Telecommunications Policy 39 (2015) 691–704

Contents lists available at ScienceDirect

Telecommunications Policy

URL: www.elsevier.com/locate/telpol

Adoption behavior of rural India for mobile telephony: A multigroup study

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ARTICLE INFO

Available online 30 January 2015

Keywords:
Mobile telephony
Adoption
Multigroup
Rural
India

ABSTRACT

Mobile telephony influences nearly all aspects of people's lives and is expected to grow in importance as a revenue and information source. Mobile phones are reported to have a positive and significant impact on the overall economic performance of individuals and the growth of a country. In India, however, the adoption pace of mobile telephony in rural regions is slower than that in urban areas. We examine the differences in the intention to adopt mobile telephony across different segments of the rural Indian population using the extended technology acceptance model (TAM), partial least squares regression, and multigroup analysis. Results suggest that gender, age, technology subscription, and region play a moderating role on the relationships in the extended TAM for rural India. These findings can help service providers design and develop group-specific offerings that lead to faster adoption of mobile telephony in rural India.

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1. Introduction

Technological change has been identified as the driver of wealth creation in a nation. In practice, it is not just technology but its diffusion and adoption that ultimately determine the pace of economic growth of a nation and an individual's overall well-being. Increase in the rate of technological change necessitates rapid acquisition of relevant technologies by individuals, encouraging adoption and diffusion behavior. The rapid rate of technological change globally has made adoption and diffusion an important and distinguished research domain in many disciplines. Development of communication technology, especially mobile telephony, has been identified as a major factor driving the social, economic, and individual development in a country. Macro- and micro-level studies have shown that mobile phones have a positive and significant impact on the overall economic performance of individuals and the growth of a country (Abraham, 2007; Waverman, Meschi, & Fuss, 2005). While many macro-level studies have investigated diffusion patterns and factors affecting the diffusion of mobile telephony in developed countries (Chu, Wu, Kao, & Yen, 2009; Frank, 2004; Lee & Cho, 2007), very few have focused on these trends in developing countries (Gupta & Jain, 2012; Liu & Li, 2010; Singh, 2008).

In India, which is a developing nation, the adoption and diffusion of mobile telephony has been unprecedented (from 4% in 1995, the year mobile telephony was launched, to 63.22% in 2010). Factors affecting the diffusion include competition between service providers, competition with fixed line telephony, and government intervention (Gupta & Jain, 2012). While the growth of mobile telephony is a global phenomenon, there are important regional drivers of technology evolution and

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http://dx.doi.org/10.1016/j.telpol.2015.01.001
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diffusion. Cultural and individual actions differ from country to country, and they also vary from region to region within large countries and even from one social group to another (Goodman, 1992). Penetration rates of mobile telephony in India are highly skewed—with 30.11% in rural India and 140.53% in urban areas. Gupta and Jain (2014) studied the factors behind this asymmetry and extended the technology acceptance model (TAM) by incorporating new factors specific to rural India. However, they did not consider different segments of the rural population, each of which has its own needs and reservations. These factors in turn have a deep influence on people's technology adoption intention. Understanding the differences between the various segments of the rural population will help to clarify the adoption process within rural India.

The objective of this paper is to examine the differences in adoption patterns of mobile telephony among the rural Indian population divided into groups on the basis of gender (male and female), age (young, middle-aged, and old), technology subscription (subscriber and nonsubscriber), and region (Uttar Pradesh (UP) and Chhattisgarh). We also examine the moderating role of these factors. This study will contribute to technology adoption research by examining whether the effect of the extended TAM factors on the intention to adopt mobile telephony in a rural context is moderated by age, gender, subscription to technology, and region. The findings will assist mobile service providers in devising strategies for targeting their services to the appropriate groups. They can also be used by policymakers to frame guidelines that facilitate the rapid adoption and diffusion of mobile telephony, as well other allied technologies, in the rural areas and throughout the country.

This paper is organized as follows. First, a review of the relevant literature on adoption and diffusion approaches is presented in Section 2, followed by the research gap to be addressed in Section 3. The research methodology adopted in the study is discussed in Section 4. Then, the conceptual model is described in Section 5, followed by the data collection techniques and analysis in Section 6. Next, the results are presented in Section 7 and subsequently discussed in Section 8. Section 9 presents the recommendations and conclusions.

2. Literature review

Various theories and models attempt to elucidate how and why individuals adopt technology, including the diffusion of innovation theory (Rogers, 1962), the theory of reasoned action (TRA) (Ajzen & Fishbein, 1977), the theory of planned behavior (Ajzen, 1991), and the technology acceptance model (TAM) (Davis, 1989). Davis (1989) developed TAM based on TRA and proposed that adoption intention is determined by attitude, the effect of perceived usefulness (PU), and perceived ease of use (PEOU). TAM has been praised for its parsimony and predictive power, which make it easy to apply to diverse situations (Agarwal & Prasad, 1999; Mathieson, 1991). Venkatesh and Davis (1996) extended Davis, Bagozzi, and Warshaw's (1989) model to include external variables that might influence a person's beliefs about technology. TAM has been used to study the adoption of information and communication technology (ICT) products/services such as V-mail and customer dial-up systems (Subramanian, 1994), spreadsheets, word processors (Jackson, Chow, & Leitch, 1997), the World Wide Web (Lederer, Maupin, Sena, & Zhuang, 2000), telemedicine technology (Chau & Hu, 2001), Internet banking (Suh & Han, 2002), wireless internet (Lu, Yu, Liu, & Yao, 2003), m-shopping service (Wong, Lee, Lim, Chai, & Tan, 2012), and mobile banking (Al-Jabri & Sohail, 2012). Kim and Garrison (2009) found a positive and significant relationship between PU, PEOU, and intention to adopt (IA) for mobile wireless technology in Korea. Teng, Lu, and Yu (2009) found that perceived utility of a new mobile service is a key factor influencing the adoption of 3G mobile phones in Taiwan. Unlike the findings on PU, the direct effects of PEOU on IA are quite inconsistent, highlighting the complexity of both the technology and the service under analysis (Kim & Garrison, 2009; Kuo & Yen, 2009; Wong et al., 2012). These inconsistencies suggest that some factors may moderate the linkages between PEOU and IA. Researchers have attempted to extend TAM by generally using one of the three approaches: introducing factors from related models, introducing additional or alternative belief factors, and examining the antecedents and moderators of PU and PEOU. The antecedents of PU and PEOU (e.g., social influence (SI), innovativeness, cost of service (CS), and personal image (PI)) have been examined in different contexts for different technologies (Kuo & Yen, 2009; Lu, Yao, & Yu, 2005; Pagani, 2004; Wu & Wang, 2005). Venkatesh, Morris, Davis, and Davis (2003) extended TAM, developed a unified theory of acceptance and use of technology (UTAUT), and incorporated the moderating roles of age, gender, experience, and voluntariness of using technology. Findings suggest that males and females adopt technology differently (Gefen & Straub, 1997; Venkatesh & Morris, 2000). Males' decisions to use technology are more strongly influenced by PU, while females' decisions are based more on PEOU (Ong & Lai, 2006; Venkatesh & Morris, 2000; Venkatesh et al., 2003). The literature in social psychology and information systems research suggests that females tend to be expressive, socially oriented, and concerned about others' feelings, whereas males are more independent in nature and concerned about their own feelings rather than those of others (Gefen & Straub, 1997; Venkatesh & Morris, 2000). Females are more affected by social norms in their adoption of information technology (Venkatesh & Morris, 2000; Venkatesh et al., 2003). They adopt technologies with the objective of social inclusion, while males more often do so with the objective of creating and preserving their status in exchanging information (Gefen & Ridings, 2005; Hwang, 2010). However, Pan and Jordan-Marsh (2010) found no moderating effect of gender on Internet-use intention. Instead, they found that age moderated the relationships between the TAM factors: PEOU had a stronger influence on Internet-use intention of older seniors than younger seniors. Morris and Venkatesh (2000) also found that age has a moderating effect on PU, PEOU, and SI. Venkatesh et al. (2003) found that older users are more influenced by social factors. Narayana (2011) found that the age of the head of the household and family size have a positive and significant impact on the household subscription to mobile

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