AN ESPOUSED CULTURAL PERSPECTIVE TO UNDERSTAND CONTINUED INTENTION TO USE MOBILE APPLICATIONS: A FOUR-COUNTRY STUDY OF MOBILE SOCIAL MEDIA APPLICATION USABILITY

ABSTRACT

As most mobile applications are tailored for worldwide consumption, it is a significant challenge to develop applications that satisfy individuals with various cultural backgrounds. To address this issue, we drew on a recently developed conceptualization and associated instrument of mobile application usability to develop a model examining the impact of mobile social media application usability on continued intention to use. Drawing on Hofstede's five cultural values, we incorporated espoused cultural values of masculinity/femininity, individualism/collectivism, power distance, uncertainty avoidance and long-term orientation into our model as moderators. To test the model, we collected data from 1,844 consumers in four countries—U.S, Germany, China, and India—who use mobile social media applications on their smartphones. The results provided support for the role of espoused national cultural values in moderating the impact of mobile social media application usability on continued intention to use and the model, with espoused cultural values explaining significantly more variance in continued intention to use (i.e., 38%) than the main effects only model (i.e., 19%). Interestingly, our results demonstrated that culture at the national level did not play a significant role in affecting the relationship between usability constructs and continued intention to use, thus underscoring the importance of espoused culture.

Keywords: Culture, espoused national culture, mobile social media applications, continued intention to use

INTRODUCTION

Over the last decade, Internet-enabled smartphones have become widely used by individuals (Wang & Barnes, 2009; Brown *et al*, 2010; Hu *et al*, 2011; Ou & Davison, 2011). Google recently revealed that about 1.5 million Android-based devices are sold daily (Martonik, 2013). This trend has led to a diversity of mobile applications in a variety of domains, such as financial services, knowledge management, marketing and social media applications (Lin *et al*, 2004; Brown *et al*, 2010; Adipat *et al*, 2011). However, the latest market research shows that many mobile applications are not as successful as anticipated (Forrester Research, 2011; Youens, 2011; Deloitte, 2012). For example, once downloaded, one in four mobile applications is never used again. Likewise, 80% of all branded mobile applications are downloaded less than 1,000 times (Deloitte, 2012). The failure of these mobile applications is mainly due to their lack of effectiveness, efficiency, and user-centered innovation and design (Hu *et al*, 1999; Rai *et al*, 2002; Brown *et al*, 2010; Schoknecht, 2012). For mobile applications, such as Facebook's mobile platform that is accessed by 750 million individuals with various cultural backgrounds (Facebook, 2013), developing mobile applications becomes even more challenging. This is due to the fact that application designers need to understand the differences in the needs of people from various cultural backgrounds and values (Nielsen, 2012). For example, an interface graphic that is preferred in one culture may not be accepted in another culture (Nielsen, 2012; Nielsen Norman Group, 2012). Consequently, considering cultural differences is essential when designing mobile applications for global use (Nielsen Norman Group, 2012). Thus, research that can shed light on cross-cultural differences related to mobile application usability will be of great value to mobile application designers and firms pursuing a mobility strategy targeted to a global audience (Nielsen Norman Group, 2012).

Usability is an important criterion to assess the quality of information systems (Agarwal & Venkatesh, 2002). Mobile application usability is defined as the degree to which a mobile application can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use (Venkatesh & Ramesh, 2006). Building on this definition, our previous work adapted Apple's user experience guidelines and developed a comprehensive conceptualization and a heuristic tool for evaluating the usability of mobile applications (Authors suppressed, in press). In that study, we closely followed the instrument development procedure of MacKenzie *et al* (2011) and conceptualized six constructs to represent mobile application usability. The associated scales were validated using four datasets collected from individuals in the U.S. who were using mobile applications. The results showed that usability is a key predictor for individuals' continued intention to use mobile applications. In the current work, we study usability in the context of specific mobile applications, i.e., mobile social media applications, that we define, based on Larson and Watson's (2011, p. 3) work, as a set of connectivity-enabled mobile applications that facilitate interaction and the co-creation, exchange, and publication of information among firms and their networked communities of customers.

Studying the usability of mobile social media applications is particularly interesting for two key reasons. First, mobile social media applications are among the most widely accepted mobile applications (Hampton *et al*, 2011) and firms, such as Facebook and LinkedIn, have effectively integrated mobile platforms into their channel strategies. Second, as noted earlier, mobile social media applications are extensively used by consumers around the world. For instance, Forrester Research (2010) reports that three quarters of European and U.S. online users use social media, as do more than 80 percent of metro Chinese and metro Indians who use the Internet. Of those users, approximately a third routinely access social media applications through

mobile devices (Forrester Research, 2010). This spurs the need to study how the effect of usability on continued intention to use mobile social media applications varies across individuals with different cultural values and extend prior work wherein we conducted our study only in one country—i.e., U.S. (Authors suppressed, in press).

Against this backdrop, it is vital to account for cultural values, especially those espoused at the individual level, when studying usability (see Kirkman & Shapiro, 2005; Kirkman *et al*, 2006). To understand these differences, we turn to a stream that has examined the role of individuals' cultural values in affecting technology acceptance and use (Srite & Karahanna, 2006; Zhang & Maruping, 2008). Understanding how technology use differs across cultures is a key area in information systems (IS) research (Leidner & Kayworth, 2006; Martinsons & Davison, 2007). In their article, Leidner and Kayworth (2006) posed the question: "Will the same IT be used in similar ways across cultures and result in similar benefits, or will the same IT be used differently across cultures and result in different benefits?" (p. 367). Addressing this issue will advance theory by helping us understand the generalizability and/or boundary conditions of existing theory across different cultural settings (Lee & Baskerville, 2003; Venkatesh & Ramesh, 2006).

Culture has been mainly studied at the country or society level to understand various organizational behaviors, such as cooperation (Wagner, 1995), work-related attitudes (Spector *et al*, 2002) and adapting behaviors (Molinsky, 2007). Hofstede's taxonomy of cultural dimensions has been applied to various cross-cultural contexts (Hofstede, 1980; Gerow *et al*, 2010). Recent studies have conceptualized Hofstede's cultural values at the individual level to understand various human behaviors (Kirkman & Shapiro, 2005; Srite & Karahanna, 2006; Zhang & Maruping, 2008; Rai *et al*, 2009). Hofstede's taxonomy comprises five cultural values, i.e.,

individualism/collectivism, masculinity/femininity, uncertainty avoidance, power distance and

long-term orientation (Hofstede, 1980, 1983; Hofstede & Bond, 1988), and are defined as

follows: *individualism/collectivism* refers to an individual's preference for a social framework

where individuals take care of themselves (individualism) as opposed to where individuals

expect the group to take care of them in exchange for their loyalty (collectivism);

masculinity/femininity refers to an individual's degree of preference for achievement,

assertiveness and material success; *power distance* refers to the extent to which people with less

power accept and expect differentials of power and inequality; *uncertainty avoidance* refers to

the extent to which individuals feel vulnerable to unpredictable and unknown situations; and

long-term orientation refers to people's consideration for the future.

Consistent with recent studies, we drew on Hofstede's taxonomy of cultural values that

have been widely adopted in prior studies on culture and conceptualize them at the individual

level (Hofstede, 1980, 1983; Hofstede & Bond, 1988), which is termed espoused cultural values

(Srite & Karahanna, 2006; Rai *et al*, 2009). Specifically, we incorporate these cultural values as

contingency factors to understand users' continued intentions to use mobile social media

applications. This is consistent with the cultural contingency perspective that argues desirable

outcomes are likely to be obtained when the approaches used to achieve the outcomes are

congruent with individuals' cultural values (Newman & Nollen, 1996; Xiao & Tsui, 2007). For

example, high employee performance is likely to be achieved when management practices are

adapted to the national cultures in which they operate (Newman and Nollen, 1996). Based on

prior work that has shown that cultural values influence technology use (Srite & Karahanna,

2006; Zhang & Maruping, 2008), we expect that this also applies to mobile social media

applications and the extent to which mobile social media application usability is congruent with

individuals' cultural values. Social media applications not only need to fulfill users' objectives, such as sharing information with friends, but also need to fulfill such objectives effectively and efficiently. This is likely to be achieved when mobile social media application usability is congruent with users' cultural values because users' cultural values will affect how they appraise mobile social media application usability.

Our work contributes to cross-cultural research in IS by evaluating how espoused cultural values play a role in explaining continued intention to use mobile social media applications in a global context. In addition, our study is among the first few that investigate espoused cultural values by drawing on all five cultural values of Hofstede (1980). Testing models in culturally diverse settings is an important contribution to research as it examines the external validity of existing models in new contexts (Lee & Baskerville, 2003; Johns, 2006). Models that hold across diverse cultural settings and new contexts are considered more robust (Lee & Baskerville, 2003; Johns, 2006; Venkatesh et al, 2007; Venkatesh & Zhang, 2010). Such models seem particularly suited for future research aiming to apply or extend the models in new situations. In contrast, models that do not generalize well to new contexts and cultural settings provide research opportunities because future studies can understand the boundary conditions in greater detail (Alvesson & Kärreman, 2007).

BACKGROUND

Culture and Espoused Cultural Values

Using a culture lens to understand organizational behaviors has been of interest in the IS and management literatures (Kirkman *et al*, 2006; Leidner & Kayworth, 2006; Martinsons & Davison, 2007; Rai *et al*, 2009; Sia *et al*, 2009). Culture represents the norms, values, and belief systems people possess (Schein, 1985). Such norms, values, and belief systems greatly affect

people's thought processes and their subsequent behaviors (Leidner & Kayworth, 2006). The culture literature has presented a few taxonomies to characterize different cultural values that shape individual behavior (Hofstede, 1980; Schwartz, 1992; Trompenaars & Hampden-Turner, 1998). We adopt Hofstede's taxonomy for two key reasons. First, Hofstede's taxonomy helps us understand what underlies technology adoption and use because it comprises both schemas about interactions between social entities and those about how individuals generally approach different environmental conditions (Leidner & Kayworth, 2006). Second, although not without detractors, Hofstede's taxonomy is a well-accepted framework in the IS discipline that allows researchers to study diversity issues in a variety of phenomena. Leidner and Kayworth (2006) found that most studies focusing on the role of culture in individuals' technology adoption and use have used Hofstede's values (Srite & Karahanna, 2006; Zhang & Maruping, 2008).

Researchers have traditionally viewed culture as being at the level of countries or societies (Hofstede, 1980; Kirkman *et al*, 2006). In this view, it is assumed that members of society are culturally homogeneous such that there is low within-country variation and high between-country variation in cultural values. A more recent perspective views culture as being an individual value that can vary even within country contexts (Kirkman & Shapiro, 2005; Kirkman *et al*, 2006; Srite & Karahanna, 2006; Zhang & Maruping, 2008; Rai *et al*, 2009; Gerow *et al*, 2010). Given that we focus on consumers using mobile social media applications on their smartphones, we draw on this view of culture―termed espoused cultural values that is defined as the extent to which an individual embraces cultural values (Srite & Karahanna, 2006). Such an approach will avoid the potential issues of ecological fallacy or the problems of conceptualizing national culture as a macro-level phenomenon whereas continued intention to use is an individual-level construct (Srite & Karahanna, 2006). An important reason to

conceptualize culture at the individual level is that recent research indicates there is a large variation in cultural values across individuals even within the same country and such differences have led to interesting insights regarding different phenomena (Srite & Karahanna, 2006; Rai *et al*, 2009; Zhang & Maruping, 2008). More recently, IS research has adopted this view of culture and started to investigate the influential role of espoused cultural values on the use of IT at the individual level. In particular, espoused culture has been employed as a boundary condition for some theoretical models in the IS literature (Srite & Karahanna, 2006; Zhang & Maruping, 2008). For example, Srite and Karahanna (2006) found that users of the same national culture espoused different cultural values that shaped their adoption of new technology. They found that the impact of social norms on intended behavior is greater among individuals with high espoused femininity and high espoused uncertainty avoidance values. Moreover, they found that perceived ease of use has a greater impact on intended behavior among individuals with masculine values (Venkatesh *et al*, 2004). This literature stream suggests that cultural values are individually held and that variation on these values can occur within countries, and that such variation across individuals can affect (i.e., moderate) key relationships.

Prior research has sought to understand how cultural values can moderate key relationships related to technology usage. For example, one study found that four of Hofstede's cultural dimensions, i.e., uncertainty avoidance, power distance, masculinity/femininity and individualism/collectivism, moderated the relationship between perceived ease of use and behavioral intention and the relationship between perceived usefulness and behavioral intention (McCoy *et al*, 2007). Another study found that individualism/collectivism moderated the effect of e-commerce portal affiliation on intention to buy and the effect of peer customer endorsement on intention to buy (Sia *et al*, 2009). Table 1 presents key illustrative studies. However, few

studies have examined all five espoused cultural values in a single study. In this paper, as stated earlier, we seek to fill this key theoretical and empirical gap—there is a need to develop a better understanding of how espoused cultural values influence continued intention to use technology at the individual level. Specifically, we will employ an espoused culture perspective to understand the relationship between mobile application usability and people's continued intention to use mobile social media applications.

Table 1: Key Illustrative Studies				
Independent variables	**Dependent variables**	**Moderating variables**	**Supported moderation**	**Source**
Perceived risk (PR)	E-commerce use Mediators: institutional trust (IT); privacy concern (PC)	Study aggregated Hofstede's cultural dimensions: compared Italy vs. U.S. as two distinct cultures with respect to IC, MF, PD, UA, and long-term orientation (LTO)	CountryxPR	Dinev *et al* (2006)
Perceived usefulness (PE) Perceived ease of use (PEOU) Subjective norms (SN)	Behavioral intention to use	Masculinity/femininity (MF) Individualism/collectivism (IC) Power distance (PD) Uncertainty avoidance (UA)	Study 1: MFxSN; PDxSN; UAxSN Study 2: MFxPEOU; UAxSN	Srite and Karahanna (2006)
Perceived ease of use (PEOU) Perceived usefulness (PU)	Behavioral intention	UA; PD; MF; IC	UAxPEOU; UAxPU; UAxPEOU; PDxPU; PDxPEOU; MFxPEOU; ICxPEOU	McCoy *et al* (2007)
Website navigation design (WND) Website information design (WID) Website visual design (WVD)	E-loyalty Mediators: trust (TR); satisfaction (SA)	UA	Partial support for UAxSA Partial support for UAxWND	Cyr (2008)
Navigational structures (NS) Visual appeal (VA)	Intention to use Mediators: perceived ease of use (PEOU); trusting belief in IT artefact (TBIA)	UA	UAxVA	Vance *et al* (2008)
E-commerce portal affiliation (EPA), Peer customer endorsement (PCE)	Actual buying Mediators: trusting belief (TB); intention to buy (INB)	IC	ICxEPA; ICxPCE	Sia *et al* (2009)
Self-perception based trust (SBT) Transfer based trust (TBT):	Trust on e-vendor	Based on Hofstede's cultural values, U.S. and Korea were divided into Type I and Type II cultures, i.e., type of culture (TC)	TCxTBT	Kim *et al* (2010)

Mobile Application Usability in the Context of Mobile Social Media Applications

Over the last decade or so, the concept of usability of Internet and mobile applications

has had a central role in the human-computer interaction (HCI) and IS literatures (Thong *et al*,

2002; Yen *et al*, 2007; Hess *et al*, 2009; Boehringer & Barnes, 2011). Until recently, few, if any,

studies attempted to rigorously develop and empirically validate a holistic conceptualization of

mobile application usability. We aimed to address this in our related work (Authors suppressed,

in press), and developed and validated a comprehensive conceptualization and instrument to

measure mobile application usability by adapting Apple's user experience guidelines for mobile

applications (Apple, 2011). We identified six constructs to represent mobile application

usability—i.e., application design, application utility, interface graphics, interface structure,

interface input, and interface output. The instrument developed to measure the constructs

representing mobile application usability was validated using three waves of data from over

1,200 U.S. consumers of social media applications. The results demonstrated that the six

constructs representing mobile application usability predicted continued intention to use mobile

applications. We next explain these constructs and discuss their relevance to the current study.

Application design. We define application design as the degree to which a user perceives

that a mobile application is well designed (Authors suppressed, in press). Prior research on

mobile applications suggests that well-designed applications preserve data that users type into a

given mobile application and it is critical that users are not required to type in the same data

twice (Kurniawan 2008; Tan *et al*, 2009; Adipat *et al*, 2011). It is also important that the mobile

application is instantly ready to use after being switched on and the application should display

information effectively independent of whether the mobile device is held horizontally or

vertically (Wobbrock *et al*, 2008). Prior work has also suggested that well-designed applications

employ subtle branding efforts because this can increase consumer satisfaction with overall application design (Dou *et al*, 2010).

Application utility. We define application utility as the degree to which a user perceives that a given mobile application generally serves its purpose well (Authors suppressed, in press). Prior research suggests that mobile applications should center around the content that is most relevant to users and the main purpose of the application should be emphasized (Thong *et al*, 2002; Hong *et al*, 2004; Venkatesh & Agarwal, 2006; Venkatesh & Ramesh 2006; Luo & Warkentin, 2007; Hess *et al*, 2009; Li *et al*, 2009; Wells *et al*, 2011). Likewise, it is important that users can search for information because this leads to a better user experience and helps users in navigating through the application menu (Wells *et al*, 2005; Valacich *et al*, 2007; Campbell *et al*, 2009; Hess *et al*, 2009).

Application interface graphics. We define application interface graphics as the degree to which a user perceives a mobile application's user interface graphics to be effectively designed (Authors suppressed, in press). Prior research recommends that a mobile application's animations are not used extensively and users' experience would improve if the mobile application incorporates realistic icons and pictures (Hong *et al*, 2004; Hess *et al*, 2005; Hong *et al*, 2007; Kang, 2007). Examples of well-established realistic icons include Apple's calendar and address book icons that were designed realistically to represent traditional calendars or address books. Such realistic icons would help users to instantly recognize the core function of a given mobile application (Flavian *et al*, 2006). Further, the graphics incorporated into mobile applications should be aesthetically appealing because this is another important criterion for users to judge the effectiveness of an application interface (Kim & Stoel, 2004; Hess *et al*, 2005; Hong *et al*, 2007; Cyr *et al*, 2009; Parboteeah *et al*, 2009; Wells *et al*, 2011).

Application interface structure. We define application interface structure as the degree to which a user perceives that a mobile application is structured effectively (Authors suppressed, in press). Prior HCI literature suggests that it is critical to organize the mobile application interface structure from top-to-bottom because users would intuitively start looking for information on the top of the screen (Thong *et al*, 2002; Hong *et al*, 2004; Kim *et al*, 2007; Valacich *et al*, 2007; Li *et al*, 2009; Wells *et al*, 2011). It is also important to structure the content by following a logical and predictable path (Adipat *et al*, 2011; Wells *et al*, 2011).

Application interface input. We define user interface input as the degree to which users perceive that a given mobile application enables them to input data easily (Authors suppressed, in press). In order to design input mechanisms effectively, an application's controls and buttons should be relatively large in order to make it easier for users to pick desired functions. Research has also demonstrated that controls equating the size of fingertips would be ideal for users to select functions and menus embedded in mobile applications (Kurniawan 2008). The controls should also be immediately obvious and intuitive because users want clear user interfaces and they are not willing to spend much time learning to use an application (Jokela *et al*, 2006; Sorensen & Altaitoon 2008). It is also critical that the effort it takes users to input data should be minimized (Jokela *et al*, 2006; Sorensen & Altaitoon, 2008; Tan *et al*, 2009; Xu *et al*, 2009). A typical way to achieve this goal could include dropdown menus or automated data entry support (Hong *et al*, 2004; Wells *et al*, 2005; Valacich *et al*, 2007).

Application interface output. We define user interface output as the degree to which a user perceives that a mobile application presents content effectively (Authors suppressed, in press). Prior research suggests that mobile applications should avoid technical jargon and the terminology to be used should be easy for users to understand (Middleton & Cukier, 2006; Luo

& Warkentin, 2007; Hess *et al*, 2009). Technology-centric jargon would frustrate users and all text should be written concisely (Middleton & Cukier, 2006; Luo & Warkentin, 2007; Hess *et al*, 2009). Users will also favor standard elements as part of mobile applications because users will feel that they are already familiar with the user interface (Jokela *et al*, 2006; Kurniawan, 2008).

THEORY

Building on our research that has found that mobile usability affects continued intention to use (Authors suppressed, in press), this paper focuses on examining how espoused cultural values moderate the effect of mobile usability on continued intention to use. We argue that individualism/collectivism, masculinity/femininity, and power distance will moderate the effects of application design and application utility on continued intention to use. These three cultural values comprise schemas about interactions between social entities and other individuals that are likely to accentuate the effects of application design and application utility on continued intention to use. Given that application design and application utility reflect the main function or design purpose of a mobile social media application, i.e., facilitating communication and collaboration among users (Brown *et al*, 2010), we relate individualism/collectivism, masculinity/femininity and power distance to application design and application utility to understand continued intention to use a mobile social media application. Thus, we suggest that their effects on continued intention to use mobile social media applications will be stronger for individuals high on collectivism, high on femininity, and low on power distance. In addition, we argue that long-term orientation and uncertainty avoidance will moderate the effects of interface graphics, interface structure, interface input, and interface output on continued intention to use because these cultural values are related to routines, rules or standards (Santos *et al* 2010). Individuals high on long-term orientation and uncertainty avoidance will focus on these usability

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dimensions because they allow them to plan ahead and reduce uncertainty when using mobile

social media applications. Therefore, we suggest that their effects on continued intention to use

mobile social media applications will be stronger for individuals high on long-term orientation

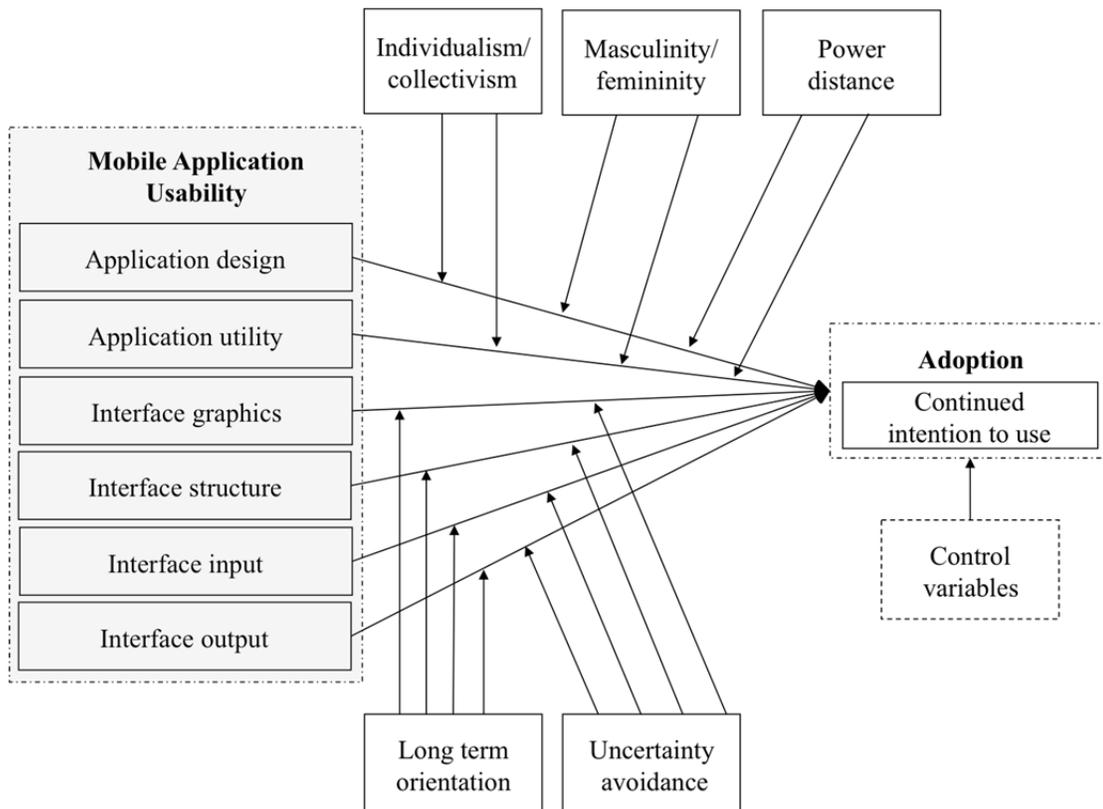and uncertainty avoidance. Figure 1 shows our research model.

Figure 1: Research model

Hypotheses Development

We argue that the positive effect of application design on continued intention to use

mobile social media applications will be stronger for individuals high on collectivism.

Individuals high on collectivism are attuned to the perspectives of others and responsive to the

needs of others (Jordan & Surrey, 1986). Thus, they will particularly appreciate well-designed

mobile social media applications because they allow them to interact with others easily and they

can retrieve information about others (Culnan *et al*, 2010; Piskorski, 2011). In contrast,

individuals high on individualism focus primarily on their own internal traits, skills and attitudes (Srite & Karahanna, 2006), and will likely place less emphasis on the design of mobile social media applications that emphasize communication and coordination.

Hypothesis 1a: The positive effect of application design on continued intention to use mobile social media applications will be stronger for individuals high on collectivism.

We also argue that the positive effect of application design on continued intention to use mobile social media applications will be stronger for individuals high on femininity. Individuals high on femininity emphasize relationship-enhancing values, and they tend to be compassionate and expressive (Bem, 1981; Hofstede, 1984). Prior work also found that people high on femininity place great importance on relationship building in comparison to individuals high on masculinity who are likely to be less interested in collaborating with others (Srite & Karahanna, 2006; Rai *et al*, 2009). Effective application design of mobile social media applications helps users to collaborate and communicate with each other (Piskorski, 2011). Because individuals high on femininity tend to be interested in communicating with others, we expect that individuals high on femininity will more greatly value the design of mobile social media applications in driving their continued intention to use mobile social media applications.

Hypothesis 1b: The positive effect of application design on continued intention to use mobile social media applications will be stronger for individuals high on femininity.

We also argue that the positive effect of application design on continued intention to use mobile social media applications will be stronger for individuals low on power distance. Individuals low on power distance tend to ignore status inequalities in hierarchical structures and they tend to be more interested in collaborating with others (Thatcher *et al*, 2003; Srite & Karahanna, 2006; Li *et al*, 2009). In contrast, individuals high on power distance accept the

existence of status inequalities and appear to be less interested in collaborating with their superiors and they accept their own status in society (Thatcher et al, 2003; Srite & Karahanna, 2006; Dudezert & Leidner, 2011). Well-designed mobile social media applications focus on the interactions among users and how they can create, share, and exchange ideas (Hoffman & Fodor, 2010). Due to the fact that individuals low on power distance tend to enjoy interacting and collaborating with others, we argue that these individuals will more greatly value the design of mobile social media applications in driving their continued intention to use mobile social media applications.

Hypothesis 1c: The positive effect of application design on continued intention to use mobile social media applications will be stronger for individuals low on power distance.

We argue that the positive effect of application utility on continued intention to use mobile social media applications will be stronger for individuals high on collectivism because these applications support collaboration among users, building social relations among people in order to share personal interests or activities (Neyem *et al*, 2008). Individuals high on collectivism like sharing their views with others and they are likely to prioritize the needs of the collective over their own (Hofstede, 1980; Hofstede & Bond, 1988). In contrast, people high on individualism prefer prioritizing their own goals and they tend to disregard collaboration and prefer pursuing their own goals, rather than participating in a group. A major goal of mobile social media applications is to provide individuals with a group-based platform for creating and exchanging user-generated content (Huy & Shipilov, 2012). Because individuals high on collectivism tend to enjoy group environments, these individuals will more greatly value the

utility of mobile social media applications in driving their continued intention to use mobile social media applications.

Hypothesis 2a: The positive effect of application utility on continued intention to use mobile social media applications will be stronger for individuals high on collectivism.

We also argue that the positive effect of application utility on continued intention to use mobile social media applications will be stronger for individuals high on femininity. Masculinity emphasizes ego-enhancing goals driven by competitiveness and independence. In contrast, individuals high on femininity emphasize interpersonal relationships, and they tend to be compassionate and expressive (Bem, 1981; Hofstede, 1984). People high on femininity also place great importance on relationship building and individuals high on masculinity appear to be less interested in collaborating with others. Due to the fact that mobile social media applications are designed to facilitate interpersonal relationships (Leidner *et al,* 2010), we believe that individuals high on femininity will more greatly value the utility of mobile social media applications in driving their continued intention to use mobile social media applications.

Hypothesis 2b: The positive effect of application utility on continued intention to use mobile social media applications will be stronger for individuals high on femininity.

We also argue that the effect of application utility on continued intention to use mobile social media applications will be stronger for individuals low on power distance. These individuals will see greater utility in using mobile social media applications because they allow them to collaborate with peers. As indicated earlier, individuals low on power distance tend to disregard hierarchical structures, and they tend to be interested in working and socializing with others. The main purpose of mobile social media applications is connecting individuals with each other and they are designed in a non-hierarchical structure (e.g., all user profiles look similar,

thereby disregarding a person's status in society) (Piskorski, 2011). Given that individuals low

on power distance value non-hierarchical structures, we believe that individuals low on power

distance will more greatly value the utility of mobile social media applications in driving their

continued intention to use mobile social media applications.

Hypothesis 2c: The positive effect between application utility and continued intention to use

mobile social media applications will be stronger for individuals low on power

distance.

We argue that the effect of application interface graphics on continued intention to use

mobile social media applications will be stronger for individuals high on long-term orientation.

People high on long-term orientation are likely to appreciate rules or standards so as to minimize

risks. Effective application interface graphics involve realistic icons and pictures, such as

Apple's calendar and address books icons (Hong *et al*, 2004; Hess *et al*, 2005; Hong *et al*, 2007;

Kang, 2007). These icons are designed to be aesthetically appealing and also aim to be

recognized instantly by the application user. The linkage to realism helps in communicating the

purpose of the application and well-designed applications use standardized and universal

symbols. Users high on long-term orientation will likely value application interface graphics in

driving their continued intention to use mobile social media applications because it will help

them in seeking out important information that is often presented via graphics in modern

applications.

Hypothesis 3a: The positive effect of application interface graphics on continued intention to

use mobile social media applications will be stronger for individuals high on

long-term orientation.

We also argue that the effect of application interface graphics on continued intention to use mobile social media applications will be stronger for individuals high on uncertainty avoidance. As indicated above, well-designed mobile social media application interface graphics follow well-accepted and universal symbols that represent the main purpose of a given application (e.g., iTunes icon displaying a musical note). By following these well-established standards, effectively designed interfaces reduce the amount of uncertainty users face when choosing to use a given mobile social media application or an embedded feature. In contrast, those low on uncertainty avoidance tend to be open to change, have a willingness to take risks, and are tolerant of unstructured situations (Earley & Stubblebine, 1989). Such individuals will thus rely less on application interface graphics embedded in mobile social media applications in driving their continued intention to use mobile social media applications.

Hypothesis 3b: The positive effect of application interface graphics on continued intention to use mobile social media applications will be stronger for individuals high on uncertainty avoidance.

We argue that the effect of application interface structure on continued intention to use mobile social media applications will be stronger for individuals high on long-term orientation. Such individuals are likely to seek out structures that will clarify misunderstanding, minimize effort, and increase efficiency. Well-structured mobile social media application interfaces aim to reduce the effort users must put in when navigating within the application (Porter *et al*, 2011). Those individuals low on long-term orientation are less likely to fixate on rules and a standardized interface structure and will therefore place less emphasis on the application interface structure in driving their continued intention to use mobile social media applications.

Hypothesis 4a: The positive effect of application interface structure on continued intention to use mobile social media applications will be stronger for individuals high on long-term orientation.

We also argue that the effect of application interface structure on continued intention to use mobile social media applications will be stronger for individuals high on uncertainty avoidance. Individuals high on uncertainty avoidance prefer formalized rules, structures, and procedures (Hofstede, 1980; Fang *et al*, 2011). A well-structured application interface follows well-accepted procedures (e.g., organizing content from top-to-bottom) that will be perceived positively by individuals high on uncertainty avoidance. Individuals low on uncertainty avoidance are tolerant of unstructured situations. Therefore, these individuals should feel comfortable if the interface structure of mobile social media applications is less organized. An example of an unstructured interface design is if the interface is designed without a clear indication of how to find information or how to navigate from one screen to another (Earley & Stubblebine, 1989). Because application interface structure provides clear procedures for users (Porter *et al*, 2011), we believe that individuals high on uncertainty avoidance will more greatly value the application interface structure in driving their continued intention to use mobile social media applications.

Hypothesis 4b: The positive effect of application interface structure on continued intention to use mobile social media applications will be stronger for individuals high on uncertainty avoidance.

We argue that the effect of application interface input mechanisms on continued intention to use mobile social media applications will be stronger for individuals high on long-term orientation. Regarding interface input, various techniques, such as fingertip-sized controls and

effort minimization techniques, can reduce the time and energy spent, thus facilitating task completion. Given that individuals high on long-term orientation respect traditions, such as diligence, patience and frugality, they are likely to favor the features of user input mechanisms that simplify interaction with the mobile application, thereby resulting in efficiency and cost saving (Hofstede, 1993). Because of this, we expect that individuals high on long-term orientation will more greatly value the application interface input mechanisms in driving their continued intention to use mobile social media applications.

Hypothesis 5a: The positive effect of application interface input on continued intention to use mobile social media applications will be stronger for individuals high on long-term orientation.

We also argue that the effect of application interface input mechanisms on continued intention to use mobile social media applications will be stronger for individuals high on uncertainty avoidance. Uncertainty avoidance reflects the degree of nervousness an individual would have in unknown or uncertain situations (Hofstede, 1984). Well-designed interface input mechanisms will reduce ambiguity and they help users to type in data easily (e.g., by integrating fingertip-sized buttons as part of the input mechanism) (Hong *et al*, 2004; Hess *et al*, 2005; Hong *et al*, 2007; Kang, 2007). Such mechanisms will make individuals high on uncertainty avoidance feel comfortable. In contrast, those individuals low on uncertainty avoidance orientation tend to be open to change, have a willingness to take risks, and are tolerant of unstructured situations (Earley & Stubblebine, 1989). As a result, these individuals will be more tolerant toward interface input mechanisms and will value interface input mechanisms less in driving their continued intention to use mobile social media applications.

Hypothesis 5b: The positive effect of application interface input on continued intention to use

mobile social media applications will be stronger for individuals high on

uncertainty avoidance.

We argue that the effect of application interface output on continued intention to use mobile social media applications will be stronger for individuals high on long-term orientation, who are typically prudent or economical in utilizing resources (Hofstede, 1993). These individuals will appreciate the use of concise language and simple and clear presentation formats as it will help them gain a better idea of the messages being transmitted. Likewise, the use of standardized user interface elements, such as message boxes and list boxes, to display output information should make it easier for users to identify information. These output design features will be particularly valued by users high on long-term orientation because the application output will conform with their desire for structure and rules (Hofstede & Bond, 1988). Because individuals high on long-term orientation value utilizing economic resources, these individuals will more greatly value interface output because it simplifies their interaction with the mobile social media application. Consequently, they will develop more favorable continued intention to use mobile social media applications.

Hypothesis 6a: The positive effect of application interface output on continued intention to use

mobile social media applications will be stronger for individuals high on long-term orientation.

We also argue that the effect of application output on continued intention to use mobile social media applications will be stronger for individuals high on uncertainty avoidance. Effectively presented output will reduce ambiguity and individuals high on uncertainty avoidance will particularly appreciate this. Those individuals who are low on uncertainty

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avoidance will tolerate technical jargon more and they will depend less on the interface output of a given mobile social media application in driving their continued intention to use these applications.

Hypothesis 6b: The positive effect of application interface output on continued intention to use mobile social media applications will be stronger for individuals high on uncertainty avoidance.

METHOD

Participants and Data Collection

We collected data from consumers using mobile social media applications in four countries, namely the U.S., Germany, China and India. We employed a market research firm to collect the data. The firm sent out email invitations to potential respondents—i.e., those in the sampling frame. The sampling frame comprised 5,000 consumers from each of these four countries. Each invited individual was asked to complete the survey online and participation was encouraged via small monetary incentives provided by the market research firm. Of these, 1,844 (1,201 men) provided usable responses (496 from the U.S., 452 from Germany, 440 from China, and 456 from India), resulting in a response rate of 8.8 to 9.9%. We tested for non-response bias and found no significant differences in demographic characteristics between the respondents and non-respondents in each country.[1] We did not see a need to compare early versus late responses because all responses were collected during a single weekend and no reminders were employed (Churchill, 1979; Hair *et al*, 1998).

The online survey was programmed to display the mobile social media application respondents selected in the initial filter question. For instance, rather than asking respondents that "I am very satisfied with the overall design of the mobile social media application," the item

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[1] Demographics of the non-respondents were obtained from the market research firm.

was displayed as "I am very satisfied with the overall design of mobile Facebook." In order to ensure that all respondents could meaningfully respond to items related to the mobile application usability of social media applications, we asked two pre-qualifying questions at the beginning of the online survey: (1) what is the frequency with which you access mobile social media applications via your smartphone? and (2) which mobile social media application do you use most often via your smartphone? Those respondents who indicated that they did not use mobile social media applications at all were disqualified from participating in the survey. We also did not collect data from potential respondents who did not use one of the following mobile social media sites: Facebook, Google+, LinkedIn, MySpace, or Twitter. All respondents were provided with instructions and the survey was available to them in either English or their native language, e.g., the items were translated and back-translated by bilingual professionals to ensure cross-language equivalence in meaning. This procedure is consistent with prior cross-cultural research (Brislin, 1970; Zhang *et al*, 2007). All responses were examined for the time respondents took to complete the survey. We excluded those respondents who did not correctly answer reverse-coded filler items and/or took less than 7 minutes to complete the survey. The average time to complete the survey, which included filler and reverse-coded items, was 16 minutes with a standard deviation of 9 minutes. If a respondent completed the survey in less than 7 minutes, it indicated that the respondent likely did not pay sufficient attention to the instructions and questions (see Authors suppressed, in press)—this was also confirmed by the market research firm as a reasonable cutoff. In any case, we dropped responses that had "wrong" answers to reverse-coded questions. These were, in most cases, also the respondents who chose all 1s or all 7s and took less than 7 minutes.[2]

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[2] In examining the response times, we found very few (~3) respondents took between 5 and 7 minutes. Including or excluding these responses did not affect the results.

Measurement

We adapted existing scales to operationalize the constructs used in our study. The items used in our study are shown in Appendix 1. Below, we elaborate on the details.

Mobile social media usability. Mobile social media usability was measured using scales developed and validated in our prior work (Authors suppressed, in press). All mobile social media usability constructs were measured using four reflective items each. The validation procedure included three waves of data collected from over 1,200 U.S. consumers using mobile social media applications (Authors suppressed, in press).

Espoused culture. Apart from long-term orientation, the espoused cultural values were assessed using scales validated by Srite and Karahanna (2006) who adapted Hofstede's 100-point scale specified in the VSM 94 manual (Hofstede, 2007). Srite and Karahanna (2006) modified Hofstede's index scales to measure espoused cultural values at the individual level via a set of reflective items (Rai *et al*, 2009). Consistent with Srite and Karahanna's (2006) approach, we adapted Hofstede's VSM scales to measure long-term orientation.

Continued intention to use. In order to measure continued intention to use mobile social media applications, we adapted a validated existing scale (Bhattacherjee, 2001; Venkatesh & Goyal, 2010). Due to the focus of our study, all items were tailored to mobile social media applications, such as Facebook, LinkedIn or Google+. This approach is consistent with prior research (Venkatesh *et al*, 2003).

Control variables. We measured age and gender. Prior experience was measured by asking individuals how long they have been using mobile social media applications, such as Facebook, Google+, LinkedIn, MySpace or Twitter.

RESULTS

Given that we collected data from four countries, we examined the descriptive statistics broken down by country (Table 2) for two reasons: (1) to examine the extent to which national stereotypes held true in our dataset (Hofstede, 1980); and (2) to examine the extent to which cultural values were indeed espoused (Srite & Karahanna, 2006). Although these two findings may appear to be mutually exclusive, that is not the case. Specifically, for instance, it is possible for the Chinese sample not only to show evidence of high collectivism (collectivism stereotype holds), but also to have high variability among individuals (collectivism values appear to be espoused). Appendix 2 shows Hofstede's (2012) original country specific scores. For example, eastern cultures exhibit high long-term orientation, whereas the opposite is the case for western cultures (Hofstede, 1984). The means shown in Table 2 reflect this because the means in the U.S. and German samples for long-term orientation were much lower in comparison to the means in the Chinese and Indian samples. Examining the standard deviations, we can see substantial variance in the cultural variables. The standard deviations within each country suggest that individuals within a country embrace cultural values to varying extents. This suggests that individuals espouse cultural values and national stereotypes do not provide a complete and accurate representation of culture. For instance, although the mean for long-term orientation in the German sample was, consistent with Hofstede (1984), relatively low (29.44), the standard deviation (14.51) was relatively high suggesting that this value was embraced to a different extent among individuals.

Table 2: Country-specific Descriptive Statistics								
	U.S.		Germany		China		India	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1. Gender	0.35	0.48	0.36	0.48	0.34	0.47	0.36	0.48
2. Age	31.52	7.07	33.17	6.90	31.32	6.12	33.80	7.25
3. Prior experience	2.00	1.34	2.02	1.35	2.01	1.35	2.05	1.36
4. Application design	4.48	1.30	4.41	1.25	4.28	1.35	4.49	1.29
5. Application utility	4.17	1.28	4.80	1.35	4.40	1.20	4.41	1.34
6. Interface graphics	4.30	1.29	4.35	1.30	4.38	1.20	4.28	1.21

7. Interface structure	4.55	1.30	4.56	1.41	4.57	1.35	4.51	1.30
8. Interface input	5.17	1.60	5.10	1.63	5.05	1.65	5.15	1.66
9. Interface output	5.12	1.57	5.04	1.67	5.10	1.62	5.13	1.69
10. Individualism/collectivism	84.12	12.55	72.15	14.98	30.39	9.55	55.65	14.28
11. Masculinity/femininity	65.75	10.21	71.33	10.28	71.42	11.21	55.18	17.24
12. Power distance	46.55	11.27	41.28	11.50	75.10	15.85	68.42	13.95
13. Uncertainty avoidance	39.28	12.90	57.40	13.12	25.42	15.60	40.16	14.90
14. Long-term orientation	22.10	9.48	29.44	14.51	94.28	18.51	56.18	13.24
15. Continued intention to use	4.51	1.30	4.62	1.28	4.65	1.35	4.73	1.20

For the model estimation, we used partial least squares (PLS), a structural equation modeling technique that uses a component-based approach to maximize the variance explained in estimating the specified model. PLS is appropriate for theory testing when the goal is to explain variance. The specific software package we used was Smart-PLS 2.0 (Ringle *et al*, 2005). We initially assessed whether pooling of the datasets was appropriate following the procedure outlined by Venkatesh *et al* (2003). The results confirmed that it was appropriate to pool the datasets across countries for our analysis with country not being a significant moderator in most cases (discussed later).

Measurement Model

To assess the psychometric properties of the scales, we examined item loadings, internal consistency reliability (ICRs) and Cronbach's alpha scores of these scales. Results obtained from the PLS measurement model indicated internal consistency and discriminant validity (Nunnally, 1978; Fornell & Larcker, 1981). Table 3 shows the loadings and cross-loadings. Although all items loaded highest on each anticipated factor, we found several instances of high cross-loadings. For instance, item AD1 loaded highest on the expected application design (AD) factor (.78) but also loaded fairly high (.60) on user interface input (UII). Although a difference between unrelated loadings of less than .2 indicates measurement issues, we decided to retain all items. Our decision was influenced by the fact that all items loaded highest on the anticipated factors and were greater than the necessary threshold of .5 (Hair *et al,* 1998). Table 3 shows that

this issue applied to several items in the data. Table 4 presents ICRs, Cronbach's alpha scores, overall descriptive statistics, and inter-construct correlations.

Table 3: Factor Loadings and Cross-loadings of Latent Variables											
	AD	AU	UIG	UIS	UII	UIO	IC	MF	PD	UA	LTO	CIU
AD1	**.78**	.40	.38	.25	.60	.54	.28			.51	.42	.43
AD2	**.74**	.42	.35	.59	.55	.22			.39	.34	.33	.39
AD3	**.75**	.36	.57	.42	.43			.29	.35	.31	.31	.35
AD4	**.73**	.32	.27	.55	.25	.28	.51		.45	.40	.40	.45
AU1	.57	**.77**	.57	.29	.28		.29	.48	.31	.28	.30	.31
AU2	.57	**.82**	.27	.26	.49	.59	.44	.49	.36	.26	.33	.36
AU3	.54	**.84**	.28				.48	.34	.50	.44	.50	.50
AU4		**.84**	.57		.50	.44	.46	.34	.57	.50	.52	.57
UIG1	.57	.49	**.78**		.30	.38	.56		.32	.29	.30	.32
UIG2	.50	.56	**.81**		.24	.37	.56	.35	.57	.51	.53	.57
UIG3		.28	**.84**	.46		.36		.32	.59	.44	.59	.59
UIG4	.35		**.73**	.23	.56	.48	.29	.54	.56	.30	.52	.56
UIS1	.57		.46	**.74**	.50	.40	.51	.30	.54	.51	.50	.54
UIS2		.57		**.73**	.58	.41		.30	.31	.29	.34	.31
UIS3	.51	.58	.53	**.77**	.38		.32	.40		.23	.28	.23
UIS4	.57	.26	.40	**.72**	.58	.39	.31	.31	.30		.29	
UII1	.57	.60	.58		**.75**	.28		.23	.60		.41	.30
UII2		.57	.60	.56	**.77**	.24		.33	.32	.49	.40	.45
UII3	.50		.27		**.72**			.36	.32		.51	.41
UII4	.50	.30	.57	.57	**.73**		.21	.37	.25	.47		
UIO1	.53	.57		.29	.55	**.73**	.29	.40	.28	.27	.40	.40
UIO2	.52		.57	.39	.43	**.77**	.37	.43	.29		.28	.23
UIO3	.36	.59			.28	**.74**	.50		.42	.49		
UIO4	.52	.46	.58		.57	**.75**	.26	.46	.35	.37	.44	.53
IC1	.55	.57	.29	.21		.52	**.74**	.28	.45	.59	.59	.49
IC2	.47	.47	.38	.30		.57	**.75**	.42	.40	.49	.53	.43
IC3	.57	.52		.37		.59	**.78**	.29	.28	.48	.35	.42
MF1			.40		.36	.43	.36	**.84**		.55		
MF2			.29	.29	.30	.27	.28	**.84**	.39	.53	.53	.57
MF3	.36	.48		.23	.57	.29	.60	**.83**	.35	.27		
PD1	.57	.40	.57	.48	.36	.29	.29	.43	**.80**	.51	.40	.43
PD2	.41	.49	.55		.39	.58	.37	.39	**.84**	.39	.39	.47
PD3	.43	.41	.60	.49		.29		.35	**.83**	.35	.35	.36
UA1	.57		.45	.60		.44	.34	.45	.28	**.74**	.45	.21
UA2	.57		.57	.38	.44	.25	.44	.31	.22	**.75**	.31	.53

UA3	.24		.28		.45		.25	.36	.29	**.77**	.36	.59
LTO1		.57	.29	.27	.38	.45	.47	.50	.35	.22	**.79**	.50
LTO2		.38		.56		.59		.57	.37	.23	**.82**	.55
LTO3	.57	.47	.57		.53		.46	.32	.41	.24	**.84**	
CIU1	.55	.57	.55	.57	.26	.60	.35	.57		.27	.48	**.78**
CIU2	.52	.57	.52	.23	.49		.37	.59	.22	.31	.43	**.74**
CIU3	.57	.55	.57			.46	.31	.56	.29	.30	.40	**.73**
CIU4		.59		.53	.59	.48	.30	.54	.34	.28	.44	**.71**
CIU5	.57	.57		.36	.21		.47	.31	.33	.29		**.73**
CIU6	.44	.44	.44		.50	.38	.30	.43	.32	.31		**.74**

Notes:

AD = application design, AU = application utility; UIG = user interface graphics, UIS = user interface structure, UII = user interface input, UIO = user interface output, IC = individualism/collectivism, MF = masculinity/femininity, PD = power distance, UA = uncertainty avoidance, LTO = long-term orientation, CIU = continued intention to use, loadings < .20 are not shown

Table 4: Reliabilities, Descriptive Statistics, Correlations																		
	ICR	Cron. α	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Gender (0:Men)	NA	NA	.35	.48	NA														
2. Age	NA	NA	32.44	6.94	-.12*	NA													
3. Prior experience	NA	NA	2.01	1.35	-.16**	-.16**	NA												
4. Application design	.84	.85	4.42	1.28	-.23***	-.07	.13	.85											
5. Application utility	.75	.77	4.48	1.27	-.19**	-.10	.15*	.34***	.85										
6. Interface graphics	.74	.72	4.32	1.25	-.23***	.29***	.17**	.20**	.22**	.88									
7. Interface structure	.85	.84	4.56	1.34	.24***	.33***	.15*	.20**	.14*	.28**	.84								
8. Interface input	.82	.83	5.10	1.62	.25***	.28***	.16**	.17*	.14*	.08	.22**	.86							
9. Interface output	.88	.86	5.02	1.64	.26***	.15*	.19**	.05	.07	.14*	.16**	.13**	.87						
10. Individualism/collectivism	.83	.81	61.25	15.58	.33***	.13*	.13*	.16**	.20**	.03	-.05	-.05	-.04	.87					
11. Masculinity/femininity	.80	.83	68.55	17.40	-.28***	-.26***	.10	.15*	-.19**	-.19**	-.23**	-.17**	-.08	.05	.88				
12. Power distance	.77	.79	55.10	16.95	-.25***	.16**	.07	.05	.05	.10	.05	.05	.06	.01	.07	.87			
13. Uncertainty avoidance	.79	.80	44.28	18.50	.21***	.14*	.05	.13*	.02	.05	.04	.06	.08	.05	.02	.06	.88		
14. Long-term orientation	.85	.84	53.25	29.28	.22***	.21***	.08	.17**	.20**	.08	.04	.10	.04	.02	.08	.03	.04	.91	
15. Continued intention to use	.83	.82	4.61	1.28	-.26***	-.23***	.22***	.20**	.44***	.21***	.14*	.14*	21***	.07	.13*	.07	.05	.10	.89

Notes:

1. n=1,844.

2. ICR: Internal consistency reliability.

3. * p < .05; ** p < .01; *** p < .001.

4. NA: Not applicable.

5. Values on diagonal are square root of AVE.

As shown in Table 4, all ICRs were greater than .70, thus indicating internal consistency. The fact that no inter-construct correlations were greater than the square root of the AVEs provided evidence of discriminant validity.

Structural Model

The results of the structural model testing are shown in Table 5. The path coefficients in a PLS structural model are interpreted as standardized coefficients (beta weights). To test the hypothesized interactions, various usability constructs and espoused cultural values were standardized prior to creating the interaction terms to reduce collinearity between the main effects and interaction terms (Aiken & West, 1991; Chin *et al*, 2003; Goodhue *et al*, 2007). We also assessed the variance inflation factors (VIF) to check for potential multicollinearity problems. All VIFs were below 3, indicating that multicollinearity was not a concern (Goodhue *et al*, 2007). The variance explained in continued intention to use increased from 19% for the main effects only model to 38% for the full model including the interaction terms. These findings supported the role of cultural values as a moderator of the impact of mobile application usability on continued intention to use.

Hypotheses 1a through 1c respectively theorized the interaction effects of application design and individualism/collectivism, application design and masculinity/femininity, as well as application design and power distance on continued intention to use. Given that all three interaction effects were positive and significant, hypotheses 1a through 1c were supported. Hypotheses 2a through 2c proposed interaction effects of application utility and individualism/collectivism, application utility and masculinity/femininity, as well as application utility and power distance on continued intention to use respectively. We found support for hypotheses 2a through 2c because all three interaction effects were positive and significant. We

suggested interaction effects of application interface graphics and long-term orientation as well as application interface graphics and uncertainty avoidance on continued intention to use in hypotheses 3a and 3b respectively. Given that both interaction effects were not significant, hypotheses 3a and 3b were not supported. We proposed interaction effects of application interface structure and long-term orientation as well as application interface structure and uncertainty avoidance on continued intention to use in hypotheses 4a and 4b respectively. Both interaction effects were significant and therefore supported hypotheses 4a and 4b. We proposed interaction effects of application interface input and long-term orientation as well as application interface input and uncertainty avoidance on continued intention to use in hypotheses 5a and 5b respectively. Given that both interaction effects were significant, hypotheses 5a and 5b were supported. We theorized the interaction effects of application interface output and long-term orientation as well as application interface output and uncertainty avoidance on continued intention to use in hypotheses 6a and 6b respectively. These interaction effects were non-significant and thus we did not find support for hypotheses 6a and 6b.

Table 5: Structural Model Results		
	Main effects only	**Full model**
R^2	.19	.38
$\Delta\ R^2$	.15***	.19***
Control variables		
Gender (0:Men)	-.04	-.03
Age	-.05	-.03
Prior experience	.05	.02
Main effects		
Application design	.13*	.04
Application utility	.32***	.21***
Interface graphics	.15*	.03
Interface structure	.03	.02
Interface input	.04	.03
Interface output	.11*	.06
Interactions		
Individualism/collectivism		.01
Masculinity/femininity		.04
Power distance		.05
Uncertainty avoidance		.12*
Long-term orientation		.03

Application design x Individualism/collectivism		.16**
Application design x Masculinity/femininity		.14*
Application design x Power distance		.13*
Application utility x Individualism/collectivism		.16**
Application utility x Masculinity/femininity		.12*
Application utility x Power distance		.15*
Interface graphics x Uncertainty avoidance		.07
Interface graphics x Long-term orientation		.04
Interface structure x Uncertainty avoidance		.17**
Interface structure x Long-term orientation		.15*
Interface input x Uncertainty avoidance		.13*
Interface input x Long-term orientation		.14*
Interface output x Uncertainty avoidance		.03
Interface output x Long-term orientation		.04

Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

In order to better interpret the patterns of the interaction effects, we plotted all significant

interaction terms based on Aiken and West (1991) at one standard deviation above and one

standard deviation below the mean. Figure 2 shows the plots. We computed the slope for high

and low levels of the cultural values and found that simple slopes of high and low cultural values

were significantly different from zero in predicting the dependent variables. A slope differences

t-test (Dawson & Richter, 2006) was also used to confirm that each pair of slopes was

significantly different from each other. The plots provide further support for the proposed

interactions by confirming the proposed patterns. For instance, Figure 2a shows the interaction

effect of application design and collectivism on continued intention to use. The plot confirms

that the effect of application design on continued intention to use is stronger in case of high

collectivism when compared to the effect in case of low collectivism (Aiken & West, 1991;

Dawson & Richter, 2006). A similar pattern of results was found for the remaining interaction
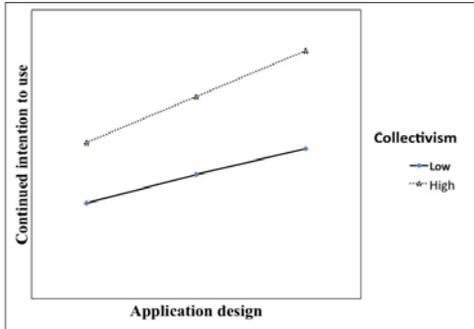
effects as shown in Figures 2b through 2j.

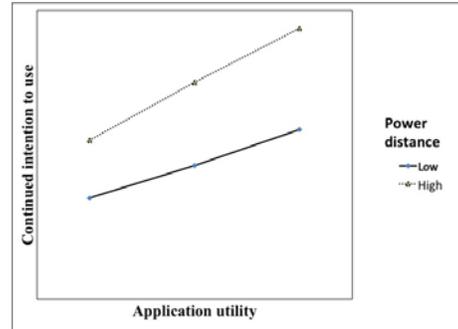**Figure 2(a): Effects of application design and collectivism on continued intention to use**

Figure 2(b): Effects of application design and masculinity on continued intention to use

Figure 2(c): Effects of application design and power distance on continued intention to use
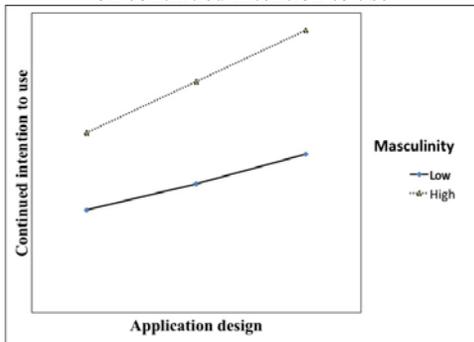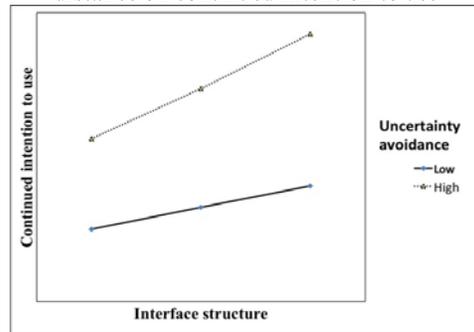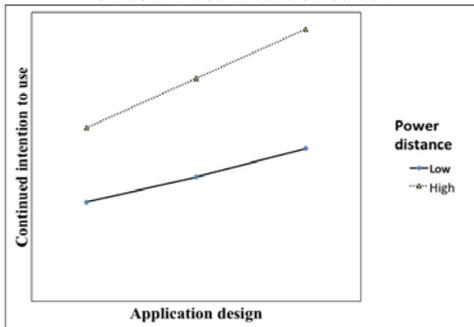

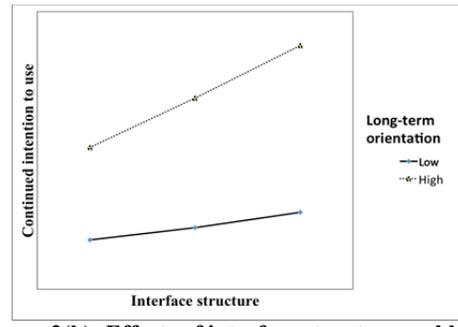
Figure 2(d): Effects of application utility and collectivism on continued intention to use

Figure 2(f): Effects of application utility and power distance on continued intention to use

Figure 2(g): Effects of interface structure and uncertainty avoidance on continued intention to use

Figure 2(h): Effects of interface structure and long-term orientation on continued intention to use
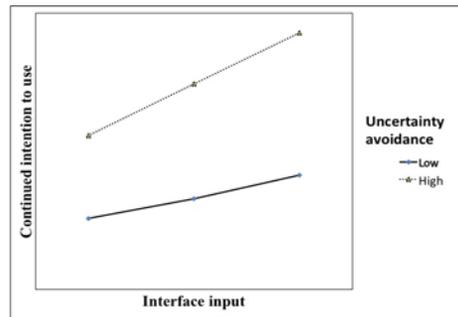

Figure 2(i): Effects of interface input and uncertainty avoidance on continued intention to use
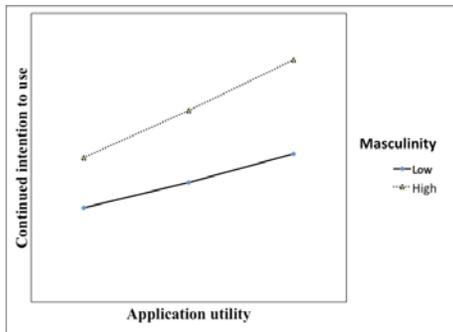
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Figure 2(e): Effects of application utility and masculinity on continued intention to use
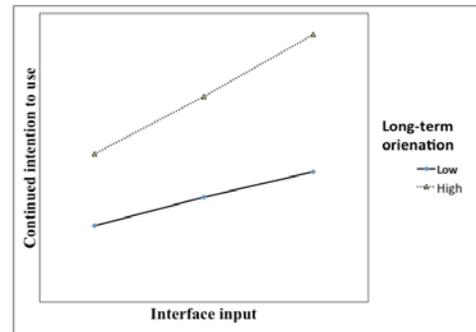

Figure 2(j): Effects of interface input and long-term orientation on continued intention to use

Given the rejected hypotheses, i.e., H3a, H3b, H6a and H6b, we conducted a power analysis to test for the likelihood of a type II error (Cohen 1992). A type II error would mean a failure to reject a false null hypothesis. The results of the power analysis suggested that even small effects would have been detected, suggesting that a type II error was unlikely.

We also conducted additional analyses to compare modeling cultural values as espoused at the individual level versus being conceptualized at the national level. To examine how the effects of various usability constructs on continued intention to use would vary across different countries (i.e., the U.S., Germany, China, and India), we created three dummy variables: Country1 coded as 1 for Germany, Country2 coded as 1 for China, and Country3 coded as 1 for India. These three dummy variables were used to test the two-way interactions using the pooled data. As shown in Table 6, the results suggested that the effects of most of the usability constructs on continued intention to use did not vary across countries. It is worth noting that the effect of application utility on continued intention to use was only significant in the China and India samples. Individuals in both countries tend to be high on collectivism (see Appendix 2). As discussed earlier, mobile social media applications are group-based platforms that allow individuals to share content with others. Due to the fact that individuals high on collectivism appreciate group environments, it is likely that individuals high on collectivism more greatly value the utility of mobile social media applications in driving their continued intention to use

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mobile social media applications. This provides a reasonable explanation for why the effect of application utility on continued intention to use is particularly strong when looking at responses from these countries. In general, our findings suggest that culture at the national level plays a less significant role in affecting the relationship between usability constructs and continued intention to use, with the variance explained being 24% using country dummies (vs. 38% when using espoused cultural values), thus underscoring the importance of espoused culture.[3]

Table 6: Structural Model Results for Country-level Culture		
	Main effects only	**Full model**
R^2	.17	.24
ΔR^2		.07**
Application design	.14*	.03
Application utility	.34***	.30***
Interface graphics	.15*	.07
Interface structure	.05	.04
Interface input	.04	.02
Interface output	.12*	.05
Country1 (1: Germany)		.03
Country2 (2: China)		.02
Country3 (3: India)		.05
Application design x Country1		.04
Application design x Country2		.02
Application design x Country3		.01
Application utility x Country1		-.08
Application utility x Country2		-.14*
Application utility x Country3		-.16**
Interface graphics x Country1		.05
Interface graphics x Country2		.04
Interface graphics x Country3		.03
Interface structure x Country1		.02
Interface structure x Country2		.01
Interface structure x Country3		.05
Interface input x Country1		.02
Interface input x Country2		.01
Interface input x Country3		.07
Interface output x Country1		.04
Interface output x Country2		.02
Interface output x Country3		.01

DISCUSSION

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[3] Note that the non-significant interactions also provided support to pool the data across countries (see Venkatesh *et al*, 2003)

We drew on Hofstede's cultural values and developed a model to better understand the influential role of individuals' espoused cultural values on the usability of mobile social media applications. The results indicated that our model incorporating espoused cultural values as contingency factors explained significantly more variance in continued intention to use compared to a main effects only model (38% vs. 19%) and a model using country dummy variables (24%). Our study thus demonstrated that espoused cultural values play an important role in affecting the relationship between mobile application usability and individuals' continued intention to use mobile social media applications.

Theoretical Contributions and Future Research

This research has several important theoretical contributions. First, our research is among the first to theorize and test all five espoused cultural values from Hofstede (1980) in order to understand technology acceptance and use at the individual level. Although prior research has drawn on various cultural values to understand technology acceptance and use, few studies have operationalized all five original cultural values developed by Hofstede (1980) as espoused cultural values (Rai *et al*, 2009). For example, in the study by Srite and Karahanna (2006), only four of the five cultural values were examined and long-term orientation was excluded from the study. It is important to examine all five cultural values because they represent a person's sense of right and wrong or what "ought" to be on five different aspects of life (Leidner & Kayworth, 2006). By examining all five espoused cultural values, we are less likely to miss any cultural value that is important for us to understand the relationship between usability of mobile social media applications and continued intention to use the applications. Our study indicates all five cultural values are important when studying the use of mobile social media applications at the individual level and the effects found were heterogeneous across different usability constructs.

Second, related to the first point, our findings showed that long-term orientation plays a significant moderating role when studying technology acceptance and use at the individual level, albeit in the mobile social media application context. Among the five cultural values, long-term orientation is the only one that incorporates time into decision making. It indicates the extent to which an individual espouses forward-thinking values or considers future and prospective events in decision making (Hofstede & Bond, 1988). Thus, this cultural value is relevant and important in the context of mobile social media applications given that consumers are likely to evaluate the applications with respect to whether they can deliver value or save time over the long term. We found support for the interaction effect of long-term orientation and interface structure on continued intention to use mobile social media applications. This suggests that long-term oriented individuals seek interface structures emphasizing crisp, clean functional design structures aiming at achieving goals quickly. In contrast, individuals low on long-term orientation seem to pay less attention to well-structured interfaces of mobile social media applications and their associated functions. Likewise, we found support for the interaction effect of long-term orientation and interface input on continued intention to use mobile applications. This suggests that long-term oriented individuals are interested in simple and efficient input mechanisms, whereas individuals low on long-term orientation may prefer more stylish but less efficient input mechanism designs. In sum, this demonstrates the important role of this cultural value in context of adoption and use of mobile social media applications.

Third, our work demonstrates the value of using espoused culture in advancing IS research. Much prior cross-cultural IS related research has treated culture as a monolithic construct (cf. Srite & Karahanna, 2006; Rai *et al,* 2009) and reported country-specific comparisons instead of focusing on cultural values that are espoused at the individual level

(Leidner & Kayworth, 2006). For example, Venkatesh and Zhang (2010) tested the unified theory of acceptance and use of technology (UTAUT) model using two different samples collected in China and the U.S. Rather than measuring espoused cultural values, they tested how the relationships in UTAUT differed across the two countries. In our work, we compared how the effects of the mobile application usability constructs on continued intention to use varied across espoused cultural values and national culture. Our findings suggested that culture at the national level did not play a significant role in moderating the relationship between the usability constructs and continued intention to use. In contrast, espoused cultural values played critical moderating roles, with 38% of the variance in continued intention to use being explained. As such, our work follows several calls for conducting studies that employ espoused cultural values (Leidner & Kayworth, 2006; Srite & Karahanna, 2006) because they can be influenced by "membership in professional, organizational, ethnic, religious, and other social groups besides national culture" (Srite & Karahanna, 2006, p. 697). Our research design can serve as an example for future studies aiming to study espoused culture versus national culture in other contexts or settings.

Fourth, this study examines the generalizability of our recently developed conceptualization of mobile application usability. Although multiple studies have integrated mobile application usability constructs into existing theories (Thong *et al*, 2002) or studied specific aspects of mobile application usability (Adipat *et al*, 2011), few studies have comprehensively assessed mobile application usability to provide clarity regarding the factors underlying mobile application usability. Our recent work started addressing this gap and systematically conceptualized mobile application usability based on Apple's user experience guidelines. The current paper built on this work and examined the generalizability of the concept

and instrument by testing it using samples from four countries. As shown in Table 6, our findings suggested that the effects of most of the usability constructs on continued intention to use did not vary across countries, thereby supporting the stability of our mobile application usability conceptualization and associated instrument. Recent literature on theory building suggests that it is important to test the generalizability of new research models and associated instruments because it provides us with a richer understanding of the context and how it may cause us to view theories differently (Johns, 2006; Alvesson & Kärreman, 2007; Brown *et al*, 2010; Venkatesh *et al*, 2012). This is particularly the case when existing theories may break down because such breakdowns are an opportunity for the creation of new knowledge (Alvesson & Kärreman, 2007).

Future research should build upon our work and integrate our model with existing IS theories including IS continuance theory (Bhattacherjee, 2001) and UTAUT 2 (Venkatesh *et al*, 2012), and study the effects of espoused cultural values on these theories. Likewise, it would be interesting to conceptualize espoused culture using alternative cultural taxonomies, such as Trompenaars and Hampden-Turner's (1998) framework. This framework emphasizes seven cultural dimensions, namely universalism vs. particularism, individualism vs. collectivism, neutral vs. emotional, specific vs. diffuse, achievement vs. ascription, sequential vs. synchronic and internal vs. external control. Finally, although hypotheses 3a, 3b, 6a, and 6b were not supported, we believe that these findings provide insights for future studies aiming to leverage espoused cultural values. These hypotheses suggested interaction effects between interface graphics and uncertainty avoidance/long-term orientation as well as interface output and uncertainty avoidance/long-term orientation on continued intention to use mobile social media applications. Although we contextualized interface graphics and interface output for mobile

social media applications, we believe that the principle is also important for other mobile applications, such as mobile news, mobile marketing and mobile financial services. Future studies should investigate the moderating role of uncertainty avoidance and long-term orientation on the relationship between interface graphics and interface output and continued intention to use mobile applications in other contexts. In order to inform future research, we conducted a post-hoc analysis in which we tested all possible moderating effects. The results of the full research model yielded findings that should be useful for future research. First, one theorized interaction changed when running the full model—i.e., the interaction effects between application utility and masculinity on continued intention to use became non-significant. Second, although not theorized in our work, we found that the interaction between interface graphics and masculinity/femininity on continued intention to use was significant. The complete results of the full model including all interactions are shown and discussed in Appendix 3.

Practical Implications

This study has important implications for practitioners to develop successful applications (Rai *et al*, 2002; Hu *et al*, 2011). For example, in the past, companies used different web and mobile application interfaces in order to correspond to cultural preferences in various countries. For instance, Yahoo!'s German website (de.yahoo.com) differs significantly in terms of color scheme and level of detail displayed in contrast to its Chinese counterpart (cn.yahoo.com). Similar differences exist for mobile application counterparts. Given our findings, it seems more appropriate to customize interfaces within countries instead of exclusively focusing on cultural differences across countries. For example, the results of our studies suggested that individuals high on collectivism see greater application utility than those low on collectivism. Application designers developing mobile social media applications could develop alternative mobile

application interfaces and provide individuals with an option to select their most preferred interface. One application interface could emphasize the ability to network with others on the mobile platform and the content shown should highlight the ability to collaborate with others using the mobile application. The second application interface could place less emphasis on socializing via the mobile application and focus on alternative aspects of the application, such as interface structure. Given our findings, it seems likely that individuals high on collectivism would prefer the first interface, whereas individuals low on collectivism would prefer the second interface (e.g., interface structure).

Using the espoused cultural value scales, mobile application designers could identify users espousing collectivistic, feminine and low power distance values. We found that the effects of application design and application utility were stronger for individuals who espouse high collectivistic, high feminine, and low power distance values. Practitioners could develop strategies and target the individuals high on collectivistic, feminine, and low power distance values with advertisements, informative emails or mobile text messages promoting the content of the mobile social media applications. Likewise, our findings indicate that the effect of interface structure on continued intention to use mobile social media applications is stronger for individuals who espouse high long-term orientation and uncertainty avoidance values. Practitioners could identify individuals high on long-term orientation and uncertainty avoidance, and target them with information about the interface structure of mobile social media applications.

Our findings also have implications for developers aiming to design customized mobile applications. We found that the effect of interface input on continued intention to use mobile social media applications is stronger for individuals high on uncertainty avoidance and long-term

orientation. Application developers and designers could leverage this finding by providing users high on uncertainty avoidance and long-term orientation with customized input mechanisms. For example, individuals who score high on uncertainty avoidance and long-term orientation could be offered large input and output interfaces (e.g., large interface buttons as well as increased text size). This should enhance the user experience for individuals high on uncertainty avoidance and long-term orientation. Alternatively, mobile social media applications could include several alternative user interaction modes that could be chosen by the user from the application menu.

CONCLUSIONS

Our work developed a model that integrated cultural values at the individual level to understand the role of mobile application usability in affecting continued intention to use mobile social media applications. Data were collected from mobile social media application users in the U.S., Germany, China, and India. The results provided support for our model and explained 38% of variance in continued intention to use. We found that espoused cultural values moderate the effects of various mobile application usability constructs on individuals' continued intention to use mobile social media applications. Our study extends cross-cultural research by examining all five espoused national cultural values as contingency factors in the context of mobile social media applications. We also contribute to mobile application usability research by providing a contextualized model that explains continued intention to use mobile social media applications.

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APPENDIX 1

Construct	Item Used
	Appendix 1: Items Used to Measure Each Construct
Construct	**Item Used**
Application design (DES1-4)	Overall, I think *the mobile social media application* is designed well.
	In general, I believe that *the mobile social media application* has a great design.
	Generally speaking, *the mobile social media application* is well designed.
	I am very satisfied with the overall design of *the mobile social media application*.
Application utility (PURP1-4)	To me, *the mobile social media application* is very functional.
	Overall, I think that *the mobile social media application* is useful.
	Generally speaking, *the mobile social media application* serves its purpose well.
	In general, *the mobile social media application* is of value to me.
User interface graphics (INTG1-4)	Overall, I think that the graphics displayed on *the mobile social media application* are designed effectively.
	In general, the interface graphics of *the mobile social media application* are designed well.
	Generally speaking, I like the graphics displayed on the interface of *the mobile social media application*.
	Overall, *the mobile social media application* has very good user interface graphics.
User interface structure (STRU1-4)	Overall, I think *the mobile social media application* structures information effectively.
	In general, *the mobile social media application* is structured very well.
	I am very satisfied with the way *the mobile social media application* is structured.
	Generally speaking, *the mobile social media application* is structured nicely.
User interface input (INP1-4)	In general, *the mobile social media application* allows me to input data easily.
	Overall, the user input mechanisms are designed effectively on *the mobile social media application*.
	I am very satisfied with the input mechanisms of *the mobile social media application*.
	Generally speaking, it is easy to type in data into *the mobile social media application*.
User interface output (CONT1-4)	In general, the content of *the mobile social media application* is presented effectively.
	Overall, I believe that *the mobile social media application* presents contents very well.
	Overall, I think that *the mobile social media application* presents content effectively.
	I am very satisfied with the way that the mobile social media application presents content.
Individualism/ Collectivism (INDV 1-3)	Being accepted as a member of a group is more important than having autonomy and independence.
	Group success is more important than individual success.
	Being loyal to a group is more important than individual gain.
Masculinity/ Femininity (MASC1-3)	It is preferable to a have a man in a high level position rather than a woman.
	It is more important for men to have a professional career than it is for women to have a professional career.
	Solving organizational problems requires the active forcible approach which is typical of men.
Power Distance (POW1-3)	Managers should make most decisions without consulting subordinates.
	Managers should not ask subordinates for advice, because they might appear less powerful.
	Decision making power should stay with top management in the organization and not be delegated to lower level employees.
Uncertainty Avoidance (UNC1-3)	Rules and Regulations are important because they inform workers what the organization expects of them.
	Order and structure are very important in a work environment.
	It is important to have job requirements and instructions spelled out in detail so that people always know what they are expected to do.
Long-term orientation (LTO1-3)	In your private life, personal steadiness and stability is important.
	In your private life, thrift is important.
	In your private life, respect for tradition is important.
Continued intention to use	I intend to continue using *the mobile social media application*.
	I want to continue using *the mobile social media application* rather than discontinue.

(CONT1-6)	I predict I will continue using *the mobile social media application*.
	I plan to continue using *the mobile social media application*.
	I don't intend to continue using *the mobile social media application* in future.
	Chances are high that I will continue using *the mobile social media application* in future.

Note: All items were measured using a 7-point Likert-type scale (1=strongly disagree... 7=strongly agree).

APPENDIX 2

Appendix 2: Hofstede's (2012) Original Country-specific Scores				
	US	Germany	China	India
Individualism/collectivism	91	67	20	48
Masculinity/femininity	62	66	66	56
Power distance	40	35	80	77
Uncertainty avoidance	46	65	30	40
Long-term orientation	29	31	118	61

APPENDIX 3

In order to inform future research, we conducted a post-hoc exploratory analysis and tested all possible interaction effects in one model. The results are shown in Table A-3-1. There were a few noteworthy results. First, one theorized interaction changed when running the full model—i.e., the interaction effect between application utility and masculinity on continued intention to use became non-significant. In the research model, the results showed that this interaction effect was significant. Second, the full model also included interaction effects that were not theorized in our work. For instance, the full model included interaction effects of application design and uncertainty avoidance as well as application design and long-term orientation on continued intention to use. The results from the full model test showed that these interaction effects were found to be non-significant. This was expected given that we were unable to find any prior work suggesting such interactions. Likewise, we found little support in the existing literature for interaction effects of application utility and uncertainty avoidance as well as application utility and long-term orientation on continued intention to use. The results from the full model showed that both interaction effects were tested non-significant. We also did not find any literature suggesting interaction effects between interface graphics and

individualism/collectivism on continued intention to use. The results from the full model test

supported this and the interaction effects were non-significant. In contrast, the results of the full

model test suggested that there was a significant interaction between interface graphics and

masculinity/femininity on continued intention to use. This was unexpected because we could not

find any prior work on the basis of which such an interaction could be predicted. A reasonable

explanation for this might be that individuals high on feminism appreciate well-designed

interface graphics because they allow them to interact with others effectively and build

relationships successfully through mobile social media applications. The results from the full

model test confirmed that the interaction effects between interface graphics and power distance

on continued intention to use were found to be non-significant. We also found little prior work

suggesting interaction effects between interface structure and individualism/collectivism,

masculinity/femininity and power distance on continued intention to use. The results from the

full model test confirmed that these interactions were non-significant. The existing literature also

did not suggest that there are interaction effects between interface output and

individualism/collectivism, masculinity/femininity and power distance on continued intention to

use. The results from the full model test were in line with this and these interaction effects were

found to be non-significant.

Table A-3-1: Full Research Model Including All Interaction Effects	
	Full model
R^2	.48
ΔR^2	.10**
Control variables	
Gender (1: women)	-.02
Age	.00
Prior experience	.02
Main effects	
Application design	.03
Application utility	.17**
Interface graphics	.02
Interface structure	.02

Interface input	.02
Interface output	.04
Interactions	
Individualism/collectivism	.01
Masculinity/femininity	.03
Power distance	.04
Uncertainty avoidance	.08
Long-term orientation	.02
Application design x Individualism/collectivism	.14*
Application design x Masculinity/femininity	.13*
Application design x Power distance	.11*
Application design x Uncertainty avoidance	.04
Application design x Long-term orientation	.03
Application utility x Individualism/collectivism	.13*
Application utility x Masculinity/femininity	.10
Application utility x Power distance	.13*
Application utility x Uncertainty avoidance	.08
Application utility x Long-term orientation	.05
Interface graphics x Individualism/collectivism	.07
Interface graphics x Masculinity/femininity	.13*
Interface graphics x Power distance	.03
Interface graphics x Uncertainty avoidance	.05
Interface graphics x Long-term orientation	.03
Interface structure x Individualism/collectivism	.01
Interface structure x Masculinity/femininity	-.04
Interface structure x Power distance	-.05
Interface structure x Uncertainty avoidance	.15*
Interface structure x Long-term orientation	.13*
Interface input x Individualism/collectivism	.08
Interface input x Masculinity/femininity	.07
Interface input x Power distance	.03
Interface input x Uncertainty avoidance	.12*
Interface input x Long-term orientation	.12*
Interface output x Individualism/collectivism	.05
Interface output x Masculinity/femininity	.03
Interface output x Power distance	.08
Interface output x Uncertainty avoidance	.02
Interface output x Long-term orientation	.02
Note: In order to check for potential multicollinearity problems, we examined VIF and found that all VIFs were below 3.	