Measurement development for cultural characteristics of mobile Internet users at the individual level

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ABSTRACT

Culture plays an important role in how an information technology is developed and used. However, few studies attempt to identify the cultural traits most relevant to the specific technology being examined. The main purpose of this study is to develop measures for cultural characteristics of individual users with a specific information technology, the mobile Internet. We propose measures for four cultural characteristics important in the context of the mobile Internet, which are expected to be widely used in the future. The proposed measures were verified empirically through online surveys conducted in seven countries. The results indicate that the measures have high validity and reliability, as well as comparability among the seven countries. The paper ends with a discussion of the study's limitations and implications.

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1. Introduction

In an increasingly global market, the effect of national differences on the development and use of information technology (IT) is a matter of great interest (Gallivan & Srite, 2005). Numerous factors contribute to national differences, including economic conditions, physical environment, infrastructure, and culture (Ford, Connelly, & Meister, 2003). Cultural characteristics of a country have been found to be more important than economic and environmental factors when it comes to the use of IT (Straub, Keil, & Brenner, 1997), because culture has a strong effect on how users interpret an IT's features (Hiller, 2003).

However, despite the obvious importance of cultural factors, only a few studies have been performed on cross-cultural issues in IT (Straub, Loch, Aristo, Karahanna, & Strite, 2002). This is partly because any such study must confront the difficulty of explicitly defining and measuring the intangible concept of culture in the context of a particular IT (Ford et al., 2003; Henry, 1976; Straub et al., 2002). This difficulty has led most cross-cultural IT studies to assume that cultural propensities elicited in other contexts (such as those provided by Hofstede (1980) and Hall (1959, 1976)) will hold for the particular ITs being studied (e.g., Cyr,

2008; Kim, 2008; Massey, Montoya-Weiss, Hung, & Ramesh, 2001; Singh, Zho, & Hu, 2003; Straub et al., 1997; Watson, Ho, & Raman, 1994). It is far from clear, however, that this inference is valid. Cultural characteristics detected in one context may not be transferable to another (Smith, Dunckley, French, Minocha, & Chang, 2004), because cultural characteristics are structured differently in different contexts (Freeman & Bordia, 2001; Merritt, 2000; Oyserman, Coon, & Kemmelmeier, 2002; Schimmack, Oishi, & Diener, 2005).

Because of these issues, Matsumoto, Weissman, Preston, Brown, and Kupperbusch (1997), Merritt (2000), Furrer, Liu, and Sudharshan (2000), and Ford et al. (2003) suggest that researchers re-examine a full range of cultural characteristics to measure the actual traits of the sample users with the specific technology under study (McCoy, 2003)—a step that appears to be taken only rarely (Ford et al., 2003; Merritt, 2000). This sort of examination is important for novel ITs like the mobile Internet that have use-contexts radically different from those of more familiar technologies.

We may define the mobile Internet as wireless access via mobile devices to digitalized contents of the Internet (Fogelgren-Pedersen, 2005). The number of mobile Internet users in the world is expected to reach 1 billion by 2011 (eMarketer, 2007). In the near future, the mobile Internet will provide more powerful services than are now available on cellular phone and surpass the desktop-based Internet (Barnes, 2002; Cyr, Head, & Ivanov, 2006). In the field of IS, the optimistic prediction has promoted extensive research on the mobile Internet (e.g., Hong & Tam, 2006; Kuo, Wu, & Deng, 2009). The mobile Internet is an appropriate research domain for two reasons. First, variations in usage patterns and service popularity across different countries indicate that

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local cultures have a strong effect on the ways in which services are used. Cross-cultural differences may be more marked for the mobile Internet than for the traditional stationary Internet, because services on the traditional Internet can be accessed from anywhere in the world, whereas mobile Internet services can be accessed only through local communication networks. Insulated from the homogenizing effect of global interoperability, users of the mobile Internet may be more prone to develop usage patterns that are culturally specific—making the mobile Internet an excellent domain in which to study cultural characteristics for a specific information technology. Second, mobile Internet services are used in mobile environments that possess significantly different characteristics than IT services that are used in conventional desktop PC environments. Thus, because mobile devices possess unique characteristics when compared to desktop PCs such as small screen size, awkward input facilities, and relatively slow CPU speed (Chae & Kim, 2003; Serif & Ghinea, 2008), mobile Internet users may develop different cultural characteristics specified to mobile Internet services that are different from existing IT services. For example, the small screen of mobile phones may cause people to download and pay for unwanted content, which makes them to try to avoid uncertainty more aggressively. Moreover, awkward input facilities and slow CPU speed of mobile phones make it difficult to do multiple tasks at the same time, which causes people to perform one task at a time, proceeding in a monochronic manner.

Our research goal is to develop measures in the form of a questionnaire, one that could be used to measure cultural characteristics in the context of the mobile Internet at the individual level. If they are to be used in cross-cultural studies, these measures should be applicable reliably and validly across different countries. They must rest on a strong theoretical foundation, and should moreover reflect the specific context of the mobile Internet. We began by selecting four important cultural characteristics established in prior studies (Hall, 1959, 1976; Hofstede, 1980)—individualism, uncertainty avoidance, contextuality, and time perception—that could be expected to have substantial impact on the use of the mobile Internet. We then devised 12 survey questions to measure these four cultural characteristics in the context of the mobile Internet. To distinguish our constructs from those of our sources we designated them as follows: M-Individualism, M-Uncertainty_Avoidance, M-Contextuality, and M-Time_Perception. Third, using an online survey we administered the questions in seven countries: Korea, Japan, Hong Kong, Taiwan, Greece, Denmark, and Australia. The general cultural characteristics of the seven countries are substantially different (Hofstede, 1980), which enables us to explicate the impact of different cultures on the mobile Internet. Moreover, these countries are at different stages of mobile Internet adoption (International Telecommunication Union, 2002; Shim & Shim, 2003), increasing the external validity of the proposed measures. The results of the survey indicate that proposed measures have high reliability and validity and provide equivalent measurement across different countries.

The Section 2 discusses important concepts pertaining to culture and reviews cross-cultural studies in various research fields. The Section 3 identifies four critical cultural characteristics for the mobile Internet and provides supporting results from several related studies. The Section 4 explains the process of measurement development and outlines our survey method The Section 5 presents the survey results. The Section 6 discusses the study's limitations and the implications of its results.

2. Theoretical background

Studies of culture have been conducted in a wide array of fields, including anthropology, psychology, management, information

systems, marketing, and human–computer interaction (HCI). In this section, we summarize key concepts in the study of culture and its dimensions.

2.1. Culture

Culture has been defined in a number of different ways. Kroeber (1952, p. 157) defined culture as "the historically differentiated and variable mass of customary ways of functioning of human societies". Kroeber and Parsons (1958, p. 583) arrived at a cross-disciplinary definition of culture as "transmitted and created content and patterns of value, ideas, and other symbolic–meaningful systems as factors in the shaping of human behavior and the artifacts produced through behavior". For Hofstede (1980, p. 25), culture is "the collective programming of the mind that distinguishes the members of one group or category of people from another". Ferraro (1998) uses three verbs to define culture as everything that people *have*, *think*, and *do* as members of their society.

2.2. Dimensions for cultural characteristics

Identifying cultural characteristics is as important for successful localization of services and applications (Hoft, 1996) as it is difficult (Honold, 1999). The problem is that it is difficult to measure the implicit levels of culture reliably (Straub et al., 2002). In an effort to address this issue, researchers have conceived of culture as a set of dimensions that provide a framework for cross-cultural comparisons of user behavior (de Mooij, 2003). Important work in defining cultural dimensions has been undertaken by Parsons and Shils (1951), Kluckhohn and Strodtbeck (1961), Hall (1959, 1976), Hofstede (1980), Trompenaars (1993), and Schwartz (1994). Table 1 presents a summary of the most commonly cited cultural dimensions.

Among the many dimensions, we review three models of cultural dimensions that have been widely used in cross-cultural studies.

First, Hall (1959, 1976), an anthropologist and cross-cultural communications researcher, developed a model of cultural dimensions based on years of observation and extensive interviewing throughout the world. He distinguished cultures along two dimensions: *contextuality* (high or low) and *time perception* (polychronic or monochronic).

Second, Hofstede (1980) conducted a survey of IBM employees in 40 different countries and proposed a model that entailed four dimensions: *uncertainty avoidance*, *individualism* vs. *collectivism*, *masculinity* vs. *femininity*, and *power distance*. Hofstede and Bond (1988) subsequently added the fifth dimension to their model, *long-term* vs. *short-term orientation*.

Finally, Trompenaars (1993) developed a set of seven cultural dimensions based on a study involving 30 companies in 50 nations. His model takes Parsons and Shils's (1951) five-dimension scheme as a foundation and incorporates some aspects of Hofstede's model. The seven dimensions of culture identified by Trompenaars are: *universalism* vs. *particularism*, *individualism* vs. *collectivism*, *affective* vs. *affect–neutral communication style*, *specific* vs. *diffuse relationships*, *ascription* vs. *achievement*, *time orientation*, and *nature orientation*.

2.3. Key cultural characteristics for the mobile Internet

In order to investigate important cultural characteristics of mobile Internet users, the current study adopts two dimensions proposed by Hofstede (1980)—individualism vs. collectivism and uncertainty avoidance—and two proposed by Hall (1959, 1976): contextuality and time perception. There are a number of reasons why we have selected these four dimensions for our study.

First, cultural characteristics along these four dimensions have been considered the most general ones for studying cross-cultural issues—partly because of the large number of countries in which