Government Information Quarterly 30 (2013) 486–497

Contents lists available at ScienceDirect

Government Information Quarterly

journal homepage: www.elsevier.com/locate/govinf

User acceptance of SMS-based e-government services: Differences between adopters and non-adopters

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ARTICLE INFO

Available online 24 August 2013

Keywords:
SMS
e-Government
User acceptance
Adopters
Non-adopters

ABSTRACT

Delivering public services through the SMS channel is popular in developed and developing countries, and it has demonstrated its benefits. However, citizens' acceptance of the services is still an issue. This paper presents a study on user acceptance of SMS-based e-government services. Constructs of the proposed model were derived from a survey on citizens' motivations for using SMS-based e-government services (142 respondents from 25 countries), prominent theories on individual acceptance of technologies, and current studies on user acceptance of SMS and e-government services. The model was validated using data from 589 citizens in three cities in Indonesia, who are non-adopters. The relationships between the factors then were compared with data from 80 adopters of SMS-based e-government services in Australia. The proposed model explains what factors influence non-adopters to accept SMS-based e-government services, and the comparison explains the relative importance of the factors for the adopters. The findings are promising for governments who wish to evaluate a new SMS-based e-government system very early in its development in order to assess potential acceptability and for governments who would like to diagnose the reasons why an existing SMS-based e-government service is not fully acceptable to citizens and to take corrective action to increase the acceptability of the service.

1. Introduction

Currently, SMS-based e-government is becoming popular (smsegov.info, 2011) and has demonstrated its benefits. SMS-based e-government refers to the use of SMS technology for providing information and public services to citizens (G2C), business (G2B) and government employees or other government organizations (G2G). The services are available as notification, pull-based information, communication, transaction, and integration services (Susanto, Goodwin, & Calder, 2008). A current report showed that SMS-based e-government has reduced time and cost for public services; introduced a cheaper, easier and faster information-accessing channel; improved transparency, accountability, communication and the relationship between the government and the citizens; made the services and procedures easier for citizens to use; improved the district political image; increased citizens participation; and promoted e-Democracy (Bremer & Prado, 2006; Lallana, 2004; Rannu & Semevsky, 2005).

As a result, some governments are willing to make large investments in SMS-based e-government initiatives. The Australian government, for example, allocated $15 million for setting up a *National Emergency Warning System* (NEWS) that will send text alerts to the mobile phones of residents threatened by bushfires, disease epidemics, sieges, cyclones, terrorist attacks, locust plagues and heat or smog.

Despite the important roles of SMS-based e-government and substantial growth in the development of the services, some cases revealed that user acceptance of SMS-based e-government services is still an issue. Lallana (2004) and Alampay (2003) reported that even though SMS is very popular in the Philippines, some SMS-based e-government services in the country did not have many users. Similar cases in Denmark and Sweden also suggested that there are factors other than the popularity of SMS and awareness of the services which influence people to use SMS-based e-government services (Westlund, 2008). The popularity of SMS and awareness of the benefits of SMS-based e-government do not guarantee that most citizens will use the services. It is a serious issue, since governments may not obtain the potential benefits of SMS-based e-government and cannot justify the investment in SMS-based e-government systems unless citizens actually use the services. Accordingly, studies on user acceptance of SMS-based e-government services are needed.

This paper is a part of a study investigating factors that may influence individuals to use SMS-based e-government services. It proposes a model of individual acceptance of SMS-based e-government. The model aims to understand why non-adopters reject SMS-based e-government services

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http://dx.doi.org/10.1016/j.giq.2013.05.010

and what factors would influence them to use the services. Moreover, this paper also analyzes the relative importance of each proposed factor for the adopters. From a practical standpoint, the findings are promising for governments, e-government practitioners, and system designers not only in explaining why an SMS-based e-government service is unacceptable to a set of users, but also in understanding how to improve user acceptance through the design of the system and the service.

2. To formulate a research model

To identify the adoption factors of SMS-based e-government services, this study initially conducted a survey investigating citizens' motivations for using or not using SMS-based e-government services over three months (April–June 2010) collecting 159 responses from 25 countries (Susanto & Goodwin, 2010a). A *triangulation* method combining a web-based survey, a paper questionnaire and a phone-call interview was used to improve the validity of the collected data. The majority of the respondents were from Indonesia and India (66.7%), male, 31–40 years old and included respondents who have internet access and ones who do not. The survey identified 15 beliefs which influenced individuals to use or to reject an SMS service as shown in Appendix A.

Further, to compose the factors into a research model, this study also reviewed extant technology adoption models and user acceptance of SMS and e-government services found in four research areas: adoption research, diffusion research, uses and gratifications, and domestication studies. Since SMS-based e-government is e-government services delivered through the SMS channel, this study assumed that the determinants of adopting SMS-based e-government services are composed of the determinants of adopting SMS and of adopting e-government services.

Among prominent technology adoption models, this study adopted the decomposed theory of planned behavior (DTPB) for the following reasons. First the DTPB was developed especially for understanding information technology use (Taylor & Todd, 1995a) and effectively explained individual intentions and behavior in adopting e-government services (Hung, Chang, & Yu, 2006) and mobile services (Yulong & Wenli, 2009).

Second the acceptance of SMS-based e-government services is not entirely in citizens' control: this condition satisfies core assumption of the DTPB that the presence of constraints including self-efficacy and facilitating conditions (such as the absence of mobile device or lack of skills to use SMS) can inhibit both the intent to use the service and the usage behavior itself.

Third the DTPB incorporates social influences which are relevant for collaborative systems in the everyday life context like SMS-based e-government (Dennis, Venkatesh, & Ramesh, 2003; Malhotra & Galleta, 1999).

Fourth the DTPB with its decomposition approach offers two advantages over other prominent models with monolithic belief structures (such as Theory of Reasoned Action, Technology Acceptance Model, and Theory of Planned Behavior): studies showed that monolithic belief structures, representing a variety of dimensions, are not consistently related to the antecedents of intention (Taylor & Todd, 1995a, 1995b); the decomposition approach, on the contrary, can provide a stable set of beliefs which can be applied across various settings overcoming some of the disadvantages in operationalization noted with other traditional intention models (Berger & Ida, 1993; Mathieson, 1991).

Moreover, due to the elaborate nature of the TPB, the DTPB provides a more complete understanding of usage behavior relative to parsimonious models such as the TAM and the TPB (Taylor & Todd, 1995a, 1995b). The last but not least is the survey conducted by this study (Susanto & Goodwin, 2010a) also revealed that individuals' motives for using SMS-based e-government services include attitudinal beliefs, social beliefs, and control beliefs as suggested in the DTPB model.

The proposed model focuses on factors determining *usage intention* since this study aims to discover what factors influence non-adopters to use SMS-based e-government services and usage intention is confirmed as the strongest predictor of actual usage (Ajzen, 1991; Davis, Bagozzi, & Warshaw, 1989; Fishbein & Ajzen, 1975; Taylor & Todd, 1995a; Venkatesh, Michael, Gordon, & Fred, 2003). Usage intention has been also confirmed as the strongest predictor of usage behavior of SMS-based services (Kaasinen, 2005; Turel, Serenko, & Bontis, 2007). Usage intention (UI) is used as an indicator of the acceptance. Usage intention is defined as a measure of the strength of an individual's intention to use an SMS-based e-government service (Davis et al., 1989).

How to develop an individual's intention to use an SMS-based e-government service or how to predict whether someone would have an intention to use or not to use the service, the DTPB model and this study suggest looking at three independent determinants: *attitude* towards using the services (A), *perceived behavioral control* (PBC), and *subjective norms* (SI) (Icek Ajzen, 1991; Horst, Kuttschreuter, & Gutteling, 2007; Hung et al., 2006; Taylor & Todd, 1995b; Titah & Barki, 2006; Treiblmaier et al., 2004). Referring to a case study of an online tax filing and payment system in Taiwan showed that individuals' intentions to use the e-government service was mainly influenced by *attitude* (72% in variance) and to a small extent by the *subjective norms* and *perceived behavioral control* (Hung et al., 2006). The significant role of these three salient constructs as direct determinants of intention were also confirmed in more recent studies related to user acceptance of SMS (Bamba & Barnes, 2006; Bauer et al., 2005; Dennis et al., 2003; Dickinger et al., 2005; Gong & Yan, 2004; Grant & Donohoe, 2007; Kim et al., 2008; Nysveen, Pedersen, & Thorbjornsen, 2005) and e-government services (Awadhi & Morris, 2008; Dimitrova & Chen, 2006; Horst et al., 2007; Hung et al., 2006; Treiblmaier et al., 2004). *Attitude* refers to the degree to which a person has a favorable or unfavorable evaluation of using the SMS-based e-government service in question. *Perceived behavioral control* is the extent to which a person perceives that the required opportunities and resources to use an SMS-based e-government service are available to him/her, and *subjective norms* or *normative social influence* is a person's perception that most people who are important to him think he should or should not perform the behavior (Ajzen, 1991). The proposed model suggests there are positive relationships between *attitude towards use*, *perceived behavioral control*, and *social norms*, with *intention to use* SMS-based e-government services (Hung et al., 2006; Nysveen et al., 2005; Scharl, Dickinger, & Murphy, 2005; Taylor & Todd, 1995b).

Further by adopting the decomposition approach of the DTPB, this study specifically investigated the dimensions of the three salient beliefs in the context of SMS-based e-government services. It derived the underlying beliefs (the dimensions) from the adoption factors suggested by existing studies on SMS-based services (Appendix C) and e-government services (Appendix B), and the survey on individuals' motivations to use SMS-based e-government (Appendix A).

This study theorizes that the *perceived behavioral control* is composed by two beliefs: *facilitating conditions* (FC) and *self-efficacy* (FC); the social influence is composed by one belief: *normative social influence* (NSI); and the *attitude* towards using SMS-based e-government services (A) is composed by eight beliefs: *perceived ease of use* (PEU), *perceived convenience* (PC), *perceived reliability and quality of the information* (PRQI), *perceived cost* (PCt), *perceived personal relationship* (PPR), *perceived responsiveness* (PRs), *perceived risk* (PRk), and *perceived compatibility* (PCy). Appendices D, E, and F consecutively present the research model, definitions of the constructs, and a summary of the hypotheses and the supporting studies.

Compared to the original DTPB model, this study introduced six attitudinal beliefs specifically for user acceptance of SMS-based e-government services: *perceived convenience* (PC), *perceived reliability and quality of the information* (PRQI), *perceived cost* (PCt), *perceived personal relationship* (PPR), *perceived responsiveness* (PRs), and *perceived risk* (PRk). Instead of