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SOCIAL ACTOR ATTRIBUTION TO MOBILE PHONES: THE CASE OF TOURISTS

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ABSTRACT

This study examines social actor attribution to mobile phones in general settings and travel context. Informed by attribution theory and computing technology continuum of perspective model, the hypothesized relationships between social characteristics of mobile phones, users' core self-evaluation, and social actor attribution to mobile phones were tested to determine the locus of causality of people's social responses to mobile technology. Further, the influence of mobile phones use for travel-related purposes was investigated to examine the situation attribution explaining the perceived social roles of mobile phones in travel. The results demonstrate that perceived positive and negative social characters of mobile phones as well as self-efficacy, locus of control and self-esteem of users significantly influence social actor attribution to mobile phones. In a travel setting, the significant influence of situational factor on the social roles of mobile technology emphasizes the importance of anthropomorphism in the designing of mobile technology for travel. As a managerial implication, features of mobile technology should suggest the roles of mobile devices as personal travel companions and/or assistants to increase the persuasive power of mobile phones for tourists.

Keywords: mobile technology, CASA, attribution theory, continuum of perspectives, persuasive technology, travel

1. RESEARCH BACKGROUND

As mobile technology continues to penetrate the society, mobile devices now increasingly replace the traditional tools and media, making the use of mobile technology an important part of daily experiences. In the context of tourism, the ability of mobile technology to facilitate communication and to exchange a large amount of information relevant to time and space has allowed mobile devices to be widely used as mobile guides, recommender systems, as well as location-based services (Edwards et al., 2006; Rasinger, Fuchs & Höpken, 2007, Tussyadiah, 2012). Indeed, numerous studies have supported the importance of mobile phones for tourists in terms of their roles in supporting and enhancing tourism experiences (Wang & Fesenmaier, 2013; Wang, Park & Fesenmaier, 2011). According to the concept of "functional triad" suggested by Fogg (1998; 2003), technology can have three different roles to persuade its users: as tools (e.g., by making activities easier and more efficient to do), as media (e.g., by providing users with vicarious experiences that motivate), and as social actors (e.g., by providing social support and rewarding users with positive feedback). The roles of mobile technology as tools and media have been widely researched in the context of travel and tourism (see Gretzel, 2011; Kabassi, 2010; Martin, Alzua, & Lamsfus, 2011). However, their role as social actors (i.e., an agent capable of conveying social cues to its users) has yet to be explored.

The idea that people have social perceptions of and relationships with technology has been around since the early 1980s (Turkle, 1984). In the context of human-computer interaction (HCI), the paradigm of Computers as Social Actors (CASA) suggests that when computing technology is designed to convey social cues such as conforming with social dynamics (e.g., displaying social behavior such as cooperation and reciprocity) and adopting and acting social roles (e.g., as a doctor, a teammate, an opponent, etc.), users respond socially to computing technology in the same manner as they respond to other people (Nass, Steuer, & Tauber, 1994; Nass et al., 1995). For example,

users often feel empathy toward a “helpful” computer or follow certain social rules when interacting with certain computing systems (e.g., taking turn, cooperating, etc.) (Fogg, 2003). In other words, people respond to computers as though they were living beings (Reeves & Nass, 1996). This behavior is believed to be automatic rather than rational (Fogg 1998; 2003) and is often rooted in people’s mindlessness when interacting with computers (Nass & Moon, 2000). Consequently, as computing technology fills the role traditionally held by humans, the persuasive effects of technology on users’ opinion and behavior can be comparable to those of human contacts, such as doctors promoting a healthy lifestyle or teachers motivating an active learning behavior. This indicates a great promise held by computers as motivational actors to influence and change users’ attitude and behavior in many different aspects of their life (Mumm & Mutlu, 2011).

From the technology design perspective, CASA studies are associated with the concept of anthropomorphism, which is the attribution of humanlike traits to non-human agents (Guthrie, 1993). Anthropomorphism has been an integral part of the design and use of technology (Marakas, Johnson & Palmer, 2000), including those of mobile devices such as mobile phones. As a matter of fact, a considerable amount of researchers have focused their emphasis on designing mobile devices to have humanlike characteristics (Lee, 2010; Schmeil & Broll, 2007). In 2011 Apple, Inc. introduced *Siri* (i.e., speech interpretation and recognition interface), a feature on their iPhone 4S devices that resembles a personal assistant who is capable of speaking, hearing and understanding commands, as well as completing delegated tasks (*apple.com*). A conversational personal assistant mobile application called *Winston* (*getwinston.com*) capable of briefing its users with relevant information daily was also launched in 2013. This prompts the significant potential social cues that people receive from mobile technologies that might lead them to interact socially (e.g., having a conversation, cooperating in finishing a task, etc.) with these devices on a daily basis. Eventually, this will cause users to form certain perception that mobile phones can be social actors, capable of

displaying social cues and, thus, adopting and acting human roles (e.g., as a teacher, a teammate, etc.).

Drawing from CASA researchers, Marakas, Johnson and Palmer (2000) developed a model called Computing Technology Continuum of Perspective (CTCP) in an attempt to explain the social roles of computing technology in the society at large. The continuum is considered to be anchored by individuals with a locally simplex perspective at one end (i.e., users who see computers as mere tools) and with a globally complex perspective at the other (i.e., users who believe computers have agency and can influence their lives). They suggest that most people interacting with computers do not reside at the extremes of the continuum, but somewhere in between (Johnson, Marakas, & Palmer, 2008). The application of CTCP in the context of mobile phones has not been explored. As mobile phones are often considered the most familiar technology due to its portability and connectivity (i.e., people use their mobile phone at home, at work, in the park, during commuting and traveling, etc.), testing the applicability of CTCP for mobile phones is considered important.

Furthermore, as tourists are displaced while traveling, the perceived support provided by mobile phones while experiencing tourism destinations could lead to persuasive influences on their behavior. Hence, a deeper understanding on tourists' social attribution to mobile phones will be valuable to better conceptualize the various social roles of information and communication technology (ICT) in supporting tourists' experience. Therefore, the goal of this study is to investigate the perceived social roles of mobile phones in the context of travel by applying the CTCP model (Johnson, Marakas & Palmer, 2006; 2008; Marakas, Johnson & Palmer, 2000). The results of this study provide an understanding of how mobile phones can be designed to convey social cues that might influence tourists' behavior.

2. THE SOCIAL ROLES OF COMPUTING TECHNOLOGY

People's daily communication with technology has been highly formalized by the metaphor personification of computers. People tend to anthropomorphize computers (i.e., treating them as living beings) in order to use them comfortably for work, so as to increase productivity, as well as for other daily activities. CASA researchers provide a considerable amount of evidence showing the social relationships between users and computers. For example, Fogg and Nass (1997) identified that praise from a computer to its users (e.g., a dialog box with positive feedback after completion of a task) generated positive effects similar to praise from people. The researchers reported that people who received praise from computers felt better about themselves, were in a better mood, felt more powerful, were more willing to work with the computer again, liked the computer more, etc. (Fogg, 2003). Nass et al. (1995) created computers that display dominant and submissive "personalities" and invited participants to work with these computers to solve a task. They found that participants preferred to work with technology whose personalities match their own (i.e., submissive people preferred submissive computers, dominant people preferred dominant computers). The findings suggested that computing technology can be designed to display social cues (e.g., physical, language, psychological, social dynamics, etc.) in order to motivate and persuade its users to perform specific behaviors and engage in particular experiences.

However, one of the main critiques of CASA research is the fact that most of their studies are experiments conducted in controlled laboratory settings. Hence, it is difficult to assume the applicability of their findings to a general use situation in the real world (Hall & Henningsen, 2008). To this end, Marakas, Johnson, and Palmer (2000) conceptualize a continuum of perspective with regards to computing technology in social settings that is anchored by two different viewpoints. At one end, there are those who view computing technology as locally simplex; they see computers as just machines, which are programmable, alterable, and controllable by humans (i.e., computers as

tools). At the other end, there are people who perceive computing technology as globally complex (i.e., incomprehensible); they see computers as outside entities that have agencies and autonomy (i.e., computers as social actors). People with locally simplex perspective are likely to carry their perspectives when interacting with technology and view themselves as an agent of causation of their behavior. In other words, they believe that technology has very little or nothing to do with their attitude, opinion, or performance. On the other hand, people with globally complex perspectives are likely to view the technology as responsible for their opinion, feeling, and behavior (i.e., technology causes them to do and think in a certain way) (Falaleeva & Johnson, 2002).

The theoretical lens of CTCP is rooted in attribution theory, a theory that focuses on how individuals interpret and ascribe causality to internal or environmental events (Heider, 1958; Weiner, 1985). The basic premise of attribution theory is that individuals develop causal explanations for significant events in their lives and an understanding of such causes will permit the individual to behave more adaptively (Hayes & Hesketh, 1989). The differences in individuals' attribution style contribute to their motivation, performance and reactions to various life experiences (Martinko, 1995). The central concept to explain the causal dimensions people use to bring forth explanations to their behavior is *perceived locus of causality* (PLOC), which differentiates between internal PLOC or internal attribution (i.e., an actor perceives that he/she is the "origin" of his/her behavior) and external PLOC or external attribution (i.e., the actor is a "pawn" to external forces) (DeCharms, 1968; Deci & Ryan, 1985; Kelley, 1973).

In the context of technology use, attribution theory has been applied in investigating perceived success or failure experiences in working with computers, anxiety with or resistance to technology, use and non-use of technology in working environment, health, education and e-learning, consumption experiences, and other contexts (Igbaria & Iivari, 1995; Karsten, 2002; Hung, Chang, & Hwang, 2011; You, Hung, Tsen & Wang, 2013; Zhu, Nakata, Shivakumar &

Grewal, 2013). These studies examined the effects of personal (i.e., internal PLOC) and external characteristics (i.e., external PLOC) on people's interactions and experiences with technologies. Igbaria and Iivari (1995) examined the effect of self-efficacy (i.e., belief in one's capability in using computers to accomplish tasks) on how individuals use computers. More recently, Zhu et al. (2013) investigated how individual characteristics, perceived control over technology, and interactivity (i.e., the characteristics of technology) influence consumer recovery from a failure with self-service technologies such as airport check-in kiosks. In summary, these studies identified internal and external attribution to explain different experiences with computing systems in different contexts. Drawing from the same theory, the CTCP model suggests that users' perception and behavior when interacting with technology are influenced by their personal characteristics (i.e., internal PLOC), the social characteristics of the technology (i.e., external PLOC), (Falaleeva & Johnson, 2002; Johnson, Marakas, & Palmer, 2006; Marakas, Johnson & Palmer, 2000), the situational contexts, and some combination of these.

To date, the context of CTCP research has been "the interaction between a person and some computing technology in a computer-mediated activity" (Johnson, Marakas & Palmer, 2008, p. 169). However, as mobile technology has becoming more and more prevalent in the society, it is of a great importance to investigate the applicability of this model to explain the social actor attribution to mobile phones. Considering the nature of mobile phone use (i.e., the fact that people carry the phone and touch it with their fingers all the time), it is argued that people display an emotional attachment to mobile phones, often referred to as mobile phone affinity. Researchers discovered that the feeling people get when they misplace their mobile phones is comparable to the feeling they get if a family pet goes missing (Kansas State University, 2011). Further, from a study using functional magnetic resonance imaging (fMRI) among 18 – 25 year old users with their iPhones as stimuli, Lindstrom (2011) found that the participants' brains responded to the sound of

their iPhones as they would respond to the presence of or proximity to their boyfriend/girlfriend or a family member. This indicates a strong perception of mobile phones as an important part of people's life. Hence, it is suggested that people place social actor attribution to mobile phones and perceive the social roles of mobile phones in their lives.

Following the Attribution Theory (Heider, 1958), the concept of PLOC (DeCharms, 1968), and CTCP (Johnson, Marakas & Palmer, 2006; 2008), Hypotheses 1a and 2a are suggested. Social actor attribution to mobile phones can be caused by users' characteristics (internal PLOC) and/or their perceived social characteristics of technology (external PLOC).

H1a: Perceived social characteristic of mobile phones has an impact on social actor attribution to mobile phones.

H2a: Users' personal characteristic has an impact on social actor attribution to mobile phones.

Nowadays, people turn to their mobile phones for support in unstructured or dead time (e.g., time spent waiting for the train or standing in line to get to a concert) and while traveling. Specifically, travel and tourism provides a context for various interactions between tourists and mobile phones that might result in decision making activities and behaviors that are important for tourism organizations. For example, recent studies found that the use of mobile phones by tourists has transformed the traditional three-stages of tourism experience: anticipatory – experiential – recollection (Wang & Fesenmaier, 2013). The use of mobile phones makes it possible for tourists to shorten or even bypass the planning process by making more on-site purchase decisions and to perform activities formerly associated with recollection purposes (e.g., posting pictures, reviews, etc.) while at the destination (Wang & Fesenmaier, 2013). Wang and Xiang (2012) categorize travel-related smartphone applications into macro-level (i.e., for travel panning) and micro-level (i.e., for travel experience enhancement). Based on user reviews of these applications, they further

assert that customers preferred applications that not only reduce decision-making efforts (i.e., indicating the roles of mobile phones as tools), but are also fun and helpful (i.e., indicating the potential of integrating social cues in the design of travel-related applications).

Tourism is seen as a form of temporary mobility characterized by social encounters and patterns of consumption of tourism destinations (Hall, 2004; Tussyadiah, 2012). More and more of these encounters and consumption experiences are mediated by technology (Tussyadiah & Fesenmaier, 2009). During traveling, mobility leads to the need for social support to ease possible stress due to displacement and detachment from social network (Kim & Tussyadiah, 2013). While tourists typically rely on others for support (i.e., close ties such as friends and family, locals, guides, and other tourists), tourists also increasingly use mobile phones to assist them with navigation and way-finding (Tussyadiah & Zach, 2012) and to provide contextual information to support meaningful encounters with and consumption of tourism destinations. Therefore, technology use for tourism experience provides a distinct situational context for social actor attribution to technology as mobile phones can adopt and act some of the roles traditionally held by humans, such as a personal tour guide or a concierge. At tourism destinations, tourists may engage in experiences that are extension and intensification of, or contrast from their everyday activities (Quan & Wang, 2004), which potentially allow for continuing, intensified or new interactions with mobile devices. These interactions will then result in users' perception of the social roles of mobile phones during traveling.

In addition to the locus of causation of social actor attribution being internal (i.e., caused by users' characteristics) and external (i.e., caused by mobile phones' characteristics) in a general setting, social actor attribution to mobile phones while traveling is influenced by situational contexts relevant to the circumstances of use and interactions (i.e., situation attribution). Hence, the

following hypotheses are suggested to capture the internal and external PLOC that cause social actor attribution to mobile phones in the context of travel:

H1b: Perceived social characteristic of mobile phones has an impact on perceived social roles of mobile phones in travel.

H2b: Users' personal characteristics has an impact on their perceived social roles of mobile phones in travel.

H3: The intensity of use of mobile phones in travel has an impact on perceived social roles of mobile phones in travel.

3. METHODOLOGY

This study attempts to apply the CTCP to mobile computing using mobile phones as context. First, the dimensions of Mobile Technology Continuum of Perspective (MTCP) was conceptualized and tested to explain the degree to which respondents place social actor attribution to mobile phones. Second, the influences of the social characteristics of mobile phones and the users' core self-evaluation were tested on the dimensions of MTCP (Model 1) to explain what causes social actor attribution to mobile phones in a general setting (i.e., using mobile phones for day-to-day activities). Third, to explain tourists' perceived social roles of mobile phones while traveling, the influences of the social characteristics of mobile phones, users' core self-evaluation and the contextual use of mobile phones for travel purposes on the perceived social roles of mobile phones while traveling (i.e., more than 50 miles away from home for leisure purposes) were tested (Model 2). The hypotheses were tested using previously validated constructs. Specifically, the measures used in this study are as follow (details of the measurement items can be found in Appendix):

a. Social Actor Attribution of Mobile Phones

To support the applicability of CTCP, a scale to measure social response to technology was developed (Johnson, Marakas & Palmer, 2008). It is argued that in order to fully understand the continuum, a deeper investigation toward the dimensions of users' beliefs of the characteristics of computing technology is necessary. Based on previous literature (e.g., Turkle, 1984; Sproull, Subramani, Kiesler & Walker, 1996), Marakas, Johnson and Palmer (2000) suggest three dimensions of computing technology characteristics: perceived socialness, intelligence, and control. Perceived socialness occurs when users interacting with computers sense that the technology is responding to their action. Perceived intelligence explains users' perception toward knowledge within technology. Finally, perceived control occurs when users perceive that their interaction with technology is directed or supervised by the technology (i.e., technology has control over the processes and outcomes of user-technology interactions). In a more recent study, Johnson, Marakas and Palmer (2008) conceptualized computing technology characteristics as having four dimensions by adding perceived emotion, which occurs when users sense an emotional reaction from the technology. Their scale development study resulted in 13 items measuring users' social responses to technology, which is found to be a multi-dimensional scale consisting of four dimensions: perceived intelligence, socialness, control, and control of rights. Three dimensions corresponding to the conceptual study (i.e., intelligence, socialness and control), were identified, one dimension (i.e., emotion) was dropped from the scale, and one dimension (i.e., control of rights, which was the extension to control) was added from the analysis.

The same scale has been used previously to test the conceptualized relationships in CTCP model (Falaleeva & Johnson, 2002; Johnson, Marakas & Palmer, 2006). However, inconsistent treatment of this scale was detected. For example, the dimensions of intelligence, socialness, and control were attributed to CTCP scale in their scale development study (Johnson, Marakas & Palmer, 2008); thus, the continuum of perspective was conceptualized as the degree of "social actor

attribution" (i.e., the extent to which users perceive that computers can act a human role). However, in another empirical analysis (Johnson, Marakas & Palmer, 2006), these dimensions were used to measure the social characteristics of technology, which was treated as a different construct from attribution. Based on the theoretical relevance of the scale and support from attribution theory, this study applies the continuum as social actor attribution scale following Johnson, Marakas and Palmer (2008).

The 13 items measuring Computing Technology CP developed in the study by Johnson, Marakas and Palmer (2008) were modified, reworded, and applied into mobile computing context. All items were presented in 5-point Likert-type scale with Agree–Disagree anchor statements. After a pilot study, confirmatory factor analysis was conducted to test the multidimensionality of the Mobile Technology CP (MTCP). The items loaded into three dimensions labeled as Perceived Intelligence, Perceived Socialness, and Perceived Control. Construct validity and reliability measures were consulted. Three items with factor loadings lower than .60 were excluded from further analysis; 10 items were retained for the construct. The MTCP scale represents the continuum of perspective that explains the degree to which respondents believe that mobile phones can have social roles.

b. Perceived Social Characters of Mobile Phones

To capture the perceived social characters of mobile technology, 20 participants in a series of focus group discussions about mobile technology in travel, conducted in a metropolitan area of East Coast US from October 2010 to February of 2011, were asked to describe the personified characteristics of their mobile phones. This resulted in 32 keywords expressing positive and negative characters of mobile phones (e.g., arrogant, trusting, etc.). All keywords were integrated into the first draft of questionnaire. After an evaluation by a panel of experts in tourism and ICT, the list was shortened using random generator into 16 keywords in order to increase responses in the main survey. After a

pilot study, the list was finalized at 14 items, retaining those with factor loadings of .60 or higher. All items were presented in 5-point Likert-type scale with Agree–Disagree anchor statements. The items loaded into two constructs: Positive Characters and Negative Characters.

c. Users' Personal Characteristics

Following Johnson, Marakas and Palmer (2008), core self-evaluation (CSE) scale was used to measure users' personal characteristics. Core self-evaluation is a stable measurement representing personality traits that encompass individuals' assessment about themselves, their own ability, and their own control over outcomes of life events (Judge, Locke, and Durham, 1997; Judge et al., 2002; Chang et al., 2012). It contains four dimensions: neuroticism, locus of control, self-esteem, and self-efficacy. In line with Judge, Locke and Durham's (1997) study that suggest the core self-evaluations as a single scale, previous CTCP studies treated core self-evaluations scale as a measure representing an individual's collection of fundamental, global psychological evaluations of themselves within the domain of computing technology (Johnson, 2001; Falaleeva & Johnson, 2002). However, as supported by attribution theory, Falaleeva and Johnson (2002) suggest that each component of individual's core self-evaluation plays a role in influencing attributions toward technology. Hence, this study uses four constructs to measure the four dimensions of core self-evaluation and estimates the individual relationship of each dimension of the core self-evaluation with the social actor attribution to mobile phones (H2a).

- *Neuroticism.* Neuroticism explains personality traits that are associated with anxiety, moodiness, worries, and jealousy (Thomson, 2008). Individuals with a high degree of neuroticism tend to be internally insecure, highly dependent and helpless (Costa & McCrae, 1988) and, thus, would be more likely to depend on circumstances and external forces. It can be suggested that, in the context of user – mobile phone interactions, uses with higher neuroticism would have a higher tendency to attribute social actions towards mobile phones.

Eight items from Eysenck personality inventory neuroticism scale (Eysenck & Eysenck, 1968) were used to represent neuroticism. All items were presented in 5-point Likert-type scale with Agree–Disagree anchor statements.

- *Locus of Control.* The theory of locus of control (Rotter, 1954) postulates that an individual's "locus" is either internal (i.e., people controls their life) or external (i.e., people's life is controlled by others). Compared with attribution theory, locus of control is typically linked with expectancies about outcomes of the future (Judge, Locke, & Durham, 1997), such as outcomes of decisions and performance. In CTCP research, it is hypothesized that users with internal locus of control will attribute the outcomes of user – technology interactions with factors within themselves. In contrast, users with external locus of control will attribute interaction outcomes with factors within technology or the circumstances (Marakas, Johnson, & Palmer, 2000; Falaleeva & Johnson, 2002). In summary, users with external locus of control tend to make social actor attribution to mobile phones. Seven items measuring locus of control from Levenson's (1973) scale were adopted. All items were presented in 5-point Likert-type scale with Agree–Disagree anchor statements.

- *Self-Esteem*. In psychology, self-esteem is believed to be an enduring personal characteristic that reflects an individual's assessment toward their own worth (Judge, Locke, & Durham, 1997). People with high self-esteem sees themselves more positively in terms of ability and, in the context of users – mobile phones interactions, would be more likely to place themselves as the locus of causation for their behaviour and opinion. Self-esteem was measured initially using seven items from Rosenberg's (1965) scale. However, three items with extremely low factor loadings were omitted from further analysis. All items were presented in 5-point Likert-type scale with Agree–Disagree anchor statements.

- *Self-Efficacy.* Self-efficacy refers to an individual's belief on his/her own ability to complete tasks or to reach goals (Ormrod, 2006). In the domain of computing technology, studies suggest that higher self-efficacy leads to internal attribution, in that people who believe that they are capable of using computer technology to achieve their goals perceive that the outcomes of their interaction with technology is attributed to them. Since self-efficacy scale is associated with specific use context (i.e., domain specific), seven items measuring the generalized computing self-efficacy (GCSE) used in previous CTCP studies (Marakas, Yi, & Johnson, 1998; Marakas, Johnson & Palmer, 2000; Johnson, 2001) were reworded and adapted into mobile phone context (i.e., labeled as mobile technology self-efficacy (MTSE)). All items were presented in 5-point Likert-type scale with Agree–Disagree anchor statements.

d. Mobile Phone Use for Travel

To measure the intensity of use of mobile phones while traveling, four items measuring the frequency of use of mobile phones were developed based on a previous study by Tussyadiah and Zach (2012) on the use of geo-based technology for travel. These items correspond to the functionalities and applications of mobile phones typically used for direction and navigation, information search, social networking, and general communication. The items were measured by 5-point scale from Never to Always.

e. Perceived Social Roles of Mobile Phones in Travel

The same group of participants in a series of focus group discussions about mobile technology in travel was asked to describe the roles of their mobile phones in travel. This effort resulted in three items that describe the social roles of mobile phones for tourists on the move, which include a companion (i.e., who accompanies), a personal assistant (i.e., who gives assistance), and a personal

guide/mentor (i.e., who gives guidance) tourists to experience tourism destinations. All items were presented in 5-point Likert-type scale with Agree–Disagree anchor statements.

A pilot study to test the reliability of measurement items was conducted from December 21 – 31, 2011 with convenience sampling through social media channels resulted in 111 respondents. After accommodating necessary adjustments to the questionnaire, the main survey was conducted from March 20 – 30, 2012. An invitation to participate in the survey was distributed to 10000 email addresses of American travelers who have requested travel-related information through *vacationfun.com*, resulting in 355 completed responses (a total of 3.5% response rate). The majority of respondents were female (71%) and older, with 29.1% between the ages of 55 and 64 years, 27.7% between 45 and 54 years old, and about 31% respondents were younger than 45 years old. Respondents were highly educated, with 34.6% holding Graduate or Advanced Degree and 30.6% Bachelor's Degree. Most respondents (84%) have been using a mobile phone for more than five years. In terms of mobile devices, 54.2% respondents use smart phones (e.g., iPhone, Android, Blackberry, etc.) and the rest of them use feature phones. To measure the hypothesized relationships, path analysis was conducted using Mplus software (Muthén & Muthén, 1998-2011). To date, there is limited empirical support to the CTCP model and only parts of the conceptualized relationships have been tested. A simultaneous examination to explain the causal relationships between different variables through path analysis will be useful in strengthening the theoretical framework of CTCP model and its adaptation to mobile computing context. Several model fit indices were consulted: Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) of .90 or higher (Hu & Bentler, 1999), root mean square error of approximation (RMSEA) up to .08 (Bagozzi & Yi, 1988).

4. RESULTS AND DISCUSSION

Before testing the hypothesized relationships, the constructs' composite reliabilities (CR) and the average variance extracted (AVE) were calculated to assess internal consistency, reliability, convergent validity, and discriminant validity of the construct measurements. As seen in Table 1, composite reliability scores for every construct are well above .70, which is the suggested benchmark for acceptable reliability (Chin, 1998). Additionally, the AVEs of all constructs are also above the cut-off point of .50, which is an indication of convergent validity (Dillon & Goldstein, 1984; Fornell & Larcker, 1981). All of the items have loadings at .60 or above with *t*-statistic significant at $p \leq .01$. These results indicate that the measurement model displays both internal consistency reliability and item convergent validity. The scale items loadings on their assigned construct are larger than their loading on any other latent variable, which support discriminant validity (individual factor loadings are not reported due to space limitation). Additionally, AVE square roots that appear in the diagonal in Table 2 are larger than any correlation between the associated construct and any other construct (Chin, 1998), which suggests that the measurement model displays discriminant validity.

== Table 1 about here ==

== Table 2 about here ==

Several independent-samples t-tests were conducted to identify mean differences for different constructs among different respondents and technology devices. In terms of social characters of mobile phones, a significant mean difference was found between smart phones and feature phones in terms of Positive Characters (smart phones *M* (*s.d.*) = 2.43 (1.04), feature phones *M* (*s.d.*) = 1.96 (.97), $t = 4.28$ ($p < .001$)). However, no significant difference was found in terms of Negative Characters. Regarding core self-evaluation, the majority of respondents evaluated themselves quite

high in terms of self-efficacy related with mobile phones (i.e., they know how to use mobile phones to their fullest capacity), relatively low in neuroticism (i.e., they are more emotionally stable and less reactive to stress), relatively low in locus of control, which suggests low external orientation (i.e., they are less likely to attribute the outcomes of events on external circumstances) and relatively high in self-esteem. Mean differences were observed between respondents who are younger than 45 years old and those who are 45 or older in terms of neuroticism and MTSE. Older respondents have lower neuroticism, indicating higher emotional stability. On the other hand, younger respondents exhibit higher MTSE than older respondents (see Table 3). No significant difference was found among other demographic variables.

== Table 3 about here ==

To identify the mean differences in terms of MTCP among different groups of respondents, several independent-samples t-tests were conducted (see Table 4). Significant differences were found between respondents younger than 45 years old and those of 45 years or older in terms of perceived intelligence; the level of perception toward intelligence of mobile phones is higher among younger respondents. Significant mean differences were also found between respondents who use smart phones and those using feature mobile phones in terms of perceived intelligence and perceived socialness, with smart phone users exhibit a higher level of perception.

== Table 4 about here ==

It can be observed that smart phone users used their phones more frequently for different functionalities during traveling than feature phone users (smart phones M ($s.d.$) = 3.32 (.94), feature phones M ($s.d.$) = 1.46 (.58), t = 21.59 ($p < .001$)). As seen in Table 5, significant differences were also found in all items measuring the intensity of mobile phone use in travel, which include various travel activities supported by the functionalities of mobile phones (e.g., navigation and way-finding,

information search, sharing experiences, etc.). Significant differences were also identified between respondents who are younger than 45 and those who are 45 years or older characters (<45 years *M* (*s.d.*) = 3.05 (1.17), feature phones *M* (*s.d.*) = 2.16 (1.13), t = -6.78 ($p < .001$)), even though the mean differences are smaller than those between the smart phone and feature phone user groups. This indicates that younger respondents tend to use their mobile phones more often during traveling.

== Table 5 about here ==

The measurement model to test the hypothesized effects of perceived social characteristics of mobile phones and core self-evaluation on social actor attribution to mobile phones (Model 1) is presented in Figure 1. For legibility of the figure, non-significant relationships among variables are not pictured and the item-to-construct loadings are presented in Table 6. The fit indices indicate a good model fit with *CFI* = .91, *TLI* = .90, *RMSEA* = .06, and *SRMR* = .05. Significant effects on Perceived Intelligence (R^2 = .29, $p < .001$) were identified from both constructs representing the social characteristics of mobile phones: Positive Characters (β = .41, $p < .001$) and Negative Characters of mobile phones (β = -.23, $p < .001$), as well as two constructs representing core self-evaluation of users: MTSE (β = .30, $p < .001$), and self-esteem (β = -.12, $p < .05$). The positive effects of Positive Characters and MTSE suggest that the more users perceived that mobile phones possess positive social characteristics and the more they believe that they are capable of dealing with mobile phones, the more they would perceive that mobile phones are intelligent. On the other hand, negative influences of Negative Characters and Self-Esteem indicate that the lower users view that mobile phones are exhibiting negative social cues and the lower their self-esteem, the more they would attribute intelligence to mobile phones. Significant influences from Positive Characters (β = .69, $p < .001$) and Negative Characters of mobile phones (β = -.16, $p < .01$) were identified on Perceived Socialness (R^2 = .42, $p < .001$), indicating that socialness is attributed to mobile phones

displaying higher positive social characteristics and lower on negative characteristics. Lastly, significant influences of Negative Characters of mobile phones ($\beta = .26$, $p < .001$) and Locus of Control ($\beta = .15$, $p < .05$) were found on Perceived Control of mobile phones ($R^2 = .13$, $p < .001$). This indicates that the more users perceived that mobile phones show negative social characters, the more they are perceived as controlling the outcomes of user – mobile phone interactions. Also, it confirms that external locus of control (i.e., those who will attribute causation of events on external environments) lead to attribution to mobile phones as an agency capable of controlling interactions among them. These results provide support for *H1a* (the impacts of social characteristics of mobile phones on social actor attribution of mobile phones were identified) and partial support for *H2a* (the impacts of user core self-evaluation on social actor attribution of mobile phones were partially identified).

== Figure 1 about here ==

== Table 6 about here ==

Additionally, several significant correlations were identified from the model. Within the social characteristics of mobile phones, significant positive correlation among Positive Characters and Negative Characters of mobile phones was identified ($r = .56$, $p < .001$), indicating that the two perceived characters are associated with each other. Within the core self-evaluation, Neuroticism is positively correlated with Locus of Control ($r = .52$, $p < .001$), strongly indicating that those with lower emotional stability (i.e., higher in neuroticism) tend to have a higher external locus of control (i.e., blame external environment for life events). Neuroticism is negatively correlated with Self-Esteem ($r = -.34$, $p < .001$) and with MTSE ($r = -.13$, $p < .05$), indicating that lower emotional stability is associated with lower self-esteem and perception of own ability to use mobile technology to its fullest capacity. MTSE has a negative correlation with Locus of Control ($r = -.14$, $p < .05$) and a positive correlation with Self-Esteem ($r = .31$, $p < .001$); indicating that higher

capability in dealing with mobile phones is associated with higher self-esteem and higher internal locus of control. Finally, Locus of Control is negatively correlated with Self-Esteem (r = -.32, p < .001), suggesting that users with high self-esteem tend to have more internal locus of control (i.e., attributing the causation of event to themselves).

Significant correlations were also found among the constructs of users' core self-evaluation and mobile phones characteristics. Positive Characters of mobile phones construct is positively correlated with MTSE (r = .10, p < .01) and Locus of Control (r = .29, p < .001), suggesting that the perception of positive characters of mobile phones is associated with higher self-efficacy and external locus of control of their users. Negative Characters of mobile phones construct is positively correlated with Neuroticism (r = .14, p < .05) and Locus of Control (r = .29, p < .001) and negatively with Self-Esteem (r = -.26, p < .001). That is, the perception of negative social characteristics of mobile phones is associated with lower emotional stability, higher external locus of control, and lower self-esteem of their users. Finally, among the dimensions of MTCP, Perceived Intelligence is significantly correlated with Perceived Socialness (r = .41, p < .001) and Perceived Control (r = .31, p < .001).

Model 2 tested the hypotheses surrounding the social roles of mobile phones in travel (see Figure 2). Specifically, the model measures the effects of social characteristics of mobile phones, users' core self-evaluation and the intensity of use of mobile phones for travel-related activities on the social roles of mobile phones in travel. For legibility of the figure, non-significant relationships among variables are not pictured. The fit indices indicate a good model fit with *CFI* = .90, *TLI* = .90, *RMSEA* = .06, and *SRMR* = .06. In terms of MTCP, Perceived Intelligence (R^2 = .29, p < .001) was significantly influenced by Positive Characters (β = .41, p < .001) and Negative Characters of mobile phones (β = -.23, p < .001) as well as MTSE (β = .30, p < .001) and Self-Esteem (β = .12, p < .05). Perceived Socialness (R^2 = .42, p < .05) was influenced positively by Positive Characters (β

= .69, $p < .001$) and negatively by Negative Characters of mobile phones ($\beta = -.16$, $p < .01$). Lastly, Perceived Control ($R^2 = .16$, $p < .001$) was significantly influenced by Negative Characters ($\beta = .26$, $p < .001$) and Locus of Control ($\beta = .15$, $p < .05$).

== Figure 2 about here ==

== Table 7 about here ==

In terms of the Social Roles of mobile phones during traveling, significant effects were found from Positive Characters of mobile phones ($\beta = .33$, $p < .001$) and Mobile Use for travel ($\beta = .76$, $p < .001$). This indicates that tourists' behavior to attribute social roles of mobile phones while traveling is highly dependent on whether they use mobile phones more intensively during traveling and if their mobile phones are perceived to display strong positive social characteristics that allow for frequent social interactions between the tourists and their mobile phones (*H1b* and *H3* was supported). None of the users' core self-evaluation was identified to significantly impact the Social Roles of mobile phones in travel. This suggests that, while users' characteristics are important in influencing the society's perspective on mobile phones in general, the effects of users' characteristics diminish in travel settings (*H2b* was not supported).

The Social Roles of mobile phones for travel is also significantly correlated with Perceived Intelligence ($r = .40$, $p < .001$) and Perceived Socialness ($r = .32$, $p < .001$), indicating that users with globally complex perspective who regard their mobile phones as smart and friendly are associated with higher social roles attribution to mobile phones while traveling. The same significant correlations were also identified in Model 2 among different constructs of social characteristics of mobile phones and users' core self-evaluation as in Model 1. Additionally, Mobile Use for travel is significantly correlated with Positive Characters of mobile phones ($r = .40$, $p < .001$), users' MTSE ($r = .40$, $p < .001$) and the Perceived Intelligence of mobile phones ($r = .16$, $p <$

.001). The correlations indicate that frequent/intense use of mobile phones for travel-related activities is associated with those who are highly capable in working with mobile technology, mobile phones with stronger positive social cues, and the higher attribution of intelligence to mobile technology.

5. CONCLUSION AND IMPLICATION

This study provides empirical evidence supporting the application of CTCP model to mobile technology. The MTCP captured three dimensions of social actor attribution to mobile phones among users: perceived intelligence, perceived socialness, and perceived control. Most respondents perceive their mobile phones as highly intelligent (i.e., closer to globally complex perspective), neutral in terms of control, and relatively low in terms of socialness (i.e., closer to locally simplex perspective). The results provide support for the supposition that mobile phones are perceived by some groups of users as having humanlike characteristics and, hence, to some extent are considered social actors, which confirms the previous studies on CASA and CTCP. To examine the locus of causation of such social attribution to mobile phones, the effects of the social characters of mobile phones and respondents' core self-evaluation on the three dimensions of MTCP were tested. The results demonstrate that the social characteristics of mobile phones have significant effects on users' social attribution to mobile phones. Mobile phones revealing strong positive social characters (e.g., friendly, kind, polite) to their users will lead to a higher attribution of intelligence and socialness to the devices. On the other hand, mobile phones with negative social cues (e.g., arrogant, mean, rude) will lead to a higher attribution of control and lower attribution of intelligence and socialness. This demonstrates the external locus of causation, in which users' social actor attribution to mobile phones is caused by the characteristics of the technology and devices. In other words, users perceived that mobile phones are capable of interacting socially with the users because of the attributes inherent to the phones. The implication of this result is the importance of

anthropomorphism in the designing of mobile technology in order to increase the persuasive power of mobile phones to its users. To increase the persuasive power of mobile phones in general use situation, it is important to design mobile phones that display positive social characters, which can be achieved through designing social cues through physical characteristics (i.e., the "look" of the mobile phones), personality, language, social dynamics (i.e., the "manners"), etc., which support Fogg's (1998) design for computers as persuasive social actors.

From users' core self-evaluation, self-esteem and self-efficacy were found to be significant predictors of the intelligence attribution to mobile phones. Social actor attribution to mobile phones is determined by the extent to which users are confident in themselves and capable of working with mobile phones without issues. In other words, those who know how to deal with mobile phones will understand the technologies' fullest capacity and, thus, perceive mobile phones as intelligent social actors who will provide guidance for them when needed and hold intelligent conversations with them. The attribution of control to mobile phones is influenced by users' internal or external locus of control. Higher perceived control of mobile phones over user – phone interactions is caused by users' tendency to blame others for various events in their life (i.e., external locus of control). This demonstrates the internal locus of causation, in which users attribute their behavior on their own attributes.

Further, to provide a deeper understanding on what prompted tourists to respond socially to mobile phones in the context of travel, the effects of social characteristics, users' core self-evaluation and mobile use for travel on social roles of mobile phones in travel were tested. While the same effects were found on the dimensions of MTCP, the perceived social roles of mobile phones in travel is determined by two factors: the characteristics of the phones and the intensity of use of the phones for travel-related purposes. Attributing social roles to mobile phones in the context of travel is highly affected by the intensity of use of mobile phones for travel-related

activities. The more tourists turn to mobile phones to assist them with various tasks at a destination (e.g., give them direction and information, navigate them around, etc.), the more they tend to interact socially with their mobile phones, which leads to social attribution (i.e., mobile phones as travel buddies or personal travel guides). This supports the concept of situation attribution (i.e., attributing individuals' behavior to the circumstance of use), in that tourists have social interactions with mobile phones due to the situational context of travel. None of core self-evaluation constructs showed significant effects on social roles of mobile phones in travel. This indicates that even though people's characteristics influence their perception and behavior toward mobile technology in general, these influences are not significant in the context of travel. This also suggests that regardless of their emotional stability, capability, confidence, and orientation of control, people may demonstrate a tendency to anthropomorphize technology as long as the design of the technology and the circumstances allow.

Other important findings supporting the design of mobile technology for travel are the factors associated with tourists' use of mobile phones in travel. Mobile phone use by tourists is associated with the attributes of the mobile phones (i.e., whether they are demonstrating positive social characteristics), the intelligence attribution to mobile phones and users' mobile technology self-efficacy. Respondents who are highly capable in working with mobile phones and perceived that their mobile phones are intelligent and socially pleasant tend to use their mobile phones more frequently when they travel.

With these findings, this study supports and extends the results from CASA researchers by applying the concepts outside the laboratory settings into real use situations (i.e., the travel context) using commonly-used consumer devices (i.e., mobile phones), hence adds to the generalizability of the results. Specifically, the findings emphasize the importance of the technology characteristics and use situation to stimulate social interactions between users and technology in the context of

travel, regardless of users' personality or characteristics. By examining the social attribution to mobile phones in both general and travel context, this study provides an explanation to how travel can stimulate different patterns of user – technology interaction. Previous studies found that patterns of use of and interactions with technology in everyday life can extend to and influence those in the travel context (Tussyadiah & Zach, 2012; Wang & Fesenmaier, 2013). This study confirms that travel context shapes and transforms HCI, emphasizing the persuasive power of technology for tourists on the move. It is important to note that the demographic characteristics of respondents in this study are slightly different to the previous studies on CASA or social attribution to mobile phones; most respondents in previous studies were younger (i.e., college students), while most respondents in this study were older. However, statistical tests showed no significant effects of age and other demographic characteristics on social actor attribution to mobile phones. Future research should capture more general demographic characteristics to support generalizability of the findings. Additionally, it is also important to note that the response rate in this study is quite low (3.5%), which can be attributed to the nature of the study panel who potentially received numerous invitations to participate in similar studies. While this may contribute to a possible bias with the study findings, the number of respondents is sufficient to draw inference from the statistical tests.

As a managerial implication, the results support the relevance of attaching humanlike characteristics in the designing of mobile technology devices, applications, and features, as well as different functionalities of mobile technology for tourism and travel contexts. Consequently, destination marketers embracing mobile technology for persuasion, especially in influencing on-site consumption decisions, should consider designing mobile technology that suggest high intelligence, socialness, and express positive social cues. Mobile phones that convey the characteristics of a travel buddy, capable of giving not only the necessary information and recommendation, but also engaging in a friendly conversation will potentially have the power to influence what tourists think

and do. As mobile technology continues to evolve into smart devices with open platform supporting third party applications, attaching these social characteristics to mobile technology can also be achieved effectively through the design of mobile phone applications for travel. In other words, smart mobile devices and mobile applications that act as travel companions should be developed to provide social support and increase the persuasive power of mobile phones for tourists.

Even though CASA research has been around since early 1990s, this area of research is still in need of further exploration. While this study provide empirical support for the applicability of CTCP model by testing the hypothesized internal and external attribution to explain people's perception of the social roles of mobile phones, future research applying the model to different use situations will strengthen the theoretical model. Finally, CTCP researchers have also attempted to reformulate the relationships among the variables in the model by treating CTCP as a mediating variable on the relationship between core self-evaluation and attribution (Fallaleeva & Johnson, 2002). However, no empirical support was presented. Future research should explore and elaborate this issue further.

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APPENDIX A. Measurement Items

Positive Social Characters of Mobile Phones (PC) – self-developed

PC1 – My cell phone is empathetic.

PC2 – My cell phone is friendly.

PC3 – My cell phone is kind.

PC4 – My cell phone is persuasive.

PC5 – My cell phone is polite.

PC6 – My cell phone is sensitive.

PC7 – My cell phone is trusting.

Negative Social Characters of Mobile Phones (NC) – self-developed

NC1 – My cell phone is arrogant.

NC2 – My cell phone is frigid.

NC3 – My cell phone is grumpy.

NC4 – My cell phone is judgmental.

NC5 – My cell phone is manipulative.

NC6 – My cell phone is mean.

NC7 – My cell phone is rude.

Neuroticism (NE) – Eysenck & Eysenck (1967)

NE1 – I often feel lonely.

NE2 – My feelings are easily hurt.

NE3 – My mood often goes up and down.

NE4 – I am often troubled by feelings of guilt.

NE5 – I am an irritable person.

NE6 – I often feel 'fed up'.

NE7 – I am often tense of high strung.

NE8 – Sometimes I feel miserable for no reason.

Mobile Technology Self-Efficacy (MTSE) – Adapted from Johnson, Marakas & Palmer (2008)

MT1 – I believe I have the ability to make a brand new cell phone work.

MT2 – I believe I have the ability to describe how a cell phone works.

MT3 – I believe I have the ability to install new apps on a cell phone.

MT4 – I believe I have the ability to identify and correct common operational problems on a cell phone.

MT5 – I believe I have the ability to remove information from a cell phone that I no longer need.

MT6 – I believe I have the ability to use a cell phone to search and display information in a desired manner.

MT7 – I believe I have the ability to use a cell phone for its fullest capacity.

Locus of Control (LC) – Levenson (1973)

LC1 – It's chiefly a matter of fate whether or not I have a few friends or many friends.

LC2 – It's not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune.

LC3 – Even if I were a good leader, I would not be made a leader unless I play up to those in positions of power.

LC4 – Often there is no chance of protecting my personal interest from bad luck happening.

LC5 – I feel like what happens in my life is mostly determined by powerful people.

LC6 – My life is chiefly controlled by powerful others.

LC7 – Whether or not I get to be a leader depends on whether or not I'm lucky enough to be in the right place at the right time.

Self-Esteem (SE) – Rosenberg (1965), positive statements

SE1 – On the whole, I am satisfied with myself.

SE2 – I am able to do things as well as most people.

SE3 – I feel that I have a number of good qualities.

SE4 – I feel that I am a person of worth, at least on an equal plane with others.

Mobile Technology Continuum of Perspective (MTCP) – adapted from Johnson, Marakas & Palmer (2008)

Perceived Intelligence of Mobile Phones (PI)

PI1 – Cell phones are capable of telling people to navigate around an unfamiliar city.

PI2 – Cell phones are capable of effectively guiding and educating people.

PI3 – Cell phones are capable of facilitating a simultaneous discussion among many people.

PI4 – Cell phones are capable of remembering things.

PI5 – Cell phones are capable of telling us the answers when we have questions.

Perceived Socialness of Mobile Phones (PS)

PS1 – Cell phones are capable of learning from their experiences.

PS2 – Cell phones are capable of holding intelligent conversations.

PS3 – Cell phones are capable of caring for people.

Perceived Control of Mobile Phones (PC)

PC1 – Cell phones are capable of infringing on personal rights and freedom.

PC2 – Cell phones are capable of invading privacy.

Mobile Phone Use for Travel (MU) – Adapted from Tussyadiah and Zach (2012)

MU1 – Using mobile maps for navigation and way-finding.

MU2 – Using mobile apps to search for information regarding attractions, restaurants, etc.

MU3 – Using mobile guides or destination apps to learn more about the place.

MU4 – Using mobile social media to find and share recommendation.

MU5 – Recording travel experiences by taking pictures, videos, etc.

Social Roles of Mobile Phones in Travel (SR) – self-developed

SR1 – When I travel, I see my cell phone as my friend. It accompanies me to experience places.

SR2 – When I travel, I see my cell phone as my personal guide. It guides me to experience places.

SR3 – When I travel, I see my cell phone as my personal assistant. It assists me to experience places.

Table 1. Internal Consistency, Composite Reliability and Average Variance Extracted

Construct	Number of Items	Mean (SD)	Chronbach's Alpha	CR	AVE
Perceived Intelligence	5	3.59 (0.80)	.84	.85	.53
Perceived Socialness	3	2.17 (0.98)	.86	.86	.68
Perceived Control	2	3.00 (1.24)	.87	.88	.78
Negative Characters	7	1.81 (0.90)	.98	.98	.90
Positive Characters	7	2.20 (1.03)	.96	.96	.79
Neuroticism	8	2.25 (0.85)	.91	.91	.56
MTSE	5	3.63 (0.92)	.92	.92	.64
Locus of Control	5	2.16 (0.75)	.86	.88	.53
Self-Esteem	7	4.25 (0.57)	.81	.82	.55
Mobile Use for Travel	4	2.45 (1.22)	.92	.92	.70
Social Roles in Travel	3	2.75 (1.19)	.88	.89	.73

Table 2. Correlations and Square Roots of AVE

Construct	1	2	3	4	5	6	7	8	9	10	11
(1) Perceived Intelligence	**.73**										
(2) Perceived Socialness	.30	**.82**									
(3) Perceived Control	.23	.16	**.88**								
(4) Negative Characters	.03	.21	.33	**.95**							
(5) Positive Characters	.22	.55	.26	.49	**.89**						
(6) Neuroticism	.00	.07	.11	.09	.06	**.75**					
(7) MTSE	.23	.06	.01	-.06	.13	-.07	**.80**				
(8) Locus of Control	.01	.14	.16	.15	.15	.20	-.06	**.73**			
(9) Self-Esteem	.07	.02	-.01	-.11	-.04	-.11	.12	-.08	**.74**		
(10) Mobile Use for Travel	.33	.24	.02	.03	.33	-.04	.46	.02	.03	**.84**	
(11) Social Roles in Travel	.38	.44	.09	.14	.46	.05	.28	.09	-.01	.74	**.85**

Note: the diagonal represents square roots of AVE

Table 3. Independent-Samples t-test for Respondents' Core Self-Evaluation

Constructs	Age of Respondents		t (Sig.) df = 352
	< 45 y.o. N = 113	≥ 45 y.o. N = 241	
	Mean (s.d.)	Mean (s.d.)	
Neuroticism	2.50 (.91)	2.12 (.80)	-3.99 (.00)
MTSE	4.01 (.71)	3.45 (.95)	-3.56 (.00)
Locus of Control	2.17 (.70)	2.09 (.77)	n.s.
Self-Esteem	4.18 (.51)	4.27 (.60)	n.s.

Table 4. Independent-Samples t-test for Mobile Technology Continuum of Perspective

Constructs	Age of Respondents		t (Sig.) df = 352
	< 45 y.o. N = 113	≥ 45 y.o. N = 241	
	Mean (s.d.)	Mean (s.d.)	
Perceived Intelligence	3.75 (.74)	3.51 (.82)	-2.66 (.01)
Perceived Socialness	2.16 (.95)	2.16 (.98)	n.s.
Perceived Control	3.00 (1.21)	3.00 (1.26)	n.s.
Constructs	Types of Mobile Phones		t (Sig.) df = 342
	Smart Phones N = 186	Feature Phones N = 158	
	Mean (s.d.)	Mean (s.d.)	
Perceived Intelligence	3.76 (.70)	3.38 (.87)	4.48 (.00)
Perceived Socialness	2.30 (.98)	2.04 (.97)	2.38 (.02)
Perceived Control	3.03 (1.23)	2.93 (1.26)	n.s.

Table 5. Independent-Samples t-test for the Intensity of Use of Mobile Phones for Travel

Items	Age of Respondents		
	< 45 y.o. N = 113	≥ 45 y.o. N = 241	t (Sig.) df = 352
Using mobile maps for navigation and way-finding.	3.04 (1.44)	2.02 (1.30)	-6.62 (.00)
Using mobile apps to search for information regarding attractions, restaurants, etc.	3.08 (1.44)	2.15 (1.44)	-5.63 (.00)
Using mobile guides or destination apps to learn more about the place.	2.58 (1.30)	1.97 (1.32)	-4.12 (.00)
Using mobile social media to find and share recommendations.	2.70 (1.49)	1.70 (1.18)	-6.63 (.00)
Recording experiences by taking pictures, videos, etc.	3.85 (1.13)	2.98 (1.40)	-5.75 (.00)

Items	Types of Mobile Phones		
	Smart Phones N = 186	Feature Phones N = 158	t (Sig.) df = 342
Using mobile maps for navigation and way-finding.	3.29 (1.21)	1.23 (.68)	19.06 (.00)
Using mobile apps to search for information regarding attractions, restaurants, etc.	3.52 (1.19)	1.25 (.74)	20.84 (.00)
Using mobile guides or destination apps to learn more about the place.	3.03 (1.21)	1.20 (.66)	17.00 (.00)
Using mobile social media to find and share recommendations.	2.81 (1.41)	1.15 (.55)	13.93 (.00)
Recording experiences by taking pictures, videos, etc.	3.95 (1.02)	2.47 (1.30)	11.77 (.00)

Table 6. Item-to-Construct Loadings for Model 1

Positive Characters		**Negative Characters**		**MTSE**		**Neuroticism**		**Locus of Control**	
Item	Loading	Item	Loading	Item	Loading	Item	Loading	Item	Loading
PC1	.92***	NC1	.95***	MT1	.77***	NE1	.67***	LC1	.58***
PC2	.85***	NC2	.92***	MT2	.76***	NE2	.70***	LC2	.73***
PC3	.94***	NC3	.94***	MT3	.85***	NE3	.84***	LC3	.73***
PC4	.88***	NC4	.96***	MT4	.83***	NE4	.71***	LC4	.70***
PC5	.86***	NC5	.94***	MT5	.75***	NE5	.76***	LC5	.80***
PC6	.91***	NC6	.98***	MT6	.81***	NE6	.75***	LC6	.80***
PC7	.87***	NC7	.94***	MT7	.80***	NE7	.77***	LC7	.73***
						NE8	.76***		

Self-Esteem		**P. Intelligence**		**P. Socialness**		**P. Control**	
Item	Loading	Item	Loading	Item	Loading	Item	Loading
SE1	.56***	PI1	.77***	PS1	.83***	PC1	.91***
SE2	.60***	PI2	.83***	PS2	.89***	PC2	.84***
SE3	.86***	PI3	.72***	PS3	.73***		
SE4	.90***	PI4	.67***				
		PI5	.64***				

Table 7. Item-to-Construct Loadings for Model 2

Positive Characters		**Negative Characters**		**MTSE**		**Neuroticism**		**Locus of Control**	
Item	Loading	Item	Loading	Item	Loading	Item	Loading	Item	Loading
PC1	.92***	NC1	.95***	MT1	.76***	NE1	.67***	LC1	.58***
PC2	.85***	NC2	.92***	MT2	.76***	NE2	.70***	LC2	.73***
PC3	.95***	NC3	.94***	MT3	.85***	NE3	.84***	LC3	.73***
PC4	.88***	NC4	.96***	MT4	.83***	NE4	.71***	LC4	.70***
PC5	.86***	NC5	.94***	MT5	.75***	NE5	.76***	LC5	.80***
PC6	.91***	NC6	.98***	MT6	.82***	NE6	.75***	LC6	.80***
PC7	.87***	NC7	.94***	MT7	.80***	NE7	.77***	LC7	.73***
						NE8	.76***		

Self-Esteem		**P. Intelligence**		**P. Socialness**		**Mobile Use**		**Social Roles**	
Item	Loading	Item	Loading	Item	Loading	Item	Loading	Item	Loading
SE1	.56***	PI1	.77***	PS1	.83***	MU1	.87***	SR1	.79***
SE2	.60***	PI2	.83***	PS2	.90***	MU2	.96***	SR2	.94***
SE3	.86***	PI3	.72***	PS3	.73***	MU3	.93***	SR3	.84***
SE4	.90***	PI4	.67***	**P. Control**		MU4	.78***		
		PI5	.64***	PC1	.92***	MU5	.62***		
				PC2	.83***				

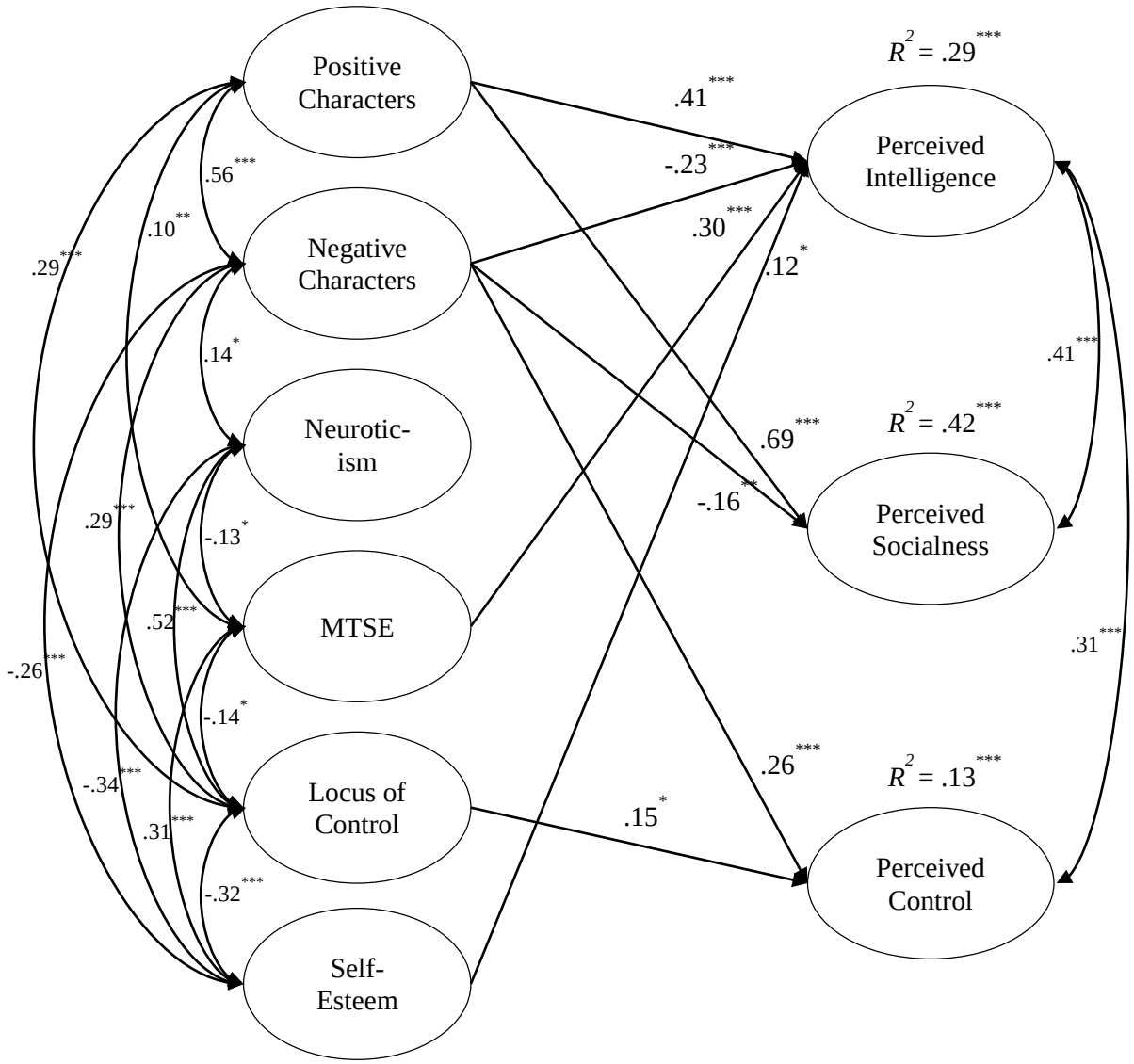

Figure 1. Model 1: Social Actor Attribution of Mobile Phones

Note: χ^2 = 2569.58, *df* = 1139, *p* = .000, *CFI* = .91, *TLI* = .90, *RMSEA* = .06, *SRMR* = .05, *N* = 355, β or *r* was statistically significant at *$p < .05$, ** $p < .01$ ***$p < .001$, non-significant relationships are not pictured for legibility.

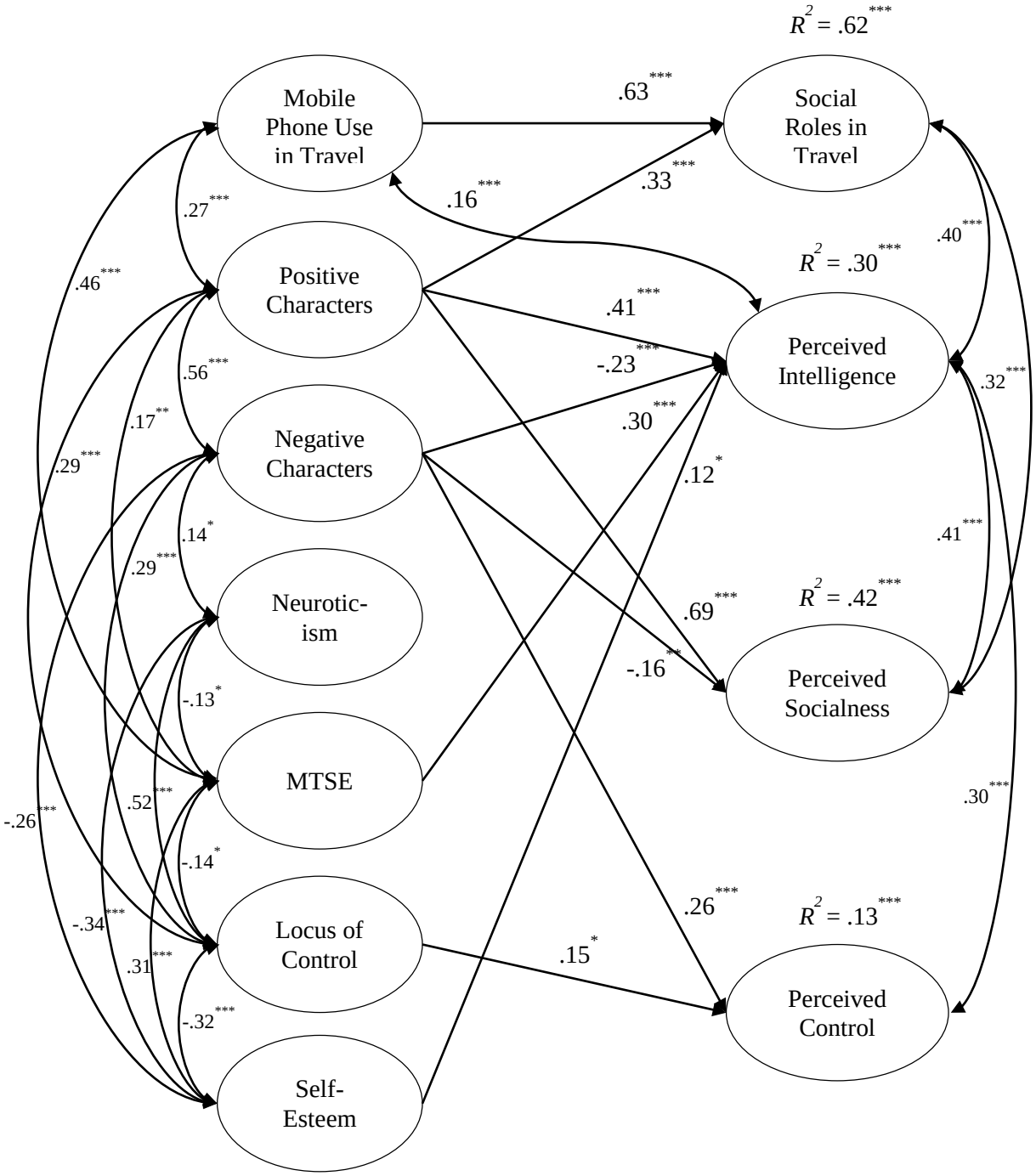

Figure 2. Model 2: Perceived Social Roles of Mobile Phones in Travel

Note: χ^2 = 3322.64, *df* = 1540, *p* = .000, *CFI* = .90, *TLI* = .90, *RMSEA* = .06, *SRMR* = .05, *N* = 355, β or *r* was statistically significant at **p* < .05, ** *p* < .01 ****p* < .001, non-significant relationships are not pictured for legibility.