Understanding the role of consistency during web–mobile service transition: Dimensions and boundary conditions

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ABSTRACT

With the advancement of mobile technologies, numerous web service providers have begun to extend their web services to the mobile context. To understand users' mobile service adoption behaviour in the context of the web–mobile service transition, this study investigates the role of consistency between web and mobile services by proposing a typology of consistency and examining the extent to which and the boundary conditions under which consistency works. Specifically, consistency is classified into behavioural consistency (e.g., operational consistency) and object-based consistency, which includes consistency in information, system and service in terms of the information systems success model. We also contend the mediating effect of operational consistency and the interaction effect of trust in web services and operational consistency. A field survey with 235 mobile service users confirms our mediating and moderating hypotheses. The implications for theory and practice are also discussed.

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1. Introduction

Mobile devices such as smartphones and tablets (e.g., iPad) have become widely used instruments for users to access a variety of services, including banking, commerce, chatting and gaming (Deng, Lu, Wei, & Zhang, 2010; Lin, 2010; Lopez-Nicolas, Molina-Castillo, & Bouwman, 2008). Even Bill Gates, who has been engaged in the traditional personal computer (PC) business for a long time, has to admit that the portable devices would become the most popular form of computing instrument within five years (Berger & Niccolai, 2012). The war in terminal devices impels the content or service providers to extend their traditional web services to the mobile context to keep or expand their user population. Thus, service providers are engaging in developing the mobile applications that are customized to the features of mobile devices, such as Amazon Mobile, Mobile Facebook and Mobile YouTube. Users of the original web services may or may not continue using the corresponding mobile services. Thus, it is interesting to discover the factors influencing users' mobile service adoption behaviour in the context of the web–mobile service transition.

Most previous studies on mobile service adoption tended to treat mobile services as a special technology or innovation and to examine users' adoption behaviour by drawing on general technology acceptance theories, including the technology acceptance model (TAM) (e.g., Davis, 1989), innovation diffusion theory (IDT) (e.g., Moore & Benbasat, 1991) and task-technology fit theory (TTFT) (e.g., Goodhue & Thompson, 1995). For example, based on TAM and IDT, Wu and Wang (2005) investigated the role of perceived usefulness, perceived ease of use, compatibility, perceived risk and cost in mobile commerce acceptance. Lopez-Nicolas et al. (2008) also proposed that mobile service adoption is determined by perceived usefulness, perceived ease of use, perceived benefits and social influence. Similar propositions can also be found in other studies, such as Mallat, Rossi, Tuunainen, and Oorni (2009), Gu, Lee, and Suh (2009) and Wu, Li, and Fu (2011).

However, the mobile services discussed in our research context are different from previous studies. Unlike those mobile services, which originated in the mobile domain, mobile services transited from web services have several unique features. First, these mobile services possess a strong *relationship* with their predecessor web services. This relationship can be reflected in the consistency or similarity (Stewart, 2003) between the mobile services and the web services. Second, users' perceptions about the mobile services may be inherited from their perceptions about the web services through the mechanism of *perception transfer* (Delgado-Ballester & Hernandez-Espallardo, 2008). All of these call

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for viewing the adoption of this type of mobile service from a new perspective.

To capture the unique features of service transition, this study tries to understand how perceptions about web services are transferred to perceptions about mobile services. Specifically, regarding trust in a technology as a critical issue for new technology adoption (Wang, Shen, & Sun, 2013), this study focuses on the trust transfer mechanisms operating during the web–mobile service transition. As the perception transfer theory suggests, a better understanding of service transition should recognize the role of the association between web services and mobile services. However, this issue has rarely been investigated in previous studies. Furthermore, a practical issue for mobile service design is whether to keep mobile services consistent with the associated web services (i.e., standardization of services). It calls for theoretical understanding of the role of perceptions regarding consistency between web and mobile services. Specifically, two related research questions can be proposed:

1. How should consistency be measured between web and mobile services?
2. To what extent and how should consistency between web and mobile services affect users' intention to use the mobile services?

To answer these two research questions, this study tries to provide a typology of consistency to clarify the measurement issues of consistency between web and mobile services and to develop a research model to articulate the mechanisms underlying the impacts of consistency perceptions on mobile service adoption.

The study contributes to the literature on mobile services in several ways. First, unlike most previous studies that explain mobile service adoption behaviour using general technology acceptance theories, this study provides a research model to capture the unique features of the web–mobile service transition. Second, this study offers a typology of consistency and investigates the hierarchy of effects between different types of consistency perceptions. Third, this study empirically examines the conditions under which consistency perceptions affect behavioural intentions.

2. Theoretical background

2.1. Consistency between web and mobile services

When extending web services to the mobile context, one question that service providers have to answer is whether to keep the services consistent in the two different contexts. In our study, consistency between web and mobile services is defined as *the extent to which the mobile services are similar to the web services*. This consistency can be treated as a construct with multiple dimensions. To clarify the dimensions of this concept, we will propose a typology of consistency between web and mobile services.

Based on the distinctions between object-based beliefs and behavioural beliefs (Wixom & Todd, 2005; Xu, Benbasat, & Cenfetelli, 2013), we propose that consistency between web and mobile services can be captured using both object-based beliefs and behavioural beliefs. Object-based beliefs refer to users' beliefs about *the characteristics of the system*, whereas behavioural beliefs refer to beliefs about *using the system* (Xu et al., 2013). Object-based beliefs such as information quality, system quality and service quality are derived from the information systems (IS) success model (DeLone & McLean, 2003). In contrast, behavioural beliefs such as perceived usefulness, perceived ease of use and perceived enjoyment are derived from the technology acceptance model and its derivatives (Davis, 1989; Venkatesh, Morris, Davis, & Davis, 2003). Based on the theory of reasoned action (Fishbein & Ajzen, 1975), which states that external variables shape behavioural beliefs,

Wixom and Todd (2005) first distinguish object-based beliefs from behavioural beliefs and assert that object-based beliefs precede behavioural beliefs. Within this study, we try to use different constructs to measure users' object-based and behavioural beliefs regarding consistency between web and mobile services. Specifically, to capture users' behavioural beliefs about this consistency, we define a new construct, *operational consistency, as the similarity between using web services and using their associated mobile services*. This can be viewed as a construct that captures users' overall perception about *using* these two types of services.

Following the IS success model (2003), which takes *information, system and service* as three dimensions to evaluate information systems, we argue that there are three key object-based beliefs about consistency, namely information consistency, system consistency and service consistency. Specifically, information consistency refers to *the extent to which the information characteristics of the mobile services and the web services are similar*. Actually, considering that the processing speed and network stability of mobile devices are not as good as those of traditional PCs, the amount of information available via mobile services may be less than via the corresponding web services. Thus, we use this construct to capture this difference. System consistency refers to *the extent to which the system characteristics (e.g., interface) of mobile services and web services are similar*. As the screen of mobile devices is relatively small and the information input of mobile devices is not so convenient, the system design of web services and mobile services may be different, making system consistency an issue. Service consistency refers to *the extent to which the service characteristics of mobile services and web services are similar*. Service providers may remove certain service functions when extending their services from the web context to the mobile context. For example, a discussion forum may be available via web services but not provided via mobile services.

By distinguishing behavioural beliefs (i.e., operational consistency) from object-based beliefs (i.e., information consistency, system consistency and service consistency) about the consistency between web and mobile services, we will further discuss their different roles in shaping users' mobile service adoption behaviour in the following.

2.2. Perception transfer theory

In the web–mobile service transition context, users' beliefs about the mobile services are not formed simply based on users' direct interactions with the mobile services because their prior perceptions about the web services can be transferred to their evaluations of the mobile services. This mechanism is called perception transfer (Delgado-Ballester & Hernandez-Espallardo, 2008; Hong & Cho, 2011). The perception transfer theory asserts that an individual's perceptions about a target object may be transferred from his or her perceptions about a reference object that is associated with the target object. During the perception transfer process, the strength of the association between the reference object and the target object can determine the individual's perceptions about the target object (Stewart, 2003, 2006). In this study, regarding the importance of trust in adopting mobile services (Kim, Shin, & Lee, 2009; Liu, Guo, & Lee, 2011), we focus on the trust transfer mechanisms.

According to the perception transfer theory or the trust transfer theory in particular, users' attitudes towards mobile services or intentions to use mobile services can be determined by their associations between the web services and the mobile services. As described in the last section, the associations between the web services and the mobile services can be captured by the consistency between these two types of services. Therefore, based on the typology of the consistency and the perception transfer theory, we