Discovering determinants of users perception of mobile device functionality fit

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ABSTRACT

In recent years, there has been an explosive growth in the use of mobile devices. The ubiquitous and multifunctional nature of these devices with internet connectivity and personalization features make them a unique context to investigate what factors shape mobile users perception of their mobile device functionality fit with their needs. In order to answer this question, we proposed a research model in which we introduced multifunctional use and perceived device-functionality fit as two new constructs. The results of our study show that a significant portion of individuals' perceived device-functionality fit can be explained by their perceived enjoyment, perceived ease of use, perceived usefulness, and symbolic value of the device. In terms of the theoretical contribution, our research suggests revamping the concept of device-functionality fit when it comes to mobile devices by accounting for both hedonic and utilitarian aspects of mobile devices. In terms of practical implications, our study highlights the importance of the social image that mobile devices create in the society for their users as well as the importance of look-and-feel aspects of mobile devices in shaping users perception of fit between functionalities of their mobile devices and their needs.

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1. Introduction

Today, mobile phone is an essential device in our daily lives. The propagation of mobile devices along with omnipresent internet access has significantly changed our lives by changing the essence of mobile phones from simple voice and messaging devices to highly flexible and multifunctional devices that can be used almost anytime and anywhere for a wide range of purposes, ranging from fully utilitarian to fully hedonic. Mobile technology has dramatically changed not only the way many businesses worked, but also the way we live and communicate with each other. It has reshaped our social habits, behaviors and our relationships with others. It has brought new needs to our lives that we never had before.

Mobile devices, such as smartphones, support for internet connectivity, GPS, digital camera, and multimedia has nurtured the proliferation of myriad mobile applications that combine these services to enrich the functionalities of these devices. It is no longer easy to list all the functionalities that a mobile device provides. It seems that the scope of functionalities that mobile devices provide these days is ever growing.

The ubiquitous and multifunctional essence of these devices along with their personalization features allows mobile users to add different applications to their mobile devices and customize them based on preferences as well as use them to address their hedonic or utilitarian needs. This makes the context of ubiquitous computing and mobile technology a unique area of study for academics and a boundless opportunity for the practitioners.

Previous studies have shown two broad emerging factors affect acceptance of mobile phones: Interface characteristics and network capabilities (Sarker & Wells, 2003). However, in this study, we investigate how the concept of fit between users' requirements and device functionalities can be applied into the context of mobile devices and how their unique characteristics can affect user's perception of their mobile device-functionality fit.

The remainder of the paper is structured as follows. After this introduction, we will provide a brief overview of the relevant literature and develop our research model for mobile device functionality fit. We will then discuss our research methodology, results, key findings and contributions, followed by limitations, directions for future research, and conclusion.

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2. Theoretical background

In this section, we present an overview of the widely used theories that have been applied within the context of adoption and use of mobile technology in order to build a foundation for our research model and introduce the concepts of *perceived mobile device functionality fit* and *multifunctional use*.

2.1. Adoption and use of information technology

Technology acceptance model (TAM) (Davis, 1989) has been widely used to explain users' acceptance and use of mobile technology (Kim & Garrison, 2009; Kim, Park, & Morrison, 2008; Negahban, 2012; Oi, Li, Li, & Shu, 2009; Son, Park, Kim, & Chou, 2012) and various mobile services including mobile internet (Chong, Darmawan, Ooi, & Lin, 2010; Chong, Zhang, Lai, & Nie, 2012; Kuo & Yen, 2009; Lee, Noh, & Kim, 2012; López-Nicolás, Molina-Castillo, & Bouwman, 2008), mobile games (Liu & Li, 2011), financial mobile services (Chen, 2008; Hsu, Wang, & Lin, 2011; Jaradat & Twaissi, 2010; Kim, Mirusmonov, & Lee, 2010; Liu, Wang, & Wang, 2011; Luarn & Lin, 2005; Teo, Tan, Cheah, Ooi, & Yew, 2012), mobile health-care services (Lin, 2011), mobile TV (Jung, Perez-Mira, & Wiley-Patton, 2009), and mobile text alert systems (Lee, Chung, & Kim, 2013). TAM posits that perceived usefulness (PU) and perceived ease of use (PEOU) are the determinants of behavioral intention to use (BI). Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). Despite its widely use, TAM has some limitations in explaining acceptance and use of mobile technology (López-Nicolás et al., 2008); which were later on addressed by other complementary theories.

The united theory of acceptance and use of technology (UTAUT) developed by Venkatesh, Morris, Davis, and Davis (2003) was used to evaluate the probability of success for new technology overviews. Moreover, in order to design interventions for users that may be less inclined to adopt and use new systems, it also supports them to understand the drivers of acceptance. UTAUT incorporated TAM, Theory of planned behavior (TPB), innovation diffusion theory (IDT), motivation model, social cognitive theory to develop a unified theory for technology acceptance. In addition, it tested independent variables, such as, performance expectancy, effort expectancy, social influence, facilitating conditions, to use of technology, controlling for gender, age, experience, and voluntariness of use. UTAUT also accounts for internal and external motivations. However, although the UTAUT provides a more detailed model for acceptance and use of technology, it was still has certain limitations. Therefore, Venkatesh, Thong, and Xu (2012) developed UTAUT2 and added hedonic motivation, price value, and habit to explain the model of acceptance and use of technology. UTAUT2 provides an integrated model of acceptance and use of technology, which improves TAM. UTAUT and UTAU2 provide a more detailed conceptions about the relationships between external, internal motivations, and acceptance and use of mobile technology. These two models hold that social influence (symbolic value) influences perceived usefulness. They have been used in previous research to investigate acceptance of various mobile services such as online mobile games (Chen & Kuan, 2012), mobile banking (Tan, Chong, Loh, & Lin, 2010), and other mobile services (Han, Mustonen, Seppanen, & Kallio, 2006; Rao Hill & Troshani, 2010).

2.2. Hedonic aspects of information systems

Information systems (IS) can have both hedonic and utilitarian purposes. Utilitarian information systems aim to provide instrumental value to users while hedonic information systems aim to provide self-fulfilling value to users (Heijden, 2004; Sun & ZhanG, 2006). However, the utilitarian-hedonic aspects of systems are task-dependent. This can blur the boundary between hedonic and utilitarian aspects, especially for mixed systems that can be used for either purposes (Sun & ZhanG, 2006). For example, internet can be used both for finding a job (utilitarian use) and for watching movies (hedonic use).

Previous studies have found that perceived enjoyment is a dominant predictor for hedonic aspects of information systems and perceived usefulness is strong predictor for utilitarian aspects of IS (Heijden, 2004). Perceived enjoyment is defined as the quality that using technology is perceived to be enjoyable by its own, regardless of performance expectations (Davis, Bagozzi, & Warshaw, 1992).

Perceived enjoyment and perceived usefulness are important factors that influence users' acceptance and use of technology (Hong & Tam, 2006; Lee & Chang, 2011; Liao, Tsou, & Huang, 2007; Thong, Hong, & Tam, 2006). Attitudinal beliefs, including perceive usability, perceive ease of use, and perceived enjoyment also significantly affect user's hedonic attitude (Hong, Thong, Moon, & Tam, 2008). Enjoyment is also identified as a value driver of hedonic digital artifacts (Turel, Serenko, & Bontis, 2010).

2.3. Device multifunctionality

Today, mobile devices are no longer a mere communication device for voice calling and text messaging, but they also provide various functionalities and services to their users such as multimedia, games, digital camera, mobile internet, navigation and GPS (global positioning system), video communication, music players (Dunlop & Brewster, 2002; Jin & Ji, 2010). By converging a large variety of functionalities, these devices are now transformed into multiplex multifunctional devices that address different needs of its users (Jin & Ji, 2010).

Multifunctionality, as a key characteristic of mobile devices, has not formally pinpointed in IS literature. It is commonly associated with mobile hardware (Hoehle & Scornavacca, 2008) and the challenges it creates for Human–Computer Interaction (HCI) designers (Dunlop & Brewster, 2002). Some researchers compare mobile devices to "Swiss Army Knife" and discuss that trying to cram as much functionalities as possible into a single device may impair efficiency and effectiveness of those functionalities provided by mobile device (Satyanarayanan, 2005), thus reducing its perceived usefulness.

The effect of multifunctional use of mobile devices on individual's device usage behavior has been studied in previous research. In a study, Lin, Chan, and Xu (2012), tested multifunctionality within the context of smartphones by combining hedonic aspects of use and theory of planned behavior (TPB) (Ajzen, 1991) – which is a widely used theory for predicting adoption of a single functionality – to understand how it may impact adoption of multifunctional devices (Lin et al., 2012). They found that TPB and pleasure together can explain more than 50% of the variance in intention to use while the effect of pleasure varied from function to function. In another study, Hong and Tam (2006) found that adoption decision determinants for multipurpose information appliance are different from those of the utilitarian systems and are dependent on the context of use and the nature of the target technology. They defined multipurpose information appliances *"as IT artifacts that (1) have a one-to-one binding with the user, (2) offer ubiquitous services*