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CONNECTING THROUGH SMARTPHONES: COGNITIVE, SOCIAL, EMOTIONAL MOTIVATIONS, AND THE EXPERIENCE OF VALUE PERCEPTIONS

For the degree of Doctor of Philosophy

Is approved by the final examining committee:

Christopher Kowal
Chair

Richard A. Feinberg

James G. Anderson

David A. Evans

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Head of the Departmental Graduate Program Date

CONNECTING THROUGH SMARTPHONES: COGNITIVE, SOCIAL, EMOTIONAL MOTIVATIONS, AND THE EXPERIENCE OF VALUE PERCEPTIONS

A Dissertation

Submitted to the Faculty

of

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by

Song-Yi Youn

In Partial Fulfillment of the

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of

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Purdue University

West Lafayette, Indiana

For my loving parents,

Younghee Lee and Kijung Youn

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ABSTRACT

Youn, Song-Yi. Ph.D., Purdue University, May 2016. Connecting through Smartphones: Cognitive, Social, Emotional Motivations, and the Experience of Value Perceptions. Major Professor: Christopher Kowal.

Smartphones became a dominant medium for communication with the emergence of converging technology. Since smartphones enable people to access various services, and to interact with other people within mobile social networks, users have become highly involved with such devices. To understand motivational factors associated with using smartphone, this study was informed by perceived cognition (i.e., expected outcomes) and social influence (i.e., social identity) from a social cognitive perspective, which was expanded to incorporate the dimension of emotional attachment.

To develop its "motivational framework", this study adopted social cognitive theory and attachment theory. This study also investigated the "experience of value perceptions" (i.e., perceived social, hedonic, and utilitarian values) that emerged concurrently with smartphone use. Moreover, consumption value theory was employed to understand the perceived values of smartphone users. Ultimately, a Motivation-Experience-Behavior (M-E-B) model was suggested for smartphone users. The main purpose of this study is to examine how different motivations influence perceived values of using the device, which consequently explains current smartphone use.

Structural equation modeling (SEM) was used to test the proposed model. Data collected from 738 current smartphone users was analyzed. Regarding results, cognitive factors (i.e., information seeking, entertained activity, and self-reactiveness), and social influence (i.e., SNS social identity) explained value perceptions (i.e., social, hedonic, and utilitarian values). Expectations of social contact, however, did not explain value perception (i.e., social value). Effects of emotional attachment on value perceptions (i.e., social, hedonic, and utilitarian values) were detected. Consequently, perceived values influenced recent use of the smartphone. In addition, demographic differences (e.g., age, sex, socioeconomic status, and race) as regards such motivations were found, and demographic variables were further included in the model as control variables. Last, to examine sex differences in the hypothesized model, two different sex groups were compared. In the male group, motivation of entertainment activity did not explain hedonic value perception, and experiences of social and hedonic values importantly explained use of the smartphone. In the female group, motivation of self-reactiveness did not have an effect on hedonic value perception, and experiences of social and functional values had an effect on use of the smartphone.

CHAPTER 1. INTRODUCTION

1.1 Research Background

Almost 185 million people in the United States owned smartphones in 2015, indicating a 76% penetration of the mobile market (Lella, 2015). In 2013, the worldwide figure for the number of smartphone owners reached two billion, and the number is expected to increase by 2019 to 5.6 billion (Ericsson, 2014). An important reason for this growth relates to the various services that smartphones provide. “Smartphone” is a generic term for mobile phones with an independent operating system similar to a PC. The complexity and range of services offered by smartphones is substantially greater than those offered by conventional mobile phones. While conventional mobile phones provide limited network services, including voice telephony, voice mail, and short message services (SMS), smartphones offer these basic mobile features plus Internet-based services (i.e., sending email, web-browsing) and various application platforms. Users can personalize the device by installing programs downloaded from third party service providers and access mobile social networking sites using a wireless network.

Arguably, people who use smartphones on a daily basis become preoccupied with the devices. According to data compiled by the Android app, Locket, the average person checks his or her smartphone up to 110 times a day (Woollaston, 2013). Although this figure seems particularly high, other researchers found the number could be even higher.

For example, an annual report by Kleiner Perkins Caufield and Byers (2013) found that the average user checks his/her phone up to nearly 150 times per day. Such findings indicate that the smartphone has emerged as a fundamental part of our lives, and users have become attached to the device. Moreover, the smartphone evolved beyond a simple tool of communication with its wireless Internet services. The mobile interface has begun to dominate applications of social networking services, such as Facebook, Twitter, and Instagram. Within the last five years, more people employed mobile interfaces for social networking services. For example, according to a recent report (eMarketer, 2015), in 2015, about 580 million Facebook members exclusively used their smartphones to access social networks, an increase of about 340 million users from the previous year. By 2018, it is anticipated that over 75% of Facebook users will access online social networks from their smartphones. The portability of the smartphone and the mobile social networking services, facilitate integrated social connections possible and are quickly becoming the most advantageous services that smartphones provide.

1.2 Problem Statement

Before the iPhone achieved mass popularity in 2007, only 2% of all American mobile phone users owned a smartphone, and the number increased to 23% by 2010 (ComScore, 2010). Currently, 65% of American adults are smartphone users, and 85% of Americans aged 19 to 29 owns the device (Smith, 2015). Regardless of the mass adoption and high popularity of the smartphone, unknown factors still persist regarding its use. For example, various studies previously discussed motivational factors for using mobile phones (Leung &Wei, 2000; Ö zcan & Koçak, 2003; Park, Kim, Shon, & Shim, 2013;

Reid & Reid, 2007; Wei, 2008; Wei & Ro, 2006) and smartphones (Gerlich, Drumheller, & Babb, 2015; Joo & Sang, 2013; Weiss, 2013). These studies identified motivational factors (e.g., to pass time, social utility, instrumentality, mobility, and accessibility) that are based on a cognitive dimension of the perceived benefits from using such devices. The single cognitive dimension, however, cannot explain smartphone use due to the smartphone's ubiquity and a unique relationship that users built with their devices. According to previous studies (Counts & Fisher, 2010; Hong, Thong, Moon, & Tam, 2008; Vincent, 2005), for instance, smartphone usage is inclined to be more comprehensive than that of other information technology (IT) devices because the smartphone is highly personal to users and provides an always-on environment of social networking services. Therefore, further study is necessary with regard to possible dimensions, such as social influence from mobile social networks, or emotional factors that motivate users to interact with the device.

In particular, extant studies of mobile devices (Gerlich et al, 2015; Joo & Sang, 2013; Leung &Wei, 2000; Ö zcan & Koçak, 2003; Park et al, 2013; Reid & Reid, 2007; Wei & Ro, 2006; Wei, 2008; Weiss, 2013) were mostly based on the uses and gratifications theory (Williams, Phillips, & Lum, 1985) that explains socio-psychological needs for using the device. However, many researchers (Ferguson & Perse, 2000; Kaye, 1998; Papacharissi & Rubin, 2000; Parker & Plank, 2000) have reported basic limitations of the theory in expecting users' behavior to be related to communication devices. LaRose, Mastro, and Eastin (2001) argued that motivational factors of using information technologies should be understood through the lens of social cognitive theory (Bandura, 1986), which explains how individual behavior is partially shaped and controlled by

individual cognitions and social influence. Since the smartphone offers various functions and activities, as well as possibilities for social participation through mobile social networks, cognitive benefits and social influences that shape users' behaviors can be understood in the context of social cognitive theory. In addition to social cognitive factors, this study explores the emotional dimension for smartphone users along with the cognitive and social dimensions. Emotion is acknowledged as a driving force behind human action (Izard, 1977; 1984; Dolan, 2002); however, emotional factors remain, to a large extent, unexplored in studies of IT device usage. Smartphone users, in particular, consider their device to be indispensable and become emotionally attached to the device (Larsen, 2004; Vincent & Harper, 2003; Vincent, 2005; 2006). Since mobile device users often consider their device to be an extension of themselves (Vincent, Haddon, & Hamill, 2005; Wehmeyer, 2007), emotional attachment leads to an emotional need to use the smartphone. Correspondingly, this study proposes a "motivational framework" that includes three dimensions of motivation (i.e., cognitive, social, and emotional dimensions) by employing social cognitive theory and attachment theory.

Further, this study identifies consumers' experience of perceived value, as a result of the influence of motivational factors. According to Holbrook (1999), consumers use products or services in a way as to satisfy their experiences in accordance with they perceived value of the products/services. He explained that "consumer value is an experience" (1999, p.8), and the value is a central concept for understanding consumer behavior. This study follows value consumption theory, explains why consumers choose a product or service, and adopts a "value-perception framework" (e.g., social, hedonic, and utilitarian values) suggested by researchers focusing on using mobile devices (Chun,

Lee, Kim, 2012; Yang, Lu, Gupta, & Cao., 2012; Gummerus & Pihlström, 2011). Although these studies found that the positive effects of value perceptions on consumer behavior of smartphone use, the relationship between motivational factors and perceived values remains unclear. Ultimately, this study suggests the Motivation-Experience-Behavior (M-E-B) model that employs "an extended motivational framework," including social, cognitive, and emotional influences, and "a value-perception framework," including experience of social, hedonic, and utilitarian value perceptions, in order to understand smartphone users' behaviors.

1.3 Statement of Purpose

The purpose of this research is to examine the hypothesized model that identifies the effects of motivations (e.g., cognitive, social, and emotional factors) on experiences of value perceptions (e.g., social, hedonic, and utilitarian values), which ultimately encourages users to engage with the device more often. Additionally, this study identifies the influence of demographic variables on smartphone using behaviors by utilizing the model.

Consequently, this study would offer a theoretical contribution for understanding the use of the smartphone by examining a social cognitive framework with an emotional dimension as well as a consumer value framework. Findings of this study would build on current knowledge, using existing motivational theories (e.g., uses and gratifications theory, and social cognitive theory), and theories (e.g., consumption value theory) related to consumer value perceptions.

CHAPTER 2. LITERATURE REVIEW

This literature review consists of three main parts: 1) consumer motivation; 2) consumer experience of value perceptions; and 3) demographic difference. In the consumer motivation part, three dimensions, including the cognitive dimension (expected outcomes), social influence, and emotional attachment, are discussed. In the second part on consumer experience, consumer value perceptions, including social, hedonic, and utilitarian value, are discussed. In the final part, the demographic influence on smartphone using behavior is discussed.

2.1 Consumer Motivation

Motivation is a theoretical construct that represents the reasons for people's actions, desires, and needs (Maslow, 1970; Elliot & Covington, 2001). Motivation can explain important determinations behind human action, or at least suggest an inclination for certain behavior (Durgee, 1991; Raymond, Mittelstaedt, & Hopkins, 2003; Rajagopal & Abraham, 2009; Sadri & Bowen, 2011, Van Raaij & Wandwossen, 1978; Ziems, 2004). In particular, the motivation for using an IT device, the smartphone, is a multi-dimensional construct because the device provides various services not only for social purposes (e.g., make social contact or appointment) but also personal desires (e.g., personal time to listen to music or watch videos). To understand the motivations of

smartphone users, the motivational factors of cognitive, social and emotional dimensions are discussed in the following sub-sections.

2.1.1 Cognitive dimension

Social cognitive theory (SCT) argues that a person's behavior is partially shaped and controlled by a person's cognition (e.g., expectations, beliefs) and the influence of social relations (e.g., social networks) (Bandura, 1986). According to the theory, a cognitive mechanism controls human behavior based on expected outcomes. For example, smartphone users would perceive the benefits of using the smartphone, and expected outcomes would regulate using behavior. According to Bandura (1986), expected outcomes stem from the uses and gratifications (U&G) theory. To explain expected outcomes in the following section, the U&G theory is discussed first, and then it addresses why expected outcomes are sufficient to explain the use of the smartphone.

2.1.1.1 Uses and gratifications (U&G) theory and social cognitive perspectives

SCT recognizes that the expected outcomes of behavior provide incentives for its performance. Outcome expectations, shaping behavioral results, develop from a “uses and gratifications” framework (Williams et al., 1985; LaRose et al., 2001). U&G theory discusses social and psychological needs that motivate people to select particular mediums (Williams et al., 1985). Diverse studies (Charney & Greenberg, 2001; Dimmick, Sikand, & Patterson, 1994; LaRose & Eastin., 2004; Leung & Wei, 2000; Song, LaRose, Eastin, & Lin, 2004, Walsh, White, Cox, & Young, 2011; Wei, 2008) applied U&G theory to uses of various IT devices, such as the computer, telephone, and mobile phone. According to LaRose et al. (2001), however, applying conventions of the

“uses and gratification” framework to a study causes a problem related to the expectation of using behavior. Many studies found a basic weakness in the theory, namely that gratifications did not support users’ behavior very strongly. Ferguson and Perse (2000) found that traditional gratifications (e.g., entertainment, passing time, relaxation, social information), with less than 10% variance, explain watching television, for example. Similar results were found in Internet use studies (Kaye, 1998; Papacharissi & Rubin, 2000; Parker & Plank, 2000).

LaRose at al. (2001) argued users’ motivations should be understood in Bandura’s (1986) socio-cognitive terms. Various studies (Lin, 1999; Charney & Greenberg, 2001; LaRose et al., 2001) suggested that developed versions of conventional gratifications related to cognitions about expected outcomes in a social cognitive framework. In these studies, researchers asked respondents to indicate the gratifications that they would reasonably expect from using the device in the future, which is distinct and different from their motivations obtained in the past. Results show that expected outcomes from a social cognitive framework predicted using behavior more accurately than conventional gratifications. Therefore, the present study maintains that expected outcomes are an adequate predictor of smartphone use.

2.1.1.2 Expected outcomes of social cognitive perspectives

According to Bandura (1986), human behaviors are extensively regulated and controlled by consequences from various social events, and expected outcomes can be converted into current guides of behavior. Bandura proposed different types of expected

outcomes-as-incentive motivators. These include the following: novel sensory, social, enjoyable activity, and self-reactive incentives (Bandura, 1986, pp. 232-240).

Novel sensory incentives theoretically refer to motivations related to new sights and sounds. People are motivated to experience *novel sensory or information* that they believe to be valuable. These incentives are intrinsically associated with actions (Bandura, 1986). According to Bandura's theory of social cognition, the main discussion of sensory incentives was to explain their effects on behavioral development and the learning process. However, recent studies on Internet uses (Charney & Greenberg, 2001; LaRose & Eastin, 2004), discussed novel sensory incentives as motivations or desires for novel information. Such studies indicated that sensory incentives refer to the seeking of novel information and that these incentives are similar to information-seeking gratifications.

Social incentives refer to social rewards received from *interactions with others*. When people experience approval of others as a reward, this social reaction becomes a predictor of primary consequences, and, thereby, become an incentive. For example, receiving support from others, belonging to a group, or maintaining a valuable relationship may be regarded to be social incentives, as social rewards, and provided from others in a social context. Social incentives are consistent with gratifications of social connections (Claisse & Rowe, 1987; O'Keefe & Sulanowski, 1995).

Activity incentives indicate that people will perform a certain activity if they believe that it will give them an opportunity to participate in another and more preferred activity (Premack, 1965; 1971). Enjoyable activities can be motivators depending on their relative values. For example, if people believe using smartphones is enjoyable and fun, their

cognitions of the enjoyment activity could be a motivator to continuously perform the behavior. For example, in studies of using a telephone, activity incentives explained the motivation of participating in enjoyable activities while using the device (Williams et al., 1985; O'Keefe & Sulanowski, 1995).

Self-reactive incentives refer to self-rewarding motivators that lead to repeated behavior. According to Bandura (1986), through a self-regulation mechanism, individuals determine their own behavior (whether repeating or not-repeating) based on self-reactive incentives (Bandura, 1986; 1991). For example, when people believe that an achieved activity meets their predefined standard (e.g., psychological inner state), they are motivated to repeat the behavior. According to LaRose, Lin, and Eastin's study of Internet usage in 2003, people are more likely to use the Internet as a way to regulate their inner states (e.g., dysphoric moods). LaRose and colleagues explained that self-reactive incentives are similar to gratifications such as passing time and alleviating boredom (LaRose & Eastin, 2004).

2.1.1.3 Expected outcomes of using smartphones

The smartphone, with high technology and various functionalities, may give users more incentives for future use. Again, smartphone usage inclines toward greater comprehensiveness than that of other IT devices (Hong et al., 2008). To understand the cognitive incentives of using the smartphone, different types of SCT expected outcomes might be applied in the context of smartphone usage.

Information seeking may be an important smartphone use motive (Wei, 2008) because of its frequent interplay with Internet connection. Accessibility to broadband

mobile networks and powerful software-enabled applications transformed the delivery of information to smartphone users (White, 2010). Simply put, many people are using the device as an important information source. According to a recent report (Pew Research Center, 2015), almost 20% of Americans rely on smartphones to access information online.

Social contact is among the strongest motives for smartphone users. With the greater prevalence of smartphones, the device has become a common way to connect to others. Palen, Salzman, and Youngs (2000) reported that many people depend on the mobile device for social reasons. Leung and Wei (2000) found that people gain benefits related to sociability when they use mobile devices, and they identified social interaction as an important motive for users.

Entertainment activity also can be an important motive for smartphone users. An early mobile phone study found that users considered using the phone to be enjoyable and fun (Kwon & Chidambaram, 2000). Smartphones offer many entertainment functions along with the basic features of conventional mobile phones. Users are able to access digital media files for listening to music, watching movies, or taking pictures. Smartphones operate as a platform for various small computer programs called apps, as a navigational device, and as a camera. Users enjoy thousands of apps, making the functionality of the smartphone almost limitless.

Self-reactiveness is relevant to understand motivations of using the smartphone. Self-reactiveness functions lead to behavioral rewards for improving one's inner state. As LaRose et al. (2003) observed people are more likely to use the Internet to regulate

dysphoric moods; thus, smartphone users would rely on the device to relieve boredom and loneliness or to relax.

2.1.2 Social dimension

According to Bandura (1986), social influence, along with cognitive incentives, control human behavior and offer a way to understand behavior within a social cognitive framework. Chiu, Hsu, and Wang (2006), however, mentioned that social cognitive researchers overlooked the importance of influence from social relations. In the study, they found that social influence, along with cognitive factors, explained knowledge sharing behavior online, and that the resultant social dimension should be considered with a cognitive dimension in social cognitive theory. In particular, to understand the motivation of smartphone use, social influence from the mobile social network is important because "mobile networking services provide an always-on environment for information exchange among members of social networks" (Counts & Fisher, 2010, p. 98). The popularity of social networking services (SNSs) (e.g., Facebook, Twitter, or Instagram) on smartphones continues to increase, and mobile social networking enables people to be highly involved with using the device. In particular, a previous study (Chun et al., 2012) found that smartphone users perceived social influence from the mobile social networks, which led to build positive social image (i.e., social identity) within the social group connected through the smartphone. Consequently, the current study considers "social identity" as important social influence derived from mobile SNSs. In this section, social influence is explained in general and social identity achieved from mobile SNSs, is discussed for understanding social influence on smartphone users.

2.1.2.1 Social influence and smartphone users

Social influence can be defined as an individual belief that is affected by another person within a group (Raven, 1964). Social influence is achieved from social pressures, which lead people to perceive social identity within a social group. The social influence can be applied to more advanced mobile technology, such as a smartphone. For example, Aldhaban (2012) proposed that social influence could explain the behaviors of smartphone users. Dasgupta and colleagues' study of social network analysis in 2008 found that social relations could explain the increased use of mobile social networking. Although many studies (Aldhaban, 2012; Choi & Chung, 2013; Chun et al., 2012; Kim, Chun, & Lee, 2014; Zhou, 2008) of technology acceptance discussed social influence as an important motive to understand consumer behaviors of smartphone adoption, social influence, particularly perceived from mobile social networks, has not been highlighted.

In particular, ***social identity*** occurs when people in a group accept social influence as a means to maintain relationships with others in the group (Kelman, 1958). Social identity can be characterized by self-defining social identity, since it refers to self-awareness related to group membership and its evaluative importance in the group (Tajfel, 1978). When mobile phone users regard themselves as members of a community, their self-awareness of social identity creates a sense of belonging to the group, which may increase their motivations to use the smartphone. A recent study (Chun et al., 2012) confirmed the impact of social influence on the use of smartphones. This study found that positive social identity within a social group influenced perceptions of using the smartphone.

2.1.3 Emotional dimension

Some people established an emotional bond with their mobile devices (Vincent et al., 2005). For example, one might encounter a person who feels uneasy or uncomfortable when he or she is in public and realizes the smartphone was left at home, even though they have no real and immediate need for the device. This is a common feeling that most smartphone users might experience, indicating that they are emotionally involved with the device. Unlike other IT devices, the smartphone provides close physical proximity to users who carry their smartphones almost every day and everywhere. In this paper, emotional attachment refers to the emotional dimension that explains one's emotional need to use the smartphone. In this section, emotional attachment theory is discussed, and emotional attachment, as an emotional dimension for smartphone users, is explained.

2.1.3.1 Emotional attachment theory

Bowlby (1969; 1979) conducted an early study on attachment with regard to the parent-infant relationship. According to the study, an attachment is an emotion-laden and target-specific bond between a person and a specific object. Attachments can be formed with various strengths, and strong attachments are related to feelings, such as affection, passion, anxiety, and concern (Aron & Westbay, 1996; Bowlby, 1969; 1979; Brennan, Clark, & Shaver, 1998; Feeney & Noller, 1996).

Four attachment-related behaviors define how attachment is regarded across the lifespan: proximity maintenance, safe haven, emotional security, and separation distress (Ainsworth, Blehar, Waters, & Wall, 1978; Hazan & Shaver, 1994; Segrin & Flora, 2005). ***Proximity maintenance*** is a desire to be near the attachment object. The strength

of an attachment is revealed by the degree of proximity maintenance to the attachment object. People tend to desire and maintain relatively close proximity to an attachment object. ***Safe haven*** is an emotional status that represents a desire to return to the attachment object for comfort and safety, particularly when people experience feeling down or stressed. People are likely to seek comfort and reassurance from the attachment object when feeling stressed or threatened. ***Emotional security*** refers to feelings of security. With regard to an attachment object, people feel emotionally secure from the surrounding environment, and they feel better when they can be with the object. ***Separation distress*** refers to anxiety or concerns that occur in the absence of the attachment object. If people are threatened with separation from the attachment object, this disconnection produces anxiety and distress.

Emotional attachment can be formed in relation to a variety of objects, such as pets, products, and places (Hirschman, 1994; Rubinstein & Parmelee, 1992). Emotional attachment has been discussed in marketing studies. Thomson, Macinnis, and Park's study (2005) on emotional attachment to brands was theoretically based on attachment theory. The study defined emotional attachment as an emotion-laden bond between a person and a specific brand. The emotional brand attachment was characterized by feelings, such as connection, affection, and passion. Their studies showed that emotional feelings are related to a desire to maintain proximity, emotional security, and safety, and to avoid separation distress.

The present study mainly adopted Vincent and Harper's study (2003) that measured emotional attachment with regard to the mobile phone, by using emotional reactions to different mobile phone using situations. Further, this study adopts four attachment-related

behaviors based on attachment theory. These behaviors include proximity maintenance, safe haven, emotional security, and separation distress. These behavioral attachments can be characterized by perceived feelings (e.g., panic, concern, upset, down, or anxiety) in various smartphone-using situations. In the next section, emotional attachment to the smartphone is further discussed.

2.1.3.2 Emotional attachment to one's smartphone

Understanding smartphone use is more complex than understanding other technologies (e.g., personal digital assistants, personal stereos, and laptops). Vincent (2005) explained that emotional values are created between users and their mobile phones. According to Vincent, the mobile phone increases a tension between needing the device and concerns about losing it. This is not a matter of losing lists of phone numbers or personal messages stored on the mobile phone, but a potential concern about losing possible relationships that the mobile phone facilitates. Also, researchers suggested that using a mobile phone invigorates social and emotional bonds, which makes mobile communication unique (Puro, 2002; Kopomaa, 2000; Taylor & Harper, 2003). Vincent (2005) explained that there is a persistent emotional value created between users and their device, which contributes to the need for building a unique device that is highly personal to the user.

Smartphone owners often consider their devices to be an extension of themselves (Vincent et al.; 2005; Wehmeyer, 2007). Owners describe being away from the device or losing the device as "terrible" (Vincent & Harper, 2003) and as viscerally akin to the "loss of a limb" (Kolsaker & Drakatos, 2009, p.268). A study conducted by Henley

Management College (2003) reported that almost half of participants said that they could not live without their phone and described the loss of a phone as similar to bereavement of a person.

The smartphone offers users emotional security because it affords them with an opportunity to stay connected to family and friends when on the move, which creates an ongoing attachment to the smartphone (Vincent, 2006). Users perceive emotional benefit from being connected to others, even when they are physically far away from the social network. The benefit from communicating with others through a smartphone makes users emotionally involved with the device (Vincent, 2006). Vincent et al. (2005) suggested that young people use a mobile phone to seek a safe haven, and in particular, they would feel lonely without the mobile device. Some users felt anxiety when they were not connected to conversations on their mobile device, even if the disconnection was temporary due to battery depletion or failed Internet connection (Vincent & Harper, 2003). Vincent et al. (2005) said that for some users, anxiety turns into anger that leads a strong emotional response when they cannot be connected to the network.

2.2 Consumer Experience of Value Perceptions

In the second part of literature review, consumer experience and its related value perceptions are discussed. According to an early researcher (Morris, 1941) of consumer behavior, consumer experience should be considered as a central position for understanding consumer value of a product or service. Abbott (1955) also mentioned that the following statement:

> What people really desire are not products but satisfying experiences. Experiences are attained through activities. […] People want products because they want the experience-bringing services, which they hope the products will render (p. 55).

Holbrook (1999) explained that consumer value could be a different form of consumer experience because consumers perceive values of the products or services based on their experiences of using the products or services. The current study tries to understand *perceived value as consumer experience* regarding smartphone use. In the following sub-sections, perceived value is discussed, and consumption value theory is addressed in order to understand perceived values for smartphone users.

2.2.1 Perceived value

According to Holbrook, perceived value can be defined as an "interactive, relativistic preference and experience" (1999, p.5), which means that every consumer uniquely perceives a value based on his/her experiences. Zeithaml (1988) defined consumer value as what consumers obtain (e.g., benefits, quality, or worth) from using the products or services, which causes resultant consumer behaviors (e.g., positive attitude or behavioral intention) (Spreng, Dixon, Olshavsky, 1993).

Early researchers explained the perceived value based on economic terms (Dodds & Monroe, 1985; Monroe & Chapman, 1987; Monroe & Krishnan, 1985). According to their search, the value, as a uni-dimensional construct, is based on a quality-price relationship. Consumers might consider value based on a "trade-off between perceptions of quality and sacrifice" (p. 308, Dodds, Monroe, & Grewal, 1991). In contrast, however,

many consumer researchers argued that perceived value could not be understood as a single construct (Holbrook, 1999; Sinha & DeSarbo, 1998; Sweeney & Soutar, 2001). Such researchers explained that perceived value is a multi-dimensional construct in which a variety of values are all embedded. From consumers' perspectives, "value" refers to something desirable, useful, or important as well as to the important personal goals that consumers are seeking from using the product (Peter & Olson, 1990). Underscored by the research on consumer value, the current study assumes that perceived value is a multi-dimensional construct that consumers perceive from their experiences using products or services.

2.2.2 Consumption value theory

According to the theory of consumption value (Sheth, Newman, & Gross, 1991a; 1991b), consumer value explains why consumers choose or purchase one product type or not. According to the theory, (a) different types of perceived value can be differentiated in specific situations, and (b) multiple values can independently contribute to consumer behavior. Different types of values may drive consumer choices (e.g., buy or not to buy, use or not to use). According to the theory, when consumers use a product, they can perceive less of one value and obtain more of another, and the perceived value would influence their using behavior later.

Utilizing the consumption value theory, previous researchers (Sweeney, Soutar, Whiteley, & Johnson, 1996) developed measures for the three dimensions of value – social, emotional, and functional – to understand consumer behavior. According to the value frame of the study, "social value" refers to the utility derived from the product's

ability to enhance social relationships. “Emotional value” refers to the utility derived from the feelings or affective states that a product generates. “Functional value” refers to the utility derived from the perceived quality and expected performance of the product.

In particular, to understand IT device consumers and their behaviors, researchers (e.g. Turel, Serenko & Bontis, 2007; Kim & Han, 2009; Choi, Kim, & Kim, 2011) suggested value-based models. For example, Turel et al. (2007) studied the impact of perceived value, including four sub-values (e.g., performance, emotional, money and social), for using short message services (SMS). Kim and Han (2009) investigated the adoption of mobile services from a three-value perspective: utilitarian, hedonic, and social. Recent studies examined analogous adoption models, which selectively included those three values in the context of mobile services (Chun et al., 2012; Gummerus & Pihlström, 2011; Yang et al., 2012). Following this application of consumption value theory for IT device use, this study adopts the three-value perspective (social, hedonic, and utilitarian) for understanding value perceptions that smartphone users experience while using the smartphone.

2.2.3 Perceived value of smartphone users

In this study, ***perceived social value*** refers to the experience of enhancing a social relationship by using a smartphone. Given the high popularity of mobile social network services, users gain social value more immediately through social network interactions via the smartphone. Park, Han, and Kaid (2012) found that smartphone users obtain relational benefits by using smartphones and mobile social networks. The study resulted that perceived social value was an important notion that smartphone users would

experience when using the smartphone. Emotional value is represented as a ***perceived hedonic value***, which refers to affective experiences (e.g., feeling good or pleasure) of using the smartphone. According to Holbrook and Hirschman (1982), hedonic value represents the emotional or psychological worth of the consumer experience related to the product. In a study of smartphone adoption (Chun et al., 2012), researchers explained that the smartphone was not only utilitarian value-driven but also hedonic value-driven. They highlighted the entertainment role of the smartphone that enhanced emotional experience. The functional value is represented as a ***perceived utilitarian value***, which refers to the experience of accomplishing task-related goals when using the smartphone. For IT device users, perceived utilitarian value is an important notion that increases behavioral intention to use a new technology (Venkatesh et al., 2003). The value explains smartphone users' behavior as well. For example, Cheong and Park's (2005) results concluded that when users perceived functional usefulness of the internet in conjunction with the smartphone, they were more likely to use the mobile internet. Similar results were found for other mobile service studies (Hong et al., 2006; Luarn & Lin, 2005).

2.3 Demographic Differences of Smartphone Users

Demographic factors have been reported as important in regard to smartphone using behavior. Kim and Hwang (2012) suggested that smartphone users would have different experiences according to demographic differences, which leads to different behaviors of smartphone use as a result. Leung and Wei (1999) and Wei (2008)'s studies concluded that relatively young and highly educated users were apt to use the mobile phone more than others. Barutçu (2007) found that income and education were significantly

correlated with using behavior of services provided by the smartphone. As regards to racial differences, Wei (2008) found a negative correlation between race (Caucasian) and mobile data services. The study also suggested that young users would be motivated to engage in enjoyable activities such as playing games compared to the motivations of older users.

In particular, men and women have different perspectives for assessing values and benefits (Gefen & Straub, 1997; Venkatesh & Morris, 2000); thus, the sex difference and its resultant behaviors have been consistently identified as a key and influential factor for information technology, among other features (Sanchez-Franco, 2006; Venkatesh & Morris, 2000). Influence of sex difference was reported as it relates to smartphone use behaviors. For example, Wei (2008) found a significant relationship between sex identification and information-seeking motivations for using the smartphone. Lee and colleagues (2014) found that females were highly motivated to interact with others in their social groups, which led them to use the smartphone more than males for social purposes. Men and women have different gender roles that would motivate use of the information technology device, in this case the smartphone, in different ways. Therefore, this study examined the influence of sex difference on relationship between motivational perceptions and value experiences for smartphone users.

CHAPTER 3. RESEARCH MODEL AND HYPOTHESES

This chapter consists of two parts: 1) theoretical framework; and 2) hypotheses development. For the part of theoretical framework, a key framework for this study is suggested, and a conceptual research model is addressed. The definitions of the main terminology are also examined. In the section of hypothesis development, hypotheses related to the hypotheses model are discussed, and other hypotheses related to demographic variables are addressed.

3.1 Theoretical Framework

This study proposes a theoretical framework that employs an extended motivational perspective including social, cognitive, and emotional dimensions, and a vale-perception perspective including social, hedonic, and utilitarian values. This framework suggests socio-psychological influences that motivate smartphone users to perceive values from using the smartphone. In addition, the proposed research model is presented in the following sections.

3.1.1 Proposed Motivation-Experience-Behavior (M-E-B) model

As discussed earlier, Holbrook (1999) explained that “consumer value is an experience” (1999, p.8). According to his research, all products and services create needs or desires (i.e., motivations) that satisfy consumer’s experience (i.e., consumer value). In

other words, consumers' perception of the value of services depends on their motivations (e.g., expectations, social influence, and emotional desires). Consumer value is a central notion for understanding the behavior of consumers (Holbrook, 1999). As an experience of services (or products), consumers' value perceptions will differ in a way as to satisfy the motivations that they believe are important (Hirshman & Holbrook, 1982). Such experience, consequently, leads to resultant consumer choices (to use the service or not). Many consumer value perception studies suggested value perception perspectives for IT device users (Choi et al., 2011; Chun et al., 2012; Gummerus & Pihlström, 2011; Kim & Han, 2009; Turel et al., 2007; Yang et al., 2012), but they could not explain how the value perspectives were explained by consumers' motivations. Therefore, this study suggests a Motivation-Experience-Behavior (M-E-B) model, which incorporates an extended motivational framework and a value perception framework, for understanding behaviors of smartphone users (see Figure 3.1).

Figure 3.1 M-E-B (motivation-experience-behavior) model

3.1.2 Proposed research model

Based on the M-E-B model, this study proposes a conceptual research model (see Figure 3.2). This model maintains an extended social cognitive framework. For the motivational framework, three dimensions (cognitive, relational, and emotional factors)

are suggested to understand the motivations of smartphone users and to explain perceived values of smartphone users. The cognitive dimension includes four factors, such as information seeking, social connection, entertainment activity, and self-reactiveness. The social dimension includes one factor of social identity derived from mobile SNSs. The emotional dimension includes four factors, such as emotional security, proximity maintenance, safe haven, and separation distress. To understand consumer value perceptions, the dimension of consumer experience includes three perceived values, such as social, emotional, and functional value. Additionally, control variables such as age, gender, socio-economic status (SES), and race are included.

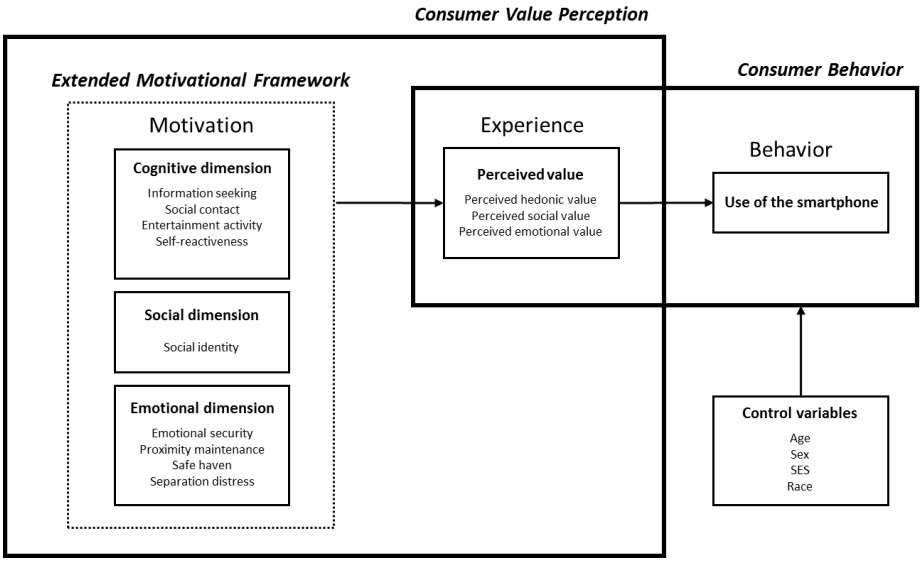

Figure 3.2 Proposed conceptual framework

3.1.3 Conceptual definitions

Consumer motivation is "the drive to satisfy needs and wants, both physiological and psychological, through the purchase and use of products and services." (Berkman, Lindquist, & Sirgy, 1997, p. 298)

Expected outcome is defined as "a person's estimate that a given behavior will lead to certain outcomes" (Bandura, 1977, p. 193). Bandura proposed certain types of expected outcomes (e.g., novel sensory, social, activity, and self-reactive incentives). These are applied to this study according to the following concepts:

(a) Information seeking: is related to activities that attempt to search information in human and technological contexts.

(b) Social contact: is related to social incentives from social interactions such as receiving support from others, and a sense of belonging to a social group.

(c) Entertainment activity: is a preferred activity that entertains or cheers people.

(d) Self-reactiveness: is a self-rewarding motivator that makes people forget problems or feel relaxed and less lonely.

Social influence is defined as an individual belief achieved from social interaction with another person within a social group (Dholakia, Bagozzi, & Pearo, 2004). Important social influence from the SNSs, in this study, is based on the following concept:

(a) Social identity: refers to self-defining identity (Tajfel, 1978) that makes individuals believe that using a smartphone is important in order to identify themselves within a particular social group.

Emotional attachment is defined as emotional desire that leads to an "emotional response to mobile devices [that is] likely to be a key influence on [the] future adoption of new services" (Kolsaker & Drakatos, 2009, p. 270). Emotional attachment is identified with the following four factors (Bowlby, 1969), which are applied to this study as the following concepts:

(a) Emotional security: is related to feelings of security that people have when they can access a smartphone.

(b) Proximity maintenance: is represented as desires to have close proximity to a smartphone.

(c) Safe haven: an emotional component that is related to desires to return to an attachment object for purposes of comfort and safety.

(d) Separation distress: is a feeling of concern and anxiety that occurs in the absence of the smartphone.

Perceived value is defined as a "consumer's overall assessment of the utility of a product (or service) based on perceptions of what is received and what is given" (Zeithaml, 1988, p. 14). Perceived value is "a multidimensional construct in which a variety of notions are all embedded." (Sánchez-Fernández & Iniesta-Bonillo, 2007, p. 428). The perceived value consists of the following concepts:

(a) Social value: refers to "the perceived utility acquired from an alternative's association with one or more specific social groups." This aspect of value was measured through the association of the product with a consumer's various reference groups (Sheth et al., 1991a, p. 161).

(b) Hedonic value: is defined as "the perceived utility acquired from an alternative's capacity to arouse feelings or affective states (that was created when the product was associated with) . . . specific feelings or when precipitating or perpetuating those feelings" (Sheth et al., p. 161).

(c) Utilitarian value: refers to "the perceived utility acquired from an alternative's capacity for functional, utilitarian or physical performance" (Sheth et al., 1991a, p. 160).

3.2 Hypothesis Development

In this section, hypotheses in the proposed research model are suggested. First, hypotheses that explain effects of motivational factors on perceived values are developed, and then, hypotheses associated with effects of perceived values on the use of the smartphone are explained. Hypotheses related to demographic variables are also explained.

3.2.1 Effects of cognitive factors on perceived values

The cognitive dimension includes four expected outcome variables. The effects of each cognitive factor, such as information seeking, social contact, entertainment activity, and self-reactiveness incentives, on perceived values were developed.

3.2.1.1 Effects of information-seeking expectations on perceived values

The smartphone is likely to change the ways in which its users effectively access information. The global availability of broadband mobile networks and the powerful searching applications provide functional opportunities to obtain information. According

to a study (Pandey, Hasan, Dubey, & Sarangi, 2013) of health information seeking behaviors using the smartphone, the smartphone was found to be a useful tool for providing information to seekers. Thus, this study assumes that people who seek information using a mobile device would perceive a utilitarian value from using the device. In particular, information can be transferred through mobile social networks and shared among smartphone users. According to a study (Heinemann, Kangasharju, Lyardet, & Mühlhäuser, 2003) of mobile information sharing, information exchange frequently occurs within social networks and mobile environments that provide users with opportunities to share information. Many researchers (Onnela, J. P., Saramäki, J., Hyvönen, J., Szabó, G., Lazer, D., Kaski, K., Kertész, J., & Barabási, A. L., 2007; Heinemann et al., 2003) explained that mobile information seekers were more likely to share information within mobile social networks, especially for a common goal (e.g., shared interest) of the network. Therefore, this study assumes that mobile users, who obtain information from mobile social networks, perceive not only the functional usefulness of the smartphone but also the social value of using the smartphone; thus, the following hypothesis was formulated:

H1: People who expect to **seek information** from using the smartphone are more likely to perceive **(a) social value** and **(b) utilitarian value** from using the smartphone.

3.2.1.2 Effects of social contact expectations on perceived values

Leung and Wei (2000) found that people obtained benefits related to sociability while using mobile devices, and they identified social interaction as an important motive for users. Palen et al. (2000) studied using behavior of mobile phone and motivation of early users. They found that "social reasons" for using a mobile phone increased and to became an important aspect for using the device. Given a greater prevalence of smartphones, the device is a common way to connect to others. Since users can make frequent and immediate social contacts using the smartphone, they are more likely to experience relational benefits from using the device; thus, the following hypothesis was formulated:

H2: People who expect to have **social contact** from using the smartphone are more likely to perceive **social value** from using the smartphone.

3.2.1.3 Effects of entertainment activity and self-reactiveness on perceived values

Davis, Bagozzi, and Warshaw (1992) recognized that when people use IT products (e.g., computer), they were significantly motivated by intrinsic factors, such as an expectation of enjoyment. From their results, they concluded that people, who expected to have enjoyment from an activity (i.e., word processing program), were more likely to experience enjoyment from the activity. The effect of motivation from an entertainment activity was also tested for other IT related behaviors such as searching the internet (Teo, Lim, & Lai, 1999), watching a movie website (Van der Heijden, 2004), texting instant messages (Lu, Zhou, & Wang, 2009), and t-commerce (Yu, Ha, Choi, & Rho, 2005).

With regard to various smartphone services, such as mobile games (Ha, Yoon, & Choi, 2007), and enjoyable applications (Nysveen, Predersen, & Thorbjørnsen, 2005), this study assumes that entertainment smartphone services would motivate to participate in enjoyment activities and perceive affective experiences. In addition, as LaRose et al (2003) suggested, a role of self-reactiveness in understanding experiences with using IT devices, smartphone users would use the device to relax and feel less lonely. Users would experience emotional benefits by engaging with the enjoyment activities that the smartphone offers; thus, the following hypotheses were formulated:

H3: People who expect to have **entertainment activity** from using the smartphone are more likely to perceive **hedonic value** from using the smartphone.

H4*:* People who expect to have **self-reactiveness** from using the smartphone are more likely to perceive **hedonic value** from using the smartphone.

3.2.2 Effects of social influence on perceived values

The smartphone offers an opportunity to be in contact with other users through real-time interacting and keeping up to date with social activities in social groups (Nikou & Bouwman, 2014). Smartphone users utilize mobile SNSs more than other mobile services, specifically when they have an identity formed with respect to their peers, friends and others in the social community (Nikou & Bouwman, 2014; Chun et al., 2012). Chun et al. (2012) found that when mobile device users have a positive social identity, they were more likely to perceive various values related to using the device. Therefore, this study assumes that people, who perceive social influence (i.e., social identity) within a social group connected through mobile SNSs, would achieve not only social values

from using the smartphone but also hedonic and utilitarian values when interacting with peers; thus, the following hypothesis was formulated:

H5: People who have a social identity within a social group, connected through mobile social networks, are more likely to perceive **(a) social value, (b) hedonic value, and (c) utilitarian value** from using the smartphone.

3.2.3 Effects of emotional factors on perceived values

Emotional attachment reflects one's intrinsic desires to be near an attachment object (Thomson et al., 2005). Read, Robertson, and McQuilken (2011) studied the effects of emotional attachment on using behaviors of digital books. Their research found that emotional attachment has an effect on the emotional experience of reading books (e.g., pleasure experience). Emotional attachment explains not only hedonic experience but also experiences of various value perceptions. For example, in a study on attachment and consumer behavior, Park, Macinnis and Priester (2006) explained that consumers developed an attachment to products (e.g., brands) in a way as to satisfy their needs, which led to various consumption experiences (e.g., experiential, functional, and symbolic). Moreover, as discussed earlier, the concept of emotional attachment is associated with four attachment-related behaviors: emotional security, proximity maintenance, safe haven, and separation distress (Ainsworth et al., 1994; Segrin & Flora, 2005). Collins (1996) explained that different emotional attachment styles caused behavioral outcomes, and this could be explained by various experiences related to an attachment object. The current study suggests that different emotional attachment styles – emotional security, proximity maintenance, safe haven, and separation distress – would

explain consumer experiences of value perceptions from using the smartphone; thus, the following hypotheses were formulated:

H6: People who feel **emotional security** when using the smartphone are more likely to perceive **(a) social value, (b) hedonic value, and (c) utilitarian value** from using the smartphone.

H7: People who feel **proximity maintenance** toward using the smartphone are more likely to perceive **(a) social value, (b) hedonic value, and (c) utilitarian value** from using the smartphone.

H8: People who feel a **safe haven** when using the smartphone are more likely to perceive **(a) social value, (b) hedonic value, and (c) utilitarian value** from using the smartphone.

H9: People who feel **distressed when separated** from the smartphone are more likely to perceive **(a) social value, (b) hedonic value, and (c) utilitarian value** from using the smartphone.

3.2.4 Effects of perceived values on smartphone use

Ha et al. (2007) explained that the smartphone provides services that are closer to personal needs for entertainment experiences rather than for workplace purposes. Their research found that the perceived hedonic value had a greater potential to explain using behavior. Similar results were found in other studies of hedonic information systems (Van der Heijden, 2004) and mobile services (Kim & Han, 2009). The smartphone also provides several useful services such as information searching, mobile banking, and location-based services. By utilizing such services, smartphone users achieved certain

task-related goals (Kim & Han, 2009). Kim and Han (2009), they also found that a perceived utilitarian value from using smartphone services has a positive effect on the using behavior of a mobile phone. In addition, as discussed, the smartphone is not only hedonically and functionally oriented but also socially oriented. Ha et al. (2007) explained that using the smartphone enhanced social relationships, which influenced the resultant behavior of mobile phone use. Therefore, this study assumes that when smartphone users perceived hedonic, utilitarian, and social values from using the smartphone, they would use the smartphone more; thus, the following hypotheses were formulated:

H10: People who perceive **social value** from using the smartphone are more likely to use the smartphone.

H11: People who perceive **hedonic value** from using the smartphone are more likely to use the smartphone.

H12: People who perceive **utilitarian value** from using the smartphone are more likely to use the smartphone.

3.2.5 Control variables in the proposed model

According to Mundorf and Bryant (2002), demographic differences apparently influence different perceptions of interactive services that mobile devices provide. Demographic factors (age, sex, socioeconomic status, and race) were found to be key differentiators in the behaviors of using smartphone services. For example, Kim and Hwang (2012) suggested that smartphone users would perceive different values of using the devices according to demographic differences. Barutçu (2007) found that people, who

were relatively older and had higher monthly income, perceived positive experiences using utilitarian services (e.g., location-based mobile services and mobile banking). In contrast, the study's results indicated that less educated respondents' experiences with using entertainment services were less positive. Other previous studies (Leung and Wei, 1999; Wei, 2008) found that relatively younger and well-educated people were more likely to use a mobile device. Wei (2008) found that race influenced smartphone using behavior. In the study, not-Caucasian male participants use mobile phones more for entertainment reasons. Other researchers (Jackson, Zhao, Kolenic, Fitzgerald, Harold, & Von Eye, 2008) presented that Caucasian males were least likely to use mobile devices when compared to others. Therefore, this study examined differences in motivations according to demographic characteristics (age, sex, socioeconomic status, and race), and tested the hypothesized model when controlling for demographic factors; thus, the following hypotheses were proposed:

H13: Smartphone users have different levels of motivations according to demographic factors (e.g., age, sex, socio-economic status, and race).

H14: Demographic factors (e.g., age, sex, socio-economic status, and race), as control variables in the proposed model, have an effect on perceived values (i.e., social, hedonic, and utilitarian values) and use of the smartphone.

3.2.6 Sex difference in the proposed model

Sex difference (male and female) was identified as a crucial factor that motivates use of the mobile phone, such that, for instance, people would have different motivations of using the smartphone. Wei (2008) found that men were more likely to seek

information using a mobile device than women. Lee, Chang, Lin, and Cheng (2014) suggested that different motivations (e.g., social connections, interactive features) would influence using the smartphone with regard to sex difference. Their research found that females experienced greater effects of social interacting motivations on use of the mobile device than the effects experienced by their male counterparts. Drawing on the findings of previous scholarship, this study suggests that people would have different experiences while using the smartphone (e.g., different value perceptions), and experiences could be explained by distinct motivations dependent on sex difference; thus the following hypothesis was formed:

H15: According to different sex (e.g., male and female) groups, people would have different motivations for using the smartphone, and their motivations would have different effects on perceived values and use of the smartphone.

3.3 Proposed Research Model

To test these hypotheses, the following research model is proposed (see Figure 3.3). The model consists of the motivational framework (cognitive, relational, and emotional factors) and the perceived value framework (social, hedonic, and utilitarian values). To test the model, structural equation modeling (SEM) analysis was used. As exogenous variables, information seeking (IFS), social contact (SC), entertainment activity (ENA), self-reactiveness (SR), social identity (SID), emotional security (ES), safe haven (SH), proximity maintenance (PM), and separation distress (SD) were included. As endogenous variables, perceived social value (PSV), perceived hedonic value (PHV), perceived utilitarian value (PUV), and use of the smartphone (USM) were included.

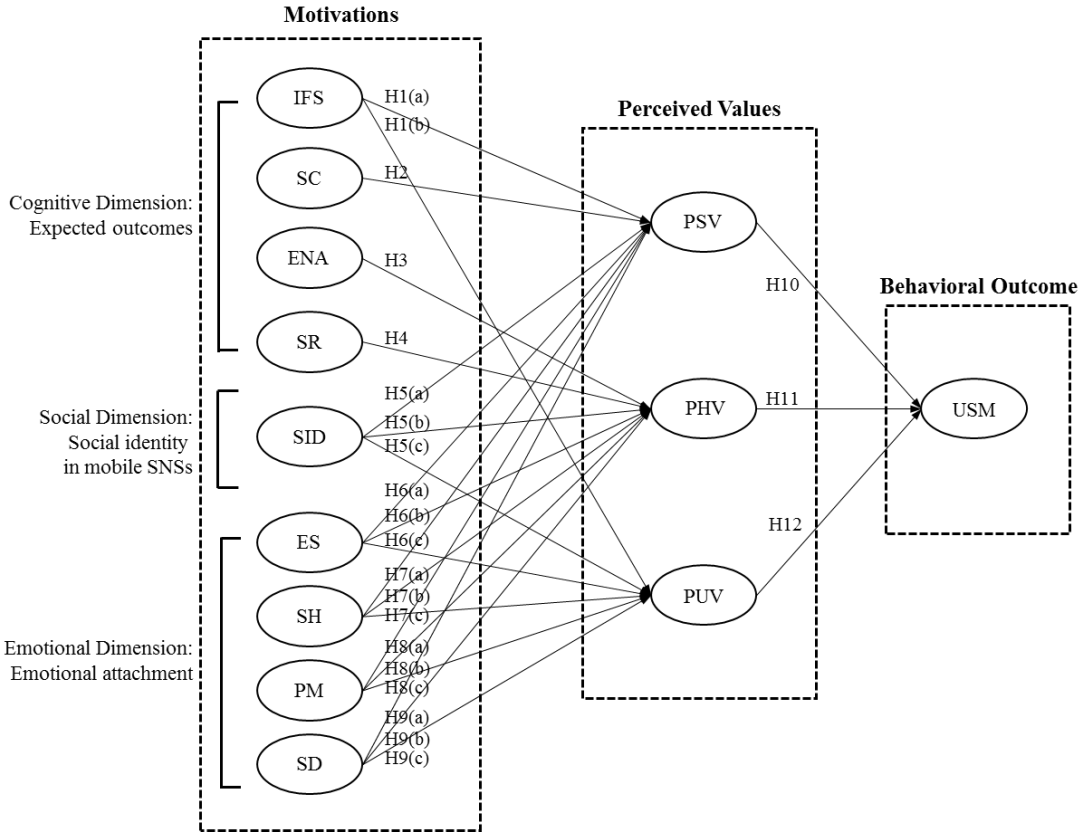

Figure 3.3 Proposed research model

CHAPTER 4. METHODOLOGY

To test the hypothesized model and proposed hypotheses, measurement instruments were developed and a self-administered questionnaire was used to collect data. In this chapter, 1) target sample, 2) data collection procedure, and 3) measurement instruments are explained.

4.1 Target Sample

This study targeted individuals, from ages 18 to 64. All participants were smartphone users who were capable of using social networking services (e.g., Facebook, Twitter, and Instagram) on their smartphone. Participants were required to have a recent experience with logging on to a social media site, using a smartphone. A self-administered questionnaire was used to collect samples. At the beginning of the survey, screening questions were used to determine whether respondents were eligible to take part in the study.

A sufficiently large sample size must be used to detect the proper estimation and inference in SEM. The N:q ratio (between sample size and model complexity) provides a practical rule to determine sample size in SEM (Bentler, 1989). Kline (2011) suggested an ideal sample size of 10:1 in terms of the ratio of cases (N) compared to the number of model parameters (q) that are required for statistical estimation. For example, when a total number of model parameters are 50 (q=50), a recommended sample size would be

500 (N=500). Other researchers (Bentler & Chou, 1989) suggested that the ratio should be between 5:1 and 10:1. In this study, the minimum target sample size was 500 or more (because the hypothesized model was expected to include 50 parameters).

4.2 Data Collection Procedure

Amazon's Mechanical Turk (https://www.mturk.com) was used to collect the samples. The Mechanical Tuck (MTurk) is a diverse workforce where requesters can provide online tasks to many individual workers (Pontin, 2007). MTurk can be a useful tool for researchers when collecting data from participants with relatively inexpensive compensation. For example, Buhrmester, Kwang, and Gosling's study (2011) found that 16 people participated in an hour on 30 minute-surveys with a compensation rate of $.50. In addition, according to the study (Buhrmester et al., 2011), samples collected from MTurk would be demographically diverse compared to typical American college samples, and when compared to general web-based surveys, the samples would be relatively diverse.

Finally, this study used MTurk to collect data from participations with a compensation rate of $1. The survey consisted of a consent form (Appendix A) and a data collection questionnaire (Appendix B). The survey link was created using Qualtrics (web-based survey software available at https://www.itap.purdue.edu/learning/tools/qualtrics/). The survey was launched in the site on 13 November, 2015, and data collection from 779 participants was completed on 15 November, 2015.

4.3 Measurement Instruments

4.3.1 Expected outcomes

Scales to measure expected outcomes were adopted from a previous study conducted by LaRose and Eastin (2004). They studied expected outcomes from a social cognitive perspective for Internet use. Scales for information seeking were additionally adopted from Wei (2008)'s study. Measures from these studies with regard to the following four variables – information seeking, social contact, entertainment activity, and self-reactiveness – were adopted and modified for this study.

Table 4.1 Measures for expected outcomes

Variable	Coding	Measures	Source of measured items
Information seeking (IFS)	IFS1	Search information	LaRose and Eastin (2004) Wei (2008)
	IFS2	Get immediate knowledge	LaRose and Eastin (2004)
	IFS3	Get information about some products	LaRose and Eastin (2004) Wei (2008)
	IFS4	Find a wealth of information	LaRose and Eastin (2004)
Social contact (SC)	SC1	Get support from others	LaRose and Eastin (2004)
	SC2	Find something to talk about	LaRose and Eastin (2004)
	SC3	Belong to a group that I value	LaRose and Eastin (2004)
Entertainment activity (ENA)	ENA1	Do entertained activities	LaRose and Eastin (2004)
	ENA2	Play a game I like	LaRose and Eastin (2004)
	ENA3	Enjoy activities using applications	LaRose and Eastin (2004)
	ENA4	Cheer myself up	LaRose and Eastin (2004)
Self-reactiveness (SR)	SR1	Forget my problems	LaRose and Eastin (2004)
	SR2	Feel relaxed	LaRose and Eastin (2004)
	SR3	Feel less lonely	LaRose and Eastin (2004)

4.3.2 Social influence

Scales to measure social identity were adopted from previous studies (Charng, Piliavin, & Callero, 1988; Kim et al., 2014). To measure social identity from SNSs connected through the smartphone, respondents were asked to remind one of social groups (e.g., school, company, or peer groups) on the social network site that they open access via their smartphone.

Table 4.2 Measures for social influence

Variable	Coding	Measures	Source of measured items
Social identity (SID)	SID1	Using smartphone helps to identify myself within the group.	Kim et al. (2014)
	SID2	Using smartphone helps to enhance my image within the group.	Kim et al. (2014)
	SID3	Using smartphone helps to elevate my standing within the group.	Kim et al. (2014)

4.3.3 Emotional attachment

Scales to measure emotional attachment were adopted from previous studies (Fraley & Davis, 1997; Hazan & Zeifman, 1999; VanMeter & Grisaffe, 2013, Vincent, 2005). A total of four emotional attachment variables – proximity maintenance, emotional security, safe haven, and separation distress – were modified to using the smartphone.

Table 4.3 Measures for emotional attachment

Variable	Coding	Measures	Source of measured items
Emotional security (ES)	ES1	I feel secured when my smartphone helps me to take on the world.	Hazan and Zeifman (1999) Fraley and Davis (1997)
	ES2	I feel secured because my smartphone keeps me connected.	Hazan and Zeifman (1999) Fraley and Davis (1997)
	ES3	I feel secured when I always count on my smartphone.	Hazan and Zeifman (1999) Fraley and Davis (1997)
Safe haven (SH)	SH1	When I'm feeling down, I often turn to my smartphone.	Hazan and Zeifman (1999) Fraley and Davis (1997)
	SH2	If something upsets me, my smartphone can help me feel better.	Hazan and Zeifman (1999) Fraley and Davis (1997)
	SH3	When I'm feeling upset or down, I like to get on my smartphone.	Hazan and Zeifman (1999) Fraley and Davis (1997)
Proximity maintenance (PM)	PM1	I feel that I need to have my smartphone near me.	Hazan and Zeifman (1999)
	PM2	I feel that I like to have access my smartphone.	Hazan and Zeifman (1999)
	PM3	I feel compelled to check my smartphone throughout the day.	Hazan and Zeifman (1999)
Separation distress (SD)	SD1	I will be panic if I find that I don't have my phone with me.	VanMeter and Grisaffe (2013)
	SD2	I feel concerned if I might be lost my smartphone.	Vincent (2005)
	SD3	I would be sad without my smartphone.	VanMeter and Grisaffe (2013)
	SD4	It's hard for me to spend a day without my smartphone.	Vincent (2005)

4.3.4 Perceived value

Scales to measure perceived values were adopted previous studies (Choi & Chung, 2013; Sweeney & Soutar, 2001). A total of three perceived values – perceived social, hedonic, and utilitarian values – were modified to using the smartphone.

Table 4.4 Measures for perceived value

Variable	Coding	Measures	Source of measured items
Perceived social value (PSV)	PSV1	Using smartphone makes it easier to develop social relationship.	Choi and Chung (2013)
	PSV2	Using smartphone improves my social relationship.	Choi and Chung (2013)
	PSV3	Using smartphone enhances my effectiveness in building social relationship.	Choi and Chung (2013)
	PSV4	Using smartphone helps me to build social relationship more quickly.	Choi and Chung (2013)
	PSV5	I find using smartphone useful in my social relationship.	Choi and Chung (2013)
Perceived hedonic value (PHV)	PHV1	The smartphone is one that I enjoy.	Sweeney and Soutar (2001)
	PHV2	The smartphone makes me want to use it.	Sweeney and Soutar (2001)
	PHV3	The smartphone makes me feel relaxed.	Sweeney and Soutar (2001) Chun et al. (2012)
	PHV4	The smartphone makes me feel good.	Sweeney and Soutar (2001)
	PHV5	The smartphone gives me pleasure.	Sweeney and Soutar (2001) Chun et al. (2012)

Table 4.4 continued

Variable	Coding	Measures	Source of measured items
Perceived utilitarian value (PUV)	PUV1	Using the smartphone enables me to accomplish tasks more quickly.	Sweeney and Soutar (2001) Park and Chen (2007)
	PUV2	Using the smartphone improves my performance.	Park and Chen (2007)
	PUV3	Using the smartphone increases my productivity.	Chun et al. (2012)
	PUV4	Using the smartphone enhances my effectiveness.	Chun et al. (2012)

4.3.5 Use of the smartphone

Scales to measure recent use of the smartphone were adopted from the previous study (LaRose & Eastin, 2004) of Internet use and applied to smartphone use. Participants were asked information about the amount of time spend recently on the smartphone and their frequency of device use on a recent day. Additional four questions related to general aspects of smartphone services (e.g., SNSs, text message, mobile data, and money spend) were asked.

Table 4.5 Measures for using of the smartphone

Variable	Coding	Measures	Source of measured items
Use of the smartphone (USM)	USM1	In the past week, on average, how many minutes per day have you spend on your smartphone? (excluding making a voice call)	LaRose and Eastin (2004)
	USM2	In the past week, on average, how many times per day have you checked your smartphone?	LaRose and Eastin (2004)

4.3.6 Demographic factors

To measure demographic characteristics, respondents were asked questions related to themselves. Demographic questions included age, sex, education, household income, and race.

CHAPTER 5. RESULTS

This chapter consists of 1) demographic description of the sample; 2) assumption tests for the SEM analysis; 3) modified research model; 4) SEM analysis procedure; 5) results for H1 ~ H12; 6) results for H13 and H14; and 7) results for H15. To examine demographic descriptions and to test assumptions, descriptive statistics, Pearson correlation, and Cronbach's standardized *alpha* were used. After the assumption tests were completed, the initially proposed research model was modified based on the results of the descriptive statistics of measures. To test the modified model (H1 ~ H12) and the model including demographic factors as control variables (H13 and H14), path analysis with the AMOS program was used. To examine sex differences in the hypothesized model (H15), two models using different sex groups (male and female) were analyzed, respectively, by using an AMOS program.

5.1 Sample Description

A sample size of 779 people completed the survey. A dataset of 738 was used after deleting incomplete data (n = 11), data from the same IP address (n = 11), and outliers (n = 19). A sample description of demographic characteristics is presented in Table 5.1. 44% of all participants were males and 56% were females. The average age of the participants was 34.73 (SD = 10.37). The majority of the participants were aged between 20 and 30, which indicates the approximately 73% of the participants aged 19 to 39 while

only 27% were aged 40 to 64. Approximately 68% of participants were Caucasian Americans. The second most reported race (15.2%) was South Asian (e.g., Indians or those from countries near India). Approximately 63% of participants were educated at a college level (i.e., some college work or college graduate). Approximately 60% of participants had a household annual income ranging from less than $ 25,000 to $ 50,000, and approximately 22% of the respondents had an income ranging from $75,000 to $100,000 or more.

Table 5.1 Demographic description

	Items	Frequency	Percent
Sex			
	Male	325	44
	Female	413	56
	Total	738	100
Age			
	19-24	101	13.7
	25-29	178	24.1
	30-34	154	20.9
	35-39	104	14.1
	40-44	64	8.7
	45-49	49	6.6
	50-54	48	6.5
	55-59	17	2.3
	Over 60	23	3.1
	Total	738	100
Race			
	Caucasian	501	67.9
	African American	36	4.9
	Native American/American Indian	8	1.1
	Hispanic/Latino	37	5.0
	Eastern Asian	27	3.7
	South Asian	111	15.0

Table 5.1 continued

Items	Frequency	Percent
West Asian	1	0.1
Pacific Islander	1	0.1
Multiracial	14	1.9
Others	2	0.3
Total	738	100
Education		
Some high school	2	0.3
High school graduate	63	8.5
Some college	175	23.7
Trade/Technical/Vocational training	49	6.6
College graduate	292	39.6
Some postgraduate work	34	4.6
Post graduate degree	122	16.5
Others	1	0.1
Total	738	100
Household income		
Less than $25,000	153	20.7
$25,000 to less than $35,000	112	15.2
$35,000 to less than $50,000	165	22.4
$ 50,000 to less than $75,000	148	20.1
$75,000 to less than $100,000	91	12.3
$100,000 to less than $150,000	47	6.4
$150,000 to more	22	3
Total	738	100

A sample description on the general use of the smartphone is indicated in Table 5.2. The majority of respondents (*n* = 494, 66.7%) reported that their current phone was the iPhone or Samsung. Approximately 60% of respondents paid between $ 50 to less than $150 for their monthly smartphone bill. Similarly proposed respondents (57.6%) used mobile data from 500 MB to less than 2 GB per month. Approximately 67% of

participants spent 10 minutes up to two hours on mobile SNS services per day. Approximately half of the participants received 10 to 50 text messages in a day.

Table 5.2 Sample description on general use of the smartphone

Items	Frequency	Percent
Smartphone brand		
Nokia	27	3.7
Sony	15	2.0
Nexus	7	0.9
Motorola	41	5.6
iPhone	241	32.7
Samsung	253	34.2
HTC	41	5.6
LG	71	9.6
Lenovo	15	2.0
Others	27	3.7
Total	738	100
Pay bill in the last month		
Less than $50	223	30.5
$50 to less than $100	305	41.1
$100 to less than$150	139	18.8
$150 to less than $200	43	5.8
$200 to more	28	3.8
Total	738	100
Data use in the last month		
Less than 300MB	55	7.5
300MB to less than 500MB	60	8.1
500MB to less than 1GB	114	15.4
1GB to less than 2GB	176	23.8
2GB to less than 3GB	135	18.4
3GB to less than 4GB	82	11.1
4GB to less than 5GB	41	5.6
5GB to more	75	10.2
Total	738	100

Table 5.2 continued

Items	Frequency	Percent
Time spent on mobile SNS per day		
Less than 10 min	46	6.2
10 to less than 30 min	160	21.7
30 to less than 60 min	181	24.5
1 to less than 2 h	154	20.9
2 to less than 3 h	99	13.4
3 to less than 4 h	46	6.2
4 h or more	52	7.1
Total	738	100
Text messages received per day		
Less than 10	115	15.6
10 to less than 20	165	22.4
20 to less than 30	132	17.9
30 to less than 50	104	14.1
50 to less than 80	69	9.2
80 to less than 100	47	6.4
100 to more	107	14.5
Total	738	100

5.2 Assumption Tests for SEM

This study assumes collected data fit to the assumptions for SEM analysis. Using AMOS and SPSS, this study tested three main assumptions – no multivariate outliers, multivariate-normal distribution, and no or less multicollinearity.

5.2.1 No multivariate outliers

First, the data does not have univariate outliers because outliers, more than three standard deviations away from the mean, were not detected. To detect univariate normality, indices of Mahalanobis distance squared were examined. The Mahalanobis d-

squared is distributed as a chi-square statistic with degrees of freedom equal to the number of observed variables (Kline, 2011). This was calculated using AMOS, and 19 influential outliers that had the probability associated with the d-squared less than 0.001 were removed.

5.2.2 Multivariate-normal distribution

SEM estimation procedures assume multivariate normal distributions. With multivariate statistics, the combination of variables is assumed to follow a multivariate normal distribution (Kline, 2011). Since there is no direct test for multivariate normality, each individual variable was tested by examining skewness and kurtosis (see Table 3). When the absolute value of skewness is greater than 3 and kurtosis is greater than 10, a serious problem can be detected on the normality assumption (Kline, 2011). Because the statistics of the skewness were mostly ranged -3 to 3 and the kurtosis statistics were below 10 (mostly less than 3), the data is normally distributed.

5.2.3 No or less multicollinearity

Issues related to multicollinearity occur when two or more predictor variables are highly correlated. To detect this problem, regression analysis using SPSS was conducted for calculating the Tolerance ($1 - R^2$) and Variable Inflation Factor (VIF = 1 / (1 - R2)) for each independent variable. The VIF is a reciprocal concept of tolerance. Several literature reviews (Hair, Anderson, Tatham, & Black, 1995; Kennedy, 1992; Neter, Wasserman, & Kutner, 1989) recommended, the maximum level of VIF as 10. If the value of VIF is greater than 10, the multicollinearity assumption suggests a serious problem. In this study, the coefficients of the VIF are mostly less than 5 (see Table 5.3),

which indicate that the data does not have a serious problem with regard to multicollinearity issues.

Further, according to Klein (2011), multicollinearity can also be detected when latent variables are highly correlated. He suggested that correlations of .85 or greater could indicate a violation of the multicollinearity assumption. Thus, a bivariate correlation analysis was conducted between latent variables (see Table 5.4). The correlation matrix which indicates that the correlation values are raged 0.27 to 0.64, expect correlations among ES, SH, PM, and SD (ranged 0.70 to 0.82). These four emotional attachment variables were relatively more correlated with each other than other variables; thus a possibility that these four variables can be conceptualized at a one second-order factor was discussed and suggested (in the following section).

5.2.4 Reliability of items

Additionally, the reliability of items was tested. Cronbach's *alpha* was measured (see Table 5.3). The statistics of Cronbach's *alpha* ranged .75 to .92, which indicated that the reliability of each item was acceptable. Finally, the measures of all latent variables fit the assumptions of the SEM analysis and were used for the main analysis.

Table 5.3 Statistics for assumption tests

	Coding	Cronbach's *Alpha*	Mean	SD	Normality statistics		Collinearity statistics	
					Skewness	Kurtosis	Tolerance	VIF
Information seeking	IFS1	.80	6.08	1.09	-1.32	1.67	.54	1.86
	IFS2		5.92	1.18	-1.38	2.33	.51	1.95
	IFS3		5.85	1.20	-1.39	2.54	.48	2.07
	IFS4		6.00	1.20	-1.60	3.00	.48	2.08
Social contact	SC1	.82	4.71	1.67	-.58	-.48	.39	2.57
	SC2		4.91	1.69	-.67	-.38	.39	2.59
	SC3		4.52	1.78	-.40	-.82	.47	2.12
Entertainment activity	ENT1	.78	5.79	1.25	-1.38	2.43	.40	2.51
	ENT2		5.60	1.64	-1.34	1.09	.57	1.76
	ENT3		5.82	1.23	-1.42	2.67	.43	2.32
	ENT4		4.82	1.66	-.58	-3.35	.27	3.66
Self-reactiveness	SR1	.79	4.38	1.80	-.17	-.98	.37	2.67
	SR2		5.06	1.55	-.69	-.01	.36	2.81
	SR3		4.38	1.87	-.27	-.99	.42	2.39
Social identity	SID1	.91	3.88	1.98	-.07	-1.29	.28	3.61
	SID2		3.79	1.90	-.03	-1.22	.23	4.33
	SID3		3.91	1.91	-.00	-1.13	.23	4.30
Emotional security	ES1	.92	5.23	1.66	-.94	.19	.27	3.70
	ES2		5.65	1.42	-1.30	1.55	.22	4.54
	ES3		5.40	1.52	-1.04	.67	.21	4.82
Safe haven	SH1	.94	4.67	1.84	-.41	-.87	.21	4.71
	SH2		4.33	1.85	-.32	-.97	.18	5.66
	SH3		4.54	1.87	-.43	-.87	.16	6.09
Proximity maintenance	PM1	.90	5.50	1.59	-1.23	.93	.26	3.90
	PM2		5.91	1.28	-1.62	2.98	.30	3.29
	PM3		5.78	1.38	-1.34	1.54	.35	2.89
Separation distress	SD1	.89	4.78	1.83	-.58	-.67	.38	2.62
	SD2		5.70	1.52	-1.37	1.49	.38	2.65
	SD3		4.89	1.81	-.67	-.52	.29	3.51
	SD4		5.14	1.85	-.89	-.25	.29	3.49

Table 5.3 continued

	Coding	Cronbach's *Alpha*	Mean	SD	Normality statistics		Collinearity statistics	
					Skewness	Kurtosis	Tolerance	VIF
Separation distress	SD1	.89	4.78	1.83	-.58	-.67	.38	2.62
	SD2		5.70	1.52	-1.37	1.49	.38	2.65
	SD3		4.89	1.81	-.67	-.52	.29	3.51
	SD4		5.14	1.85	-.89	-.25	.29	3.49
Perceived social value	PSV1	.92	5.20	1.60	-.96	.39	.20	4.89
	PSV2		4.97	1.61	-.82	.02	.35	2.89
	PSV3		5.07	1.57	-.89	.27	.18	5.68
	PSV4		5.32	1.48	-1.06	.91	.30	3.29
	PSV5		5.32	1.52	-1.03	.74	.36	2.79
Perceived hedonic value	PHV1	89	6.07	.98	-1.18	1.55	.48	2.10
	PHV2		5.92	1.14	-1.41	2.79	.43	2.31
	PHV3		5.25	1.42	-.73	.07	.25	3.95
	PHV4		5.39	1.41	-.94	.62	.19	5.29
	PHV5		5.47	1.38	-.92	.50	.26	3.88
Perceived utilitarian value	PUV1	.92	6.02	1.02	-1.34	2.48	.35	2.87
	PUV2		5.77	1.17	-1.08	1.32	.23	4.39
	PUV3		5.64	1.34	-1.20	1.21	.19	5.39
	PUV4		5.70	1.29	-1.15	1.28	.18	5.58
Use of the smartphone	USE1	.75	4.75	1.89	.26	-.81	NA*	NA
	USE2		3.60	1.72	.81	-.48	NA	NA

*To calculate collinearity statistics, regression analysis, using the *use of the smartphone* as a dependent variable, was conducted.

Table 5.4 Correlation matrix of latent variables

	INS	SC	ENA	SR	SID	ES	SH	PM	SD	PSV	PHV	PUV	USE
INS	1												
SC	.43**	1											
ENA	.60**	.57**	1										
SR	.43**	.70**	.64**	1									
SID	.32**	.63**	.49**	.58**	1								
ES	.51**	.51**	.56**	.52**	.55**	1							
SH	.39**	.61**	.64**	.64**	.61**	.70**	1						
PM	.48**	.40**	.52**	.43**	.44**	.82**	.70**	1					
SD	.41**	.45**	.50**	.48**	.46**	.75**	.72**	.80**	1				
PSV	.47**	.58**	.54**	.50**	.65**	.62**	.58**	.56**	.53**	1			
PHV	.49**	.51**	.60**	.56**	.52**	.59**	.64**	.54**	.57**	.58**	1		
PUV	.46**	.39**	.45**	.33**	.45**	.49**	.42**	.39**	.37**	.50**	.51**	1	
USE	.27**	.27**	.35**	.31**	.28**	.36**	.38**	.40**	.38**	.32**	.31**	.28**	1

**p<.01

5.3 Modified Research Model

According to Gaskin (2012), the decision of whether to use the second-order approach could be decided based on either theoretical conceptualization or statistics. For example, if two factors are theoretically or statistically correlated to each other, these two factors can be conceptualized at a higher order concept. Because of relatively high associations among four emotional variables – emotional security (ES), safe haven (SH), proximity maintenance (PM), and separation distress (SD) – this study considered the possibility that these variables could be conceptualized at a higher order concept.

In addition to the statistical correlations, previous studies support the second-order conceptualized construct of emotional attachment. Thomson et al. (2005) focused on the construct of emotional attachment and found that emotional attachment has sub-dimensions represented by different types of feelings such as affections, passion, and connection. Their research proposed a second-order structural model that conceptualized emotional attachment as a higher-order construct. Park, Macinnis, Priester, Eisingerich, and Iacobucci (2010) also suggested that the construct of emotional attachment could consist of sub-concepts (e.g., feelings of personally connected, or feeling that automatic coming to mind). In addition, Read and colleagues (2011) suggested a similar concept of emotional attachment. They suggested that different types of emotional reactions (e.g., feelings of passion, concern, or attachment) could be conceptualized as sub-dimensions under the second-order concept of "emotional attachment."

Although the study (Bowdly, 1979; 1980), initially suggested these four types of emotional attachment (ES, SH, PM, and SD), did not conceptualize emotional attachment as a second-order concept, these four attachment styles were theoretically based on the

single higher concept of emotional attachment (Hazan & Zeifman, 1999). Moreover, early researchers (Ainsworth et al., 1978; Hazan & Shaver, 1994; Segrin & Flora, 2005) mentioned that these four attachment styles were theoretically associated with emotional attachment. Therefore, this study modified four types of emotional attachment into the second-order construct for the higher concept of emotional attachment. Finally, this study proposed a modified research model (see Figure 5.1) that maintained a second-order approach for the emotional dimension. Consequently, hypotheses (i.e., H6, H7, H8, and H9) were deleted and the modified hypothesis (MH) was formulated as follows:

MH: People, who feel **emotionally attached** toward using the smartphone, are more likely to **perceived social value (a), hedonic value (b), and utilitarian value (c)**

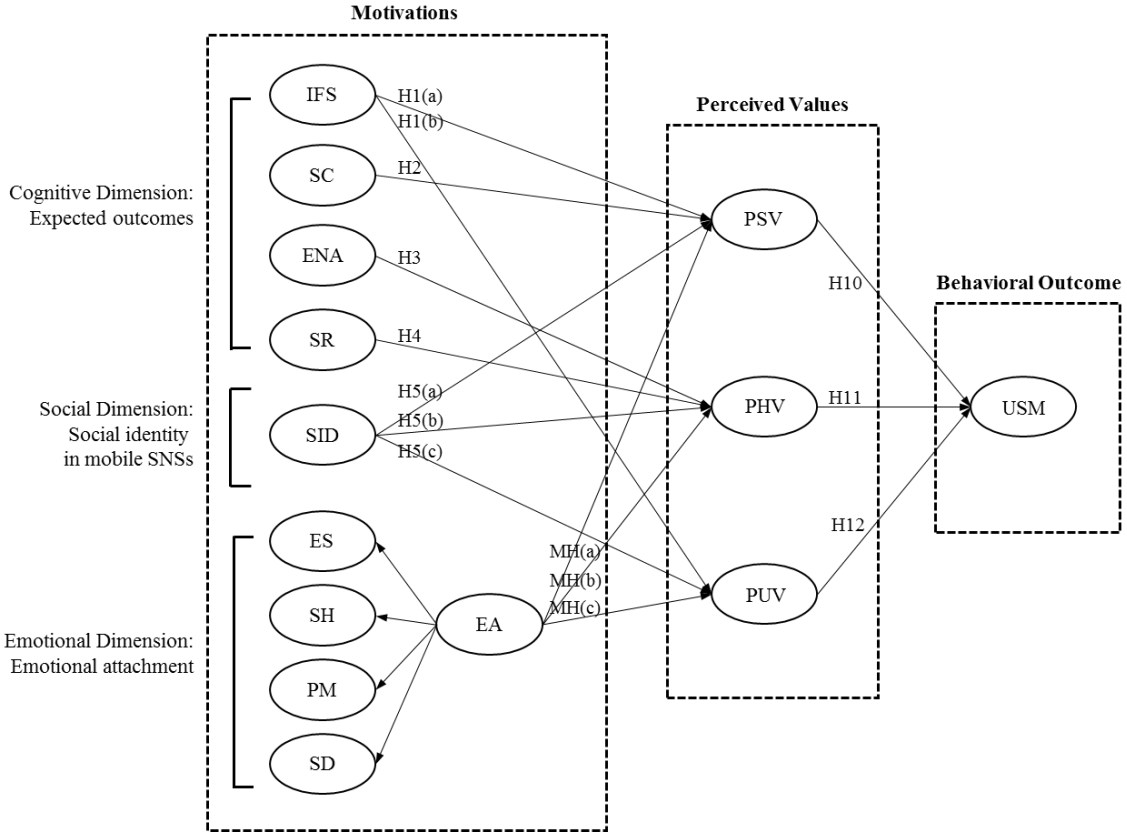

Figure 5.1 Modified final research model

5.4 Structural Equation Modeling (SEM)

The data analysis follows a two-step approach, as recommend by Anderson and Gerbing (1988). The first step is to analyze a measurement model using confirmatory factor analysis (CFA), and the second step is to analyze a structural path model. The purpose of testing the measurement model is to access the reliability and validity of the measures before using them in a full model. Further, the purpose of conducting the path model is to test hypotheses proposed in the model.

5.4.1 A measurement model

Confirmatory factor analysis (CFA) was used to measure the reliability of constructs (i.e., construct validity). In the measurement model, each construct was correlated freely with other construct (Appendix Figure A 1). The model generated an acceptable model fit (CFI = .90, GFI = .78, RMR = .06, RMSEA = .06, χ^2 = 4203.53, df = 1204, p = 0.00, CMIN/DF = 3.49).

To test the reliability of constructs, convergent validity and discriminant validity were tested. Convergent validity represents that indicators, which measure the same hypothetical variables, should be related. Convergent validity can be tested by examining values of constitute reliability (CR) and average variance extracted (AVE). According to Anderson and Gerbing (1988), AVE values above 0.5 and CR values above 0.7 indicate convergent validity. Values of AVE and CR for all constructs are presented in Table 5.5 below. AVE statistics range from 0.51 to 0.84, and CR statistics range from 0.75 to 0.94, which indicates convergent validity. In addition, discriminant validity was examined. “Discriminant validity” means that all constructs should be divergent (i.e., should not be

related to) each other. According to Fornell and Larcker (1981), AVE values from the construct should be greater than the squared correlation coefficients shared between the construct and other constructs in the model. All values of AVE are greater than squared correlation coefficients (see Table 5.6), which indicate a discriminate validity among the constructs.

Table 5.5 Results of a measurement model

Variable	Coding	Cronbach's *Alpha*	Mean	SD	Standardized Loading	AVE[1]	CR[2]
Information seeking	IFS1	.80	6.08	1.09	.66	.51	.80
	IFS2		5.92	1.18	.71		
	IFS3		5.85	1.20	.74		
	IFS4		6.00	1.20	.73		
Social contact	SC1	.82	4.71	1.67	.82	.61	.82
	SC2		4.91	1.69	.81		
	SC3		4.52	1.78	.71		
Entertainment activity	ENT1	.78	5.79	1.25	.73	.51	.81
	ENT2		5.60	1.64	.68		
	ENT3		5.82	1.23	.71		
	ENT4		4.82	1.66	.74		
Self-reactiveness	SR1	.80	4.38	1.80	.76	.58	.80
	SR2		5.06	1.55	.82		
	SR3		4.38	1.87	.70		
Social identity	SID1	.91	3.88	1.98	.82	.77	.91
	SID2		3.79	1.90	.90		
	SID3		3.91	1.91	.91		
Emotional security	ES1	.92	5.23	1.66	.86	.80	.92
	ES2		5.65	1.42	.90		
	ES3		5.40	1.52	.92		
Safe haven	SH1	.94	4.67	1.84	.89	.84	.94
	SH2		4.33	1.85	.91		
	SH3		4.54	1.87	.95		

Table 5.5 continued

Variable	Coding	Cronbach's *Alpha*	Mean	SD	Standardized Loading	AVE[1]	CR[2]
Proximity maintenance	PM1	.90	5.50	1.59	.89	.72	.88
	PM2		5.91	1.28	.85		
	PM3		5.78	1.38	.80		
Separation distress	SD1	.89	4.78	1.83	.79	.65	.89
	SD2		5.70	1.52	.77		
	SD3		4.89	1.81	.86		
	SD4		5.14	1.85	.87		
Emotional attachment	ES	.89	5.43	1.43	.90	.76	.93
	SH		4.51	1.75	.79		
	PM		5.73	1.28	.90		
	SD		5.13	1.52	.89		
Perceived social value	PSV1	.92	5.20	1.60	.90	.71	.92
	PSV2		4.97	1.61	.77		
	PSV3		5.07	1.57	.92		
	PSV4		5.32	1.48	.83		
	PSV5		5.32	1.52	.77		
Perceived hedonic value	PHV1	.89	6.07	.98	.54	.63	.89
	PHV2		5.92	1.14	.67		
	PHV3		5.25	1.42	.86		
	PHV4		5.39	1.41	.93		
	PHV5		5.47	1.38	.88		
Perceived utilitarian value	PUV1	.92	6.02	1.02	.74	.76	.93
	PUV2		5.77	1.17	.88		
	PUV3		5.64	1.34	.93		
	PUV4		5.70	1.29	.93		
Use of the smartphone	USE1	.75	4.75	1.89	.79	.60	.75
	USE2		3.60	1.72	.76		

[1] Average variance extracted
[2] Constitute reliability

Table 5.6 Discriminant validity: correlation matrix and AVE statistics

	INS	SC	ENA	SR	SID	EA	PSV	PHV	PUV	USE	AVE
INS	1										.51
SC	.18[a] (.43[b])	1									.61
ENA	.36 (.60)	.33 (.57)	1								.50
SR	.19 (.43)	.49 (.70)	.41 (.64)	1							.58
SID	.10 (.32)	.39 (.63)	.24 (.49)	.33 (.58)	1						.77
EA	.25 (.50)	.32 (.57)	.41 (.64)	.40 (.63)	.36 (.60)	1					.76
PSV	.23 (.45)	.34 (.58)	.29 (.54)	.25 (.50)	.42 (.65)	.43 (.66)	1				.71
PHV	.24 (.49)	.26 (.51)	.36 (.60)	.31 (.56)	.28 (.52)	.45 (.67)	.34 (.58)	1			.63
PUV	.21 (.46)	.15 (.39)	.20 (.45)	.11 (.33)	.20 (.45)	.23 (.48)	.25 (.50)	.26 (.51)	1		.76
USE	.07 (.27)	.08 (.27)	.12 (.35)	.10 (.31)	.08 (.28)	.19 (.43)	.10 (.32)	.09 (.31)	.08 (.28)	1	.60

[a] Squared correlation coefficient
[b] Correlation coefficient

5.4.2 A structural equation model

Finally, proposed measures were used as indicators of latent variables in the structural equation model. Figure 5.2 below shows the final structural equation model. In the model, exogenous variables were all correlated to each other.

To examine the overall model fit, multiple fit statistics should be considered (Bollen, 1989). This study examined six indices – chi-square (χ^2), ratio of chi-square to degree of freedom (CMIN/DF), comparative fit index (CFI), goodness of fit index (GFI), root mean squared error of approximation (RMSEA), and standardized root mean squared residual (SRMR).

This model generated significant chi-square (p=.000), which means that the proposed model did not adequately present the entire set of relationships. However, this result is due to the large sample size. Since χ^2 is sensitive to sample size, the chi-square values can be inflated with large sample sizes (e.g., n = 200 or more), which could erroneously suggest a poor data-to-model fit (Schumacker & Lomax, 2004). For this reason, CMIN/DF (chi-square/degree of freedom ratio) was recommended by previous researchers (Byrne, 1989; Carmines & McIver, 1981; Marsh & Hocevar, 1985), because CMIN/DF is less dependent on sample size. They suggested that CMIN/DF, ranging from 2 to 5, indicates a reasonable fit.

In addition, CFI indicates the extent to which the proposed model is better than the independent model that assumes variables are not correlated. Researchers suggested that CFI should be greater than 0.90 or close to 0.95 (Gerbing & Anderson; 1992). In complex models, however, 0.80 could be the lowest acceptable level for the CFI (Hart, 1994). GFI indicates the proposition of variance in the proposed model by the observed covariance

(Tabachnick & Fidell, 1996). The GFI should be greater than 0.80, and the lowest acceptable level is 0.70 in the case of complex models (Judge & Hulin, 1993). RMSEA and SRMR indicate the square root of the difference between the residuals of the sample covariance matrix and the covariance in the proposed model. The RMSEA and SRMR should respectively have values close to (or lower than) 0.06, and 0.08 (Hu & Bentler, 1999).

The structural model generated a reasonably acceptable model fit (CFI = .90, GFI = .79, SRMR = .07, RMSEA = .06, χ^2 = 3686.87, *df* = 956, *p* = 0.000, CMIN/DF = 3.86). In the next section, hypotheses (i.e., H1 ~ H5, MH1 ~ MH3, and H10 ~ H12) related to this model were discussed. Also, structural equation models for testing other hypotheses (i.e., H13 ~ H15) were analyzed and discussed.

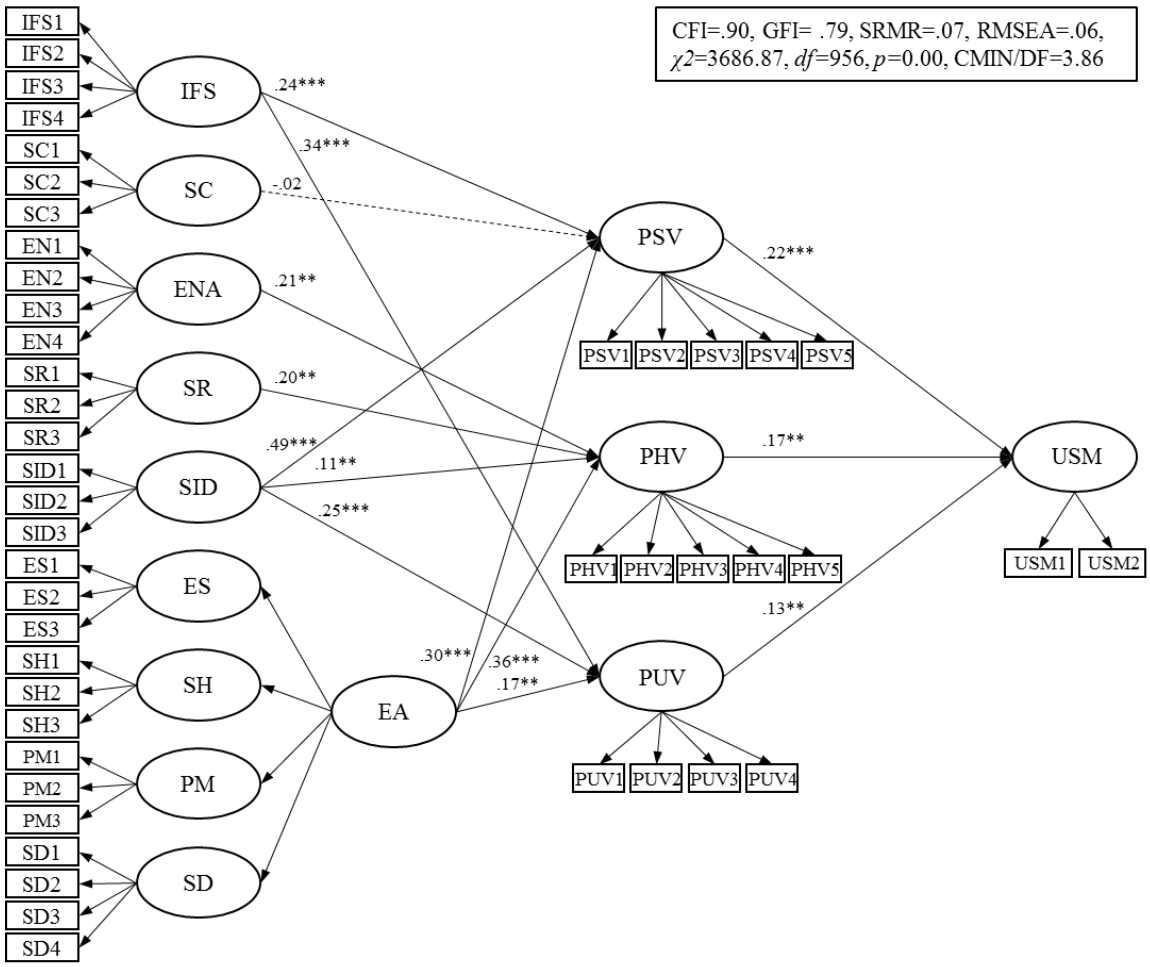

Figure 5.2 Final structural equation model (for testing H1 to H12)

5.5 Results: Hypotheses 1 ~ 12

The path results are presented in Table 5.7 below. In this section, the effects of cognitive factors on perceived values (H1 ~ H4), effects of social influence on perceived values (H5), effects of emotional attachment on perceived values (MH), and effects of perceived values on use of the smartphone (H10 ~ H12), were reported

Table 5.7 Path results for H1 ~ H12

	Structural Path	Std. estimate[1]	C.R. [2]	Results
Effects of cognitive expectations on perceived value				
H1(a)	Information seeking → Perceived social value	.24	5.85***	Accepted
H1(b)	Information seeking → Perceived utilitarian value	.34	6.91***	Accepted
H2	Social contact → Perceived social value	-.02	-.47	Rejected
H3	Entertainment activity → Perceived hedonic value	.21	2.80**	Accepted
H4	Self-reactiveness → Perceived hedonic value	.20	2.81**	Accepted
Effects of SNS social influence on perceived value				
H5(a)	Social identity → Perceived social value	.49	11.85***	Accepted
H5(b)	Social identity → Perceived hedonic value	.11	2.96**	Accepted
H5(c)	Social identity → Perceived utilitarian value	.25	6.07***	Accepted
Effects of emotional attachment on perceived value				
MH(a)	Emotional attachment → Perceived social value	.30	7.13***	Accepted
MH(b)	Emotional attachment → Perceived hedonic value	.36	7.01***	Accepted
MH(c)	Emotional attachment → Perceived utilitarian value	.17	3.09**	Accepted
Effects of perceived values on use of the smartphone				
H10	Perceived social value → Use of the smartphone	.22	3.88***	Accepted
H11	Perceived hedonic value → Use of the smartphone	.17	3.11**	Accepted
H12	Perceived utilitarian value → Use of the smartphone	.13	2.62**	Accepted

p *<.05, *p* **<.01, *p****<.001

[1]Standardized estimate

[2]Critical Ratio (C.R.) values of 1.96 or more mean that the path is significant at the .05 level or better.

5.5.1 Effects of cognitive expectations on perceived values: H1 ~ H4

Information seeking showed positive effects on perceived social value ($\gamma = .24$, $p < .001$) and utilitarian value ($\gamma = .34$, $p < .001$). This indicates that people, who expect to seek information from using the smartphone, are more likely to experience social, hedonic, and functional benefits from using the smartphone. Social contact did not have an effect on the social value ($\gamma = -.02$, $p = .64$) of using the smartphone. Entertainment activities had a positive effect on perceived hedonic value ($\gamma = .21$, $p < .001$), and self-reactiveness also had a positive effect on perceived hedonic value ($\gamma = .20$, $p < .001$). These results indicate that when smartphone users expect an entertainment activity, or self-reactive incentives from using the smartphone, they would perceive positive hedonic experiences while using the device.

5.5.2 Effects of SNS social influence on perceived values: H5

Social identity showed positive effects on perceived social value ($\gamma = .49$, $p < .001$), hedonic value ($\gamma = .11$, $p < .01$), and utilitarian value ($\gamma = .25$, $p < .001$). This result indicates that when people perceive social identity in mobile social networks by using the smartphone, they would positively experience various values (i.e., social, hedonic, and utilitarian values) that the smartphone provides through such networks.

5.5.3 Effects of emotional factors on perceived values: MH

Emotional attachment had positive effects on perceived social ($\gamma = .30$, $p < .001$), hedonic ($\gamma = .36$, $p < .001$), and utilitarian values ($\gamma = .17$, $p < .01$). This indicates that people, who are emotionally attached to smartphone, would perceive not only relational enhancement, but also hedonic and utilitarian experiences from using the smartphone.

5.5.4 Effects of perceived values on use of the smartphone: H10 ~ H12

The perceived social value indicated a positive effect on the use of the smartphone (β = .22, p < .001). Also, the perceived hedonic (β = .17, p < .05) and utilitarian (β = .13, p < .05) values had a positive effect on the use of the smartphone.

5.6 Results: Hypotheses 13 and 14

To test H13 and H14, demographic variables – age (AGE), sex (SEX), socio-economic status (SES), and race (RACE) – were used. To test demographic differences in motivational factors (H13), *t*-test analysis was conducted. To test the effects of demographic variables (as control variables) in the hypothesized model (H14), path analysis was conducted.

Demographic variables were recorded as binary variables. Age was divided into two groups (e.g., young and old). Participants in their 20 to 39 were categorized into the younger group (n = 538, 72.9%) and participates aged 40 to 64 were categorized into the older group (n = 200, 27.1%). Sex was categorized as male (n = 325, 44%) and female (n = 413, 56%) groups. Socioeconomic status was also divided into two groups (e.g., low and high) based on education and income. People, who were relatively more educated (e.g., postgraduate work, or post graduate degree) and with a higher household income (e.g., more than $ 50,000 per year), were categorized as a higher socioeconomic status (n = 363, 49.2%). The others, who were relatively less educated and with a lower household income, were categorized as a lower socioeconomic status (n = 375, 50.8%). Due to the limited sample size, RACE was only categorized as two groups: Not-Caucasian (n = 237, 32.1%) and Caucasian (n = 501, 67.9%) groups.

5.6.1 Demographic difference in motivations: H13

The results of age difference (i.e., young and old) in motivational factors are presented in Table 5.8. Relatively young users had higher expectations of social contact (t = 2.10, p < .05), entertainment activity (t = 2.08, p < .05), and self-reactiveness (t = 2.86, p < .01) compared to relatively older users. Their perceptions of social identity (t = 3.89, p < .001) from using the smartphone was greater compared to older users. Sex difference as regards motivational factors is presented in the Table 5.9. Females had higher expectations of information seeking (t = -3.14, p < .01), entertainment activity (t = -2.67, p < .01), and self-reactiveness (t = -3.00, p < .01) than males' expectations. Female participants also perceived emotional attachment (t = -2.81, p < .01) from using the smartphone more so than males. Male respondents were more likely to perceive social identity (t = 2.43, p < .05) in mobile SNSs when compared to females. For the results of the SES difference in motivations (see Table 5.10), participants with high SES had more expectation of information seeking (t = -2.05, p < .05), while those with low SES expected to have more social contact (t = 2.52, p < .05) and social identity (t = 2.53, p < .05). Last, not-Caucasian participants had higher motivations with regards to all factors when compared to Caucasian participants (see Table 5.11).

Table 5.8 Age difference in motivations of using the smartphone

	Young (n = 538)		Old (n = 200)			
	M	SD	M	SD	*t*-test	*p*-value
Information seeking	5.95	0.96	6.02	0.82	-.99	.32
Social contact	4.78	1.50	4.53	1.36	2.10*	.04
Entertainment activity	5.56	1.14	5.36	1.10	2.08*	.04
Self-reactiveness	4.70	1.48	4.35	1.41	2.86**	.00
Social identity	4.01	1.77	3.45	1.69	3.89***	.00
Emotional attachment	5.22	1.32	5.15	1.28	.657	.51

p *<.05, *p* **<.01, *p****<.001

Table 5.9 Sex difference in motivations of using the smartphone

	Male (n = 325)		Female (n = 413)			
	M	SD	M	SD	*t*-test	*p*-value
Information seeking	5.84	0.99	6.05	0.85	-3.14**	.00
Social contact	4.66	1.46	4.74	1.46	-0.72	.47
Entertainment activity	5.38	1.19	5.60	1.07	-2.67**	.01
Self-reactiveness	4.42	1.47	4.74	1.44	-3.00**	.00
Social identity	4.03	1.69	3.72	1.81	2.43*	.02
Emotional attachment	5.04	1.31	5.31	1.28	-2.81**	.01

p *<.05, *p* **<.01

Table 5.10 SES difference in motivations of using the smartphone

	Low SES (n = 375)		High SES (n = 363)			
	M	SD	M	SD	*t*-test	*p*-value
Information seeking	5.90	0.95	6.04	1.49	-2.05*	.04
Social contact	4.85	1.43	4.57	1.49	2.52*	.01
Entertainment activity	5.57	1.11	5.44	1.15	1.47	.14
Self-reactiveness	4.69	1.46	4.52	1.47	1.64	.10
Social identity	4.02	1.79	3.69	1.73	2.53*	.01
Emotional attachment	5.19	1.28	5.20	1.33	-.082	.93

p *<.05

Table 5.11 Race difference in motivations of using the smartphone

	Not-Caucasian (n = 237)		Caucasian (n = 501)			
	M	SD	M	SD	*t*-test	*p*-value
Information seeking	6.09	0.78	5.91	0.98	2.75**	.00
Social contact	5.29	1.28	4.44	1.47	7.97***	.00
Entertainment activity	5.88	0.85	5.33	1.21	7.10***	.00
Self-reactiveness	5.12	1.29	4.36	1.48	7.07***	.00
Social identity	4.81	1.68	3.41	1.63	10.74***	.00
Emotional attachment	5.57	1.06	5.02	1.37	5.90***	.00

p **<.01, *p****<.001

5.6.2 Effects of control variables in the model: H14

Finally, the effects of demographic variables on motivational factors were controlled (see Figure 5.3) and the model, including demographic variables as controls, was analyzed for testing H14. In the model, exogenous latent variables and demographic indicators were correlated with each other. The model generates an acceptable model fit (CFI = .90, GFI = .79, SRMR = .07, RMSEA = .06, $\chi 2$ = 3875.55, df = 1100, p = 0.00, CMIN/DF = 3.52). The model fit was slightly better when compared to the model fit for the model without control variables (Table 5.12). The effects of control variables on endogenous variables are presented in Table 5.13 and other path results in the model are presented in Appendix Table B 1. Results of significant tests for the path analysis were not changed even after controlling for demographic variables.

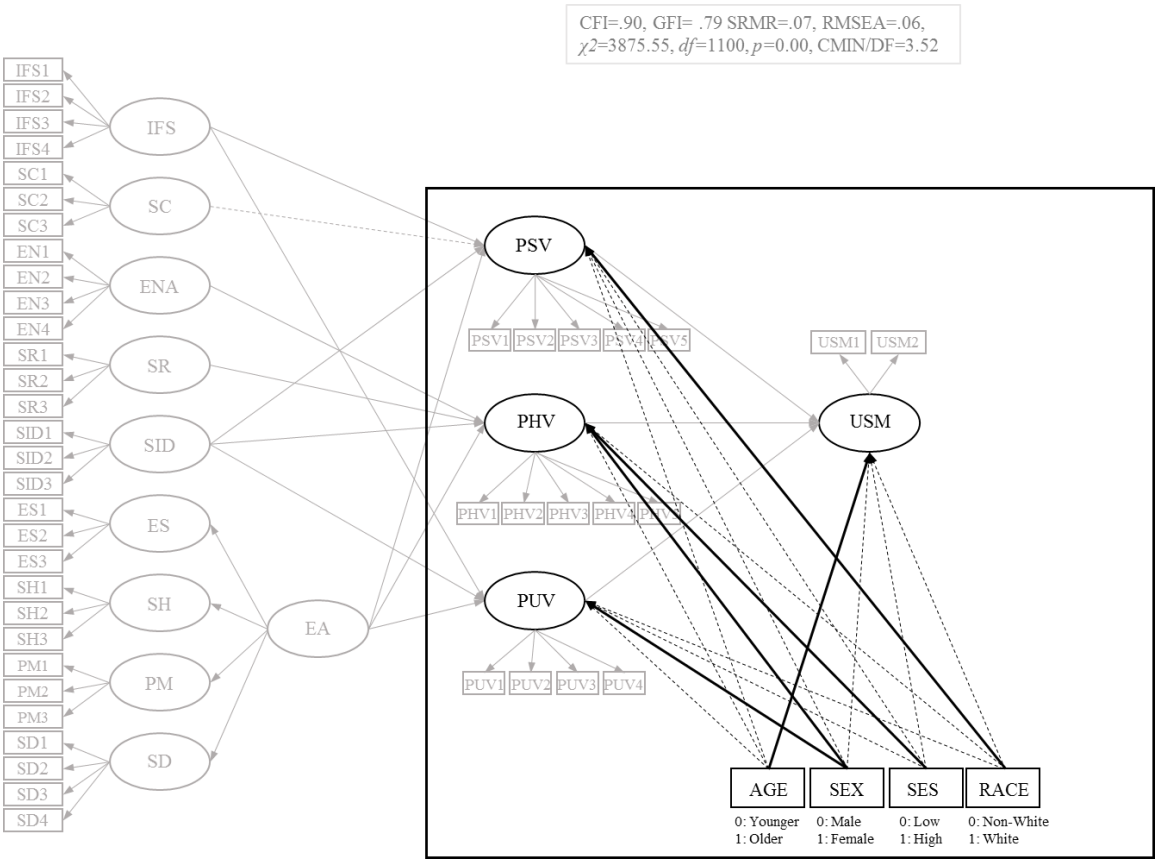

Figure 5.3 Structural equation model (for testing H14)

Table 5.12 Model fits of the final model and the model including control variables

	χ^2	*df*	CMIN/DF	CFI	GFI	SRMR	RMSEA
The final model	3686.865	956	3.857	.900	.785	.069	.062
The final model with control variables[1]	3875.546	1100	3.523	.900	.793	.065	.059

[1]The overall model fit was little bit improved after controlling for demographic variables

Effects of control variables on endogenous variables are presented in Table 5.13. Regarding results, age did not have significant effects on perceived social ($\gamma = .02$, $p = .48$), hedonic ($\gamma = .05$, $p = .08$), and utilitarian values ($\gamma = -.02$, $p = .56$). Female participants are less likely to perceive hedonic ($\gamma = -.08$, $p < .01$) and utilitarian ($\gamma = -.11$, $p < .001$) values than male participants. Socio-economic status had a positive effect on hedonic value perception ($\gamma = .07$, $p < .01$), but it did not have effects on social ($\gamma = -.04$, $p = .13$) and utilitarian ($\gamma = .01$, $p = .88$) value perceptions. Caucasian participants were more likely to perceive social value ($\gamma = .06$, $p < .05$) from using the smartphone. Results of demographic variables' effects on use of the smartphone showed that only age has a significant effect on use of the smartphone. Younger users ($\gamma = -.12$, $p < .01$) were more likely to use the smartphone compared to relatively older participants. Sex ($\gamma = .07$, $p = .08$), Socioeconomic status ($\gamma = .05$, $p = .22$), and Race ($\gamma = .05$, $p = .27$) did not have a significant effect on the use of the smartphone.

Table 5.13 Effects of control variables on endogenous variables

Structural Path	Std. estimate[1]	C.R. [2]	*p*-value
Effects of demographic variables on perceived values			
Age (young vs. older) → Perceived social value	.02	.71	.48
Age (young vs. older) → Perceived hedonic value	.05	1.78	.08
Age (young vs. older) → Perceived utilitarian value	-.02	-.59	.56
Sex (male vs. female) → Perceived social value	-.02	-.74	.46
Sex (male vs. female) → Perceived hedonic value	-.08	-2.81**	.01
Sex (male vs. female) → Perceived utilitarian value	-.11	-3.44***	.00
Socio-economic status (low vs. high) → Perceived social value	-.04	-1.52	.13
Socio-economic status (low vs. high) → Perceived hedonic value	.07	2.69**	.01

Table 5.13 continued

Structural Path	Std. estimate[1]	C.R. [2]	*p*-value
Socio-economic status (low vs. high) → Perceived utilitarian value	.01	.16	.88
Race (Not-Caucasian vs. Caucasian) → Perceived social value	.06	2.07*	.04
Race (Not-Caucasian vs. Caucasian) → Perceived hedonic value	-.05	-1.87	.06
Race (Not-Caucasian vs. Caucasian) → Perceived utilitarian value	.03	.78	.44
Effects of demographic variables on use of the smartphone			
Age (young vs. older) → Use of the smartphone	-.12	-2.90**	.01
Sex (male vs. female) → Use of the smartphone	.07	1.73	.08
Socio-economic status (low vs. high) → Use of the smartphone	.05	1.24	.22
Race (Non-white vs. white) → Use of the smartphone	.05	1.10	.27

p *<.05, *p* **<.01, *p****<.001
[1]Standardized estimate
[2]Critical Ratio (C.R.) values of 1.96 or more mean that the path is significant at the .05 level or better.

5.7 Results: Hypothesis 15

One of major demographic differences that influence smartphone-using behavior was sex difference. Before analyzing sex difference in the hypothesized model, other demographic differences were tested using *t*-test (age) and chi-square statistics (other categorical variables) in this section. Then, sex differences in the hypothesized model were examined (H15).

5.7.1 Demographic description according to sex difference

The results of age difference among males and females are represented in Table 5.14. The results of demographic differences by sex are represented in Table 5.15, and the results of other categorical differences related to using behavior of the smartphone are shown in Table 5.16. Results of *t*-test and chi-square statistics indicated that significant

differences of demographic variables, and other variables (smartphone using behavior) by sex were not detected.

The average age of male respondents was 34.29, and the average age of female respondents was 35.09. The majority of males (*n* = 216, 66.7%) and females (*n* = 285, 69%) identified as Caucasian American. Almost 40% of males (*n* = 135, 41.5%) and females (*n* = 157, 38%) were educated at the college-graduate level. Approximately 40% of males (*n* = 135) and females (*n* = 178) reported that they had an annular household income ranging from $ 35,000 to less than $ 75,000.

Approximately 60% of males (*n* = 102, 62.2%) and females (*n* = 292, 70.7%) reported that their current smartphone was an iPhone or Samsung. The majority of males (*n* = 243, 74.7%) and females (*n* = 285, 69%) paid less than $ 100 for their phone bills during the previous month. Approximately 40% of males (*n* = 128, 39.3%) and females (*n* = 183, 44.3 %) used mobile data from 1GB to 3GB. More than half of males (*n* = 224, 69%) and females (*n* = 270, 65.6%) spent from 10 minutes to less than 2 hours on mobile SNS services per day. Also, the majority of males (*n* = 235, 72.4%) and females (*n* = 281, 67.6%) received up to 30 text messages per day.

Table 5.14 Sample description by respondents' sex and age

	Male (*n* = 324)		Female (*n* = 413)			
Variable	Mean	SD	Mean	SD	*t*-value	*p*-value
Age	325	34.29	412	35.09	-1.06	.21

Table 5.15 Sample description by respondents' sex and other categorical variables (demographics)

	Male (n = 324)		Female (n = 413)		
Variable	Frequency	%	Frequency	%	$\chi^2(df)$
Race					15.93(9)
Caucasian American	216	66.7	285	69	(p=.07)
African American	13	4	23	5.6	
Native American/American Indian	6	1.8	2	0.5	
Hispanic/Latino	12	3.7	25	6.1	
Eastern Asian	15	4.6	12	2.9	
South Asian	59	18.2	52	12.6	
West Asian	0	0	1	0.2	
Pacific Islander	0	0	1	0.2	
Multicultural	3	0.9	11	2.7	
Others	1	0.3	1	0.2	
Total	325	100	413	100	
Education					11.50(7)
Some high school	1	0.3	1	0.2	(p=.12)
High school graduate	28	8.6	35	8.5	
Some collage work	65	20	111	26.9	
Trade/Technical/Vocational training	20	6.2	28	6.8	
College graduate	135	41.5	157	38	
Some postgraduate work	22	6.8	12	2.9	
Post graduate degree	53	16.3	69	16.7	
others	1	0.3	0	0	
total	325	100	413	100	
Household Income					5.11(6)
Less than $25,000	65	20	88	21.3	(p=.53)
$25,000 to less than $35,000	50	15.4	62	15	
$35,000 to less than $50,000	76	23.4	89	21.5	
$50,000 to less than $75,000	59	18.2	89	21.5	
$75,000 to less than $100,000	39	12	52	12.6	
$100,000 to less than $150,000	22	6.8	25	6.1	
$150,000 to more	14	4.3	8	1.9	
Total	325	100	413	100	

Table 5.16 Sample description by respondents' sex and other categorical variables (general use of the smartphone)

	Male (n = 324)		Female (n = 413)		
	Frequency	%	Frequency	%	χ^2 (df)
Smartphone brand					9.57(10)
Nokia	13	4	14	3.4	(p=.48)
Sony	8	2.5	7	1.7	
Nexus	4	1.2	3	0.7	
Motorola	21	6.5	20	4.8	
iPhone	100	30.8	141	34.1	
Blackberry	0	0	2	0.5	
Samsung	102	31.4	151	36.6	
HTC	19	5.8	22	5.3	
LG	35	10.8	36	8.7	
Lenovo	9	2.8	6	1.5	
Others	14	4.3	11	2.7	
Total	325	100	413	100	
Pay bill in the last month					4.19(4)
Less than $50	97	29.8	126	30.5	(p=.38)
$50 to less than $100	146	44.9	159	38.5	
$100 to less than $150	54	16.6	85	20.6	
$150 to less than $200	16	4.9	27	6.5	
$200 to more	12	3.7	16	3.9	
Total	325	100	413	100	
Data use in the last month					7.27(7)
Less than 300MB	21	6.5	34	8.2	(p=.401)
300MB to less than 500MB	27	8.3	33	8	
500MB to less than 1GB	48	14.8	66	16	
1GB to less than 2GB	71	21.8	105	25.4	
2GB to less than 3GB	57	17.5	78	18.9	
3GB to less than 4GB	42	12.9	40	9.7	
4GB to less than 5GB	18	5.5	23	5.6	
5GB to more	41	12.6	34	8.2	
Total	325	100	413	100	

Table 5.16 continued

	Male (n = 324)		Female (n = 413)		
	Frequency	%	Frequency	%	χ^2 (df)
Time spent on mobile SNS per day					7.98(7)
Less than 10 min	21	6.5	25	6.1	(p=.33)
10 to less than 30 min	85	26.2	75	18.2	
30 to less than 60 min	76	23.4	105	25.4	
1 to less than 2 h	63	19.4	91	22	
2 to less than 3 h	43	13.2	56	13.6	
3 to less than 4 h	18	5.5	28	6.8	
4 to more	19	5.9	33	8.0	
Total	325	100	413	100	
Text messages per day					6.15(6)
Less than 10	54	16.6	61	14.3	(p=.41)
10 to less than 20	75	23.1	90	21.8	
20 to less than 30	59	18.2	73	17.7	
30 to less than 50	47	14.5	57	13.8	
50 to less than 80	32	9.8	36	8.7	
80 to less than 100	13	4	34	8.2	
100 to more	45	13.8	62	15	
Total	325	100	413	100	

5.7.2 Sex differences in the M-E-B model: H15

To test sex differences in the hypothesized model, two SEM models, using male and female samples, respectively, were examined (Figure 5.4 and Figure 5.5). Before accessing path results, CFA models for each sample group were tested (Appendix Table B2~B5). The CFA model, using male samples, generated an acceptable model fit (i.e., chi-square = 2125.32, df = 94, CMIN/DF = 2.26, GFI = .75, CFI = .90, RMSEA = .06, SRMR = .07), and the CFA model, using female samples, also had a model fit at an

acceptable level (i.e., chi-square = 2568.96, *df* = 94, CMIN/DF = 2.73, GFI = .76, CFI = .89, RMSEA = .07, SRMR = .07). The path results are indicated in Table 5.17.

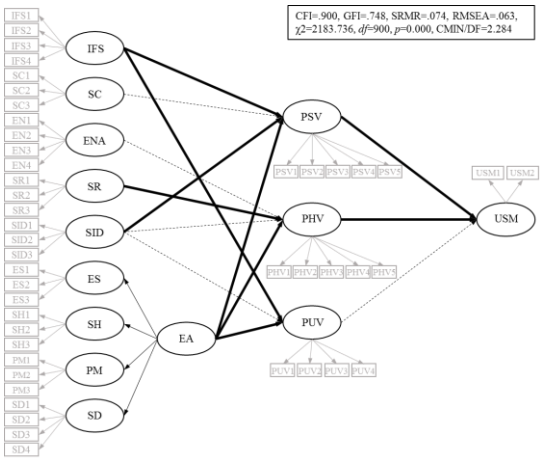

Figure 5.4 Path results for male group

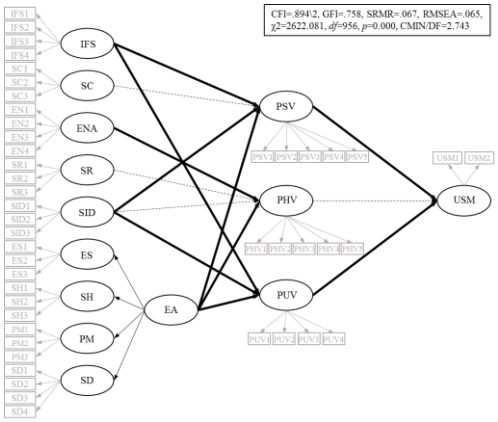

Figure 5.5 Path results for female group

Table 5.17 Path results for the Model 1 and Model 2

	Male group (n = 325)		Female group (n = 413)	
Structural Path	Estimate[1]	C.R. [2]	Estimate	C.R.
Effects of cognitive factors on perceived value				
Information seeking → Perceived social value	.11	2.01*	.32	5.55***
Information seeking → Perceived utilitarian value	.40	5.35***	.30	4.86***
Social contact → Perceived social value	.05	.65	-.04	-.69
Entertainment activity → Perceived hedonic value	.12	.99	.45	3.33***
Self-reactiveness → Perceived hedonic value	.34	2.58*	.01	.07
Effects of SNS social influence on perceived value				
Social identity → Perceived social value	.36	5.17***	.55	10.04***
Social identity → Perceived hedonic value	.03	.39	.06	1.28
Social identity → Perceived utilitarian value	.11	1.73	.29	5.24***

Table 5.17 continued

Structural Path	Male group (n = 325) Estimate[1]	C.R.[2]	Female group (n = 413) Estimate	C.R.
Effects of emotional attachment on perceived value				
Emotional attachment → Perceived social value	.47	7.39***	.18	3.16**
Emotional attachment → Perceived hedonic value	.40	4.88***	.33	4.49***
Emotional attachment → Perceived utilitarian value	.21	2.50*	.19	2.81**
Effects of perceived values on use of the smartphone				
Perceived social value → Use of the smartphone	.21	2.50*	.20	2.76**
Perceived hedonic value → Use of the smartphone	.28	3.29**	.10	1.41
Perceived utilitarian value → Use of the smartphone	.10	1.41	.16	2.42*

p *<.05, *p* **<.01, *p****<.001

[1]Standardized estimate

[2]Critical Ratio (C.R.) values of 1.96 or more mean that the path is significant at the .05 level or better.

In both male and female groups, information seeking motivation had positive effects on perceived social and utilitarian values. Social contact motivation did not have an effect on perceived social value in both groups. Among males, entertainment activity motivation did not have an effect on hedonic value perception ($\gamma = .12$, $p = .32$), but self-reactiveness motivation had a positive effect on hedonic value perception ($\gamma = .34$, $p < .05$). In contrast, females, who had motivation for entertainment activity, were more likely to experience hedonic value ($\gamma = .45$, $p < .001$), but the self-reactiveness motivation was not important to experience hedonic value ($\gamma = .01$, $p = .95$).

As a result of social influence in SNSs on value perceptions, social identity in the mobile social networks had a positive effect on perceived social value ($\gamma = .36$, $p < .001$) among males. Among females, social identity in SNSs had a positive effect on social ($\gamma = .55$, $p < .001$), and utilitarian value ($\gamma = .29$, $p < .001$) perceptions.

With regard to the effects of emotional influence, males, who were emotionally motivated to use the smartphone, perceived positive social ($\gamma = .47$, $p < .001$), hedonic ($\gamma = .40$, $p < .001$), and utilitarian ($\gamma = .21$, $p < .05$) values. Similar results were detected in the female group. Females, who were emotionally motivated to use the smartphone, perceived positive social ($\gamma = .18$, $p < .01$), hedonic ($\gamma = .33$, $p < .001$), and utilitarian ($\gamma = .19$, $p < .01$) values.

Results of value perceptions' effects on use of the smartphone indicated that, males, who experienced social ($\beta = .21$, $p < .05$), and hedonic value ($\beta = .28$, $p < .01$) perceptions, were more likely to use the smartphone. However, females, who experienced social ($\beta = .20$, $p < .01$) and utilitarian ($\beta = .16$, $p < .05$) values, were more likely to use the smartphone. In particular, the effect of hedonic value was stronger than other values for male participants, and effect of social value from using the smartphone was stronger than other values for female participants. These results indicate that, for males, experience with perceiving social and hedonic values from using the smartphone would be important for understanding actual use of the smartphone. In contrast, for females, experiences with perceiving social and utilitarian values from using the smartphone would importantly influence actual use of the smartphone.

CHAPTER 6. DISCUSSION

This study proposed the hypothesized Motivation-Experience-Behavior (M-E-B) model to understand motivational factors of smartphone users and their experience of value perceptions. The motivational framework was theoretically developed through integration of three domains (i.e., social, cognitive, and emotional dimensions) by adopting social-cognitive theory (Bandura, 1986) and attachment theory (Bowlby, 1970). The value perception framework (i.e., social, hedonic, and utilitarian values) was supported by consumption-value theory (Sheth et al., 1991a). This study tested the hypothesized model using SEM analysis (H1 ~ H12), the model considering demographic variables, as control variables (H13 ~ H14), and sex difference using the hypothesized model (H15). In this section, findings on testing hypotheses are discussed.

6.1 The Hypothesized M-E-B Model

A smartphone is highly personal to users and provides an always-on environment of social networking services, which makes its usage be more comprehensive compared to those of other IT devices (Counts & Fisher, 2010; Hong at al., 2008). To understand motivational dimensions (e.g., cognitive expectations, SNS social influence, and emotional attachment) and its influence on experience of value perceptions (e.g., social,

hedonic, and utilitarian values), this study tested the M-E-B model for understanding smartphone using behaviors.

According to SCT (1986), human behaviors are controlled by the person's expected outcomes based on cognitive mechanism. By following Bandura (1986)'s suggestion, this study adopted four types of expected outcomes (i.e., information seeking, social contact, entertainment activity, and self-reactiveness) in the cognitive dimension. As results with regards to the cognitive expectations in the hypothesized M-E-B model, information seeking, entertainment activity, and self-reactiveness expectations positively influenced value perceptions. For example, the information-seeking expectation influenced social and utilitarian value perceptions while expectations of entertainment activities and self-reactiveness influenced hedonic value perceptions. The results indicate that when smartphone users perceived cognitive expectations (i.e., information seeking, entertainment activity, or self-reactiveness incentives) from using the smartphone, these cognitions could positively influence on their experiences associated with relational, functional, or enjoyable benefits from using the device. However, expectations of social contact did not influence experiences of social value perceptions in this study. It is possible that participants might utilize the smartphone primarily to perform solitary functions (e.g., conduct information searches, participate in entertainment activities, or watch videos to relax) and have scant expectations of using the smartphone for social connection (e.g., gaining support from others; belonging to a group). Although this study found that no significant influence of "social contact" expectations on smartphone users' value perceptions, previous studies indicated that "sociability" was one of the most important motivators for users to utilize mobile devices (Leung & Wei, 2000; Palen et al.,

2000). These studies, however, focused on conventional cell-phones, which had limited Internet connectivity and services associated with applications (Goggin, 2009; Kamvar, Kellar, Patel, & Xu, 2009). When compared to users of the conventional cell-phone, smartphone users would be highly motivated to use the smartphone in order to seek information, play games using applications, or indulge themselves with their mobile devices (Drake, Elvove, & Maki, 2012). The new and updated functions of the smartphone might cause the results, in this study, indicating less important effects of "social contact" on experience of value perceptions compared to the effects of other cognitive factors. In particular, participants in this study were mostly younger users (aged 20s and early 30s) who might perceive less benefit related to "social contact" compared to those from other solitary functions.

Along with the cognitive expectations, social identity achieved through mobile social networks is considered as an important social factor that motivates smartphone users to experience of value perceptions (Counts & Fisher, 20101). As results, social identity derived from mobile SNSs positively influenced experiences of social, hedonic, and utilitarian value perceptions. The results indicate that perceptions of SNS social identity could be important social influence that motivates smartphone users to experience value perceptions. People perceive social influence through perceptions of social image within their reference group (Dickinger, Arami, & Meyer, 2008; Hsu & Lu, 2004), and the perceived social image (or social identity) explains smartphone users' value perceptions from using the device (Chun et al., 2012). In addition, the positive effects of SNS identity on value perceptions – social, hedonic, and utilitarian values – could be understood by the fact that social networking services provide various experiences to users. For example,

people are able to interact with others through SNSs (e.g., Facebook, Instagram) for "social" reasons and have access to various types of contents (e.g., video, picture, or text) for either "hedonic" or "utilitarian" reasons. These SNS services would explain that smartphone users might experience relational and utilitarian benefits as well as emotional enjoyment by perceiving social identity from SNSs.

In addition to cognitive and social factors, this study further explored emotional attachment as important emotional desire that motivates users to experience value perceptions while using the smartphone. According to previous studies (Vincent & Harper, 2003; Vincent, 2005; 2006), smartphone users often established an emotional bond with their device. As results, in the present study, emotional attachment had positive effects on social, hedonic, and utilitarian value perceptions. This result implies that emotional desire is a salient factor that explains various experiences of value perceptions from using the smartphone when compared to the effects of each cognitive expectation on these experiences. According to the previous study (Choliz, 2010), people, who had emotional desire to use the smartphone, were more likely to use the device intensively compared to those who did not have such desire. Since people, who are emotionally attached to their smartphone, would spend relatively more time with their device than others, they could have a greater number of experiences using the smartphone. In addition, the findings related to emotional attachment, in this study, can be supported by other studies (Vincent, 2006; Vincent et al., 2005) that highlighted the importance of emotional attachment for understanding behaviors with regards to using mobile devices.

The M-E-B model also examined how experience of value perceptions explained actual use of the smartphone (e.g., actual time spent on the smartphone). The social,

hedonic, and utilitarian value perceptions positively influenced use of the smartphone. Among these three value perceptions, social value had the greatest effect on the use of the smartphone. Although the smartphone provides various services that motivate users to experience value perceptions (Chun et al., 2012), the results, in this study, addresses that experiences of social enhancement from using the smartphone would be the most influential factor, among three values, that predicts actual use of the smartphone.

6.2 Demographic Variables in the Hypothesized Model

Since demographic factors have been discussed to be influential factors with regards to smartphone using behavior (Kim & Hwang, 2012; Leung & Wei, 1999; Wei, 2008), the present study identified the effects of demographic variables – age, sex, SES, race – in the hypothesized M-E-B model. Regarding results of demographic differences in motivations, females were more likely to expect information seeking, entertainment activity, and self-reactiveness incentives than males. In addition, relatively younger participants, aged 19 to 29, were more likely to have expectations related to social contact, entertainment activity, and self-reactiveness incentives from using the smartphone than relatively older participants. Females held higher expectations to achieve a positive SNS social identity by using the smartphone. Moreover, participants with higher socioeconomic status were expected to have higher expectations of information seeking and social contact, and perceive a higher social identity in mobile social networks. When compared to not-Caucasian participants, Caucasian Americans were less likely to perceive information seeking, social contact, entertainment activity, and SNS social identity. Also, they had less emotional desire to use the smartphone

compared to not-Caucasian participants. The findings related to demographic variables indicate that users would be motivated differently to use the smartphone based on age, sex, SES, and race. The demographically conditioned results, in this study, are supported by previous studies (Kim & Hwang, 2012; Lee et al., 2014; Leung & Wei, 1999; Sanchez-Franco, 2006; Wei 2008) which suggest that demographic differences in behaviors with regards to using mobile devices.

Because participants possessed different levels of motivations for using the smartphone according to demographic factors (e.g., age, sex, SES, and race), a model including these demographic factors as controls was examined. When comparing the two models (i.e., a model without control variables and a model with control variables), the latter presented a slightly better model fit than the other. Noticeable changes on path coefficients, however, were not detected. Regarding the effects of control variables on value perceptions, male participants positively perceived experience of functional value and hedonic value perceptions more than female participants. Also, participants with high SES positively perceived hedonic value more than participants with lower SES, and participants of Caucasian Americans positively perceived social values more than not-Caucasian participants. These results indicate that demographic variables, such as age, sex, SES, and race, influence experiences of value perceptions while using the smartphone. In addition, regarding the effect of demographic difference on use of the smartphone, the effect of age was only detected. In the model, younger participants used the smartphone more when compared to older participants.

6.3 Sex Difference in the Hypothesized Model

Among other demographic factors, sex difference has been consistently identified as a key and influential factor for understanding different perspectives of value perceptions (Gefen & Straub, 1997; Venkatesh & Morris, 2000). In particularly, to understand behavior of smartphone users, sex difference has been reported to be an important differentiator (Lee et al., 2014; Wei, 2008). Therefore, the present study tested sex differences (male and female) in the hypothesized M-E-B model. Male and female groups were respectively analyzed in the hypothesized model.

As results, sex difference was detected on the effect of motivational factors on experience of value perceptions. In the male group, entertainment activity did not influence hedonic value perceptions, while self-reactiveness had a positive effect on hedonic value perceptions. In the female group, in contrast, self-reactiveness did not influence hedonic value perceptions, while entertainment activity had a positive effect on hedonic value perceptions. Therefore, for male users, self-reactiveness purposes would motivate enjoyment-seeking experiences from using the smartphone while various activity functions would be relatively more important for female users. These might indicate that men, who expect to feel less lonely or relaxed (e.g., playing games) by using the smartphone, would be more likely to perceive enjoyable experiences while using the smartphone. Yet women, who expect to derive entertainment from various activities (e.g., playing games using apps) by using the smartphone, would be more likely to experience enjoyment from using the smartphone. Interestingly, the results indicate that males might less experience enjoyment particularly when they expect to have entertainment activity by using the smartphone. This might be because males are more inclined to use other IT

devices (e.g., desktop or personal computer) in order to have enjoyable activities such as playing games (Schumacher & Morahan-Martin, 2001).

With regards to the effects of social identity on experience of value perceptions, social identity in mobile SNSs positively influenced social value perceptions in the male group. For female users, SNS social identity positively influenced not only social value perception but also utilitarian value perception. This result, in the female group, can be supported by a study (Lin & Lu, 2011) focusing on SNS use and gender difference. The study found that women had greater effects of social interacting motivation on the use of SNSs. Thus, SNS social identity would have greater effects on various value perceptions for women when compared to those effects for men.

Finally, on the subject of the effects of value perceptions on actual usage of the smartphone, male participants, who perceived social and hedonic values, were more likely to use the smartphone. In contrast, female participants, who perceived social and utilitarian values, were more likely to use the smartphone. The findings indicate that the greater importance that hedonic value experience plays for men to explain actual usage of the smartphone. For women, the social value experience is more important to explain using behavior of the device. Although other researchers could not find the effect of hedonic value perception on using mobile services among males (Yang & Lee, 2010), the present study suggests a different perspective that hedonic value could be important for male users, especially when considering various cognitive, social (SNS identity), and emotional desires.

CHAPTER 7. CONCLUSIONS

This chapter presents conclusions of the findings from the empirical study and identifies implications for future scholarship that focuses on users of information technology (IT) devices in the field of consumer behavior. Limitations of this study are addressed and suggestions are offered for future research.

7.1 Conclusions and Implications

The M-E-B model explains the influence of motivational factors on consumers' experiences with regard to value perceptions. Although previous literature on smartphone users (Chun et al., 2012; Ha et al., 2007; Kim & Han, 2009) explained that smartphones provide services that fulfill users' experiences of value perceptions (e.g., social, hedonic, or functional), there has been little effort within the scholarship to identify the influence of motivational factors on such experiences of using the device. Findings of the present study contribute to identifying the relationships between motivational factors and experiences of value perceptions. In particular, the M-E-B model suggests that smartphone users' experiences could be explained by various motivational factors, which consist of not only cognitive expectations and social influence (from SNSs) but also related to emotional desire

In particular, the present research has two important implications. First, the model explains how SCT could be utilized for understanding smartphone consumers'

motivations. Although diverse research on motivational factors of using mobile phones or smartphones (Gerlich et al., 2015; Joo & Sang, 2013; Leung &Wei, 2000; Ö zcan & Koçak, 2003; Park et al., 2013; Reid & Reid, 2007; Wei, 2008; Wei & Ro, 2006; Weiss, 2013) adopted traditional U&G theory, this study applied "social cognitive perspectives" from Bandura's SCT (1986) in order to understand motivational factors of smartphone users. A problem related to U&G theory, in expecting IT device using behaviors, has been consistently reported (Ferguson & Perse, 2000; Kaye, 1998; LaRose et al., 2001; Papacharissi & Rubin, 2000; Parker & Plank, 2000); thus, the attempt to understand motivational factors from a social cognitive perspective, in the current study, has an important implication to future researchers who would focus on motivational factors of IT device users, especially smartphone users. Moreover, the present study presents the importance of SNS social identity, achieved through social relations (i.e., social influence), which is based on social cognitive perspectives that explain relational influence on human behavior (Bandur, 1986). Consequently, the findings, related to cognitive expectations and social influence, would supply evidence that SCT can be applied to new technology research as it is to other studies on the use of a computer or Internet (Compeau & Higgins, 1995; Igbaria & Jivari, 1995; LaRose et al., 2001). Further, because the results indicated that users' perceived social influence being connected to others through mobile social networks, future study might examine the diverse social roles that users may perceive through mobile social networks.

Second, the results of the model also suggest that emotional desire would be an important motivational need to examine, especially for smartphone users in the field of consumer behavior. The proliferation of smartphones in society enables constant

connectivity among users and encourages users to establish an emotional bond with their device (Vincent, 2005; 2006; Vincent & Harper, 2003). This study adopted a social cognitive framework to explain that social cognition shapes smartphone-using experience, and it also adopted attachment theory to expand social cognitive dimensions by including an emotional dimension. Although many users regard the smartphone as an extension of the self, reflecting who they are (Vincent et al., 2005; Wehmeyer, 2007), insufficient research has been conducted for the purpose of understanding emotional attachment to smartphones among their users. In particular, a recent study (Jiménez &Voss, 2014) focusing on emotional attachment mentioned that scant literature has been conducted for identifying a construct of emotional attachment. For example, an emotional attachment connecting an individual with a specific product is believed to be an important concept in the field of marketing. Thus, the attempt to understand emotional attachment to smartphones would contribute to scholarly evidence for understanding emotional desires of IT device users. This study measured emotional attachment based on the related four concepts (i.e., emotional security, proximity maintenance, safe haven, and separate distress) suggested by Bowlby's (1969) study of emotional attachment, and found that the second-order construct of emotional attachment consists of four sub concepts – emotional security, proximity maintenance, safe haven, and separate distress. The possibility of the second order concept of emotional attachment is also supported by previous studies (Park et al., 2010; Thomson et al., 2005; Read et al., 2011). Demonstrating results of the influence of emotional attachment on the experience of value perceptions, this study found that people, who perceived emotional attachment to their smartphone, were more likely to experience various value perceptions while using

the smartphone. These findings confirm the importance of emotional desire along with other socio-cognitive needs.

7.2 Limitations and Future Research

The present study has several limitations, and its related implications for future research are suggested in this section. First, the sample might be limited to users who were already familiar with using IT devices or social networking. Because this study targeted smartphone users who were able to utilize social networking services on their phones, approximately 73% of participants were limited in the age range of 20s and 30s. This narrowed age range among prolific users implies limited angles for understanding general smartphone users' behaviors.

Amazon's MTurk was used to collect samples. Although other researchers (Buhrmester et al., 2011; Pontin, 2007) argued that MTurk could be a useful tool for collecting demographically diverse samples, compared to American college samples, the collected samples in this study had a relatively high number of Asian samples (n = 139, 18.8%). Consequently, among not-Caucasian participants, approximately 50% of the samples were South Asians (n = 111) (e.g., from India or other countries near India). On account of the weighted sample size of South Asian participants, it was impossible to conclude that South Asian participants entirely represented the not-Caucasian group. This also indicates a lack of reliability on the t-test results of racial difference (not-Caucasian vs. Caucasian) on motivations for smartphone use (Table 11). In addition, a main concern about using MTurk is the validity of research participants. When participants completed the 20-minute survey, each participant was compensated with one dollar. Since one dollar

is a relatively higher rate, compared to the compensation for other work on MTurk (e.g., most surveys provide 10 to 50 cents at MTurk), participants could be motivated to participate with the survey because of the compensation regardless of a lack of required conditions.

In particular, many previous researchers identified cultural difference in the use of information technology between Asian and not-Asian groups (Choi, Kim, Sung, & Sohn, 2011; Kim, Sohn, & Choi, 2011). For example, Kim and colleagues (2011) found that Korean participants utilized social media for the purpose of social reasons, while Americans participants used social media for individual entertainment. Since studies from previous literature (Wei, 2008; Jackson et al., 2008) found that cultural differences had an effect on behavior regarding mobile device usage, such differences could be an interesting topic for future research that might help to identify different effects of motivational factors on smartphone usage among different cultural groups (Asian vs. not-Asian).

In the proposed model, implications for the "use of the smartphone" are weaker than those of other motivational and value perceptional factors. In this study, the variable (recent use of the smartphone) was measured by using two indicators: the amount of time spent on the smartphone and frequency of checking the device on a recent day. However, the "actual use of the smartphone" is difficult to measure by simply depending on participants' reflections on using behavior of the smartphone, which would thus prove to be a major limitation that empirical research would have as it aims to measure behavioral variables by using cognitive reflections.

Lastly, emotional factors could be further discussed in future research on smartphone users as this study suggests possible applications of the emotional dimension for an extended cognitive-social framework for smartphone users. For example, an emotional dimension can be explained with other social-cognitive constructs within the technology acceptance model (TAM). In addition, researchers could specify emotional dimensions in various ways. This study focused on emotional attachment toward using the smartphone, but emotional attachment can be applied to smartphone brands for future research, which might explain the use of mobile-services or attitudes toward mobile advertisements.

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APPENDICES

Appendix A Consent form and IRB approval

RESEARCH PARTICIPANT CONSENT FORM

Use of a Smartphone: Cognitive, Social, and Emotional motives

Christopher Kowal, PhD & Songyi Youn, Graduate Student
Department of Consumer Science
Purdue University

What is the purpose of this study?
The purpose of this research is to understand smartphone using behavior regarding cognitive, social, and emotional motives.

What will I do if I choose to be in this study?
In this study you will be asked a series of questions about your personal thoughts and experiences associated with using a smartphone. Only required individuals can participate in this study. You must be (1) a smartphone user (aged 18 to 64), and (2) a user of social networking sites (e.g. Facebook, Twitter, Instagram etc.) logging on the site using your smartphone at least twice a day on average. Once you have completed the survey you will be provided with a completion code. Copy the completion code and enter it into a given box. If you have already completed the survey, you cannot complete it again.

How long will I be in the study?
This task is expected to be done within 30 minutes.

What are the possible risks or discomforts?
Breach of confidentiality is a risk associated with this study. To minimize this risk and protect your confidentiality, personal identifying information will not be asked. During the survey, if you feel discomforts, you can withdraw your participation at any time by closing your browser window.

Are there any potential benefits?
There are no direct benefits to the participant. All participants may be provided a chance to learn a researcher's perspective of consumer behavior. The results and implications would contribute to marketing literature on understanding of smartphone consumers, which would enrich diversity in academies.

Will I receive payment or other incentive?
You will receive $1.0 for your completion of the survey.

Will information about me and my participation be kept confidential?
The dataset will be securely stored in a safe location (Matthews Hall 312A) for five years. Only authorized personnel (Dr. Kowal and Songyi Youn) will have access to the data. After five years, Dr. Kowal will erase all materials related to this project. The project's research records may be reviewed by departments at Purdue University responsible for regulatory and research oversights.

What are my rights if I take part in this study?
Your participation in this study is voluntary. You may choose not to participate or, if you agree to participate, you can withdraw your participation at any time without penalty or loss of benefits to which you are otherwise entitled. You may skip questions that make your feel uncomfortable.

Who can I contact if I have questions about the study?
If you have questions, comments or concerns about this research project, you can talk to one of the researchers. Please contact Dr. Christopher Kowal at ckowal@purdue.edu; (765) 494-9245 and Songyi Youn at youn3@purdue.edu.

If you have questions about your rights while taking part in the study or have concerns about the treatment of research participants, please call the Human Research Protection Program at (765) 494-5942, email (irb@purdue.edu) or write to:
Human Research Protection Program - Purdue University
Ernest C. Young Hall, Room 1032
155 S. Grant St.,
West Lafayette, IN 47907-2114

IRB Approval on the research

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HUMAN RESEARCH PROTECTION PROGRAM
INSTITUTIONAL REVIEW BOARDS

To:	CHRISTOPHER KOWAL MTHW
From:	JEANNIE DICLEMENTI, Chair Social Science IRB
Date:	10/14/2015
Committee Action:	**Exemption Granted**
IRB Action Date:	10/27/2015
IRB Protocol #:	1510016581
Study Title:	Use of a Smartphone: Cognitive, Social, and Emotional motives

The Institutional Review Board (IRB) has reviewed the above-referenced study application and has determined that it meets the criteria for exemption under 45 CFR 46.101(b)(2) .

If you wish to make changes to this study, please refer to our guidance "**Minor Changes Not Requiring Review**" located on our website at http://www.irb.purdue.edu/policies.php. For changes requiring IRB review, please submit an **Amendment to Approved Study** form or **Personnel Amendment to Study** form, whichever is applicable, located on the forms page of our website www.irb.purdue.edu/forms.php. Please contact our office if you have any questions.

Below is a list of best practices that we request you use when conducting your research. The list contains both general items as well as those specific to the different exemption categories.

General

- To recruit from Purdue University classrooms, the instructor and all others associated with conduct of the course (e.g., teaching assistants) must not be present during announcement of the research opportunity or any recruitment activity. This may be accomplished by announcing, in advance, that class will either start later than usual or end earlier than usual so this activity may occur. It should be emphasized that attendance at the announcement and recruitment are voluntary and the student's attendance and enrollment decision will not be shared with those administering the course.
- If students earn extra credit towards their course grade through participation in a research project conducted by someone other than the course instructor(s), such as in the example above, the students participation should only be shared with the course instructor(s) at the end of the semester. Additionally, instructors who allow extra credit to be earned through participation in research must also provide an opportunity for students to earn comparable extra credit through a non-research activity requiring an amount of time and effort comparable to the research option.
- When conducting human subjects research at a non-Purdue college/university, investigators are urged to contact that institution's IRB to determine requirements for conducting research at that institution.
- When human subjects research will be conducted in schools or places of business, investigators must obtain written permission from an appropriate authority within the organization. If the written permission was not submitted with the study application at the time of IRB review (e.g., the school would not issue the letter without proof of IRB approval, etc.), the investigator must submit the written permission to the IRB prior to engaging in the research activities (e.g., recruitment, study procedures, etc.). This is an institutional requirement.

Category 1

- When human subjects research will be conducted in schools or places of business, investigators must obtain written permission from an appropriate authority within the organization. If the written permission was not submitted with the study application at the time of IRB review (e.g., the school would not issue the letter without proof of IRB approval, etc.), the investigator must submit the written permission to the IRB prior to engaging in the research activities (e.g., recruitment, study procedures, etc.). This is an institutional requirement.

Categories 2 and 3

- Surveys and questionnaires should indicate
  - only participants 18 years of age and over are eligible to participate in the research; and
  - that participation is voluntary; and
  - that any questions may be skipped; and
  - include the investigator's name and contact information.
- Investigators should explain to participants the amount of time required to participate. Additionally, they should explain to participants how confidentiality will be maintained or if it will not be maintained.
- When conducting focus group research, investigators cannot guarantee that all participants in the focus group will maintain the confidentiality of other group participants. The investigator should make participants aware of this potential for breach of confidentiality.
- When human subjects research will be conducted in schools or places of business, investigators must obtain written permission from an appropriate authority within the organization. If the written permission was not submitted with the study application at the time of IRB review (e.g., the school would not issue the letter without proof of IRB approval, etc.), the investigator must submit the written permission to the IRB prior to engaging in the research activities (e.g., recruitment, study procedures, etc.). This is an institutional requirement.

Category 6

- Surveys and data collection instruments should note that participation is voluntary.
- Surveys and data collection instruments should note that participants may skip any questions.
- When taste testing foods which are highly allergenic (e.g., peanuts, milk, etc.) investigators should disclose the possibility of a reaction to potential subjects.

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Appendix B Survey

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Do you use or own a smartphone as your primary mobile phone?

- Yes
- No

During the past few days, have you accessed social networking sites (e.g., Facebook, Instagram, Twitter, etc) via your smartphone?

- Yes
- No

Survey Completion

0% 100%

<< >>

Part A

General thoughts about using smartphone

Survey Completion

0% 100%

<< >>

Using the smartphone how likely are you to _____

	Very Unlikely (1)	(2)	(3)	(4)	(5)	(6)	Very Likely (7)
relive boredom.	○	○	○	○	○	○	○
get information when I do some assignment or task.	○	○	○	○	○	○	○
forget my problems.	○	○	○	○	○	○	○
feel relexed.	○	○	○	○	○	○	○
get support from others.	○	○	○	○	○	○	○
	Very Unlikely (1)	(2)	(3)	(4)	(5)	(6)	Very Likely (7)
find something to talk about.	○	○	○	○	○	○	○
belong to a group that I value.	○	○	○	○	○	○	○
find a wealth of information.	○	○	○	○	○	○	○
find new interactive features.	○	○	○	○	○	○	○
contact family and friends.	○	○	○	○	○	○	○
	Very Unlikely (1)	(2)	(3)	(4)	(5)	(6)	Very Likely (7)
maintain a relationship I value.	○	○	○	○	○	○	○
be stylish.	○	○	○	○	○	○	○
get immediate knowledge of big news events.	○	○	○	○	○	○	○
find a way to pass the time.	○	○	○	○	○	○	○
feel less lonely.	○	○	○	○	○	○	○

Survey Completion

0% 100%

<< >>

(Continued)

Using the smartphone how likely are you to _____

	Very Unlikely (1)	(2)	(3)	(4)	(5)	(6)	Very Likely (7)
obtain information that I cannot find from others.	○	○	○	○	○	○	○
do entertained activities.	○	○	○	○	○	○	○
be fashionable to have it.	○	○	○	○	○	○	○
hear music I like.	○	○	○	○	○	○	○
take pictures whenever I want.	○	○	○	○	○	○	○
	Very Unlikely (1)	(2)	(3)	(4)	(5)	(6)	Very Likely (7)
enjoy activities using applications.	○	○	○	○	○	○	○
fine a place using a GPS service no matter where I am.	○	○	○	○	○	○	○
avoid looking old-fashioned without a smartphone.	○	○	○	○	○	○	○
get information about some product.	○	○	○	○	○	○	○
cheer myself up.	○	○	○	○	○	○	○
	Very Unlikely (1)	(2)	(3)	(4)	(5)	(6)	Very Likely (7)
play a game I like.	○	○	○	○	○	○	○
be always accessible to anyone no matter where I am.	○	○	○	○	○	○	○
provide immediate access to others anywhere anytime.	○	○	○	○	○	○	○

Survey Completion

0% 100%

<< >>

Part B

Using "mobile social networking"

Survey Completion

0% 100%

<< >>

These questions are about your experiences of accessing social network sites using the smartphone.

*Before answer the questions, please remind *one of your social groups* (e.g., school, company,or peer groups) *on the social network site that you open access via a smartphone.*

	Strongly disagree (1)	(2)	(3)	(4)	(5)	(6)	Strongly agree (7)
Other people (in the group) think that using smartphone is important to me.	○	○	○	○	○	○	○
It really would not matter to most people (in the group) I know if I decided to give up using the smartphone.	○	○	○	○	○	○	○
Many of people (in the group) expect me to continuously use the smartphone.	○	○	○	○	○	○	○
No one (in the group) would really be surprised if I just stopped using the smartphone.	○	○	○	○	○	○	○
	Strongly disagree (1)	(2)	(3)	(4)	(5)	(6)	Strongly agree (7)
Others (in the group) would probably make me feel guilty if I quit using the smartphone.	○	○	○	○	○	○	○
Using smartphone helps to identity myself with the group.	○	○	○	○	○	○	○
I found using smartphone useful in my social relatonship.	○	○	○	○	○	○	○
I have frequent communication with some members (in the group) using social networking on my smartphone.	○	○	○	○	○	○	○

Survey Completion

0% 100%

<< >>

(Continued)

*Before answer the questions, please remind *one of your social groups* (e.g., school, company,or peer groups) *on the social network site that you open access via a smartphone.*

	Strongly disagree (1)	(2)	(3)	(4)	(5)	(6)	Strongly agree (7)
Using smartphone helps to enhance my image within the group.	○	○	○	○	○	○	○
Using smartphone makes it easier to develop social relationship.	○	○	○	○	○	○	○
Using smartphone enhances my effectiveness in building social relationship.	○	○	○	○	○	○	○
Using smartphone helps to elevate my standing with the group.	○	○	○	○	○	○	○
	Strongly disagree (1)	(2)	(3)	(4)	(5)	(6)	Strongly agree (7)
I spend a lot of time to interact with some members (in the group) using social networking on my smartphone.	○	○	○	○	○	○	○
I know some members (in the group) on a personal level.	○	○	○	○	○	○	○
Using smartphone helps me to build social relationship more quickly.	○	○	○	○	○	○	○

Survey Completion

0% 100%

<< >>

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Part C

General feelings that you might have when you use a smartphone.

Survey Completion

0% 100%

<< >>

Please indicate your response to the following statements.

	Strongly disagree (1)	(2)	(3)	(4)	(5)	(6)	Strongly agree (7)
I feel that I need to have my smartphone near me.	○	○	○	○	○	○	○
I will be panic if I find that I don't have my smartphone with me.	○	○	○	○	○	○	○
I feel better when I have access to my smartphone.	○	○	○	○	○	○	○
When I am feeling down, I often turn to my smartphone.	○	○	○	○	○	○	○
If something upsets me, my smartphone can make me feel better.	○	○	○	○	○	○	○
	Strongly disagree (1)	(2)	(3)	(4)	(5)	(6)	Strongly agree (7)
I would be sad without my smartphone.	○	○	○	○	○	○	○
My smartphone helps me feel emotionally secure because it keeps me connected.	○	○	○	○	○	○	○
It's hard for me to spend a day without my smartphone.	○	○	○	○	○	○	○
I like to get on my smartphone when I am feeling upset or down.	○	○	○	○	○	○	○
I feel compelled to check my smartphone throughout the day.	○	○	○	○	○	○	○
	Strongly disagree (1)	(2)	(3)	(4)	(5)	(6)	Strongly agree (7)
I will be panic if I think I might have lost my smartphone.	○	○	○	○	○	○	○
I feel better when my smartphone helps me to take on the world.	○	○	○	○	○	○	○
I am feeling better when I count on my smartphone.	○	○	○	○	○	○	○
I feel concerned if I might be lost my smartphone.	○	○	○	○	○	○	○

Please indicate your response to the following questions.

	Not at all 0	1	2	3	4	5	6	7	8	9	Completely 10
To what extent is your smartphone part of you and who you are?	○	○	○	○	○	○	○	○	○	○	○
To what extent do you feel personally connected to your smartphone?	○	○	○	○	○	○	○	○	○	○	○
To what extent do you feel emotionally bonded to your smartphone?	○	○	○	○	○	○	○	○	○	○	○
To what extent is your smartphone part of you?	○	○	○	○	○	○	○	○	○	○	○
	Not at all 0	1	2	3	4	5	6	7	8	9	Completely 10
To what extent does your smartphone say something to other people who you are?	○	○	○	○	○	○	○	○	○	○	○
To what extent are your thoughts and feelings toward your smartphone often automatic, coming to mind seemingly on their own?	○	○	○	○	○	○	○	○	○	○	○
To what extent do your thoughts and feelings toward your smartphone come to your mind naturally and instantly?	○	○	○	○	○	○	○	○	○	○	○
To what extent do your thoughts and feelings toward your smartphone come to mind so naturally and instantly that you don't have much control over them?	○	○	○	○	○	○	○	○	○	○	○

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Part D

Current usage of a smartphone

Survey Completion

0% 100%

<< >>

In this page, you will be asked about using applications on your smartphone.

Q1. How many notifications from smartphone applications are received on your smartphone daily?

- less than 5
- 5-10
- 10-15
- 15-20
- 20-30
- Over 30

Q2. In the past week, how many text messages per day were sent/received?

- less than 10
- 10-20
- 20-30
- 30-50
- 50-80
- 80-100
- over 100

Q3. How often do you different types of activities on your smartphone?

	Never	Rarely	Occasionally	Sometimes	Frequently	Usually	Very often
Making contact (e.g. Calling, Texting, Writing or Responding to email)	○	○	○	○	○	○	○
Social media applications (e.g., Facebook, YouTube, Instagram, Twitter etc.)	○	○	○	○	○	○	○
Searching information (e.g., for task or shopping)	○	○	○	○	○	○	○
Entertained functions (e.g., camera, game, music, video)	○	○	○	○	○	○	○
Optional functions (e.g., GPS, Calendar, Calculator etc.)	○	○	○	○	○	○	○

In this page, you will be asked about "current use of your smartphone".

Q4. In the past week, on average, how many times per day have you checked your smartphone?

- ○ less than 5 times
- ○ 5-20 times
- ○ 20-40 times
- ○ 40-60 times
- ○ 60-80 times
- ○ 80-100 times
- ○ Over 100 times

Q5. In the past week, on average, how many minutes per day have you spend on your smartphone? (excluding making a voice call)

- less than 10 minutes
- 10-30 minutes
- 30-60 minutes
- 1-2 hours
- 2-3 hours
- 3-4 hours
- 4-5 hours
- Over 5 hours

Survey Completion
0% 100%

<< >>

In this page, you will be asked about "spent money on using smartphone".

Q6. In the last month, how much data did you use on your smartphone?

- Under 300MB
- 300-500MB
- 500MB-1GB
- 1-2GB
- 2-3GB
- 3-4GB
- 4-5GB
- Over 5GB

Q7. In the last month, how much money did you pay on your smartphone bill?
Please write below. (Rate: US dollar)

- Less than $50
- $50-$100
- $100-$150
- $150-$200
- Over $200

Q8. Please indicate how open do you access social networking sites on your smartphone.

	Never	Rarely	Occasionally	Sometimes	Frequently	Usually	Very often
I use social networking applications on my smartphone	○	○	○	○	○	○	○
I use my smartphone to log into my social network	○	○	○	○	○	○	○
I check my social networking site using my smartphone	○	○	○	○	○	◉	○
I run a social networking application on my smartphone	○	○	○	○	○	○	○

Survey Completion
0% 100%

<< >>

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Part E

Experiences of using smartphone

Survey Completion
0% 100%

<< >>

Please indicate your response to the following statements.

	Strongly disagree	Disagree	Somewhat disagree	In between	Somewhat agree	Agree	Strongly agree
Learning to operate the smartphone is easy for me.	○	○	○	○	○	○	○
I find it easy to get the smartphone to do what I want it to do	○	○	○	○	○	○	○
My interaction with the smartphone is clear and understandable	○	○	○	○	○	○	○
I find the smartphone to be flexible to interact with	○	○	○	○	○	○	○
It is easy for me to become skillful at using the smartphone	○	○	○	○	○	○	○
I find the smartphone easy to use	○	○	○	○	○	○	○

Survey Completion
0% 100%

<< >>

Please indicate your response to the following statements.

	Strongly disagree	Disagree	Somewhat disagree	In between	Somewhat agree	Agree	Strongly agree
Using the smartphone would enable me to accomplish tasks more quickly.	○	○	○	○	○	○	○
Using the smartphone would improve my performance.	○	○	○	○	○	○	○
Using the smartphone would increase my productivity.	○	○	○	○	○	○	○
Using the smartphone would enhance my effectiveness.	○	○	○	○	○	○	○
Using the smartphone would make it easier to do my tasks.	○	○	○	○	○	○	○
I would find the smartphone is useful.	○	○	○	○	○	○	○

Survey Completion
0% 100%

<< >>

In this page, you will be asked about your "*experiences and thoughts*" while using a smartphone.

Please indicate your response to the following statements.

	Never 0	1	2	3	4	5	Very often 6
The smartphone at some time stopped unexpectedly.	○	○	○	○	○	○	○
The smartphone operated consistently overall.	○	○	○	○	○	○	○
The smartphone allowed me to do the task with sufficiently few keystrokes.	○	○	○	○	○	○	○
The smartphone supported the operation of all the tasks in a way that I found useful.	○	○	○	○	○	○	○
The smartphone is one that I enjoyed.	○	○	○	○	○	○	○
	Never 0	1	2	3	4	5	Very often 6
The smartphone would make me want to use it.	○	○	○	○	○	○	○
The smartphone made me feel relaxed.	○	○	○	○	○	○	○
The smartphone made me feel good.	○	○	○	○	○	○	○
The smartphone gave me pleasure.	○	○	○	○	○	○	○

Survey Completion

0% 100%

<< >>

	Strongly disagree 0	1	2	3	4	5	Strongly agree 6
The smartphone is reasonably priced.	○	○	○	○	○	○	○
The smartphone offers value for money.	○	○	○	○	○	○	○
The smartphone is a good product for the price.	○	○	○	○	○	○	○
The smartphone would be economical.	○	○	○	○	○	○	○
The smartphone helped me to feel acceptable.	○	○	○	○	○	○	○
	Strongly disagree 0	1	2	3	4	5	Strongly agree 6
The smartphone improved the way I was perceived.	○	○	○	○	○	○	○
The smartphone made a good impression on other people.	○	○	○	○	○	○	○
The smartphone gave me social approval.	○	○	○	○	○	○	○
Difficulties in finding and installing the application has a negative impact on my usage.	○	○	○	○	○	○	○
Difficult configuration has a negative impact on my usage.	○	○	○	○	○	○	○
	Strongly disagree 0	1	2	3	4	5	Strongly agree 6
Poor performance has a negative impact on my usage.	○	○	○	○	○	○	○
I can use the smartphone without help from others.	○	○	○	○	○	○	○
I have the means and resources to use when I have a problem in using smartphone.	○	○	○	○	○	○	○
I have the knowledge and skills to use the smartphone.	○	○	○	○	○	○	○

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Last Part

Demographic Questions

Survey Completion

0% 100%

<< >>

What is your sex?

- Male
- Female

How old are you?

Please specify your ethnicity.

- American Indian or Alaska Native
- Hawaiian or other Pacific Islander
- Asian or Asian American
- African American
- Hispanic or Latino
- White
- Others

Survey Completion

0% 100%

<< >>

Please specify your household income per year.

- less than $10,000
- $10,000-$30,000
- $30,000-$50,000
- $50,000-$70,000
- $70,000-$90,000
- $90,000-$120,000
- Over $120,000

Please specify your ethnicity. What is the highest degree of level of school you have completed? If currently enrolled, highest degree received.

- No schooling completed
- Some high school
- High school graduate
- Some college
- Some postgraduate work
- Master's degree
- Doctorate degree
- Others

Survey Completion

0% 100%

<< >>

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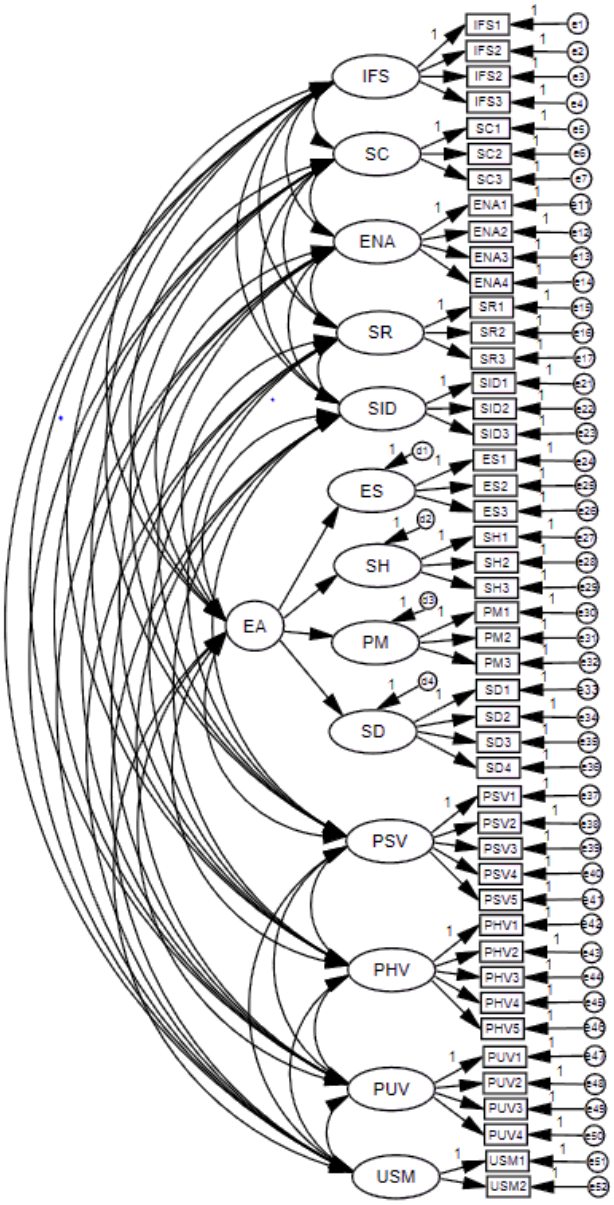
Thank you for your participation. :)
Please click on the button below to finish.

Survey Completion

0% 100%

<< >>

Appendix Figure



A 1 Measurement model (CFA)

Appendix Table

B 1 Path results in the model including control variables

.	Structural Path	Std. estimate[1]	C.R. [2]	Results
Effects of cognitive expectations on perceived value				
	Information seeking → Perceived social value	.240	5.911***	Accepted
	Information seeking → Perceived utilitarian value	.346	7.132***	Accepted
	Social contact → Perceived social value	-.020	-.424	Rejected
	Entertainment activity → Perceived hedonic value	.205	2.745**	Accepted
	Self-reactiveness → Perceived hedonic value	.219	3.141**	Accepted
Effects of SNS social influence on perceived value				
	Social identity → Perceived social value	.508	11.563***	Accepted
	Social identity → Perceived hedonic value	.090	2.144*	Accepted
	Social identity → Perceived utilitarian value	.235	5.171***	Accepted
Effects of emotional attachment on perceived value				
	Emotional attachment → Perceived social value	.304	7.106***	Accepted
	Emotional attachment → Perceived hedonic value	.359	6.868***	Accepted
	Emotional attachment → Perceived utilitarian value	.185	3.465**	Accepted
Effects of perceived values on use of the smartphone				
	Perceived social value → Use of the smartphone	.224	3.964***	Accepted
	Perceived hedonic value → Use of the smartphone	.167	3.044**	Accepted
	Perceived utilitarian value → Use of the smartphone	.130	2.656**	Accepted

p *<.05, *p* **<.01, *p****<.001

[1]Standardized estimate

[2]Critical Ratio (C.R.) values of 1.96 or more mean that the path is significant at the .05 level or better.

B 2 Results of a measurement model for a male group (*n* = 325)

Variable	Coding	Mean	SD	Standardized Loading	AVE[1]	CR[2]
Information seeking	IFS1	5.92	1.177	.695	.562	.837
	IFS2	5.86	1.187	.760		
	IFS3	5.72	1.196	.756		
	IFS4	5.88	1.299	.786		
Social contact	SC1	4.60	1.675	.797	.611	.825
	SC2	4.85	1.671	.801		
	SC3	4.55	1.807	.745		
Entertainment activity	ENT1	5.62	1.324	.806	.551	.830
	ENT2	5.50	1.642	.658		
	ENT3	5.72	1.268	.794		
	ENT4	4.67	1.710	.701		
Self-reactiveness	SR1	4.15	1.802	.707	.554	.788
	SR2	4.90	1.625	.806		
	SR3	4.22	1.899	.716		
Social identity	SID1	4.03	1.932	.826	.748	.899
	SID2	4.02	1.840	.878		
	SID3	4.06	1.812	.890		
Emotional security	ES1	5.13	1.684	.865	.794	.920
	ES2	5.52	1.439	.907		
	ES3	5.24	1.520	.900		
Safe haven	SH1	4.56	1.823	.882	.816	.930
	SH2	4.24	1.835	.892		
	SH3	4.38	1.861	.935		
Proximity maintenance	PM1	5.36	1.669	.852	.709	.880
	PM2	5.79	1.370	.845		
	PM3	5.62	1.441	.829		
Separation distress	SD1	4.50	1.774	.735	.639	.876
	SD2	5.47	1.603	.761		
	SD3	4.72	1.792	.824		
	SD4	4.94	1.794	.870		

B 2 continued

Variable	Coding	Mean	SD	Standardized Loading	AVE[1]	CR[2]
Emotional attachment	ES	5.30	1.436	.959	.786	.936
	SH	4.39	1.721	.749		
	PM	5.59	1.342	.937		
	SD	4.91	1.484	.887		
Emotional attachment	ES	5.30	1.436	.959	.786	.936
	SH	4.39	1.721	.749		
	PM	5.59	1.342	.937		
	SD	4.91	1.484	.887		
Perceived social value	PSV1	5.19	1.570	.921	.752	.938
	PSV2	5.03	1.502	.831		
	PSV3	5.08	1.572	.926		
	PSV4	5.30	1.435	.837		
	PSV5	5.30	1.487	.813		
Perceived hedonic value	PHV1	6.00	1.050	.575	.608	.883
	PHV2	5.89	1.089	.642		
	PHV3	5.23	1.343	.817		
	PHV4	5.41	1.284	.923		
	PHV5	5.45	1.296	.883		
Perceived utilitarian value	PUV1	5.99	1.006	.783	.754	.924
	PUV2	5.81	1.133	.887		
	PUV3	5.77	1.241	.897		
	PUV4	5.82	1.195	.901		
Use of the smartphone	USE1	4.62	1.816	.834	.566	.720
	USE2	3.55	1.622	.660		

[1] Average variance extracted
[2] Constitute reliability

B 3 Correlation matrix and AVE statistics for a male group (*n* = 325)

	INS	SC	ENA	SR	SID	EA	PSV	PHV	PUV	USE	AVE
INS	1										.562
SC	.190[a] (.436[b])	1									.611
ENA	.379 (.616)	.401 (.633)	1								.551
SR	.181 (.426)	.498 (.706)	.458 (.677)	1							.554
SID	.089 (.298)	.450 (.671)	.242 (.492)	.408 (.639)	1						.748
EA	.283 (.532)	.366 (.605)	.477 (.691)	.379 (.616)	.340 (.583)	1					.789
PSV	.251 (.501)	.394 (.628)	.367 (.606)	.285 (.534)	.457 (.676)	.533 (.730)	1				.752
PHV	.278 (.527)	.282 (.531)	.416 (.645)	.334 (.578)	.263 (.513)	.476 (.690)	.408 (.639)	1			.608
PUV	.281 (.530)	.129 (.359)	.203 (.450)	.109 (.330)	.120 (.347)	.107 (.475)	.240 (.490)	.297 (.545)	1		.754
USE	.079 (.281)	.127 (.357)	.158 (.398)	.158 (.398)	.092 (.304)	.235 (.485)	.128 (.358)	.158 (.389)	.085 (.291)	1	.566

[a] Squared correlation coefficient
[b] Correlation coefficient

B 4 Results of a measurement model for a female group (*n* = 413)

Variable	Coding	Mean	SD	Standardized Loading	AVE[1]	CR[2]
Information seeking	IFS1	6.21	0.994	.595	.448	.764
	IFS2	5.97	1.173	.668		
	IFS3	5.95	1.194	.732		
	IFS4	6.10	1.107	.676		
Social contact	SC1	4.80	1.674	.830	.608	.822
	SC2	4.95	1.701	.818		
	SC3	4.49	1.763	.682		
Entertainment activity	ENT1	5.92	1.178	.590	.413	.732
	ENT2	5.68	1.635	.543		
	ENT3	5.89	1.199	.571		
	ENT4	4.93	1.611	.824		
Self-reactiveness	SR1	4.55	1.785	.800	.595	.814
	SR2	5.19	1.484	.822		
	SR3	4.50	1.840	.686		
Social identity	SID1	3.77	2.006	.817	.778	.913
	SID2	3.61	1.922	.909		
	SID3	3.79	1.977	.917		
Emotional security	ES1	5.30	1.635	.855	.803	.924
	ES2	5.76	1.404	.890		
	ES3	5.53	1.513	.941		
Safe haven	SH1	4.76	1.847	.888	.855	.947
	SH2	4.39	1.867	.931		
	SH3	4.66	1.866	.954		
Proximity maintenance	PM1	5.61	1.519	.926	.722	.886
	PM2	6.00	1.198	.858		
	PM3	5.91	1.315	.757		
Separation distress	SD1	4.99	1.851	.819	.698	.902
	SD2	5.88	1.423	.764		
	SD3	5.02	1.812	.883		
	SD4	5.30	1.880	.870		

B 4 continued

Variable	Coding	Mean	SD	Standardized Loading	AVE[1]	CR[2]
Emotional attachment	ES	5.53	1.412	.850	.728	.914
	SH	4.60	1.766	.828		
	PM	5.84	1.211	.852		
	SD	5.30	1.534	.881		
Perceived social value	PSV1	5.21	1.626	.890	.684	.915
	PSV2	4.92	1.693	.736		
	PSV3	5.07	1.574	.916		
	PSV4	5.33	1.516	.832		
	PSV5	5.33	1.548	.744		
Perceived hedonic value	PHV1	6.13	0.919	.526	.638	.895
	PHV2	5.96	1.173	.692		
	PHV3	5.26	1.479	.885		
	PHV4	5.37	1.506	.937		
	PHV5	5.49	1.442	.879		
Perceived utilitarian value	PUV1	6.04	1.025	.714	.767	.929
	PUV2	5.74	1.200	.876		
	PUV3	5.54	1.404	.954		
	PUV4	5.62	1.356	.938		
Use of the smartphone	USE1	4.86	1.942	.739	.633	.775
	USE2	3.64	1.797	.849		

[1] Average variance extracted
[2] Constitute reliability

B 5 Correlation matrix and AVE statistics for a female group (*n* = 413)

	INS	SC	ENA	SR	SID	EA	PSV	PHV	PUV	USE	AVE
INS	1										.448
SC	.178[a] (.422[b])	1									.608
ENA	.339 (.582)	.272 (.522)	1								.413
SR	.180 (.424)	.483 (.695)	.354 (.595)	1							.595
SID	.048 (.219)	.296 (.544)	.158 (.397)	.255 (.505)	1						.778
EA	.219 (.468)	.294 (.542)	.345 (.587)	.410 (.640)	.261 (.511)	1					.728
PSV	.211 (.459)	.294 (.542)	.234 (.484)	.237 (.487)	.441 (.664)	.362 (.602)	1				.684
PHV	.214 (.463)	.252 (.502)	.329 (.574)	.295 (.543)	.202 (.449)	.441 (.664)	.292 (.540)	1			.638
PUV	.179 (.423)	.172 (.415)	.221 (.470)	.124 (.352)	.171 (.414)	.245 (.495)	.261 (.511)	.241 (.491)	1		.767
USE	.062 (.249)	.045 (.212)	.091 (.301)	.057 (.239)	.035 (.187)	.152 (.390)	.082 (.287)	.066 (.256)	.077 (.278)	1	.633

[a] Squared correlation coefficient
[b] Correlation coefficient

VITA

VITA

SONG-YI YOUN

EDUCATION

August 2012 – May 2016

Ph.D.
Major: Consumer Behavior
Department of Consumer Science
Purdue University, West-Lafayette, IN, USA

March 2008 – February 2010

Ph.D. Candidate
Major: Clothing and Textiles
Department of Clothing and Textiles
Hanyang University, Seoul, South Korea

February 2006 – February 2008

M.S.
Major: Clothing and Textiles
Department of Clothing and Textiles
Hanyang University, Seoul, South Korea

February 2002 – February 2006

B.S.
Major: Clothing and Textiles
Department of Clothing and Textiles
Hanyang University, Seoul, South Korea

Minor: Business Administration
The School of Business
CUM LAUDE

.

INDUSTRY EXPERIENCE

April, 2010 – December, 2011

Full-time Employment
Fashion Planning Team, Korea Color and Fashion Trend Center (CFT, government agency), Seoul, Korea

- Organized a business plan for a government project on the 2011 Global Technology Development.
- Analyzed the global fashion market and managed documentation.
- Supported the 2010-2011 Korea color and fashion trend seminar.
- Conducted consumer research and analysis for brand marketing.

February – April, 2009

Part-time Freelancer
PFIN (Profashion Information Network), Seoul, Korea

- Supported the 2009 FIBA consumer research.
- Managed documentation required.

January – February, 2007

Internship
Fashion R&D Team, FnC Kolon Corp., Gyunggi-do, Korea

- Researched retail brands of Kolon.
- Supported statistical analysis and managed documentation.

RESEARCH

Research Interests

General interests lie in social and psychological aspects of consumer behavior, especially focus on the consumers' micro and macro cultures shaping their responses. In particular, I am interested in information technology (IT) users and their behaviors under-circumstances of using social media or smartphones. I conducted research on consumer issues pertaining to self-concept, body images, online self-images, and behavioral involvement to fashion clothing. Recent work focuses on smartphone users' social, cognitive, and emotional influence on using mobile services.

Book Chapter:

Acharya, L., Jin, L., & **Youn, S.** (2014). Japan. In Teresa L. Thompson (Ed.), *Encyclopedia of Health Communication* (pp.761-764). Thousand Oaks, California: Sage Publications

Referred Journal Articles:

Youn, S., & Lee, K. -H. (2015). Self-image and fashion leadership: Focusing on clothing involvement and consumer confidence. *Fashion and Textile Research Journal, 17*(3), 1-10.

Youn, S., Park, J. Y., & Lee, K. H. (2011). Social self image and Avatar image in the virtual world: Focus on ideal-self image and actual-self image. *Journal of the Korean Society of Costume, 61*(9), 1-14.

Yoon, N. & **Youn, S.** (2010). The effects of fashion luxury consumption values on the perceived acquisition value and the role of reservation price. *The Research Journal of the Costume Culture, 18*(4), 774-788.

Seo, M. -J., Kim, Y. -H., **Youn, S. -Y.**, Seo, M. -S. & Lee, K. -H. (2008). The influence of self images on clothing innovativeness and conformity of college students. *Journal of Korean Living Science Research, 28*(1), 3-10.

Youn, S. -Y. & Lee, K. -H. (2007). Effects of cosmopolitanism and nationalism on apparel product shopping. *Journal of the Korean Society of Clothing and Textiles, 31*(7), 1085-1095

Lee, Y. -M., Kim, Y. -H., Kim, M. -J., Lee, Y. -K., **Youn, S. -Y.** & Lee, K. -H. (2007). Consumer age group differences in knitwear consumption behavior. *The Research Journal of the Costume Culture, 15*(2), 284-298.

Jang, Y. -J., Park, J. -O., Lee, K. -H. & **Youn, S. -Y.** (2007). Relational market behavior of fashion online community members. *The Research Journal of Costume Culture, 15*(1), 58-67.

Kim, Y. -H., Seo, M. -J., **Youn, S. -Y.** & Lee, K. -H. (2006). Effects of gender roles, conformity in dress on fashion seeking and novelty seeking. *The Journal of Korean Living Science Research*, 26(1), 3-9.

Conference Proceedings/Presentations:

Youn, S. & Kowal, C. (2016). “Me Time” versus “Social Networking”: understanding the motivations of smartphone users. 2016 America Collegiate Retailing Association (ACRA) Annual Conference, Secaucus, New Jersey, April 13-16.

Youn, S. -Y., Bae, K. -M., Lee, J. -I., Kwon, K. -S. & Lee, K. -H. (2009). Influence of body image and clothing involvement on fashion leadership and

experience with appearance. *2009 International Textile and Apparel Association Annual Conference*, Bellevue, WA, Oct 29.

Youn, S. -Y. & Lee, K. -H. Clothing interest and acculturation of international students in Korea: Covariate effect of cultural values. *2009 International Textile and Apparel Association Annual Conference*, Bellevue, WA, Oct 30.

Youn, S. -Y., Park, J. & Lee, K. -H. (2008). Social self-image and avatar image in the virtual world. *The Korean Society of Costume*, Seoul, May 09.

Youn, S. -Y., Lee, K. -M. & Cho, J. -Y. (2008). A study on the narcissistic personality and color preferences. *2008 International Costume Culture Conference & Exhibition*, Tsinghua University, China, Oct 10.

Youn, S-Y., Bae, K-M. & Lee, K-H. (2008). Discrepancy between real self and ideal self as an indicator of fashion leadership. *2008 International Costume Culture Conference & Exhibition*, Tsinghua University, China, Oct 10.

Youn, S. -Y. & Lee, K. -H. (2008). Acculturation styles and clothing behavior of international students in Korea. *The Korean Society of Costume*, April 12.

Youn, S. -Y. & Lee, K. -H. (2007). Effects of acculturation on international students' self-identity and clothing behavior. *International Textiles and Apparel Association*, Los Angeles, CA, November 7-10.

Shu, M. -J., **Youn, S. -Y.**, Seo, M. -S. & Lee, K. -H. (2007). Importance of functional evaluative criteria of knitwear and purchase satisfaction. *The Korean Society of Clothing and Textiles*, Seoul, April, 20.

Youn, S. -Y., Kim, E. -J. & Lee, K. -H. (2007). Publications of cross-cultural studies and acculturation studies in the clothing and textiles discipline from 1977-2006: A research trend analysis. *2007 International Conference, The Korean Society of Knit Design*, Tokyo, Japan, July 27.

Kim, E. -J., **Youn, S. -Y.** & Lee, K. -H. (2007). Modeling consumer use of criteria for evaluating knitwear: Moderating effect of price orientation. *2007 International Conference, The Korean Society of Knit Design*, Tokyo, Japan, July 27.

Kim, Y. -H., Shu, M. -J., **Youn, S. -Y.** & Lee, K. -H. (2006). Individuality and conformity in dress: Personality traits as antecedents and shopping orientation as consequences. *The Fiber Society, The Korean Fiber Society, The Korean Society of Costume. International Fiber Conference*, Seoul, May. 30 - June 3.

Shu, M. -J., Kim, Y. -H., **Youn, S. -Y.**, Seo, M-S. & Lee, K-H. (2006). Effects of self-images on conformity and individuality seeking in clothing behavior. *The Korean Society of Clothing and Textiles*, Seoul, Oct, 20.

Youn, S. -Y. & Lee, K. -H. (2006). Effects of cosmopolitanism and nationalism on apparel product shopping. *The Korean Society of Clothing and Textiles*, Seoul, Oct, 21.

ESEARCH ASSISTANCE

Researcher for 2nd BK21 Knit team,
Fall 2006 – Spring 2010, *Clothing and Textiles, Hanyang University*

- Worked for team to build cooperation system between industry and university and to foster specialist on Knit industry.
- Organized data and documents required.
- Conducted data analysis and provided interpretation.

TEACHING EXPERIENCES

Course Instructor**:**

Textile Material Science
Spring 2010, *Fashion and Textile Design, Seoil College, Seoul, Korea*

- Held full responsibility for proceeding of the course.
- Developed course materials with textile samples.
- Taught in-class lectures.
- Conducted in-class discussions, activities, case analyses, and exams.
- Evaluated individual student performance and provided feedback.

Visual Merchandizing
Fall 2009, *Textile Design, Gyeongnam National University of Science and Technology, Korea*

- Held full responsibility for proceeding of the course.
- Conducted in-class discussions, activities, quizzes, case analyses, and exams.
- Conducted group projects to develop a new brand and visual merchandizing of the retail model based on the seasonal and brand concept.
- Graded assignments and final group project.

ADDITIONAL EXPERIENCE

- Participated in a Fashion IT Professional course for Photoshop, Illustrator, Fashion Design CAD, Pattern CAD, *Hanyang University supported by Ministry of Gender Equality & Family*, June- July 2008
- Participated in an Intensive Fashion Seminar, *Bunka Women's University*, Japan, Tokyo, July 2007
- Participated in a Special Winter Seminar, *Domus Academy*, Milano, Italia, January 2007

ACADEMIC GRANTS/AWARDS

Fall 2012 (Sept 28- Dec 06)	Grant Americasave.org (with Dr. Norris and CSR600 graduate students, $570) Title: Increasing Financial Literacy of West Lafayette Purdue Community Students grant program for Community Service/Service learning project
Spring 2008 - Fall 2009	Excellent, Doctoral Fellowship Award *Department of Clothing and Textiles, Hanyang University*
Fall 2009 - Fall 2010	Honor, BK21 (Brain Korea 21) Fellowships Award *Hanyang University funded by National Research Foundation of Korea*
Fall 2006 - Fall 2007	Honor, BK21 (Brain Korea 21) Fellowships Award *Hanyang University funded by National Research Foundation of Korea*
Spring 2006	Honor, Teaching Assistant Fellowships Award *Department of Clothing and Textiles, Hanyang University*
July 2006	Award, Graduation Fashion Show *Department of Clothing and Textiles, Hanyang University*
February 2006	Award, Graduation Academic Best Student (Cum Laude) *Department of Clothing and Textiles, Hanyang University*
Fall 2005	Excellent, Academic Scholarship Award *Department of Clothing and Textiles, Hanyang University*