to be noticed and to be reflected in the initiatives and practice of those that are designing, developing, and implementing e-government services.

The fact that 71.7 percent of the respondents to the survey questionnaire most frequently accessed the Internet from various mobile devices suggests changes in the pattern of Internet users. It implies that the role of mobile wireless communication and mobile government (m-government) in particular will only be growing. It is important that the Ukrainian government take advantage of this discovery and not miss the opportunity to be on top of the situation and to be on time with this emerging trend.

Practically all of the interviewees and a majority of the respondents surveyed reported a lack of trust in the government as one of the factors that influences adoption and actual usage. Therefore, it would be advisable if the government, along with all of its subordinate bodies, make the necessary effort to change this situation for the better.

For researchers, this study offers a comprehensive model of adoption, presented in Figure 3, which proposes a model for studying e-government adoption that is completely different to previous models. The theoretical contributions of the research are not only limited to model development, but also include a new and more thorough way of defining e-government adoption, e-ready citizens, and e-government.

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