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e-Government adoption model based on theory of planned behavior: Empirical validation

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ABSTRACT

The e-Government phenomenon has become more important with the ever increasing number of implementations worldwide. A model explaining the e-Government adoption and the related measurement instrument – a survey – had been developed and validated in this study. In a post Technology Acceptance Model (TAM) approach, theory of planned behavior (TPB) was extended to fit the requirements of e-Government context. The adoption of student loans service of the higher education student loans and accommodation association of Turkey (KYK) was investigated to obtain data for empirical validation. The instrument was administered to over four-hundred students and partial least squares path modeling was employed to analyze the data. The results indicate that the model was an improvement over TAM in terms of predictive power. The constructs trust, perceived behavioral control and attitudes successfully explained the intention to use an e-Government service. The findings presented in this study provide useful insights for researchers and policy makers when dealing with e-Government services.

1. Introduction

The application of information technologies (IT) to government services has given rise to e-Government. e-Government provides several benefits in terms of efficiency, availability, costs, and return on investments (Organisation for Economic Cooperation and Development [OECD], 2007; United Nations Department of Economic and Social Affairs [UNDESA], 2008, 2010). As these benefits have become more apparent, the number of countries employing e-Government services began to increase, such that among the 192 countries surveyed in the UN e-Government survey there was not one country that did not employ some form of e-Government (UNDESA, 2008, 2010). The financial reports also support these findings. This worldwide trend is also evident in Turkey where expenditures on e-Government have been steadily rising since 2001 (OECD, 2007; UNDESA, 2010).

The expected returns on investment (ROI) for e-Government projects are extremely high. For example, the estimated investment for an e-Government project in social insurance association of Turkey (SSK) was 2.4 million TL whereas the estimated return on the same project was 1.8 billion TL (OECD, 2007). But these ROI values can only be actualized if the projects are successful. Unfortunately, the success rates have been reported to be low. Studies conducted in Manchester University, UK found out that only 15% of the e-Government projects achieved all of their established goals (Heeks, 2008). The main determinant of success for G2C services is the utilization of these services. The utilization of services is a measure of adoption of the service by citizens. UN report lists the reasons behind low adoption of e-Government services as: Usefulness, Content Accessibility, Lack of Trust, Lack of Confidentiality, Social and Cultural Issues, Inadequate Infrastructure, Inadequate Delivery of Services (UNDESA, 2008).

The reasons listed above have also been noted in the e-Government adoption literature. The usability and accessibility have long been known to influence the adoption of technological artifacts (Davis, 1989). The uncertainty in online interactions is known to be lessened by trust and the role of trust and confidentiality in on-line interactions has been a subject well studied (Gefen, Karahanna, & Straub, 2003; McKnight, Choudhury, & Kacmar, 2002). International nature of this phenomenon had caused social and cultural issues and unique infrastructural differences among the countries to be investigated (Carter & Weerakkody, 2008).

Considering the significant amount of resources spent on e-Government projects, each failed project means that a significant amount of taxpayer money has been wasted. e-Government adoption models can identify the factors leading to adoption by citizens, which could then lead to more successful e-Government projects.

The aim of this study is to develop and validate an e-Government adoption model for predicting and explaining citizens' adoption behavior regarding the use of government to citizen (G2C) e-

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Government services. To that end, the following research questions were pursued: (1) What factors influence e-Government acceptance, (2) What are the relations among these factors, and (3) What is the weight of each factor on the behavior in question.

This study describes and discusses the development and validation of the said model. To develop a customizable model with high explanatory power, Ajzen's (1991, 2002b) theory of planned behavior (TPB) was extended with constructs derived from technology acceptance and e-Government literatures. The scientific nature of the study required sound theoretical foundations and rigorous validation of the model. All modifications to the model have been theoretically justified. These modifications had been empirically tested via the measurement instrument developed as part of this study. For the statistical validation of the model and the instrument, component based structural equation modeling had been employed.

2. Literature review

There are various models for the adoption of technological novelties in the literature. For specific technologies or implementations of novelties, such as e-commerce or e-Government, these models are generally taken as a base and extended using various constructs that are deemed relevant to the subject. Perhaps the most widely known adoption model is the Technology Acceptance Model (TAM) (Davis, 1989), yet other models have seen acceptance in IS domain such as Diffusion of Innovations (DOI) (Moore & Benbasat, 1991) and Uniform Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). An evaluation of these models reveals that, two constructs can be observed in each model, under different names. These constructs are the ease of use (perceived ease of use of TAM, technical complexity of DOI, effort expectancy of UTAUT) and the Usefulness (perceived usefulness of TAM, relative advantage of DOI, and performance expectancy of UTAUT).

2.1. e-Government adoption models

The models developed for e-Government adoption are generally based on one of the models listed above. This is quite logical considering that e-Government is itself a technology artifact. These models usually extend the technology adoption models by inclusion of various additional constructs to account for the multi-disciplinary nature of the field.

Our review of the literature on e-Government adoption revealed that TAM was the model that was utilized most often in the literature (Carter & Weerakkody, 2008; Gefen, Warkentin, Pavlou, & Rose, 2002; Warkentin et al., 2002). Other models have also been used: Carter and Belanger (2005) used DOI, Al-Awadhi and Morris (2008) used UTAUT, and Hung, Tang, Chang, and Ke (2009) used TPB. When factors influencing e-Government success listed by the UN report are considered, it can be seen that the additional constructs in these models cover a significant amount of them. Usefulness and accessibility, being the most basic determinants of technology acceptance, had been investigated in all of the studies. Lack of trust and confidentiality had been investigated by Carter and Belanger (2005), Gefen et al. (2002), Warkentin et al. (2002), and Hung et al. (2009). The infrastructure and service delivery had been investigated in Carter and Weerakkody (2008). There had also been studies where a custom model independent from others have been developed (Hamner & Al Quahtani, 2009). Additionally, trust has been found to be the common construct integrated into e-Government adoption models.

Reflecting on the international nature of the e-Government phenomena, intercultural comparison studies have also been carried out. Carter and Weerakkody (2008) used IT penetration to compare two countries, the UK and the U.S. They theorized that a country's position in the digital divide affects the IT penetration, which in turn affects the citizens' ability to use computers and the availability of computers. The citizens' computer skills and access to computers provide easily measurable and tangible measures for IT penetration.

2.2. Theory of planned behavior as an alternative

While TAM has seen wide acceptance in information systems literature, its dominion has not been without resistance. Benbasat and Barki (2007) have noted the limitations of TAM in terms of extendibility and explanatory power. The argument against the explanatory power arose from the overly simplistic structure of the model. TAM did not provide any insights into what usefulness was nor provided any mechanism to do so later on if the researcher wished. This formed the basis for the second argument against TAM: Extendibility. TAM did not include any extension facilities and the researchers aiming to extend the model needed to justify this in terms of TAM. Over the years, as the limitations of TAM became clear, researchers either extended the existing model or referred to other models such as UTAUT or DOI for the explanatory power. While it is true that these models do have more explanatory power, they too do not provide default extension mechanisms. TPB, being a psychology theory used to explain human behavior possesses of these extension mechanisms (Ajzen, 1991). Benbasat and Barki (2007) suggested returning to the theoretical roots of TAM and using TPB instead of other models for the sake of the extendibility and explanatory power. This study adopted the approach and extended TPB into e-Government domain. The major constructs of the theory of planned behavior can be seen in Fig. 1.

The salient belief constructs of TPB provide an extension mechanism to integrate additional constructs (Ajzen, 1991). This study modeled the previously validated technology acceptance and e-Government adoption constructs as salient belief constructs and integrated them into the TPB. By using this default mechanism and careful selection of constructs from the literature, it was possible to

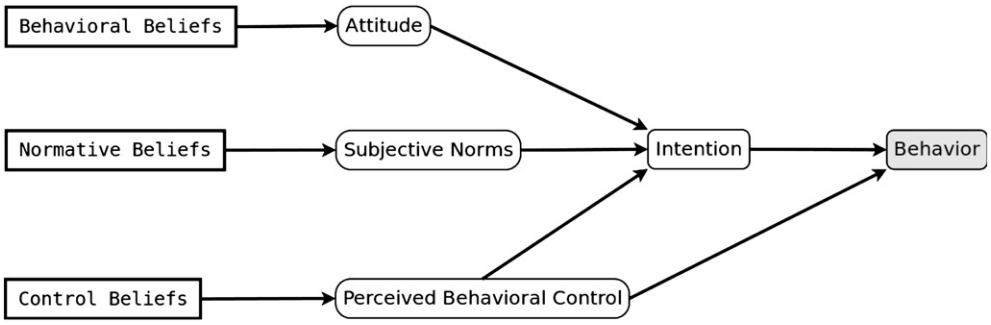

Fig. 1. Theory of planned behavior (Ajzen, 1991).