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Antecedents of consumers' intentions to upgrade their mobile phones

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ABSTRACT

The fourth generation (4G) mobile phone will soon be launched. Marketers need to know which factors determine whether customers choose to upgrade their mobile phones, as this will affect the diffusion of third generation (3G), 4G, and Worldwide Interoperability for Microwave Access phones. This study integrates pre- and post-adoption theories, upgrading, and value-based theory to examine plans to upgrade to a newer model mobile phone among second generation (2G) and 3G mobile phone users. The empirical results show that the technology acceptance model fails to explain consumers' intentions to upgrade in sequence. Although customers perceived next-generation mobile phones as being easier to use and more useful than their current model phones, this did not directly influence them to upgrade. When users were satisfied with their current model, they were not willing to upgrade to a newer generation model. Moreover, value assessments affect users' plans to upgrade to next-generation mobile phones.

1. Introduction

Compared to other durable goods, technology-based products have a distinctively brief lifecycle. Firms develop next-generation products to profit from consumers' desires to upgrade. For example, older model cell phones are rapidly replaced by newer models with augmented functions.

The penetration of mobile phone use in Taiwan was anticipated to reach 114.69% in 2009 (National Communications Commission, 2009), which suggests that every individual in the country has at least one mobile phone. The National Communications Commission report also shows that the number of second generation (2G) and 2.5 generation (2.5G) users has decreased annually, whereas the number of 3G and 3.5 generation (3.5G) users has increased, indicating that Taiwanese consumers tend to upgrade their mobile phones. However, the 4G mobile phone will soon be launched, and thus it is necessary to analyze the factors that determine whether customers upgrade their mobile phones. Upgrading in turn affects the diffusion of 3G, 4G, and even Worldwide Interoperability for Microwave Access (WiMAX) phones.

Previous studies have used logit regression or duration formulation and measurable variables to analyze the explanatory variables associated with upgrading behavior (Kim & Srinivasan, 2009; Kim, Srivastava, & Han, 2001). However, these methods cannot measure consumers' cognitive or emotional perceptions of a product (e.g. a mobile phone). Yet emotional assessments, cognitive perceptions, and other psychological factors combine to determine whether consumers will use or buy a mobile phone (Asthana, 2009). They also affect consumers' subsequent plans to upgrade their mobile phone to the next-generation model. Although upgraded phones have some innovative functions, they share the same basic functions as older models. Therefore, customers' experiences with the earlier model also influence their desire to upgrade (Kim & Srinivasan, 2009).

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The existing marketing research has traditionally focused on pre-adoption or post-adoption decisions, with most research having been conducted on the adoption of single-generation products. Despite its importance to both academics and product manufacturers, upgrading behavior has rarely been studied.

Therefore, to bridge the gap in research between consumers' initial adoption of a particular innovation and their subsequent acceptance of innovations in that technology, this study explores the factors that affect consumers' decisions to upgrade to next-generation mobile phones. This study provides industry managers with valuable insights that can be used to formulate effective marketing strategies.

2. Background

Digital mobile telecommunications networks were introduced in the early 1990s (Gruber & Verboven, 2001), and Taiwan launched its first digital mobile phone soon thereafter in 1995. Since then, nationwide mobile communication systems have developed, with the penetration rate reaching 114.69% in 2009 (National Communications Commission, 2009).

The first commercial launch of the 3G phone was by NTT DoCoMo in Japan in 2001 (UMTS, 2009). The technology reached Taiwan in 2005, when all of the major domestic telecommunications providers launched 3G cell phones (TEEMA, 2005). Although 2G mobile phones can support basic functions such as text messaging, voice calls, voicemail, and navigational mapping, 3G mobile phones offer enhanced functionality. For example, these models offer Global Positioning System navigation; music (MP3) and video (MP4) playback; personal digital assistant functionality; the ability to watch streaming video or to download video for later viewing; video calling; built-in digital cameras and camcorders (for video recording); ringtones; games; memory card readers; USB (2.0); infrared, Bluetooth (2.0), and WiFi connectivity; instant messaging; Internet e-mail and Web browsing; and wireless modem connections. 3G mobile phones will also soon serve as a "console" for online games and other high-quality games (Huh & Kim, 2008). Yet despite these advantages, 3G phones did not initially perform well in the market. According to the National Communications Commission, the penetration rate for 3G technology in Taiwan was 6% in 2005 and 14.75% in 2006. This suggests that mobile phones in Taiwan were still primarily used for voice, rather than data, transmission, and that few people used the 3G technology (Taipei Times, 2007).

However, competition in the industry has helped keep prices low and has led to increased 3G sales since late 2008. According to a National Communications Commission report, 11.29 million 3G phones were in use in Taiwan in 2009, with about 60% of customers using value-added services (MEPO Humanity Technology Inc, 2009). Yet even as 3G keeps growing, 4G is emerging as the latest technology. 4G technology is marked by widespread availability, low-cost data delivery, and a high degree of personalization and synchronization between various user interfaces; its development is being driven by service (Rouffet, Kerboeuf, Cai, & Capdevielle, 2005).

Telecommunications Infotechnology Forum (1996) reported that Long Term Evolution and 4G will be tested in North America, Western Europe, and East Asia in 2009. The number of Long Term Evolution users is expected to begin to increase in 2012. However, Taiwan has been an aggressive advocate of WiMAX, awarding six licenses in 2007; since then, the country has spent $614 million on the peripheral development of the technology (Lee, 2007). However, some have criticized this government-driven choice. For example, Tucker Grinnan, the head of regional telecoms equity research for the financial services company HSBC, argued that Long Term Evolution, not WiMAX, will be the technology of choice for 4G (Taipei Times, 2008). The cost of WiMAX will be too great for Taiwan's telecommunications industry. Some Taiwanese service providers launched WiMAX in the first quarter of 2009. These services are cheaper than asymmetric digital subscriber lines and offer 3 to 4 times the speed.

3. Research model and hypotheses

According to Davis, Bagozzi, and Warshaw's (1989) technology acceptance model (TAM), users tend to adopt a new technology if they perceive that technology as being useful and easy to use. The TAM is applicable in the pre-adoption stage and in the repurchase stage (Bhattacherjee, 2001; Thong, Hong, & Tam, 2006).

According to the expectation–confirmation model (ECM) of post-adoption stage behavior, consumer satisfaction is a significant determinant of repurchase intentions (Bhattacherjee, 2001; Thong et al., 2006). That is, the more satisfied a consumer is with his or her current product, the more willing that consumer is to make future purchases. However, studies using the ECM do not explain how a customer's use of an older generation product affects his or her pre-adoption intentions for newer generation products.

Consumers' buying intentions can be key determinants of whether they will upgrade to a newer model product. Consumers may measure their own use of a product based on their perception of the services they are offered (Caruana, Money, & Berthon, 2000; Zeithaml, 1988), which directly influences their plans to upgrade. Therefore, the TAM, the ECM, upgrade decisions, and perceived value can all be combined to explain the gap between pre-adoption and post-adoption behavior.

3.1. TAM

Several studies have used the TAM to discuss adoption behavior with regard to mobile telecommunications technology (Bruner & Kumar, 2005; Hung, Ku, & Chang, 2003; Lu, Liu, Yu, & Wang, 2008; Teng, Lu, & Yu, 2009). These studies have