Government Information Quarterly 31 (2014) S26–S36

Contents lists available at ScienceDirect

Government Information Quarterly

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

The adoption of public smartphone applications in Korea: Empirical analysis on maturity level and influential factors

Seok-Jin Eom [a,*], Jun Houng Kim [b]

[a] Graduate School of Public Administration, Seoul National University, 1 Gwanak-ro, Gwanak-gu, Seoul 151-742, Republic of Korea
[b] Master of Public Administration, Graduate School of Public Administration, Seoul National University, Republic of Korea

ARTICLE INFO

Available online 3 May 2014

Keywords:
Public smartphone applications (public applications)
Smartphone
Mobile government (m-government)
Maturity model

ABSTRACT

With the rapid proliferation of smartphones, public smartphone applications (hereafter public applications) have emerged as a new technology and innovation toward smarter government. To assess the current status of the adoption of public applications in Korea, the authors measure the maturity level of these public applications by applying a newly developed 'public application maturity model.' In addition, the factors influencing the differences in the maturity levels of public applications are analyzed. It was found that Korean governmental agencies have adopted diverse public applications actively in an effort to deliver public services. The overall maturity level of public applications, however, is accessed as relatively low at present. Moreover, the results of the analysis of the factors influencing the maturity of public applications can be interpreted as showing that the government agencies have only followed the trend of the rapid proliferation of public applications without considering how high-level citizen-centric services could be delivered through public applications.

1. Introduction

With the rapid advance in wireless information technology (IT), governments around the world are providing citizens with public services with mobile devices (Abhijit, Munir, & Rajiv, 2007; Hung, Chang, & Kuo, 2013; Ntaliani, Costopoulou, & Karetsos, 2008; Ojo, Janowski, & Awotwi, 2013). Particularly, public smartphone applications (public applications) have emerged not only as a new channel for delivering public information services but also as a new type of technology and as innovations toward smarter government (Accenture, 2012; Holzer & Ondrus, 2011; OECD/ITU, 2011).

Despite the widespread usage of public applications, few or no rigorous research in the field of e-government and/or information policy has dealt with public applications for government. This research fills this gap by examining the current status of the development of public applications in Korea. More specifically, the authors carry out this research with the following purposes: (1) to build a 'public application maturity model' for assessing the level of maturity of public applications, (2) to measure the overall maturity level of public applications by applying the maturity model, and (3) to analyze the factors which influence differences in the maturity levels of public applications.

To fulfill these research purposes, a six-stage public application maturity model was built based on the citizen-centricity and technological complexity of the public applications after referring to previous research on maturity models applicable to e-government. By examining the entire population of public applications, the authors found that a total of 405 public applications had been provided by central and local government agencies in Korea as of December of 2012.

This study is expected to make theoretical contributions to our understanding of mobile government (m-government), i.e., as to whether it is similar to or different from e-government, while also adding to the knowledge pertaining to actualized public services through mobile and handheld devices. In addition, the empirical approach adopted here is helpful to those who seek to gain an understanding of the current status of these types of public applications and future directions to realize the potential of public applications (Hung et al., 2013; OECD/ITU, 2011). In practice, the results of this study can be used to make guidelines and toolkits which can lead to the creation of better public applications.

The organization of this study is as follows. In Section 2, previous literature on public applications and the theoretical background on e-government maturity models and success/failure factors for IT/IS are examined. In Section 3, the authors build a public application maturity model to assess the current level of maturity of public applications. Sections 4 and 5 describe an analytical model to explain the differences in the levels of maturity of public applications and the methods of data collection and measurements of variables. In Section 6, the results from the measurements of the level of maturity of public applications and those of statistical analyses of the factors which influence the maturity level are presented.

* Corresponding author.
E-mail address: sjum21@snu.ac.kr (S.-J. Eom).

http://dx.doi.org/10.1016/j.giq.2014.01.005
0740-624X/

2. Theoretical background

2.1. Public smartphone applications, a new technology toward smarter government

A mobile application is defined as the application software actualized through mobile devices. That is, mobile applications are applications operated under mobile and wireless environments (Bae, 2010; Kim, Hong, & Joo, 2011). Mobile applications can be classified into three categories: (1) native applications, (2) web applications, and (3) hybrid applications. Native applications are produced based on a native application programming interface (API) and are installed directly onto the operating systems of devices. Web applications are produced on the basis of web standard technology such as hypertext markup language (HTML), cascading style sheets (CSS), and JavaScript and are operated through mobile web browsers such as Safari, Opera, and Internet Explore Mobile. Hybrid applications are installed directly on the operating systems of devices, similar to native 'apps', but are produced based on web standard technology, which is analogous to a 'web app'. In addition, a browser component is built into the application, and the application is operated through the browser component (Kim et al., 2011).

Based on the conceptual discussion of these mobile applications, public applications can be defined as native and hybrid applications produced and disseminated by government agencies through mobile application markets. Public applications have been actively adopted for delivering public information services in some countries. For example, the U.S. federal government had produced and distributed 422 public applications via their public application site (apps.usa.gov) as of November of 2013. With the awareness that mobile technology has the potential to deliver public services more efficiently and effectively and change how citizens search for and use public information, the U.S. federal government has tried to build the virtuous circle between public application initiatives and the open data initiative. The U.K.'s central government agencies have produced various types of public applications. For example, the U.K. foreign office produces public applications for tourists. The Department for Work and Pensions has provided 'Job Centre Plus', a public application for jobseekers. The Driver and Vehicle Licensing Agency (DVRA) produced and distributed the 'Motoring Master Class' application, which provides information about repairing cars.[1]

From the viewpoint of users, public applications have many strong points. First, they are easily found in mobile application markets and installed directly onto mobile devices by being downloaded from these markets. Second, users can enjoy more speedy and personalized services, as mobile devices can be designed for a single user and because information provided through mobile phone reaches the preferred addressee at any time. In addition, public application users can enjoy the graphics and user-generated content leveraged by device-native capabilities. Moreover, citizens can always receive updated public information because the application is automatically updated by the providers (OECD/ITU, 2011: 87).

Public applications, however, have some weaknesses, such as the need to build for multiple platforms and submit applications to some stores for approval. One of the most serious problems pertaining to public applications is security. The growth of mobile usage brings with it concerns about security. As an extension to mobile devices increases an organization's security risks, mobile solutions must effectively balance information access and information protection (OECD/ITU, 2011: 89–90).

2.2. Maturity models of e-government

In the field of e-government research, various maturity models have been highlighted as guidelines for policy implementation and future research by scholars, consulting firms, and international organizations (Andersen & Henriksen, 2006; Baum & Maio, 2000; Curtin, Sommer, & Vis-Sommer, 2003; Deloitte Research, 2000; Heeks, 2006; Layne & Lee, 2001; United Nations, 2008).[2] Moreover, some scholars have made an effort to synthesize existing e-government maturity models to provide a common frame of reference for research and practice (Gil-Garcia & Martinez-Moyano, 2007; Sandoval-Almazan, Gil-Garcia, & Luna-Reyes, 2011; Siau & Long, 2005). As a result of the synthesis of diverse e-government maturity models, they presented a five-stage model which is relatively simple but comprehensive enough to include the main ideas of previous models and to capture the overall vision of e-government, including (1) presence stage where of simple and limited information typically posted by governments through their websites; (2) interaction stage in which information about simple interactions between governments and users provided using search engines, e-mail systems, as well as official information from downloads; (3) transaction stage where information about how users can conduct complete online transactions such as license applications, tax filing, and personal information updates; (4) integration stage where information about how the government can move toward transforming the way they provide services with horizontally and vertically integration; and (5) participation stage where the e-government provides online voting, polling and surveys for improving political participation, citizen involvement and administrative transparency.

However, some scholars raise questions about the validity and the usefulness of maturity models. More specifically, they point out that the evolutionistic perspective embedded in the maturity models is not supported by empirical evidence (Andersen & Henriksen, 2006; Coursey & Norris, 2008; King & Kraemer, 1984). Despite these criticisms and weaknesses of maturity models, given that few studies have dealt with public applications and the substance of m-government to a large extent, it is expected that building a public application maturity model helps us understand new phenomena related to public applications. Moreover, the established e-government maturity models appear to be invalid when used to measure the maturity of public applications because models for e-government do not cover the new wireless technological features permanently adopted in public applications and smartphones. This explains why the authors build a new maturity model suitable for the idiosyncratic characteristics of the mobile applications of the smartphones after referring to previous established maturity models for e-government.

2.3. Factors influencing IT/IS maturity

What factors influence the maturity of IT adoption and success of information systems (IS)? According to the literature, the success/failure factors which bring about the maturity and success of IT/IS in public organizations can be classified into five categories: (1) data and information factors, (2) technological factors, (3) organizational factors, (4) institutional factors, and (5) environmental factors (DeLone & McLean, 2003; Gil-Garcia, 2012; Gil-Garcia & Pardo, 2005; Petter, DeLone, & McLean, 2008; Snellen, 2005).

First, data and information factors emphasize data quality and accuracy issues (Ballou & Tayi, 1999; Kaplan et al., 1998). Without accuracy, consistency, and appropriateness of the data, it is less likely that an IT initiative will be successful. The problems with data structures and definitions also hinder IT/IS development. In order to address these challenges, it is necessary to develop adequate structures and definitions of data through inter-agency cooperation and information sharing

[1] Retrieved from "Government spends thousands on iPhone apps," BBC News, 2010. 6. 2. Rory Cellan-Jones, "Government apps: A case for the axe?" BBS News blog, 2010. 6. 6.

[2] From the perspective of quality management theory, diverse information quality management maturity models have been presented. Caballero and his colleagues (2008) build a five-level maturity model with the levels defined as follows: (1) initial, (2) defined, (3) integrated, (4) quantitatively managed and (5) optimizing. Each one addresses a specific information quality management goal and several key process areas (KPAs) to achieve the goal.