



# An empirical investigation of mobile government adoption in rural China: A case study in Zhejiang province



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## ABSTRACT

This study is among the first attempts to empirically investigate the adoption of mobile government by rural populations in developing economies. Based on 409 validated questionnaires collected from families living in rural China, the study examines the interdependences among rural inhabitants' demographic attributes, their access to and perceptions of mobile government, and quantifies how their intention to use mobile government is influenced by technology attributes, social factors and trust beliefs. The results indicate that young males, who live far from a village center or market, and have some knowledge of recent government policies, tend to have a more positive perception of mobile government, and therefore become potential adopters of the service. Perceived ease of use, near-term usefulness, long-term usefulness, integrity, benevolence, image and social influence have significant and positive influences on the intention to use mobile government. Specifically, perceived ease of use, long-term usefulness and social influence have a direct influence on intention to use, while perceived near-term usefulness, integrity, benevolence and image have an indirect influence.

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## 1. Introduction

This paper seeks to investigate the perceptions of rural populations that affect the adoption of mobile government services in the sparsely populated rural areas of developing economies. Previous work has highlighted how the use of the Internet and computers has been instrumental, particularly for those living in developed economies like the USA and Western Europe, in effectively accessing government information and services (see Chadwick & May, 2003; Hosio, Goncalves, Kostakos, & Riekkki, 2014; Lee, Tan, & Trimi, 2005). Internet-based e-government appears to be well-suited for urban populations considering the dense and cheap coverage of the Internet in such areas. However, an open challenge remains as to how government can effectively deliver information and services to inhabitants in remote areas, particularly those living in the sparse rural regions of developing economies, such as rural China, India and Africa. This paper provides empirical evidence on how the perceptions of citizens in such areas are likely to affect their adoption of such services.

To date, the main challenges of deploying Internet-based e-government in a rural environment, such as high implementation costs, IT infrastructure costs, computer costs and Internet fees as well

as the inhabitants' low computer literacy, have given rise to the likelihood of an increase in the technological divide between urban and rural areas. However, the rapid penetration of cell phones in recent years has also given rise to an economic alternative. Thus, there is a timely need to investigate how formerly hard-to-reach rural citizens can benefit from recent advances in mobile technology and mobile government. Support for this comes from Kushchu and Kuscu (2003, p. 3) who state, "in such countries with insufficient conventional telecom infrastructures and greater acceptance of mobile phones, ability of reaching rural areas may be considered as an important feature of m-government".

According to a report by the World Bank and infoDev, in 2012 mobile phone access had reached three quarters of planet's population (The World Bank, 2012). The number of mobile subscriptions in use worldwide has grown from fewer than 1 billion in the year 2000 to over 6 billion in 2012, of which nearly 5 billion are in developing countries (The World Bank, 2012). The International Telecommunication Union (ITU) claims that, by the end of 2013, overall mobile penetration rates will have reached 96% globally, 128% in the developed world, and 89% in developing countries (International Telecommunication Union, 2013). In comparison, 2.7 billion people, or 39% of the world's population, will use the Internet by the end of 2013 (International Telecommunication Union, 2013). Therefore, considering its broad convergence, the utilization of the mobile phone as an alternative communication channel is particularly meaningful for future government service development and research. In this vein, Kushchu and Kuscu

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(2003) argue that mobile government is inevitable, and will be a key approach for developing countries in reaching their citizens and promoting the exchange of communications, especially in remote areas.

Mobile government (m-government) refers to the use of various mobile platforms (e.g., cell phones, notepads) for deploying government information and services to citizens in a way that is independent of time and location (c.f. Scholl, 2005). From a technological perspective, mobile government services can be delivered to users in remote areas through the use of the mobile Internet, pre-installed phone software and SMS. As a new paradigm of e-government development, recent mobile government has attracted considerable research attention (i.e., Gang, 2005; Hung, Chang, & Kuo, 2013; Mengistu, Zo, & Rho, 2009; Ntalani, Costopoulou, & Karetsos, 2008; Song & Cornford, 2006). However, existing studies on mobile government are mostly theoretically based or targeted at users in developed economies. There is a lack of empirical investigation into the diffusion of mobile government among rural users. In addition, even though there are a number of studies on the diffusion of mobile services in rural regions from the perspective of telecommunication operators or commercial corporations, there has been a lack of investigation into the willingness of rural citizens to adopt government services.

In this light, the study seeks to examine the interdependences among a rural population's demographic features, their access to and perceptions of mobile government, and quantify how different factors affect service adoption. Based on the technology acceptance model, a theoretical research model was developed for this study by incorporating three kinds of diffusion factors: technologies attributes (perceived ease of use and perceived usefulness), trust toward government (integrity and benevolence) and social environmental factors (social influence and image). Based on 409 validated questionnaires, the research model is evaluated through the use of structural equation modeling technologies.

The remainder of the paper is structured as follows: a literature review will be presented in the next section, followed by a discussion about the research model and its hypotheses. The fourth section presents the research methodology while the fifth section discusses the results. Section 6 concludes the paper. The limitations of the research and future research directions are discussed in Section 7.

## 2. Literature review

### 2.1. Mobile government for rural development in developing economies

A number of studies and projects have focused on the value of mobile technologies for benefiting the rural citizens of developing economies (Jalote, 2013; Jotischky & Nye, 2011; Ojo, Janowski, & Awotwi, 2012). It is worth noting that the SMS function offered by even the most basic handset can be used to provide information to farmers that they would not have had access to in former times (Vark, 2012). As a result, a recent report from the World Bank described the expansion of mobile networks in rural areas as “a unique and unparalleled opportunity to give rural smallholders access to information that could transform their livelihoods” (Halewood & Surya, 2012). In Africa, a number of mobile services have been developed to improve agricultural yield and profits by providing advice to farmers on crops, weather and market prices (see Vark, 2012). Hellström (2008) argues that mobile technologies would help improve governance because they can reduce inefficient use of state resources, corruption and unstable systems. Encouraged by increased demand, India's National Agricultural and Rural Development Bank (Nabard) announced a pilot project for the dissemination of agriculture advisory services via SMS to 50,000 farmers in 10 districts of Maharashtra in September 2012 (Times of India, 2012). The Madhya Pradesh government of India launched a pilot mobile government project to facilitate the electronic provisioning of services and access to government information using a cell phone, especially for regions that lack Internet connectivity (m-Govworld, 2013). There is clear evidence that mobile devices offer an unprecedented chance for

governments to facilitate economic growth in rural regions via the proper implementation of mobile government services. However, the factors influencing the adoption of such services, particularly in rural areas, have not been investigated.

### 2.2. Mobile government for China's rural population

The issues of *agricultural economy, village community, and farmers*, also known as the *Three Agrarian Issues* (TAIs, or *San-nong* in Chinese), have been widely used to represent the focus of government work in rural China (for a review see Xia & Lu, 2008; Xia, 2010). Politically, the Communist Party of China has put forward the goal of establishing an equitable and harmonious society, which has TAIs as a focal point (Xia & Lu, 2008). “To achieve this goal, the improvement of rural communications, among other things, was intended as a sign of [the Communist] Party's drive to address these issues” (Xia & Lu, 2008, p. 688). It is worth noting that economic development in rural regions has long been an important focus of society development in China due to (i) the imbalance in the economic and income growth between urban and rural regions (Xia & Lu, 2008; Yao & Zhou, 2011); (ii) over 656 million people living in rural China wishing to benefit from the economic growth (National Bureau of Statistics of China, 2012); and (iii) a high and growing domestic demand for agricultural products. Regarding government investment, 2013 will be the third year that the Chinese government invests over one trillion RMB (approximately 125 billion euros) to address TAIs (Xinhua News Agency, 2013). Considerable investment has been made in delivering government information to the rural population of China, while China's administration, at different levels, has sought to establish various web portals for this purpose.

However, despite the constant improvement in e-government services, the service quality as well as the adoption of e-government websites varies greatly across different administrative levels – with a particularly low performance at the local government level in rural China (Anhuinews, 2011; Xinhua News Agency, 2008, 2012a; Zheng, 2012). In addition, many Chinese rural inhabitants are unable or unwilling to afford a computer and an Internet connection fee and/or have low computer literacy. From the perspective of the government, it is very important to effectively disseminate and publicize government information to the rural population in order to improve the economic conditions of those living there. In this regard, mobile government offers a chance for the government to change the wait-to-use style of government information provision and become a rather personalized ‘home-delivery’ government. Therefore, it is imperative that governments investigate mobile government as a possible alternative for complementing existing e-government services.

Considering the ineffectiveness of conventional e-government in rural China, there have been some discussions and initial efforts to construct mobile government for rural inhabitants (Schlæger, 2011; Yu & Qin, 2011). As a consequence, this pilot research project seeks to offer first-hand information to facilitate a more complete understanding of a rural population's accessibility, requirements and perceptions of mobile government, thus providing a useful reference for the future implementation of the service.

### 2.3. Advantages of using mobile government for rural inhabitants

Mobile-phone-based government service has a number of unprecedented features. We argue that, especially for rural inhabitants, mobile government offers at least seven different advantages with regard to affordability, reachability, ubiquity, on-time information delivery, a low technology literacy requirement, personalized information delivery and emergency management.

1) *Affordability*. Compared to the cost of computers and Internet infrastructure in vast rural regions, sending government information via cell phones is a much more affordable and economic solution

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