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I am submitting herewith a dissertation written by Kiseol Yang entitled “The Effects of Consumer Perceived Value and Subjective Norm on the Adoption of Mobile Data Services: A Cross-cultural Comparison of American and Korean Consumers.” I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Human Ecology.

Laura D. Jolly

Major Professor

We have read this dissertation
and recommend its acceptance:

Ann E. Fairhurst

Youn-Kyung Kim

Hee-Jin Lim

Robert T. Ladd

Accepted for the Council:

Anne Mayhew

Vice Chancellor and
Dean of Graduate Studies

(Original signatures are on file with official student records.)

**The Effects of Consumer Perceived Value and Subjective Norm on the Adoption of
Mobile Data Services: A Cross-cultural Comparison of American and Korean
Consumers**

A Dissertation

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of Philosophy Degree

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Kiseol Yang

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DEDICATION

This dissertation is dedicated to
My precious Jongsung and Giho

ABSTRACT

Despite the explosive growth of mobile phone subscribers and rapid adoption of mobile data services worldwide, the usage of mobile data services is highly variable across countries. This study attempted to reveal the differences in mobile data service adoption behavior between American and Korean consumers since it has been reported that the national culture and usage of mobile data services between the two countries is different, but mobile penetration rate is similar between the two countries. This study attempted to explain the differences in mobile data service adoption behavior between American and Korean consumers in regarding the effects of consumer perceived value and subjective norm on the adoption of mobile data services. The hypothesized research model based on Technology Acceptance Model was constructed to explore differences in mobile data service adoption behavior between American and Korean consumers.

The instrument equivalence was established by a backward and forward translation process. Data were collected via online and sample was comprised of American (n=200) and Korean (n=200) consumers. Measurement equivalence was assessed by multiple group structural equation modeling after data collection. Structural equation modeling method was used to examine hypotheses.

Results revealed that consumer perceived value explained the differences in consumer behavioral intention to use mobile data services between American and Korean consumers. Moreover, the results indicated that consumer emotional value is the most important value driving to use mobile data services for both countries. However, subjective norm on mobile data service adoption behavior was not supported in the study. Finally, the research model proved that the Technology Acceptance Model (TAM) is also applicable for a Korean sample. This study contributes to increasing the knowledge of consumer values driving to use mobile data services in each country and provides the applications and directions for success in mobile markets.

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CHPATER I

INTRODUCTION

The explosive growth of mobile telephone subscribers is estimated to exceed that of fixed-line subscribers by the year 2009 (ITU, 2002). Moreover, the rapid diffusion of mobile telephones has accelerated the development of mobile data services which in turn has facilitated the development of m-commerce in the last decade. Emerging mobile markets spawned by mobile telephones, mobile data services, and m-commerce will be a driving force in the 21st century. Since m-commerce and mobile data services have many advantages such as lower levels of investment for building infrastructure, lower costs of developing and providing services, and lower costs and greater ease of use (Dholakia & Dholakia, 2004), the mobile market has tremendous growth potential. Furthermore, with this market potential, leading companies are extending their marketing budgets to invest in creating mobile marketing solutions (MMA, 2006).

Nevertheless, mobile market research and specifically understanding consumers' behavioral intentions to use mobile markets is not thoroughly conceptualized and knowledge is limited. As a preliminary step toward understanding the mobile market phenomena, this study seeks to understand consumers' behavioral intentions to use mobile markets. This study focuses on mobile data services since these services often serve as a bridge between mobile phone services and m-commerce in mobile markets. Moreover, mobile data services enable consumers to communicate and conduct transactions anywhere and anytime and the ubiquitous characteristic of mobile data

service generates tremendous m-commerce potential, predicted as a driving force for the next wave of electronic commerce (Liang & Wei, 2004). In this regard, mobile data service is viewed as a fundamental precondition for m-commerce development.

Furthermore, since mobile data services can also be utilized for retailing applications (e.g., providing shopping information through mobile data services), how well retailers or m-commerce providers understand consumers' behavioral intention to use mobile data services is a critical determinant of the success of mobile market strategies (Dholakia & Dholakia, 2004).

Despite the rapid growth and usage of mobile data services worldwide, adoption and usage of mobile data services have been highly variable across countries (Dholakia et al., 2004). Various mobile data services have proliferated in European and Asian countries, but are simple and still in the infancy stage in the United States (FCC, 2005). Thus, mobile data services may be more dependent on the characteristics of country environments (e.g., culture, telephone system infrastructure, and geography).

The differences in mobile data service adoption and usage across countries may be attributable to mobile telecommunications infrastructure differences, to the range of mobile data services offered, to the marketing strategies utilized by service providers, and to cultural influences related to using mobile data services (Harris, Rettie, & Kwan, 2005). Patterns of mobile data services usage may be culturally based. Since culture consists of a set of values, norms, and symbols that guide individual behavior (Parson & Shils, 1951), this study considers values and norms as key aspects of culture that may generate different adoption and usage of mobile data services across countries. More specifically, consumer perceived value may vary based on culture (Sweeny & Soutar, 2001) and it

may explain the differences in consumers' behavioral intentions to use mobile data services across cultures. In addition, the effect of subjective norm on behavioral intentions to use mobile data services may explain the differences across countries. Thus, consumer perceived value and subjective norm may be cultural determinants influencing consumers' mobile data service adoption and usage behavior across countries.

Significance of the Study

Several cross-cultural studies have been conducted to investigate cultural differences in the acceptance of m-commerce (e.g., Carlson et al., 1999), patterns of m-commerce diffusion (Vrechopoulous et al., 2003), and m-commerce infrastructure across countries (Henten et al., 2003). However, cross-cultural studies of mobile data services are relatively sparse (e.g., Harris, Rettie, & Kwan, 2005; Kim et al., 2004; Straub et al., 2002; Lee et al., 2002). Furthermore, cross-cultural research (e.g., Henten et al., 2003; Lee et al., 2002) consistently recommends that retailers avoid implementing the same m-commerce retailing strategies in all countries since the success factors for the diffusion of mobile data services and m-commerce vary between countries. Therefore, research examining differences in using mobile data services across countries is needed to aid in developing appropriate retailing strategies for mobile markets. Since the Korean mobile data service market is one of the most advanced in the Asia pacific region (Pyramid Research, 2002) and the American mobile data service market is still in the development and adoption stage, it would be useful to compare the differences in mobile data services adoption and usage behavior between American and Korean consumers.

This study selected American and Korean consumers for three reasons. First, the mobile phone penetration rate is similar between Americans and Koreans (61% and 76% respectively) (Lynch, 2005). Secondly, mobile data services in Korea are developed and popular, but simple and in the infancy stage in the United States (FCC, 2005). Third, research has been reported that the national culture is different between the two countries (e.g., Nakata & Sivakumar, 2001; Lee & Green, 1991; Trafimow, Trandis, & Goto, 1991; Hofstede, 1980). Koreans are more influenced by group norms than American consumers (Lee & Green., 1991). The degree of emphasis placed on norms may explain differences in consumer behavioral intention to use mobile data services between American and Korean consumers. Thus, identifying differences in behavioral intention to use mobile data services between consumers in the two countries will increase understanding of consumer mobile data service adoption behavior.

Several issues must be addressed to investigate adoption of mobile data services. First, by comparing American and Korean consumers' mobile data service adoption behavior in the same research model, this study may explain differences and similarities between American and Korean consumers. Second, focusing on the subjective norm and its relationship to the use of mobile data services may shed light on how this culturally based variable may play a role in the adoption of mobile data services. Third, understanding the effects of consumer perceived value as an antecedent variable on intent to use mobile data services will increase understanding of consumers' motives for using mobile data services. Results of the study will provide implications for American and Korean retailers who plan to implement mobile data service as part of their retailing strategies.

Purpose of the Study

The purpose of the study is three fold: (1) to explore how consumers' perceived value toward mobile data services is different between American and Korean consumers, (2) to examine subjective norm effects on consumers' behavioral intentions to use mobile data services among American and Korean consumers, and (3) to investigate how the overall model of consumers' adoption of mobile data services differs between American and Korean consumers.

This study predicts that consumer perceived value toward mobile data services and the subjective norm effect on using mobile data services will generate differences in behavioral intention to use mobile data services for American and Korean consumers. Furthermore, this study compares the differences and similarities in using mobile data services between American and Korean consumers in the same research model.

Mobile Related Services

Before studying mobile data services, this study provides a clear definition of mobile data services as used in this study. General mobile service is defined as a radio communication service between mobile and land stations, or between mobile stations (Telecom Glossary, 2000). Specifically, mobile data service (e.g., Short Message Service, e-mail, Multi-media Messaging Service, mobile games, weather, news, e-tickets, and stock trading) including m-commerce services is defined as "transactions over a mobile telecommunications network using a handheld device" (Methlie & Gressgard, 2006, p.14). Mobile data service also includes m-commerce services providing consumers with a tool to connect with business. In addition, m-commerce is defined as "electronic

commerce transactions carried out via mobile, wireless terminals” (Dholakia & Dholakia, 2004, p.1391). Figure 1 illustrates a typology of mobile related data services that distinguishes mobile services (mobile voice services, mobile data services) from m-commerce (see Figure 1). Some of the trade and scholarly literature discusses these mobile services as interchangeable and broad in scope. However, this study illustrates where mobile data services fit and where the services are also used in m-commerce.

As depicted in Figure 1, mobile services are conceptualized as having two parts; mobile voice services and mobile data services. M-commerce is a business transaction conducted via a mobile handheld device in this study. Some m-commerce business transactions are offered as mobile data services (e.g., e-tickets and e-payments).

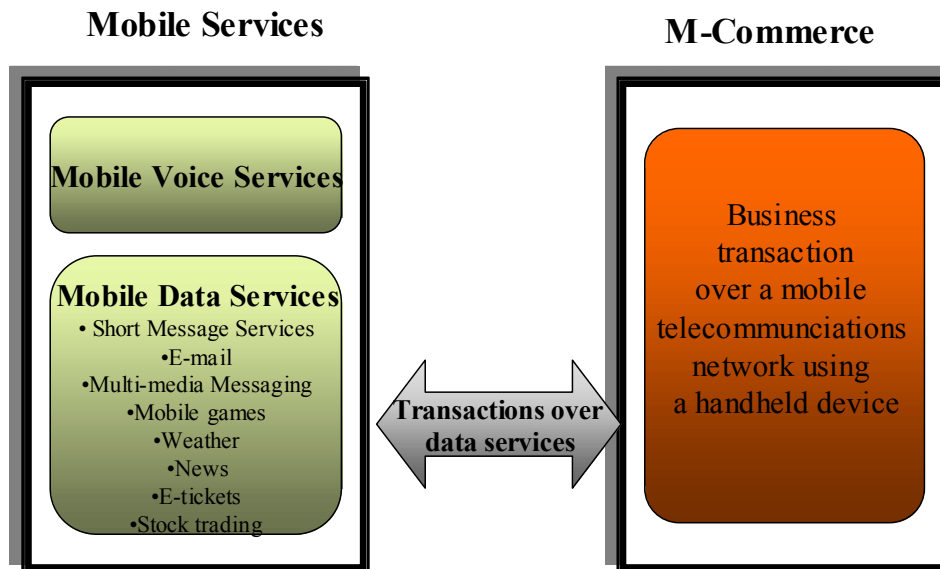


Figure 1. Mobile Related Services

Contributions of the Study

Cross-cultural research on consumer mobile data service adoption and usage behavior is limited. This study provides data from a study of American and Korean consumers and contributes to the literature in this area. Specifically, this study focuses on the effect of consumer value perception and subjective norm on using mobile data services and explains the differences and similarities in consumer mobile data service adoption behavior between American and Korean consumers. Further, this study provides direction for retailers, mobile data services developers, and m-commerce developers regarding potential mobile markets and consumer interests in retail applications. Finally, this study contributes to testing whether the research model based on the Technology Acceptance Model (TAM) is also applicable for the Korean culture or not.

CHAPTER II

REVIEW OF LITERATURE

The review of literature is divided into four major sections and provides a context for the study. The first section describes the current state of mobile data services and usage patterns worldwide, and specifically in the United States and Korea. The second section explores cultural orientations and consumer behavior, especially in regard to effects of consumers' perceived value and subjective norms. The third section reviews essential theories of behavioral intention as the basis of the theoretical framework for this study: Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), and Technology Acceptance Model (TAM). The final section presents research questions and research hypotheses and finally proposes a conceptual model.

Mobile Services

Today, the widespread use of mobile phones and mobile services are commonplace in daily life. The mobile phone is not just a communication device, but also a personal tool enhancing business and daily activities. Key factors stimulating mobile subscriber growth and usage may be relatively low cost, widespread availability, and increased use of mobile data services (FCC, 2005). As mobile subscribers increase, the number of mobile data service users appears to be rising (FCC, 2005). With data-ready mobile phones and connectivity to digital communication networks, mobile data service provides a precondition for m-commerce (Dholakia & Dholakia, 2004). Furthermore, mobile data

service, termed as an experience good, can be persuasive in nature when used as an advertising tool (FCC, 2005) and it may eventually boost market performance as well.

Moreover, the uniquely personal form of technology-based mobile data services provides self-expression capability, through the choice of ringtone and screen wallpaper (Townson, 2005). For instance, “teenage users especially like to express their characteristics by personalizing their mobile phone –choosing a particular brand, color, size, display logo, and ringtone” (Bauer, Barnes, Reichardt, & Neumann, 2005, p.182). Adults also personalize their mobile phones by saving contact numbers, messages, and important schedules. In addition, mobile phone users typically have their devices with them at all times and may leave them on standby for an average of 14 hours a day (Bauer et al., 2005). It is thus a highly personalized and private device going with users in their daily lives. Further, since a mobile phone is rarely used by any other person than its owner, the personal form of the mobile phone allows for highly personalized marketing not realizable by the use of other media (Bauer et al., 2005). For instance, retailers can send personalized shopping information or advertising messages to the mobile phone owner. In this regard, retailers can use this personal technology-based mobile phone in marketing and it may be the next source of competitive advantage.

Mobile Data Services Worldwide

Since the mid-1990s, the penetration of mobile phones has been explosive in developed countries. In 1997 only 215 million people were using mobile devices worldwide, by 2003 this grew to 1.16 billion (Bauer et al., 2005). In 2002, the total number of SMS messages sent globally was 670 billion and this figure is expected to rise

to 2.6 trillion by 2007 (Bauer et al., 2005). The high penetration of mobile phone usage could be one indicator of the high potential of mobile data services in a specific country.

The Federal Communications Commission (2005) reported that there are three consistent differences in performance between the U.S. mobile market and mobile markets abroad. First, mobile penetration is significantly higher in Western Europe and developed Asia-Pacific countries than in the United States. Second, average minutes of use per mobile phone subscriber are significantly higher in the United States than in Western Europe and developed Asia-Pacific countries. Third, revenue per minute is significantly lower in the United States than in Western Europe and Japan.

In a number of countries, including Italy, the United Kingdom, Sweden, and Portugal, mobile penetration exceeded 100 percent at the end of 2004 (Lynch, 2005). However, U.S. mobile penetration at the end of 2004 was at approximately 61 percent, lower than the lowest mobile penetration rate in Western Europe. To provide an international comparison, mobile penetration rates in a number of other Asian-Pacific countries were within the range of European levels, including Australia (89 percent), South Korea (76 percent), Hong Kong (106 percent), and Singapore (90 percent) (“OECD Communications Outlook,” 2005).

The United States continues to lead the world in average Minutes of Use (MOU). It was estimated that the U.S average MOU was approximately 630 minutes per month in the fourth quarter of 2004 (Lynch, 2005). MOUs in comparable Asian-Pacific countries were generally higher than the Western European average, but still below the U.S. figure.

As a result of this international comparison, it can be seen that the U.S. mobile market is relatively cost competitive compared to mobile markets in Western Europe. In the past

year, mobile voice in the United States still remains relatively inexpensive on a per minute basis compared with that in Western Europe (FCC, 2005). However, text messaging, or SMS, continues to be the most popular mobile data service in Western Europe, accounting for an estimated 90 percent of European operators' data revenues (Lagrotteria, 2004). The European text message usage rate is more than double that in the United States and this difference may be attributed to the higher per minute usage rate in Europe compared to the United States. Thus, European mobile subscribers are more likely to use text messaging services than American mobile subscribers (FCC, 2004).

Mobile Data Services in the United States

Mobile phone subscribers increased from 160.6 million at the end of 2003 to 184.7 million at the end of 2004, raising the penetration rate to approximately 62 percent in the United States (FCC, 2005). Moreover, the Federal Communications Commission (2005) reported that the volume of SMS (Short Message Services) traffic grew to 4.7 billion at the end of 2004 and this figure is more than double the 2 billion messages at the end of 2003. In the United States, the largest segment of the mobile data service market consists of text messaging (Short Message Services), multimedia messaging services (MMS) such as photo messaging, and entertainment applications such as ringtones and downloading games. A second market segment is comprised of monthly mobile Internet access service packages for customers who wish to be connected to wireless networks primarily or exclusively for data, rather than voice use (FCC, 2005). In the past year mobile service companies have continued to promote their mobile data offerings. For instance, a certain mobile data service enables mobile subscribers to watch real-time news, sports, and

entertainment programming and other video content from a variety of cable television channels (Mossberg, 2004).

Furthermore, the number of mobile data service users appears to be rising as a percentage of mobile phone subscribers. Based on figures reported by one nationwide carrier, the percentage of mobile phone subscribers who use mobile data services has increased significantly in the past year (FCC, 2005). The Federal Communications Commission (2004) estimated that almost 25 percent of U.S. mobile subscribers can be considered casual mobile data service users, most of who use SMS and some of whom use picture mail, download ringtones or access the Internet.

Mobile data services are particularly popular among teenagers and young adults. According to a Yankee Group survey, 25 percent of text messaging is used by people between the ages of 35 and 44 and remained at the same rate in 2003 and 2004, while usage by people ranging in age from 18 to 24 grew to 62 percent from 52 percent in the same period (Yuan, 2005). Moreover, while text messaging continues to be the most widely used messaging service, the volume of photo messaging and other multimedia messaging services is also increasing. Entertainment applications such as games and ringtones continued to grow and it is estimated that about 250 million ringtones were downloaded by U.S. mobile data services users in 2004 (Strauss, 2005).

In addition, one online survey in 2005 reported (see Figure 2.1) that text messaging services are the most commonly used services in the United States with 49 percent of the respondents having used text messaging at least once in the previous month ("Next Generation," 2005). Taking a photo with a phone was the next most popular service, gaining 30 percent usage in the previous month. Instant messaging was the third most

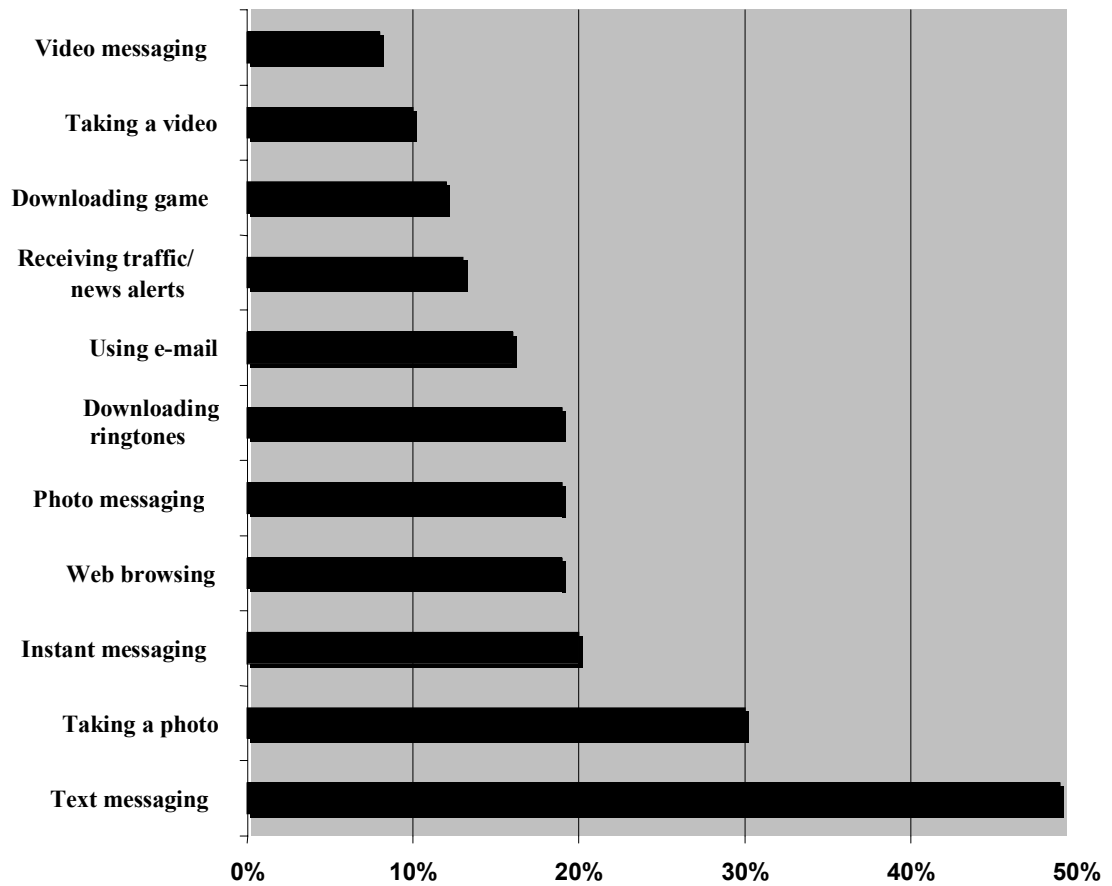


Figure 2.1. Usage of Mobile Data Services

From “Next Generation Wireless Multimedia Services”, 2005, July, TMNG Market Research.

popular service (20 percent), followed by web browsing (19 percent), photo messaging (19 percent), downloading ringtones (19 percent), using email (16 percent), receiving traffic or news alerts (13 percent), downloading a game to be played (12 percent), taking a video with a phone (10 percent), and video messaging (8 percent) (“Next Generation,” 2005). Consumers still prefer mobile voice to other mobile data services; however, mobile data services continue to increase and have tremendous market potential in the United States.

Mobile Data Services in Korea

The Korean mobile data service market is one of the most advanced in the Asia-Pacific region (Pyramid Research, 2002). Mobile data services in Korea reached 62% of the population in 2001 (Pyramid Research, 2002) and will reach up to 80.5% in 2008 (KISDI, 2004). This growth of mobile data services demonstrates that using mobile data services has become common place and provides a tremendous business opportunity in Korea (Maeil Business Newspaper, 2004). Mobile data services have proliferated in Korea for 5-6 years. Specifically, the text messaging mobile data service is very popular among teenagers. One survey in Korea revealed that 68% of teenagers are mobile phone subscribers and the primary reason for usage of a mobile phone is sending text messages to friends (59%), connecting to parents (29%), and using mobile voice with friends (3%) (Kim, 2006). This survey provides the evidence that mobile data service is a key tool in social networking, especially for Korean teens.

Moreover, International Data Corp Korea projects that the domestic mobile data market is expected to soar by 30 percent (an increase of approximately 2.6 trillion in U.S

dollars) and will continue to grow through 2009 (Bhattacharyya, 2005). The key drivers for the increase in mobile data services may be the growing number of video services and an expanding number of mobile banking users in Korea (Bhattacharyya, 2005). With the growing number of video mobile data services, marketers can promote new movies to mobile data service users in Korea.

Cultural Orientations and Consumer Behavior

National culture has been identified as a key characteristic underlying the differences in consumer behavior (Lynn, Zinkhan, & Harris, 1993). The unique cultural characteristics across countries are due to shared values, norms, and learned behaviors that relate to culture (Ackerman & Tellis, 2001). In a cultural context, individuals can be viewed as actualizing cultural characteristics, which depend on socially shared values and norms. Consumers learn values and norms about the acquisition, consumption and disposal of products or services through socialization in their communities (Moschis, 1987). Consumer behavior is influenced not only by a consumer's own makeup, but also by the norms and beliefs of the cultural environment (Triandis, 1989). Thus, consumption is culturally specific and articulated within or in relation to specific meaningful ways of life (Slater, 1997). Moreover, individual preferences which are born within a culture draw on languages, values, norms, and habits that are social in nature (Slater, 1997).

Despite the critical effects of cultural differences on consumer behavior, the question of how culture might moderate consumer behavior remains largely unanswered due to the confounding of the meaning of culture and its consequences. In addition, some predict that globalization will eventually lead to cultures converging to create a world of

one common culture (Tse et al., 1998; Costa & Bamossy, 1995). However, fundamental elements underlying a culture are durable, resistant to change, and continue over subsequent generations (Sewell, 1999; Hofstede, 1984). Hence, in spite of changes driven by globalization, cultures will retain their fundamental values and identity over generations (Wong & Maher, 1998; Schwartz, 1992; Hofstede, 1984). Therefore, the examination of cultural effects on consumer behavior is necessary to thoroughly understand international consumer behavior.

This study focuses on cultural orientation, specifically norms and values that would lead to differences in the adoption of mobile data services between American and Korean consumers (Ackerman & Tellis, 2001). The following section discusses cultural differences in relation to consumer perceived value and subjective norm that may explain the differences in adoption of mobile data services between American and Korean consumers.

Value in a Cultural Context

Values may be defined as beliefs that relate to desirable end states or modes of conduct, transcend specific situations, guide selection or evaluation of behavior, and are ordered by importance in relation to one another to form a system of value priorities (Rokeach, 1973). Value is a concept that tends to change and vary across countries, and thus is an appropriate concept to explore in cross-cultural research. Furthermore, value can affect people's behaviors more than other components of culture that are relatively less sensitive to behavioral changes (Lanchman, 1983). Schwartz (1997) reported that national culture moderated the magnitude of the effects of individuals' values. Different

values and attitudes affect the ways people behave in their lives (Adler, 1991; Hofstede, 1980). Since using mobile data services is a daily activity and the mobile data service users live in a fast changing society, the concept of value is appropriate to interpret consumer intentions to adopt mobile data services. Value is viewed as not a single concept but a concept that is comprised of many heterogeneous sub-components (Sweeny & Souter, 2001; Sheth et al., 1991).

Consumer Perceived Value of Mobile Data Services

It is now important to narrow down the general concept of value into consumer value in exploring consumer intention to adopt mobile data services. Consumer value has been examined as the antecedent of consumers' behavioral intention to purchase a product or use a certain service in previous research (e.g., Sweeny & Soutar, 2001; Parasuraman & Grewal 2000; Sheth, Newman, & Gross, 1991; Zeithaml, 1988). The most common definition of consumer value is the ratio or trade-off between quality and price (e.g., Monroe, 1990; Cravens, Holland, Lamb, & Moncrieff, 1988; Chain Store Age, 1985), which is a value-for-money conceptualization. Some consumers perceive value when there is a low price; others perceive value when there is a balance between quality and price (Zeithaml, 1988). Therefore, the dimensions of perceived value might be differentially weighted for different consumers (Sweeny & Soutar, 2001), especially for consumers in different cultural contexts.

A broader theoretical framework of consumer perceived value was developed by Sheth, Newman and Gross (1991). Sheth et al. (1991) argued that consumption value is made up of multiple value dimensions (functional value, conditional value, social value,

emotional value and epistemic value) with varying contributions in different choice situations. These five dimensions of value relate specifically to the perceived utility of a choice, whether at the decision to buy level (buy or not buy), at the product level (product type A or product type B) or brand level (brand A or brand B) (Sweeny & Soutar, 2001). These value dimensions provide the best foundation for extending existing value constructs.

In service marketing, value is defined as the “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). By applying this perspective to the use of mobile data services, this study defines value as a user’s overall assessment of the utility of the services when using mobile data services (Lee et al., 2002). Four sub-values are critical to assess mobile data services: functional value, emotional value, social value, and monetary value. First, *functional value* can be defined as the practical or technical benefits that users can obtain by using a product or a service (Sweeney & Soutar, 2001). The functional aspect of mobile data service can lead consumers to adopt and utilize the mobile data services. For instance, when a mobile data service user wants to know the traffic information in a certain area, the traffic information may help the consumer determine whether a certain road will be accessible or not. In this regard, functional value may be obtained by using mobile data service traffic information.

Second, *emotional value* refers to meeting the mental or psychological needs of product or service users (Sweeney & Soutar, 2001). Emotional value is the most important predictor of purchase intention and word-of-mouth behavior (Sweeney & Soutar, 2001). Although a consumer may not seek emotional benefits intentionally during

the consumption experience, positive feelings aroused unintentionally from the experience play an important role in further decision making at a subliminal level (Sweeny & Souter, 2001). Mobile data service users can receive emotional value while they download favorite ringtones, music, and games (Lee et al., 2002).

Third, *social value* is obtained when consumers feel they are connected to others by using a product or a service (Sheth et al., 1991). Social value can be derived by communicating with and belonging to a specific group or socializing actively through mobile data services such as virtual communities by text messaging services. For example, TTL (The Twenty's Life) service, a community activity which is connected through mobile data services, is one of the most popular mobile data services among teenagers in Korea. Community provided by TTL service created strong bonds among members and the members of the community enjoy their own culture and have events through the community activities (Lee et al., 2002). Services such as TTL enhance social value when using mobile data services.

Finally, *monetary value* is defined as how much a product or a service is satisfactory in regard to cost, time or effort spent in using a product or a service (Sweeney & Soutar, 2001; Bolton & Drew, 1991; Monroe, 1990; Cravens et al., 1988). Monetary value cannot be neglected because mobile data service users have to pay relatively high usage fees for mobile data services.

These four value structures are relevant antecedents to examine when studying consumers' behavioral intentions to use mobile data services. The recognition of the importance of different dimensions of consumer perceived value among American and Korean consumers may enable retailers in both countries to develop more sophisticated

positioning strategies (Sweeny & Soutar, 2001). Retailers who plan to implement mobile data services as a part of their retailing strategies should explore all dimensions of consumer value to decide an appropriate market approach.

Subjective Norm in Consumer Behavior

Consumer behavior like any other behavior is open to be influenced by the norms of the social group (Ackerman & Tellis, 2001). A subjective norm is defined as the person's perception of the social pressure to perform the behavior in question (Fishbein & Ajzen, 1975). The subjective norm can be divided into societal norm and social influence. Societal norm refers to adhering to the larger societal fashion (large circle of social influence), while social influence reflects adhering to opinions from family and peers (small circle of influence) (Pavlou & Chai, 2002). With subjective norm effects on consumer behavior, individuals compare themselves and adjust behaviors more with similar others than with dissimilar others (Miller et al., 1988). For instance, since Koreans are likely to be influenced by others' opinions, they like to see what the most popular ringtones are and use that information as part of their decision-making process (Frauenfelder, 2005).

Subjective norms are influenced by social pressure, termed normative beliefs that the behavior is accepted, encouraged, and promoted by the circle of influence (Ajzen, 1991). The influence of a person's normative belief that others approve or disapprove of a particular behavior will generate different behavioral intentions. Individuals' intentions to perform a particular action are a function of a subjective norm or their perception that important others think they ought to do so. In other words, consumers may believe that

their family, friends, and groups would favor certain behaviors, and this belief tends to influence their behavioral intentions (Pavlou & Chai, 2002).

Moreover, previous research supports the effect of subjective norm on behavioral intentions, especially in the adoption of technology use (e.g., Chiasson & Lovato, 2001; Morris & Venkatesh, 2000; Karahann, 1999). Morris and Venkatesh (2000) found that individuals were strongly influenced by subjective norms regardless of age and length of the exposure to the system in their study. Individuals may use technology in order to comply with mandates from their superiors or peers, rather than due to their own feelings and beliefs about using the system (David et al., 1989). Thus, a subjective norm may affect behavioral intentions to use a certain technology such as mobile data services

Subjective Norm Effects on American and Korean Consumers

Hofstede (1980) indicated that Chinese, Japanese, and Koreans share a Confucian cultural background, which reflects a group-oriented culture. In addition, people in these cultures are more motivated toward conforming to the norms of the group than people in an individualistic culture (Yau, 1986). In countries which reflect a strong group-oriented culture such as China and Korea, there is a close-knit social structure, in which people expect their group to care for them (Steenkamp, Hofstede, & Wedel, 1999). Korean culture is conformity-oriented and shows a higher degree of group behavior. Americans are emotionally more separated from in-groups (other than immediate family) and place their personal goals and desires ahead of those of the in-group (Kagitcibasi, 1997).

In general, Americans can be characterized as individualistic, different from the group-oriented Korean society. Americans' individualistic nature is more clearly

manifested by their resentment of conformity (Hui & Triandis, 1986) than Koreans. Americans' individual-centered way of life operates in direct contrast to the Koreans' group-oriented way of life, which strongly emphasizes interdependence and conformity to group norms (Lee & Green, 1991). Lee and Green's study (1991) found that the degree of personal and group-oriented attitudes affects behavioral intentions. Since societies with strong group conformity pressures foster strong interactions between individual and societal attitudes, subjective norm effects on attitude and behavioral intention manifest more prominently in Korean culture than American culture (Lee et al., 1991). In this sense, the effect of subjective norm on consumer behavior may vary in response to cultural differences between American and Korean consumers.

Theories of Behavioral Intentions

Since the mid-1990s, acceptance research has gained considerable importance especially in the field of behavioral research. Acceptance research has provided important insights in explaining the adoption of new products or services. As mobile data service is still in an embryonic stage in the United States, most consumers have not yet had the chance to adopt and use mobile data service (Pavlou, & Chai, 2002). It is thus impossible to empirically measure adoption; consequently, overall adoption to use should be forecasted by measuring behavioral intention influenced by the attitude toward acceptance (Pavlou, & Chai, 2002). Moreover, since behavioral intention theories are rooted in psychology, it is important to recognize the highly culture-bound state of behavioral intentions (Lee & Green, 1991) between American and Korean consumers.

Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) provides important direction for predicting behavioral intentions (Fishbein & Ajzen 1975) (see Figure 2.2). The theory hypothesizes that individuals' behavioral intentions are determined by an attitudinal or personal component and a normative or social component. The basic assumption of TRA is that consumers consciously decide on performing or not performing a specific behavior; they consider and evaluate various criteria concerning the behavior before actually performing it. The most basic paradigm of the TRA is that behavior is determined by behavioral intention. Behavioral Intention is a measure of the strength of one's intention to perform a specified behavior and Actual behavior is an individual's feeling (evaluative affect) about performing the target behavior (Fishbein & Ajzen, 1975). Beliefs are the individual's subjective likelihood that they will perform the target behavior (Fishbein & Ajzen, 1975).

The behavioral intention is postulated to be a function of the individual's attitude toward the act and the subjective norm. Whether the attitude toward the act or the subjective norm exerts a greater influence on the behavioral intention depends on the individual and the decision object (Fishbein & Ajzen 1975). The subjective norm is a result of the individual's normative beliefs, which is an individual's assumption about what another person wants him to do, and his motivation to comply with the expectations of this person. In addition, Lee and Green (1991) found that the theory of reasoned action performs well in explaining behavioral intentions among American and Korean consumers.

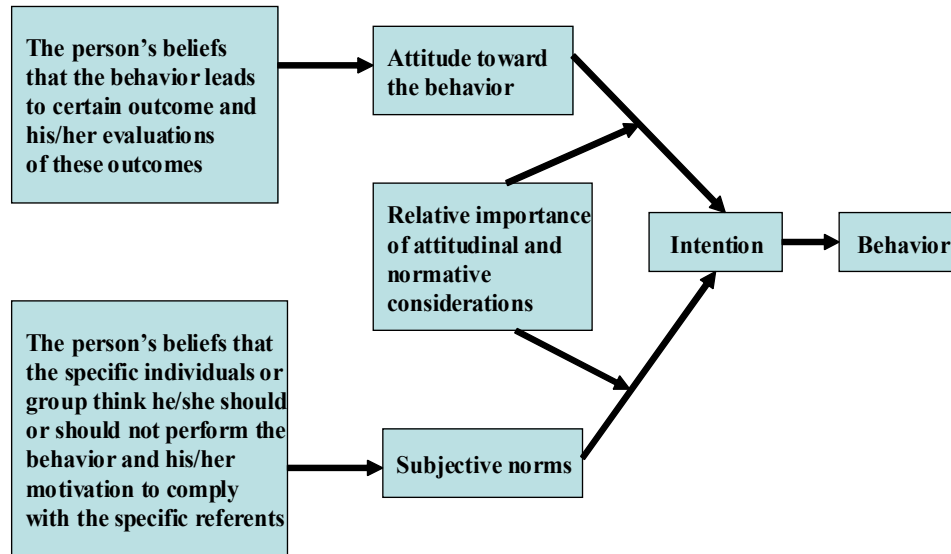


Figure 2.2 Theory of Reasoned Action

From “Understanding attitudes and predicting social behavior” by I. Ajzen & M. Fishbein, 1980. Englewood Cliffs, NJ: Prentice-Hall Inc.

Theory of Planned Behavior (TPB)

The adoption of mobile data services depends primarily on consumer behavioral intentions to experience the services (Pavlou, & Chai, 2002). The Theory of Planned Behavior (TPB) is a well-established general theory of social psychology, which affirms that specific salient beliefs influence behavioral intentions and subsequent behavior (Ajzen, 1985; 1991). In TPB, individual behavior is driven by behavioral intentions where behavioral intentions are a function of an individual's attitude toward the behavior, the subjective norms surrounding the performance of the behavior, and the individual's perception of the ease with which the behavior can be performed (behavioral control) (Ajzen, 1991;1985). The TPB extends the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) to account for conditions where consumers do not have full control over the situation (Madden et al., 1992). Three antecedent constructs are attitude, subjective

norm, and perceived behavioral control in the TPB. Attitude is determined through an assessment of one's beliefs regarding the consequences arising from a behavior and an evaluation of the desirability of these consequences (Eagly & Chaiken, 1993). The subjective norm can be expressed as the sum of the individual perception multiplied by the motivation assessments for all relevant referents (Eagly & Chaiken, 1993). Behavioral control is one's perception of the difficulty of performing a behavior in the model (Eagly & Chaiken, 1993). Moreover, these antecedents of behavioral intention influence each other. From the Theory of Planned Behavior model, this study assumes that attitude and subjective norms are antecedents of intention and have reciprocal effects (see Figure 2.3).

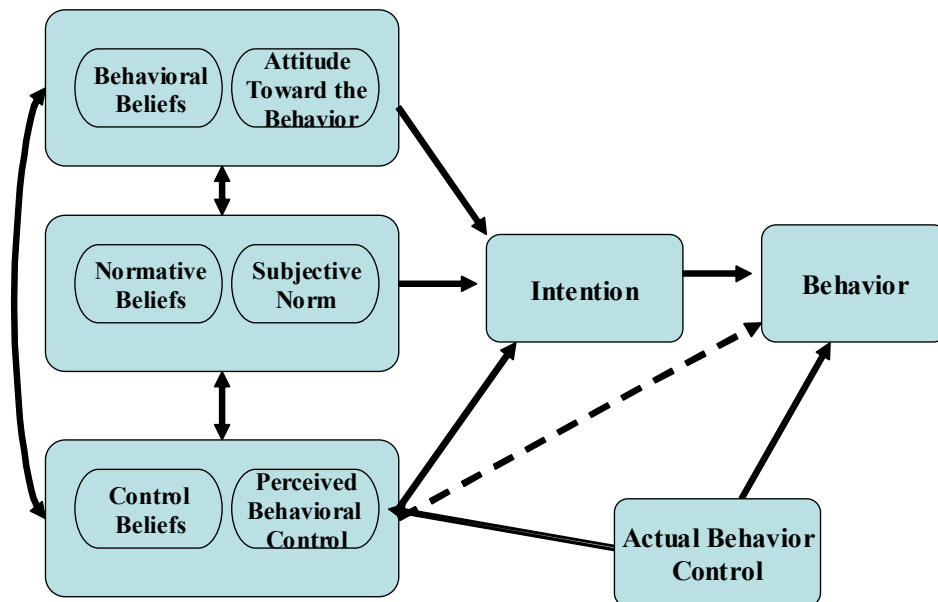


Figure 2.3. Theory of Planned Behavior

From “The theory of planned behavior” by I. Ajzen, 1991, *Organizational Behavior and Human Decision Processes*, 50, 179-211.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), an alternative model to the TRA and TPB, is used to explain computer usage behavior (Davis, 1986). TAM has become well-established as a robust, powerful, and parsimonious model for predicting technology acceptance in the past decade (Venkatesh & Davis, 2000). Researchers can identify why a particular system may be unacceptable, and develop appropriate steps to improve the system (Davis, Bagozzi, & Warshaw, 1989). The TAM explains why consumers choose to use or not use the technology (Davis et al., 1989). The key purpose of TAM is to provide a basis for investigating the impact of external factors on internal beliefs, attitudes, and intentions of technology acceptance (Davis et al., 1989). TAM suggests that two beliefs, *perceived usefulness* and *perceived ease of use*, affect consumers' computer acceptance behaviors (see Figure 2.4).

Perceived usefulness is defined as the consumers' subjective perceptions that using technology will be useful. In addition, perceived usefulness is regarded as an effect on the adoption of technology when consumers realize the usefulness of the technology.

Perceived ease of use is the degree to which the prospective consumer expects the technology to be free of effort (Davis et al., 1989). The easier a system is to interact with, the greater should be the consumer's sense of efficacy (Davis et al., 1989) and personal control (Davis et al., 1989; Lepper, 1985) regarding the consumer's ability to operate the technology (Davis et al., 1989). In other words, the more consumers perceive ease of use of technology, the higher the intention to adopt the technology. External variables are referred to as system design characteristics, user characteristics (including cognitive style

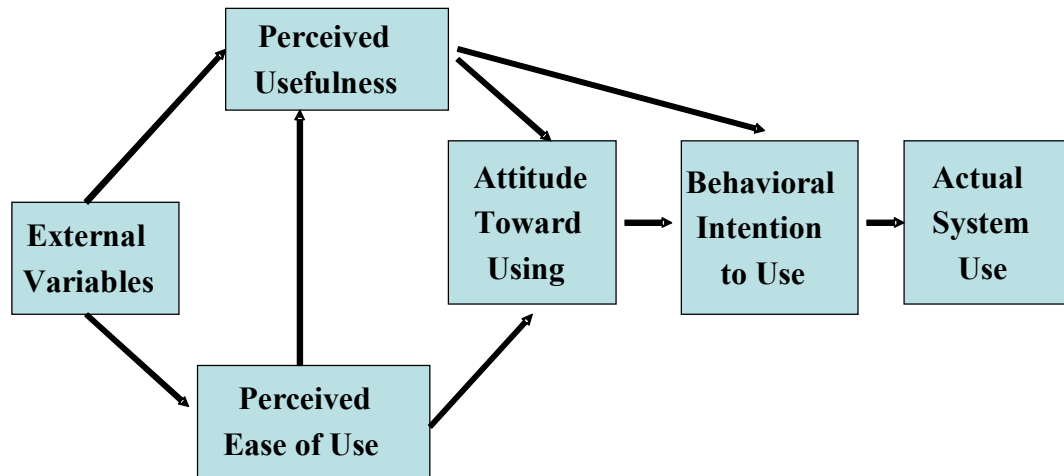


Figure 2.4. Technology Acceptance Model

From “Perceived usefulness, perceived ease of use and user acceptance of information technology,” by F. D, Davis, 1989, *MIS Quarterly*, 13(3), 319-340.

and other personality variables), task characteristics, nature of the development or implementation process (Davis et al., 1989).

Conceptual Model Development

The conceptual model constructed for the study is based on the Technology Acceptance Model. Behavioral intention is consistently supported by three well-established theories of behavioral intention- Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), and Technology Acceptance Model (TAM). This study employs behavioral intention, attitude, and subjective norm constructs from TPB and TRA in measuring various external factors that can influence consumers’ attitudes, internal beliefs and motivation to comply with perceived expectations in adopting mobile

data services. These behavioral intentions and attitudes are constructs in TAM as well. External variables influencing perceived usefulness and perceived ease of use in TAM are replaced by consumers' perceived value in the conceptual model for the study. Consumers' perceived value has been justified as a determinant of consumer behavior and thus is used to determine its antecedent effects on behavioral intentions. In addition, subjective norm is tested to determine whether subjective norm generates different consequences of attitude and behavioral intention for American and Korean consumers.

Research Questions

Based on the preceding discussion, the following research questions are proposed. Subjective norm is expected to affect both attitude and behavioral intention and explain differences in consumers' behavioral intentions to use mobile data services between American and Korean consumers. Therefore, the following research question explores the behavioral intention to use mobile data services:

- Can subjective norm explain differences in attitude and behavioral intention to use mobile data services between American and Korean consumers?

Consumer perceived value as an antecedent variable may generate different consequences of behavioral intention to use mobile data services. Moreover, exploring the differences in consumer perceived value in using mobile data services will contribute to a more fundamental understanding of the key psychological dimensions driving consumers' behavioral intentions to use mobile data services. Thus, this study will attempt to answer the following research questions:

- Does each dimension of consumer perceived value differ between American and Korean consumers in using mobile data services?
- Which dimension of consumer perceived value plays a more significant antecedent role in behavioral intention to use mobile data services between American and Korean consumers?

Research Hypotheses

To provide empirical evidence for the study, the following research hypotheses were formulated. Several researchers (e.g., Adler, 1986; Hofstede, 1980) mentioned that consumer behavior and attitudes vary across countries and consumer behavior is influenced by consumer values. Moreover, consumer perceived value is culturally specific (Slater, 1997) and each consumer perceived value dimension plays an important and separate role in forming attitudes and behavior (Sweeny & Soutar, 2001). Thus each dimension of consumers' perceived value toward mobile data services may generate different outcomes on perceived usefulness. In this regard, this study postulates that each dimension of consumer perceived value toward mobile data services will generate different perceived usefulness perceptions for American and Korean consumers. Thus, the following hypotheses are proposed;

H1a: The relationship between functional value and perceived usefulness is different between American and Korean consumers.

H1b: The relationship between social value and perceived usefulness is different between American and Korean consumers.

H1c: The relationship between monetary value and perceived usefulness is

different between American and Korean consumers.

H1d: The relationship between emotional value and perceived usefulness is different between American and Korean consumers.

According to the Technology Acceptance Model (TAM), perceived ease of use affects perceived usefulness because, other things being equal, the easier a system is to use the more useful it can be (David, 1989). In addition, perceived ease of use directly influences attitude toward using mobile data services. Therefore, the next hypotheses are;

H2a: The greater the perceived ease of use, the greater the perceived usefulness.

H2b: The greater the perceived ease of use, the more positive the attitude toward using mobile data services.

Furthermore, across the many empirical studies of TAM, perceived usefulness has consistently been a fundamental driver of behavioral intentions (Venkatesh & Davis, 2000) and it is also a direct determinant of attitude to use a particular system (David, 1989). Thus, the next hypotheses are formulated as follows;

H3a: The greater the perceived usefulness, the more positive the attitude toward using mobile data services.

H3b: The greater the perceived usefulness, the stronger the behavioral intention to use mobile data services.

Subjective norm is included as a direct determinant of behavioral intentions in the TRA (Fishbein & Azen, 1975) and the subsequent TPB (Ajzen, 1991). However, the direct effect of subjective norm on behavioral intentions has yielded mixed results (Venkatesh & Davis, 2000). Davis et al. (1989) found that subjective norm had no significant effect on behavioral intentions, but suggested the need for additional research

to “investigate the conditions and mechanisms governing the impact of social influences on usage behavior” (p.999). The effects of subjective norm on behavioral intentions remain questioned.

In addition, two antecedents of behavioral intentions, attitude and subjective norm were correlated in the studies of the Theory of Planned Behavior (Ajzen, 1991; 1985). Ryan (1978) found that attitudinal structure was correlated with subjective norm, and that normative structure was correlated with attitude. Fishbein and Ajzen (1981) suggested that confounding effects on behavioral intentions are unavoidable since subjective norms and attitudes are intertwined to some extent. Thus, the fourth two-part hypothesis is needed;

H4a: The higher the level of subjective norm, the more positive the attitude toward using mobile data services.

H4b: The higher the level of subjective norm, the stronger the behavioral intention to use mobile data services.

However, based on the Fishbein and Ajzen (1975) behavioral intention model, the effect of subjective norm on behavioral intentions may be more significant than the effect of subjective norm on attitudes. Thus, the next hypothesis is tested;

H4c: The effect of subjective norm on behavioral intention (H4b) is greater than the effect of subjective norm on attitude toward using mobile data services (H4a).

In addition, the indirect effect of subjective norm on attitude and behavioral intention needs to be addressed in terms of the operation of the specific behavioral process. Previous research by Lee and Green (1991) supported that subjective norm is

sufficiently robust to depict the strong forces of social pressure in a group-oriented culture. Since Koreans are more group-oriented than Americans, subjective norm may play a major role in the formation of Koreans' behavioral intentions and have a relatively weak influence on Americans. In this regard, the indirect effect of subjective norm on attitude and intention will be stronger for Korean consumers. Therefore, the next hypothesis is formulated as follows:

H4d: The indirect effect of subjective norm through attitude on behavioral intention is stronger for Korean consumers than American consumers.

Fishbein (1963)'s behavioral intention theory and other empirical studies (e.g., Eagly & Chaiken, 1993; Ajzen, 1991, 1985; Davis, Bagozzi, & Warshaw, 1989; Fishbein & Ajzen 1975) have clearly supported that attitudes are strongly predictive of corresponding behaviors. In addition, the well-established theories, which are extensions of Fishbein's behavioral intention theory; Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM) consistently support that attitude directly influences behavioral intention. Based on the previous studies, the following hypothesis can be tested:

H5: The more positive the attitude toward mobile data services the higher the behavioral intention to adopt mobile data services.

Based on these hypotheses, the following model is proposed for the study (see Figure 2.5).

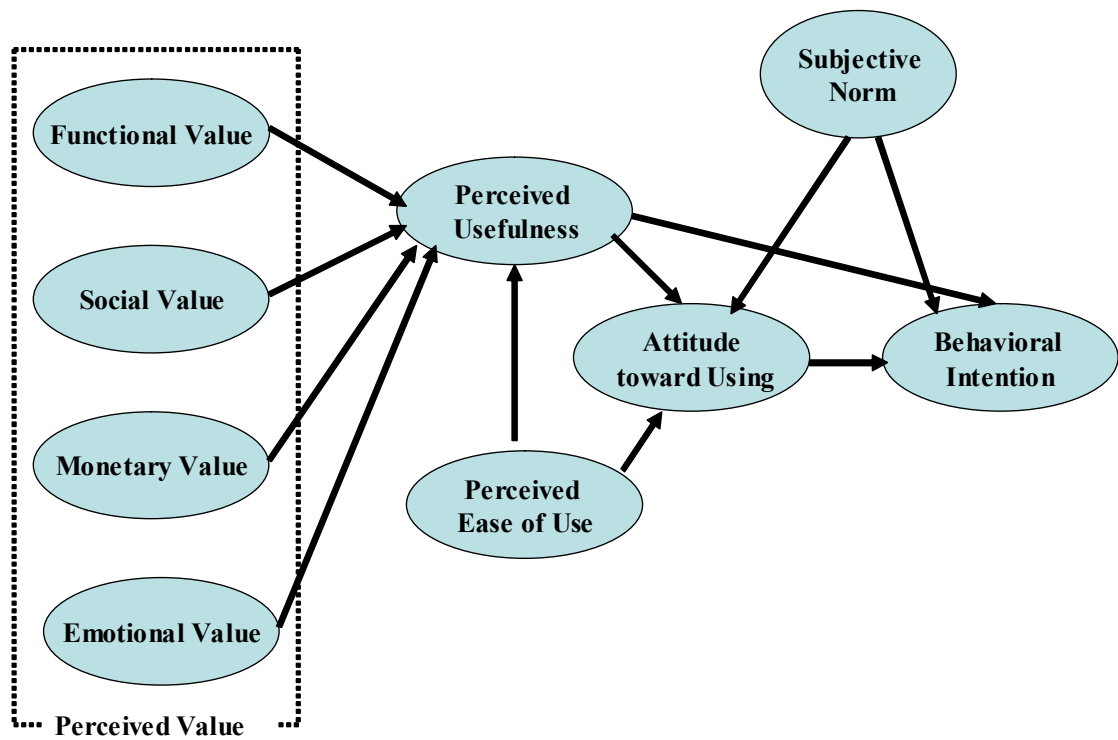


Figure 2.5. Conceptual Model for the Study

CHAPTER III

METHODOLOGY

This study was designed to investigate the effect of subjective norm and consumer perceived value on the adoption of mobile data services for American and Korean consumers. Overall, the research examined whether there were differences in the behavioral intention to adopt mobile data services between American and Korean consumers. Exploring consumers' mobile data service adoption behavior between the two countries may provide insight to understand the values driving consumers to use mobile data services. Furthermore, it may reveal cultural differences in consumer adoption behavior between American and Korean consumers. This chapter discusses the methods used in the study. First, in the research design section, operational variables, hypotheses in the proposed research model, and methods to establish the methodological equivalence of the instrument are discussed. Second, the instrument development and pretest procedures and results are presented. Third, population and sample selection are described. Finally, data collection procedures and data analysis method are described.

Research Design

Research Model

The research model in the study is rooted in the Technology Acceptance Model (Davis, 1989). The Technology Acceptance Model (TAM) has been used frequently to examine the use of technological systems in the workplace (e.g., Venkatesh & Davis,

2000; Davis, 1989; Davis et al, 1989). However, this study adapted the TAM model for investigating behavioral intentions to use mobile data services in a consumer context. This study employed four dimensions of consumer perceived value as antecedents in the Technology Acceptance Model (TAM) and subjective norm was used to examine whether there were direct or indirect effects on behavioral intention to use mobile data services. Consumer perceived value and subjective norm may explain differences in consumer behavioral intention to use mobile data services between American and Korean consumers in the research model.

Operational Variables

The research model for this study proposes that, a consumer's adoption of mobile data services, is determined by consumer perceived value, perceived usefulness, perceived ease of use, subjective norm, and attitude. The Technology Acceptance Model (TAM) theorizes that the effects of external variables (e.g., personal characteristics, system characteristics, development process, training) on intention to use technology are mediated by perceived usefulness and perceived ease of use (Venkatesh & Davis, 2000). Attitude is predicted by perceived usefulness and perceived ease of use and has a direct influence on behavioral intention. Consumer perceived value is a multi-dimensional construct and is replaced as an external variable in the TAM for the study.

Consumer perceived value is an exogenous variable along with perceived ease of use and subjective norm in the model. Perceived usefulness, attitude, and behavioral intention are treated as endogenous variables. The direct and indirect effect of subjective norm on attitude and behavioral intention to use mobile data services may play a role to

determine differences in the adoption of mobile data services between the two countries. Consumer perceived value and subjective norm are critical constructs in exploring differences between American and Korean consumers in this study.

Exogenous Variables

The four dimensions of consumer perceived value are adapted from studies by Sheth et al. (1991) and Sweeney et al.(2001). First, *functional value* can be defined as the practical or technical benefits that users can obtain by using the mobile data services (Sweeney & Soutar, 2001). Second, *emotional value* refers to mental or psychological needs of mobile data service users (Sweeney & Soutar, 2001). Third, *social value* is a benefit when mobile data service users can feel they are connected to others by using the mobile data services (Sheth et al., 1991). The last value, *monetary value* is defined as how much mobile data services are satisfactory compared to cost, time or effort spent in using the mobile data services (Sweeney & Soutar, 2001).

Perceived ease of use is defined as the degree to which the prospective consumer expects the mobile data service to be free of effort (Davis et al., 1989). The easier a mobile data service is to interact with, the greater should be the consumer's sense of efficacy (Davis et al., 1989) and personal control (Lepper, 1985; Davis et al., 1989). The perceived ease of use influences the consumer's ability to carry out the sequences of behavior needed to use the mobile data services (Davis et al., 1989).

Subjective norm in this study is proposed as a determinant of the difference in the behavioral intention to use mobile data services between American and Korean consumers. Subjective norm refers to the person's perception of the social pressure to use

mobile data services (Fishbein & Ajzen, 1975). The direct effect of subjective norm on attitude and the behavioral intention to use mobile data services and the indirect effect of subjective norm on the behavioral intention to use mobile data services were examined in this study.

Endogenous Variables

Three endogenous variables, perceived usefulness, attitude, and behavioral intention, may explain the consumers' adoption of mobile data services. In the study, *perceived usefulness* is defined as the consumers' subjective perception that using mobile data services will be useful and a fundamental driver of behavioral intentions (Venkatesh & Davis, 2000). *Attitude* is a person's positive or negative feelings toward use of mobile data services (e.g., Fishbein & Ajzen, 1975). *Behavioral intention* is a measure of the strength of one's intention to use mobile data services in the study (Fishbein & Ajzen, 1975).

Hypotheses

The following hypotheses are tested in the research model (see Figure 3.1)

H1a: The relationship between functional value and perceived usefulness is different between American and Korean consumers.

H1b: The relationship between social value and perceived usefulness is different between American and Korean consumers.

H1c: The relationship between monetary value and perceived usefulness is different between American and Korean consumers.

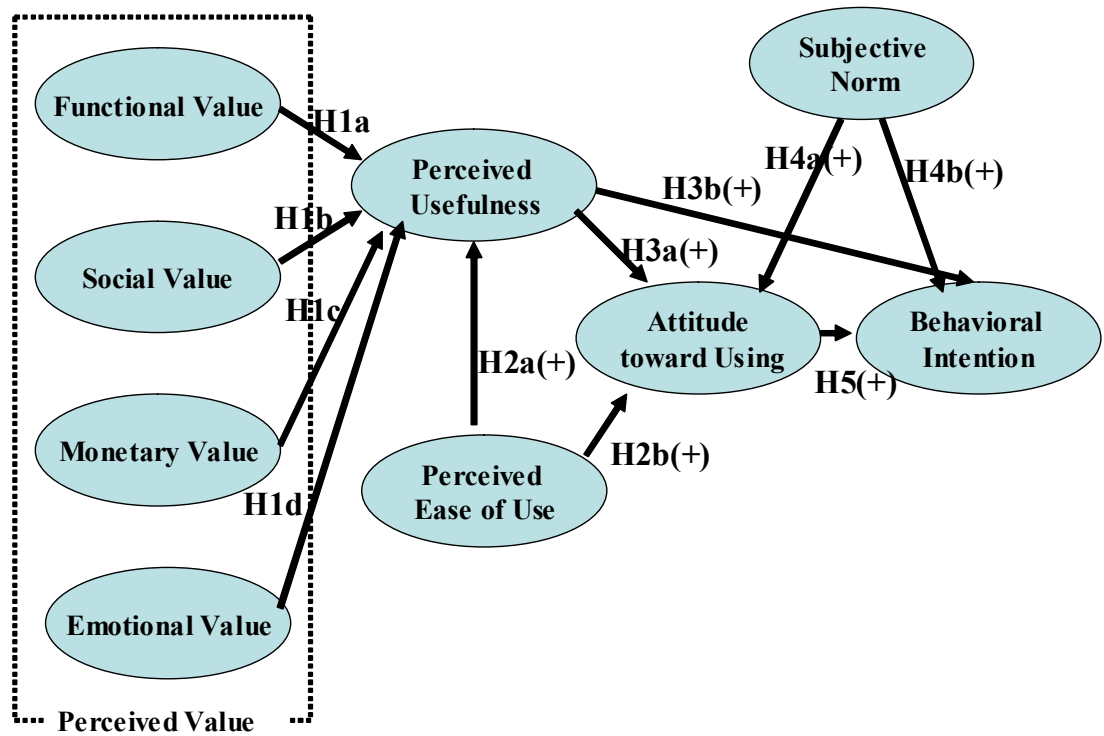


Figure 3.1. A Consumer's Adoption of Mobile Data Services

H1d: The relationship between emotional value and perceived usefulness is different between American and Korean consumers.

H2a: The greater the perceived ease of use, the greater the perceived usefulness.

H2b: The greater the perceived ease of use, the more positive the attitude toward using mobile data services.

H3a: The greater the perceived usefulness, the more positive the attitude toward using mobile data services.

H3b: The greater the perceived usefulness, the stronger the behavioral intention to use mobile data services.

H4a: The higher the level of subjective norm, the more positive the attitude toward using mobile data services.

H4b: The higher the level of subjective norm, the stronger the behavioral intention to use mobile data services.

H4c: The effect of subjective norm on behavioral intention (H4b) is greater than the effect of subjective norm on attitude toward using mobile data services (H4a).

H4d: The indirect effect of subjective norm through attitude on behavioral intention is stronger for Korean consumers than American consumers.

H5: The more positive the attitude toward mobile data services, the higher the behavioral intention to adopt mobile services.

Methodological Equivalence in Cross-cultural Research

The notion of “equivalence” is critical for cross-cultural research (Chen & Bates, 2005). Since the validity of the research could be jeopardized if the researchers are not aware of the subtle differences between cultures (Green & White, 1976), the methodological equivalence should be considered before exploring data collection. Thus, in order to enhance the usability of the results from the study, important aspects of methodological equivalence are addressed.

Conceptual Equivalence

Conceptual equivalence is the first issue in using sociological or psychological measures across cultural boundaries and requires establishing whether the concepts of interest are relevant in the countries investigated (Chen & Bates, 2005; Green & White,

1976). Additionally, conceptual equivalence is related to the concepts of “*emic*” and “*etic*”. *Emic* refers to concepts that are culture-specific or that apply only to a specific group of individuals (as defined by linguistic, cultural geography or other boundaries) (Chen & Bates, 2005). *Etic* refers to the concepts that are culture-general in the sense that they are taken to be applicable universally across cultural boundaries (Hofstede, 2001). The concept of *etic* was applied to establish conceptual equivalence since the concepts of interest in the study are culture-general. In the study, conceptual equivalence is established between the American version and the Korean version of the instrument by assessing content validity and by using backward and forward translation processes.

Instrument Equivalence

This study employs *etic* instruments which are culture-free, identical instruments (properly translated) that can be employed in all nations (Anderson, 1967). Since an *etic* instrument is universal in its application, it permits direct comparisons on the same variables across countries (Green & White, 1976). In order to develop valid and reliable instruments, the following issues are considered for the study.

Instrument translation. Instrument equivalence is a reflection of the extent to which the same items on two versions of an instrument (the original version and the translated version) have the same meaning (Chen & Bates, 2005). In order to ensure measurement items have the same underlying nuance and connotation, as the original items, cross-cultural studies often employ a backward and forward translation (Werner & Campbell, 1973). This study used a backward and forward translation method for enhancing instrument equivalence. Two bilingual Korean researchers with a retailing and consumer

sciences degree translated the English version to Korean. After determining the form and the meaning of the items was as close to the original as possible, the two translators who are bilingual Korean researchers compared the translated instrument item by item to assess the consistency of the translation (Chen, Holton III, & Bates, 2004). Items with rater disagreements or with errors were further examined and revised until both translators reached an agreement (Chen, Holton III, & Bates, 2004).

Construct equivalence. Construct equivalence focuses on the extent to which the constructs in the translated and original forms of an instrument have the same meaning (Chen & Bates, 2005). In order to obtain construct equivalence in both the English and Korean versions, the researcher and one Korean committee member assessed content validity of the instruments after backward and forward translations were completed. The final version of the Korean and English instruments were then pre-tested. Confirmatory Factor Analysis (CFA) was used to determine whether the constructs from both the original and translated instruments are correlated (convergent or divergent) after data collection.

Instrument Development

Based on a careful review of the literature, this study adapted existing measurement scales with good internal consistencies. All scale items were modified for testing in a mobile data service context. Two backward and two forward translations by four bilingual Korean researchers were conducted for each measurement item to ensure instrument equivalence between the two countries. All measurement items had good construct validity established in previous research (e.g., Venkatesh & Davis, 2000; Davis,

1989; Davis et al, 1989) and the instruments also generated good construct validity and reliability in the pre-testing. The following section provides a description of the pre-test survey instrument and its modifications after analyzing the pre-test data.

Survey Instrument

The five section survey instrument was pre-tested in America and Korea. The first section was designed for assessing consumers' perceived value for mobile data services and was comprised of 17 items with a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The items on the consumer perceived value scale (see Table 3.1) were adapted from Sweeny et al. (2001) and Lee et al. (2002) and modified for a mobile data service context.

Section 2 contains nine items measuring consumer perception of mobile data services concerning perceived usefulness, perceived ease of use, and subjective norm in using mobile data services. Three items measuring perceived usefulness, four items measuring perceived ease of use, and two items measuring subjective norm were pre-tested with a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) (see Table 3.2). The items measuring perceived usefulness and perceived ease of use in this study were adapted from Nysveen et al. (2005). This study modified the items for a mobile data service context. In addition, items to measure the subjective norm were adapted from Taylor et al. (1995) and modified to a mobile data service context for the study.

Table 3.1. Measurement Items in Section 1

Variable		Items	Reliability (α)*	Source
Value	Functional Value	- Mobile data service is reliable - Mobile data services have good functions - Mobile data services are well provided - Mobile data services are provided in a timely manner - Mobile data services fulfill my needs well	$\alpha = .90$ (A) $\alpha = .75$ (K)	Sweeny et al. (2001) Lee et al. (2002)
	Emotional Value	- Using mobile data services is enjoyable - I feel relaxed when I use mobile data services. - I feel good when I use mobile data services. - Using mobile data services gives me pleasure	$\alpha = .88$ (A) $\alpha = .84$ (K)	Sweeny et al. (2001) Lee et al. (2002)
	Social Value	- Mobile data service makes me feel accepted by others - Mobile data service makes a good impression on other people. - Using mobile data services improves the way I am perceived by others. - Using mobile data service gives me a social approval	$\alpha = .93$ (A) $\alpha = .89$ (K)	Sweeny et al. (2001) Lee et al. (2002)
	Monetary Value	- Mobile data services are good for the price - Mobile data services are reasonably priced - The price of using mobile data service is economical. - Mobile data service offers value for the money.	$\alpha = .93$ (A) $\alpha = .80$ (K)	Sweeny et al. (2001) Lee et al. (2002)

* Pre-test reliability results. "A" indicates Americans and "K" indicates Koreans

Table 3.2. Measurement Items in Section 2

Variable	Items	Reliability (α)*	Source
Perceived Usefulness	- Using a mobile data service makes me save time - Using a mobile data service improves my efficiency. - A mobile data service is useful to me.	$\alpha = .89$ (A) $\alpha = .85$ (K)	Davis et al. (1989) Nysveen et al. (2005)
Perceived Ease of Use	- Learning to use a mobile data service is easy to me. - It is easy to make a mobile data service do what I want it to. - My interaction with mobile data service is clear and understandable. - It is easy to use mobile data service.	$\alpha = .94$ (A) $\alpha = .76$ (K)	Davis et al. (1989) Nysveen et al. (2005)
Subjective Norm	- People who influence my behavior think that I should use a mobile data service - People who are important to me think that I should use a mobile data service	$\alpha = .86$ (A) $\alpha = .87$ (K)	Taylor et al. (1995)

* Pre-test reliability results. "A" indicates Americans and "K" indicates Koreans

Section 3 is comprised of four measurement items (see Table 3.3) concerning attitude toward mobile data services using a seven-point Likert scale adapted from previous research and modified for a mobile data service context (e.g., Lee et al., 2005; Nysveen et al., 2005; Suh & Han, 2003; Vijayasarathy, 2004; Davis et al., 1989). Even though bipolar semantic differential items have been frequently used to measure attitudes, this study used a seven-point Likert scale. Most Structural Equation Modeling applications are based on Likert-type scaled data with estimation of parameters using Maximum Likelihood procedures (Breckler, 1990). In addition, a committee member for this study indicated that measuring an attitude construct by using a bipolar semantic differential scale has rarely been successful. Based on these suggestions, this study modified the bipolar semantic differential scale to a seven-point Likert scale.

Section 4 contains the three items measuring behavioral intention to use mobile data services adapted from previous research (e.g., Lee et al., 2005; Suh et al., 2003; Pavlou,

Table 3.3. *Measurement Items in Section 3*

Variable	Items	Reliability (α)*	Source
Attitude	▪ Using mobile data services is a good idea ▪ I am favorable about using mobile data services ▪ Using mobile data services is a wise idea ▪ I am positive about using mobile data services	$\alpha = .97$ (A) $\alpha = .96$ (K)	Davis et al. (1989) Suh et al. (2003) Vijayasarathy (2004) Lee et al. (2005) Nysveen et al. (2005)

* Pre-test reliability results. "A" indicates Americans and "K" indicates Koreans

2003). The items used a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) (see Table 3.4).

The last section included items to gather demographic information and usage of mobile services. Demographic information included age (continuous), income (ordinal), gender (nominal), and education (ordinal). Usage of mobile data services included items regarding which mobile data services were used most frequently (nominal). This section was utilized to provide mobile market segment profiles on the basis of five sets of variables, adapted from Aarnio et al. (2002): the use of mobile data services, information sources of mobile data services, recommendations to others regarding mobile data services, purposes of mobile phone use, age, gender, and educational background (see Table 3.5). Questionnaires are provided in Appendix 1.

Table 3.4. Measurement Items in Section 4

Variable	Items	Reliability (α)	Source
Intentions	▪ I intend to say positive things about using mobile data services to other people ▪ I expect my use of mobile data services to continue in the future ▪ I intend to purchase products or services via mobile data services	$\alpha = .87$ (A) $\alpha = .90$ (K)	Suh et al. (2003) Pavlou (2003) Lee et al. (2005)

* Pre-test reliability results. "A" indicates Americans and "K" indicates Koreans

Table 3.5. Clustering Variables

Variable	Items	Source
Clustering Variables	▪ Which mobile data services do you use the most frequently? ▪ What kind of Internet services do you use? ▪ How did you hear about the mobile data services you use? ▪ To whom have you recommended the mobile data services, you use? ▪ For what purposes do you use a mobile phone? ▪ In what year were you born? ▪ What is your gender? ▪ What is the highest level of formal education that you have completed?	Adapted from Aarnio et al, (2002).

Pre-test Results

The pre-test was used to identify items that might be unclear in terms of wording and to enhance the conceptual equivalence for the English and Korean versions of the instrument. Pre-tests were conducted with retailing and consumer sciences students at the University of Tennessee for the American pre-test sample (n= 64) and marketing students at Chung-Ang University and Yonsei University for the Korean pre-test sample (n= 70). The survey instruments were hosted online by the University of Tennessee. Pre-test participants were encouraged to participate in the online pre-test survey by their instructors. An e-mail containing the online survey link was sent to the students and they voluntarily completed the survey.

The reliability of each construct was assessed using a Cronbach's (1951) alpha coefficient with a cut-off value of .70 to proceed in further analysis. Each construct showed good reliability for both the American and Korean pre-test data and ranged from .75 to .97 (see Table 3.1, 3.2, 3.3, and 3.4). Confirmatory factor analysis was conducted to identify whether the measurement items measured the construct interest or cross loaded. In order to confirm the degree of construct equivalence, measurement equivalence in the pre-test was tested utilizing simultaneous multi-group factor analysis (Singh, 1995). No items were dropped based on the pre-test results since the sample size was relatively small for using a CFA model.

Revisions to Instrument

Following the pre-test, additional items were added to improve the measurement of some constructs. Since some items measuring functional value and emotional value was

Table 3.6. *Items Added After Pre-test*

Variable	Items
Functional value	▪ Mobile data services offer consistent service quality. (Sweeny et al., 2001)
Emotional value	▪ Using mobile data services is interesting (Lee et al., 2002) ▪ Mobile data services make me want to use them (Sweeny et al., 2001)
Subjective Norm	▪ I feel that the important people in my life want me to use mobile data services (Miniard & Cohen, 1981; Ahtola, 1976) ▪ Most people who are important to me probably consider my use of mobile data services to be wise (Shimp et al., 1984) ▪ Most people who are important to me probably consider mobile data services as useful (Shimp et al., 1984) ▪ Most people who are important to me probably consider using mobile data services as valuable (Shimp et al., 1984)

cross-loaded, items were added to measure functional value and emotional value in order to enhance convergent and discriminant validity. To further support the decision to add items, the literature suggests that more than three items for each construct are required to conduct Structural Equation Modeling well (Byrne, 2001). Thus, four items measuring subjective norm adapted from a previous study were added (e.g., Shimp et al., 1984; Miniard & Cohen, 1981; Ahtola, 1976). Table 3.6 lists the items added for each construct.

Population and Sample Selection

The population of this study was mobile service users in America and Korea. Samples were drawn from consumer panels in the United States and Korea. Consumer panels were pre-recruited and maintained by research firms in each country. In addition, the completed sample size of 200 from each country was sufficient since adequate

observations are available for the number of parameters in the model (Myers, Calantone, Page Jr, & Taylor, 2000).

In order to achieve sample comparability, this study made an effort to match the American and Korean samples on age (approximately 19-50 years of age) and gender (approximately 50% male and 50% female). The proportion of male and female respondents was based on the proportion of males and females in the selected cohort in each country. According to the U.S census bureau (2000), the proportion of 20-49 year olds is 44.1% of the U.S population and the proportion of males is approximately 2% higher than females in this age group. In addition, the Korean census of population and housing (2000) reported that the proportion of 20-49 year olds is 52.3 % of the population and the proportion of males is approximately 0.7% higher than females in this age group. Thus, the size of this age group (i.e., 20-49 years old) and the proportion of males and females within the age group are similar in America and Korea. Moreover, approximately 50% of cell phone users in the age group of 20-39 access information through mobile phones in the United States (Lipsman, 2002) and have been found to be faster adopters of mobile services in general (Lee et al, 2002).

Consumer Panel

Using a consumer panel has several advantages. First, in an international context, finding a similar representative sample presents difficulties due to the paucity of information available on consumer groups in other countries (Hernandez & Watkins, 2003). Thus, this study used consumer panels to facilitate finding a representative sample in each country. Second, using consumer panels is a time and cost efficient way to collect

data. Third, coded data was gained immediately since the panels are pre-recruited and responded in a designated time frame.

The consumer panels were obtained from two research companies. The Korean sample was obtained from the Embrain company in Korea and the American sample was obtained from the e-Rewards company in May of 2006. A Korean survey agent stored the data and sent files electronically to the researcher. American consumer panels were asked to participate in an online survey hosted by the University of Tennessee.

Consumer Panel Sampling

Consumer panels are non-random samples. However, consumer panelists are representative of the population in each country. Embrain, a Korean survey agent (www.embrain.com) indicates that samples are selected from nationwide panels representative of the Korean population. Embrain uses information from various databases to select best-fit respondents for a particular study and has over 200,000 panels. In addition, they manage survey databases to prevent the same panel from participating in similar surveys.

E-rewards company (www.e-rewards.com), the American survey agent, indicates that more than 1,700,000 consumers are in its panels in the U.S and Canada. The e-Rewards consumer panel demographic characteristics are correlated closely to the U.S. population in terms of age, gender, background, ethnicity, place of residence, and other demographics. Using consumer panels as a sampling frame is likely to yield a sample that is representative of the population in each country.

Data Collection

Data Collection Procedure

Data were collected electronically in May 2006 in each country. The survey questionnaire for the American sample was placed on a website hosted by the University of Tennessee, and e-mail messages were sent to the members of the e-Reward consumer panels requesting their participation. The completed surveys were stored on the researcher's survey account and the raw data were retrieved into the SPSS statistical software for analysis. The survey questionnaire for the Korean sample was placed on the Embrain company website. The raw data were sent to the researcher via e-mail in Excel format. Two-hundred consumer panelists completed the survey in each country and a total of four-hundred usable surveys were collected for the study.

Online Survey Research Design

The American consumer survey was designed by the researcher using SPSS dimensionnet version 3.0 software. Respondents were required to answer each item and if the participants failed to answer an item, the next survey item was blocked by the survey system. The Korean online survey was designed by an Embrian survey agent and used the same survey design strategy as the American online survey. With this strategy, the researcher was able to obtain complete data without missing values.

Data Analysis

Preliminary Step

Purification of Data

Before analyzing the data, outliers were identified in the data set and treated in terms of their proportion within the data and their randomness. In regard to missing value, the survey was designed such that respondents were required to answer each question. Thus, 400 completed surveys were obtained with no missing values. A coefficient of multivariate Kurtosis was used to test for normality and it is widely recommended when using the Structural Equation Modeling method. Items with a Kurtosis value greater than 1.96 were considered non-normal.

Reliability and Validity

In order to test the reliability of the scales, Cronbach's alpha coefficients were estimated. A Cronbach's alpha of .70 was used as a cut-off value to demonstrate good internal consistency. Construct validity was tested by conducting confirmatory factor analysis to determine the loadings and paths ($p\text{-value} < .001$).

Test of the Research Model

Two-step structural equation modeling was used for testing the research model. The structural equation modeling approach was used for examining the research model for the following reasons. First, this study examined American and Korean consumer behavior in the adoption of mobile data services based on the Technology Acceptance Model (TAM). With respect to cross-cultural research, SEM can simultaneously estimate all path

coefficients and can allow measurement equivalence tests. Second, SEM enables the researcher to evaluate the performance of the model as a whole (Bagozzi, 1982, 1981; Ryan, 1982), which allows direct comparisons across groups or cultures (Lee et al., 1991). Third, SEM is recommended for modeling and analyzing constructs that are not scientific such as benefits, attitudes, intention, market orientation, and brand equity which can not be directly observed (Steenkamp et al., 2000). Steenkamp and Baumgartner (2000) indicated that some constructs “can only be measured through observable measures or indicators that vary in their degree of observational meaningfulness and validity” (p.196). In this regard, SEM is an appropriate method for investigating consumer mobile data services adoption behavior.

Measurement Model Evaluation

The measurement model was assessed by using confirmatory factor analysis to validate the model. Undimensionality, convergent validity, composite reliability, discriminant validity, and measurement equivalence were assessed to determine the quality of the measurement model. The measurement model was examined to determine whether a parallel model could be used, or whether a congeneric model was preferred (Singh, 1995).

Assessing measurement equivalence. Multiple group structural equation modeling is suggested as a reliable method for determining measurement equivalence in a cross-cultural study (Myers, Calantone, Page Jr., & Taylor, 2000). Multiple group structural equation modeling allows for a simultaneous examination of a system of hypothesized equations involving multiple dependent variables and several models can be tested that

restrict all or selected path coefficients to be equal for cross-cultural data sets (Singh, 1995). This method is useful for comparative analysis and yields a reasonable control on the overall error rate (Singh, 1995). Thus, this study undertakes an application of multiple group structural equation modeling for determining measurement equivalence and utilized multiple group analysis windows in AMOS graphic 5.0.

The multiple group analysis window in AMOS was used to fit a model simultaneously to multiple groups (Arbuckle & Wothke, 1999). This method allows the researcher to create cross-group constraints to test measurement equivalences in terms of configural invariance, metric invariance, factor invariance, scalar invariance, factor covariance invariance, and factor mean invariance. As indicated by Singh (1995), this stage of the study also included examination of the critical ratios for both the Americans and Koreans, in order to ensure that the paths examined are significant for each group.

The multiple group equivalence test procedure and interpretation is guided by the Mullen (1995) and Steenkamp et al. (1998) suggestions. The first test is for configural invariance, in which no constraints are imposed between American and Korean consumer models. This study assessed whether the same pattern of factor loadings was obtained in both countries. The second test examined factor covariance invariance by constraining the correlations among the factors to be equal. In the third test, the factor loadings were constrained to be equal in both countries and the invariance of the measurement error variances between the two countries was examined. A Chi-square difference test and overall model fit indices were used to evaluate overall measurement structure consistency (Myers, Calantone, Page Jr., & Taylor, 2000).

Structural Model

After determining the measurement models were clean, this study proceeded with the structural model evaluation. The structural model was conducted using path analysis with latent variables. When this study obtained a sufficient comparability through testing the measurement equivalence in CFA, standardized coefficients were used to interpret the relationships among constructs in the research model for several reasons. Standardized coefficients are useful for (1) interpretability, (2) common metric or “scale” and/or (3) “emic” comparison standard (Singh, 1995). Since standardized coefficients are adjusted on the basis of within-sample variability, the standardized coefficients within-sample adjustment can be used when the measurement equivalence exist between samples (Singh, 1995). AMOS 5.0 in SPSS was used for conducting SEM in assessing the research model and hypotheses.

Test of the Effects of Subjective Norm

In order to determine the direct and indirect effects of subjective norm on the behavioral intention to use mobile data services, three tests were conducted in terms of 1) the direct effect of subjective norm on attitude, 2) the direct effect of subjective norm on behavioral intention, and 3) the indirect effect of subjective norm on behavioral intention. Figure 3.2 depicts the hypothesized direct effect of subjective norm on attitude and the direct effect of subjective norm on behavioral intention. The direct effect of subjective norm on attitude and behavioral intention was tested by path analysis in the structural equation model. Figure 3.3 shows the indirect effect of subjective norm on behavioral intention. Path analysis and chi-square difference tests were conducted to examine

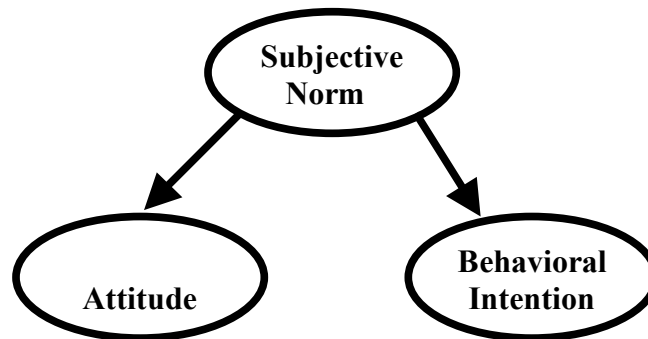


Figure 3.2. The Direct Effect of Subjective Norm on Attitude and Behavioral Intention

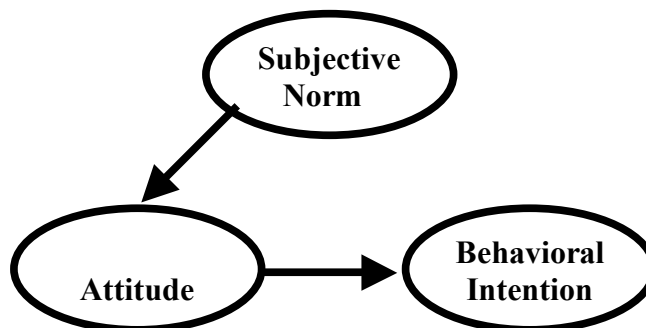


Figure 3.3. The Indirect Effect of Subjective Norm on Behavioral Intention

whether the indirect effect of subjective norm on behavioral intention was stronger for Korean consumers than American consumers.

Demographic Information and Usage of Mobile Data Services

Based on demographic information and usage of mobile data services, this study used cluster analysis to provide potential mobile data service market segment profiles. By using k-means clustering, this study determined internally coherent subgroups, which represent different mobile data service usage patterns. Clusters are formed on the basis of seven sets of variables: the use of mobile data services, information sources of mobile data services, recommendations to others regarding mobile data services, purposes of mobile data service use, age, gender, and educational background.

CHAPTER IV

RESULTS

This chapter provides the data analysis results and the steps taken for analyzing the research model. This chapter is presented in the following order: 1) item purification and model improvement, 2) measurement model evaluation and assessment of construct validity, 3) measurement equivalence test between American and Korean samples, 4) hypothesis testing and results, and 5) descriptive information and mobile data service consumer profiles for the American and Korean samples.

Item Purification and Model Improvement

Apriori Model Evaluation

First, an apriori model was estimated by Confirmatory Factor Analysis (CFA) for each group. Evaluation of the apriori model for each group allowed examination of each apriori model that best fit the data from the perspective of both parsimony and substantive meaningfulness (Byrne, 2001). In addition, the model fit indices for each group represent how the underlying structure fits the data across groups when no cross-group constraints are imposed (Byrne, 2001).

In evaluating the measurement and structural models, this study evaluated the models by using the following model fit indices; Chi-square statistic, Degrees of Freedom (DF), Chi-square statistic (CMIN)/DF, CFI, and RMSEA. These selected model fit indices among model fit indices in Structural Equation Modeling are valuable to evaluate the

overall goodness-of-fit of the model for the following reasons. First, Chi-square statistics indicate the degree to which the input data fit the model (Lee & Green , 1991). Also, the value of the Chi-square statistic is mainly based on the sample size (i.e. Chi-square statistics = $(N-1) F_{\min}$) and thus it is sensitive to the sample size, departures from the multivariate normality assumption, and the models' complexity (Oliver & Bearden, 1985; Bearden, Sharma, & Teel, 1982; Bentler & Bonnet, 1980). A Chi-square value (CMIN)/DF less than 2.00 is desirable. Moreover, this study employed two additional indices to complement the chi-square statistic; Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA). CFI (Comparative Fit Index) compares the existing model fit with a null model which assumes the latent variables in the model are uncorrelated (Hu & Bentler, 1995). CFI is advanced by taking sample size into account (Bentler, 1990) and a CFI greater than .90 represents a well-fitting model (Bentler, 1990). RMSEA (Root Mean Square error of Approximation) is the discrepancy per degree of freedom and thus is sensitive to the number of estimated parameters in the model. Hu and Bentler (1999) have suggested a RMSEA less than .06 as the cutoff for good fit.

This study examined the measurement model to determine whether a congeneric model could be used or whether a parallel model would be preferred (Singh, 1995). The nested model comparisons showed that a parallel model had DF of 30, Chi-square of 172.005, and CMIN/DF of 5.73, indicating the model is under stress. In addition, a congeneric model showed a DF of 1371, Chi-square of 3312.821, CMIN/DF of 2.416, CFI of .884, and RMSEA of .060 (see Table 4.1). A parallel model had DF of 1401, Chi-square of 3484.826, CMIN/DF of 2.487, CFI of .876, and RMSEA of .061. Thus, a

Table 4.1 *Apriori Model (A Congeneric Model) Fit Indices*

	Model fit	Desired Score
Chi-square	3312.821	NA
Degrees of Freedom	1371	NA
CMIN/DF	2.416	≤ 2.00
CFI	.884	$\geq .900$
RMSEA	.060	$\leq .06$

congeneric model was selected since a congeneric model has a better model fit than a parallel model.

However, the model fit indices of a congeneric model suggested that the model needed to be improved. Thus, an apriori model was conducted for each group. By using selected model fit indices, apriori model fit indices in each group were as follows: model fit indices for the American data show Chi-square of 1863.895, DF of 704, CMIN/DF of 2.648, CFI of .882, and RMSEA of .091. The Korean model fit indices were Chi-square of 1628.815, DF of 704, CMIN/DF of 2.314, CFI .876, and RMSEA .081. The model fit indices in each country are slightly different. However, apriori models are not expected to be completely invariant across groups since measuring instruments are often group specific in the way they operate (Byrne, 2001).

As shown in the results of the apriori model evaluation, apriori model fit indices are not adequate for the desired fit scores and the apriori model needs a model modification to obtain better model fit. Thus, item purification was conducted by scrutinizing the

Lambda weight of each measurement item, assessing the item normality by using a Kurtosis test. Normality assessment is evaluated by using the multivariate kurtosis value. An item with a Kurtosis value greater than 1.96 means that there is significant non-normality and it is normally dropped from further analysis. However, this study found no items with a Kurtosis value greater than 1.96. This was true for both the American and Korean data (Appendix 2).

Outliers were examined by Malanobis distance the highest Malanobis d-squared distance for data indicates that the case can be outliers and might need to be deleted further analysis. However, this study decided that not to delete the case of the highest Malanobis d-squared distance in each data since it did not seem to seriously affect the data (Appendix 3).

Item Purifications

In order to purify items and reduce the measurement error, Lambda weights for each measurement item were examined and items with a Lambda weight below .4 for in both the American and Korean samples were removed. A Lambda weight of below .4 was not acceptable due to the risk of measurement errors (Singh, 1995). The measurement items with Lambda weights between .4 and .6 for both groups were considered marginally acceptable for inclusion in the study. In the Korean data, a majority of the items had a Lambda weight greater than .6. One of the functional value items showed a Lambda weight of .592 and one of the monetary value items had a Lambda weight of .511. Interestingly, there were no items with a Lambda weight below .6 in the American data and most items had Lambda weights greater than .7. By examining the two low Lambda

weight items, a decision was made to retain the functional value item (Lambda weight of .592) since the Lambda weight approached .6 in the Korean data and was .712 in the American data. One item on the monetary value scale was problematic in fitting the model and was dropped to eliminate the risk of measurement error.

After removing one item, the following model fit indices were obtained: model fit indices for the American data show Chi-square of 1803.261, DF of 666, CMIN/DF of 2.708, CFI of .881, and RMSEA of .093. The model fit indices for the Korean data are Chi-square of 1445.647, DF of 666, CMIN/DF of 2.171, CFI .892, and RMSEA .077 (see Table 4.2). Model fit indices for the American model are weaker than the indices prior to removing the low Lambda weight item, but the model fit indices for the Korean model have a better fit after removing the item. However, the apriori model is not adequate given the desired model fit scores and all model fit indices suggest revising the apriori model. Thus, the next step involved scrutinizing the Modification Indices (MI) to find the cross-loaded items to improve the overall model fit.

Model Improvement and Its Modifications

In testing for the validity of the measurement items in the apriori models for each country, this study found that some items have highly correlated error terms by using the Modification Indices (MI). The value of the Modification Indices (MI) for each fixed parameter specified indicates the predicted change in the parameter if the parameter were to be freely estimated (Byrne, 2001). An expected parameter change labeled Par Change allows the researcher to assess the information regarding updated judgmental estimates, reestimation of the model, and new assessment of the appropriateness of judgmental

Table 4.2. Model Fit Indices After Removing One Monetary Value Item

	American	Korean	Desired Score
Chi-square	1803.261	1445.647	NA
Degrees of Freedom	666	666	NA
CMIN/DF	2.708	2.171	≤ 2.00
CFI	.881	.892	$\geq .900$
RMSEA	.093	.077	$\leq .06$

estimates (Byrne, 2001). This study examined the parameters in the covariance modification indices to determine whether the meaning of each pair of items represents error covariances. This study found that the following five item pairs are highly correlated in terms of the error term and its contents as well. Table 4.3 shows the covariance modification indices and the changes in the model fit indices after each correlation was added.

After the addition of seven error covariances in the model, the revised apriori model obtained the following model fit indices in the unconstrained model (Table 4.4): Chi-square of 2949.969, DF of 1318, CMIN/DF of 2.238, CFI of .903, and RMSEA of .056.

As shown in Table 4.4, the value of CMIN/DF still exceeded the desired score of 2.00. However, the CMIN/DF of 2.238 is not problematic in this model since the value of Chi-square (i.e. Chi-square statistic = $(N-1)F_{\min}$) is sensitive to the sample size. Hence, finding well-fitting hypothesized models in terms of the desired score of CMIN/DF has

Table 4.3. Error Covariances and Model Fit Indices

Error Covariance Items	M.I	Par Change	Chi-square	DF	CMIN/DF	CFI	RMSEA
e1<-> e4	27.470	.330	3210.093	1330	2.414	.888	.060
e1<->e12	20.165	-.259	3185.357	1328	2.399	.889	.059
e9<->e18	24.117	.287	3159.594	1326	2.383	.891	.059
e19<->e20	24.379	.291	3112.707	1324	2.351	.893	.058
e23<->e32	19.501	.303	3066.742	1322	2.320	.896	.058
e24<->e29	29.559	.358	2987.069	1320	2.263	.901	.056
e34<->e37	18.944	-.072	2949.969	1318	2.238	.903	.056

Table. 4.4. Revised Apriori Model Fit Indices for Both Groups

	Model fit	Desired Score
Chi-square	2949.969	NA
Degrees of Freedom	1318	NA
CMIN/DF	2.238	≤ 2.00
CFI	.903	$\geq .900$
RMSEA	.056	$\leq .06$

proven to be unrealistic in most CFA or Structural Equation Models in previous empirical research (Byrne, 2001). The CMIN/DF range from 2 to 5 is also acceptable (Marsh & Hovecar, 1985). Therefore, this study determined the overall goodness-of-fit of the model to be good, all hypothesized paths were significant with critical ratios greater than 2.00 (Appendix 4). No respecification of the model was needed. Thus, the final model depicted in Figure 4.1 was used to proceed in evaluating the measurement model, the multiple group measurement equivalence test, and structural models.

Measurement Model Evaluation and Assessment of Construct Validity

After conducting a series of model fit improvement processes and obtaining the final model, the reliability and validity of multiple indicators was assessed to examine how well the sets of indicators captured the constructs of interest (Steenkamp & Baumgartner, 2000) by using the results of the final measurement model. In order to assess the quality of the measurement model, this study examined the reliability, convergent validity, and discriminant validity of the constructs. Since the threshold value of Cronbach's alpha was greater than .70, this study assumes that unidimensionality exists for each construct (Hair et al., 1998). In this study, Cronbach's alpha for each latent construct ranged from .85 to .976 across groups and proved to have very good internal consistency for each latent construct.

This study used Confirmatory Factor Analysis (CFA) to assess both convergent and discriminant validity instead of using Exploratory Factor Analysis (EFA) or Principal Component Analysis (PCA). EFA and PCA are commonly used in exploring the nature of factors, but there is no reason to believe a rotated factor structure will correspond to

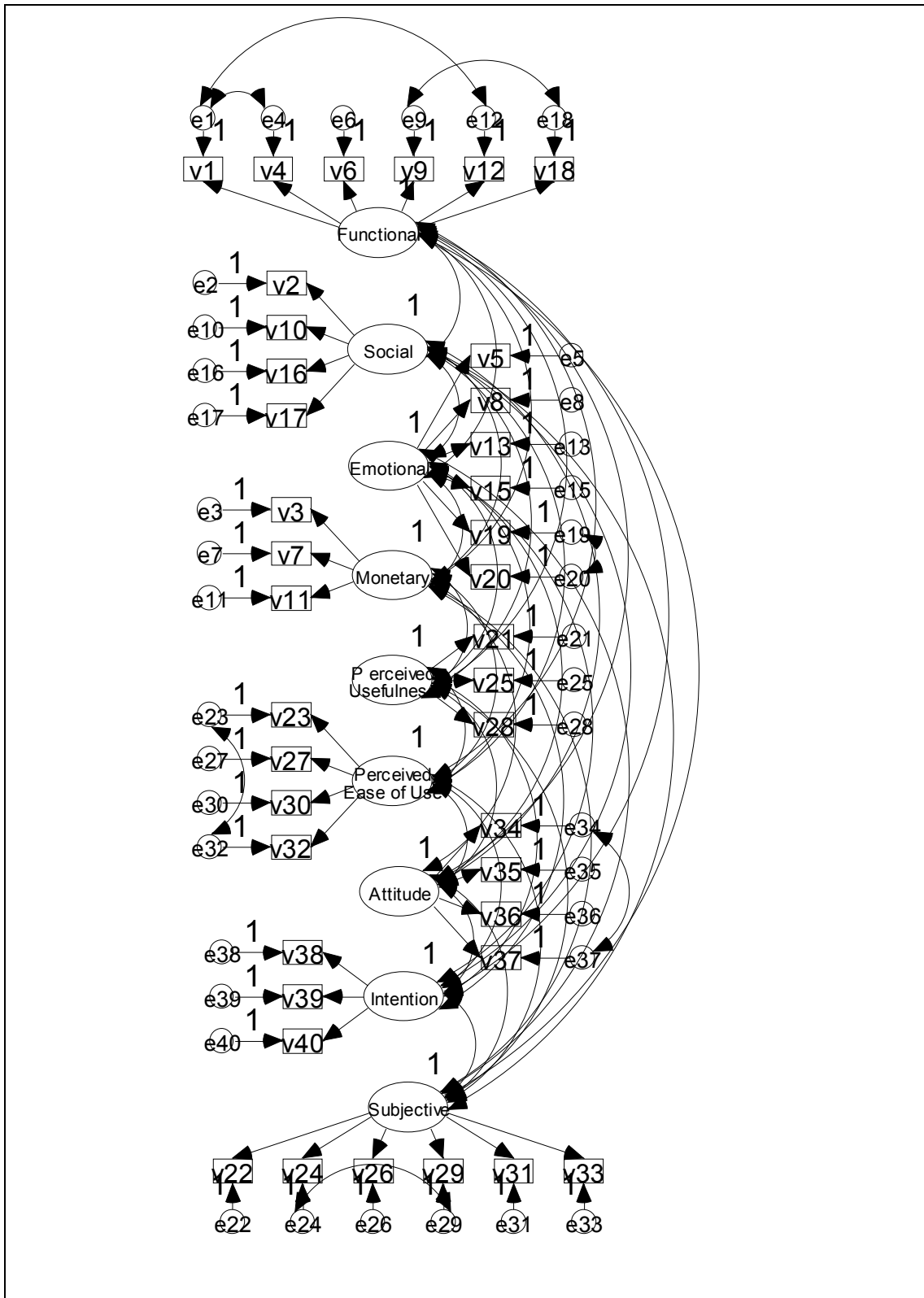


Figure 4.1. Final Model for Both Groups

any intended structure or will be meaningful in practice (Ladd, 2005). Assessing construct validity by using a CFA model has several advantages: 1) both discriminant and convergent construct validity can be assessed, 2) the correlations among the factors are independently specified, not specified to be simply an orthogonal or oblique structure, 3) each observed variable may be constrained to be determined by any limited number of factors, not necessarily all factors in the model (Ladd, 2005).

Convergent validity was assessed by the magnitude of the factor loadings of each indicator of the latent constructs (Anderson & Gerbing, 1988). All factor loadings had a significant p-value less than .001 and the average of standardized factor loading was .85 and .81 in the American data and the Korean data respectively (see Table 4.5). In order to assess reliability jointly for all items of a construct, the composite reliability and average variance extracted was calculated (Baumgartner & Homburg, 1996; Steenkamp & Van Trijp, 1991) by combining all items for each construct. The composite reliability should be greater than .60 and the average variance extracted should be at least .50 (Bagozzi & Yi, 1988). The composite reliabilities of each construct in this study ranged from .833 to .978, which exceeds the recommended level of .60 and the average variance extracted ranged from .513 to .918, which exceeds the desirable level of .50. Thus, the tests supported that each construct had convergent validity.

For testing the discriminant validity, this study examined whether correlations among the latent constructs were significantly less than 1 and all correlations of latent constructs are less than 1 (Appendix 5). Table 4.5 provides the standardized factor loadings for each measurement item, the composite reliability, average variance extracted, and Cronbach's alpha coefficient for each latent construct in each final model.

Table 4.5. Measurement Model Results

Latent Construct		Observed Indicators	American Sample (n=200)				Korean Sample (n=200)			
			Factor Loadings	Composite Reliability	Variance Extracted	α	Factor Loadings	Composite Reliability	Variance Extracted	α
Consumer Value	Functional	V1.Mobile data services are reliable	.695	.882	.550	.876	.575	.862	.513	.868
		V4. Mobile data services have good functions	.746				.721			
		V6. Mobile data services are well provided	.791				.785			
		V9. Mobile data services are provided in a timely manner	.736				.684			
		V12. Mobile data services fulfill my needs well	.831				.791			
		V18. Mobile data services offer consistent service quality	.664				.719			
	Social	V2.Using mobile data services makes me feel accepted by others	.756	.930	.770	.928	.761	.914	.727	.911
		V10. Using mobile data services makes a good impression on other people	.827				.805			
		V16. Using mobile data services gives me social approval	.966				.908			
		V17. Using mobile data services improves the way I am perceived by others	.944				.926			
	Monetary	V3.Mobile data services are good for the price	.807	.898	.746	.894	.826	.895	.740	.893
		V7.Mobile data services are reasonably priced	.911				.939			
		V11.The price of using mobile data services is economical	.870				.810			
	Emotional	V5. I feel relaxed when I use mobile data services	.699	.910	.629	.911	.732	.862	.513	.913
		V8. I feel good when I use mobile data services	.829				.773			
		V13. Using mobile data services is enjoyable	.856				.857			
		V15. Using mobile data services gives me pleasure	.875				.824			
		V19. Using mobile data services is interesting	.718				.782			
		V20. Mobile data services make me want to use them	.764				.825			

Table 4.5. (Continued)

Latent Construct	Observed Indicators	American Sample (n=200)				Korean Sample (n=200)			
		Factor Loadings	Composite Reliability	Variance Extracted	α	Factor Loadings	Composite Reliability	Variance Extracted	α
Perceived Usefulness	V21. Using mobile data services makes me save time	.871	.926	.806	.929	.735	.856	.666	.859
	V25. Using mobile data services improves my efficiency	.892				.806			
	V28. Mobile data services are useful to me	.930				.899			
Perceived Ease of Use	V23. Learning to use mobile data services is easy for me	.783	.909	.714	.916	.585	.833	.559	.850
	V27. My interaction with mobile data services is clear and understandable	.854				.774			
	V30. It is easy to make mobile data services do what I want them to	.849				.845			
	V32. It is easy to use mobile data services	.890				.762			
Subjective Norm	V22. I feel that the important people in my life want me to use mobile data services	.893	.964	.819	.965	.807	.923	.666	.928
	V24. People who influence my behavior think that I should use mobile data services	.797				.747			
	V26. Most people who are important to me probably consider mobile data services as useful	.904				.834			
	V29. People who are important to me think that I should use mobile data services	.919				.767			
	V31. Most people who are important to me probably consider my use of mobile data services to be wise	.950				.879			
	V33. Most people who are important to me probably consider using mobile data services as valuable	.957				.854			
Attitude	V34. Using mobile data services is a good idea	.939	.978	.918	.976	.870	.948	.821	.944
	V35. I am favorable about using mobile data services	.965				.939			
	V36. Using mobile data services is a wise idea	.947				.906			
	V37. I am positive about using mobile data services	.981				.908			
Intention	V38. Given the chance, I intend to use mobile data Services	.975	.934	.828	.928	.896	.920	.794	.919
	V39. I expect my use of mobile data services to continue in the future	.967				.942			
	V40. I intend to purchase products or services via mobile data services	.773				.832			

Measurement Invariance Test between American and Korean Samples

Prior to the multiple group measurement invariance test, equality constraints are imposed on particular parameters in the final measurement model, and thus the data for the two groups were analyzed simultaneously to obtain efficient estimates (Joreskog & Sorbom, 1996b; Bentler, 1995). This study used a multiple group invariance test by using the AMOS graphic 5.0. In this study, the invariance of factor-loading regression paths is of primary interest and the invariance of factor covariances is of secondary interest. The equality of error variances and covariances are important if the invariant reliability of an assessment measure across groups are of interest (Bentler, 2004). However, testing for the invariance of error parameters represents an overly restrictive test of the data (Byrne, 2001), and it is the least important in this study.

To identify the measurement invariance in multiple group analysis using Amos 5.0 windows, this study examined the significance of the difference in fit between several nested models by using a chi-square difference test and model fit indices. Since the nested models (e.g., measurement weights, structural covariances, measurement residuals) in the model comparisons differ by their constraints in the models, the chi-square difference test only suggests that the fit of the nested models is beyond what would be expected by chance. Thus, other model fit indices (e.g., CFI, RMSEA) need to be examined to check the extent of differences among the models.

By using Amos graphic 5.0 windows, slightly different model fit indices between models was obtained. In the model comparisons section, chi-square difference tests and p-value greater than .05 may indicate there is no difference in measurement items across

groups. Even though this study obtains the following chi-square difference test and the p-value is not greater than .05, this study concludes that the measurement items across groups are not significantly different by comparing model fit indices. By examining model fit indices' changes between the unconstrained model (configural model) and the measurement weights (factor invariance) model, this study revealed that the measurement weights model with imposing 39 degrees of freedom has a slight change in the model fit indices compared to the unconstrained model. In an unconstrained model the values in all model matrices are freely estimated and it serves as a benchmark against which the fit of more restricted models are compared (Mavondo, Gabbott, & Tsareko, 2003). When this study compares the measurement weights and structural covariance models against unconstrained model fit indices (see Table 4.6), there is not a significant difference among the models. After scrutinizing the chi-square difference tests (see Table 4.7) and the corresponding changes in the model-fit indices, this study concluded that the measurement invariance between the American and Korean groups exists and it enabled this study to proceed to the structural model evaluation.

Hypotheses Testing

This study tested the research model and its hypotheses by using structural equation modeling. In this section, the results of all hypotheses tested based on the research model and the comparative analysis for each hypothesized path is provided. Figure 4.2 presents the hypothesized research model for the structural equation modeling.

While testing the research model, results indicated that the error variance of the perceived usefulness construct was negative in the Korean model. When this occurs, the

Table 4.6. Model Fit Indices of Nested Models

Model	NPAR	CMIN	DF	P	CMIN /DF	CFI	RMSEA
Unconstrained	242	2949.969	1318	.000	2.238	.903	.053
Measurement weights	203	3015.763	1357	.000	2.222	.901	.053
Structural covariances	167	3139.686	1393	.000	2.254	.896	.054
Measurement residuals	121	3425.359	1439	.000	2.380	.882	.056
Saturated model	1560	.000	0			1.000	
Independence model	78	18260.785	1482	.000	12.322	.000	.166

Table 4.7. Chi-square Difference Tests (Assuming unconstrained model to be correct)

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	39	65.794	.005	.004	.004	-.001	-.001
Structural covariances	75	189.717	.000	.010	.011	.001	.001
Measurement residuals	121	475.390	.000	.026	.028	.012	.013

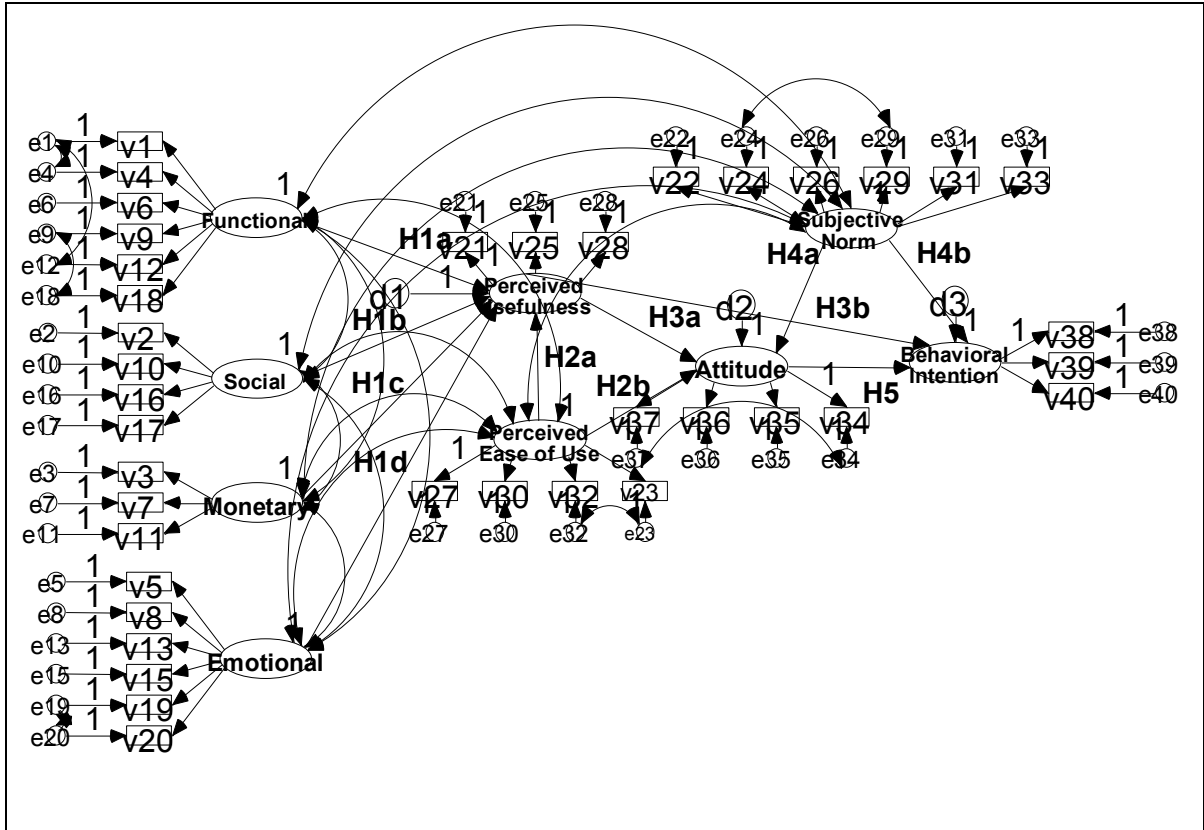


Figure 4.2. Research Model for Structural Equation Modeling

researcher must first resolve each occurrence before evaluating the results of the model (Hair et al., 1998). The remedy for a negative error variance, known as the Heywood case, is to fix the negative value to a very small positive value (.005) (Bentler & Chu, 1987; Dillon, Humar, & Mulani, 1987). Thus, the error variance of perceived usefulness was set to .005 for the Korean model. After changing the error variance, the model fit indices were obtained and reported in Table 4.8. Using this final research model, each hypothesis was tested.

Table 4.8. Model Fit Indices of Structural Equation Model

	Model fit	Desired Score
Chi-square	2985.381	NA
Degrees of Freedom	1340	NA
CMIN/DF	2.228	≤ 2.00
CFI	.902	$\geq .900$
RMSEA	.056	$\leq .06$

Hypotheses 1

First, hypothesis 1 a-d examined the difference in the relationship between each of the four dimensions of consumer perceived value and perceived usefulness between American and Korean consumers. The relationship between each dimension of consumer perceived value and perceived usefulness is labeled H1a through H1d for each country (e.g., AH1a through AH1d for the American group, KH1a through KH1d for the Korean group) in the structural equation model. In order to examine hypothesis 1a through hypothesis 1d, six nested models were created; a freely estimated model, which has no parameter constraints, four models with each hypothesized path constraint imposed (e.g., AH1a equal to KH1a, AH1b equal to KH1b, AH1c equal to KH1c, AH1d equal to KH1d), and one model that set hypotheses 1 a-d equal.

By examining the six nested models (see Table 4.9) using a chi-square difference test, this study found that hypothesis 1a, 1c, and 1d had significant p-values less than .001, which means a different relationship exists between American and Korean consumers in

Table 4.9. Chi-square Difference Tests in Hypothesis 1

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Model H1a	1	13.452	.000	.001	.001	.001	.001
Model H1b	1	.024	.877	.000	.000	.000	.000
Model H1c	1	7.112	.008	.000	.000	.000	.000
Model H1d	1	13.900	.000	.001	.001	.001	.001
Model all H1	4	28.436	.000	.002	.002	.001	.001

H1a, H1c, and H1d. The results of the chi-square difference test indicated that hypothesis 1b was not supported. However, the model testing hypothesis 1a through 1d revealed a slight difference existed between American and Korean consumers. As shown in the model fit indices (see Table 4.10), there are slight changes in the model fit indices among the models. This means that a different relationship exists between consumer perceived value and perceived usefulness for the American and Korean consumers as stated in hypotheses 1 a-d, but all of the hypotheses are not strongly supported. The specific results of each hypothesis are summarized and the standardized regression weights for each group are presented in Table 4.11.

Hypothesis 2

The second set of hypotheses were tested to examine whether the effects of perceived ease of use on perceived usefulness (H2a) and attitude (H2b) was positive or not. This study examined whether each hypothesized path was statistically significant or not, and then assessed each standardized regression weight in each group. H2a was supported for each group with .816, .648 standardized regression weights in the American and Korean

Table 4.10. Model Fit Indices of Six Nested Models

Model	NPAR	CMIN	DF	P	CMIN/DF	CFI	RMSEA
free model	220	2985.381	1340	.000	2.228	.902	.056
Model H1a	219	2998.833	1341	.000	2.236	.901	.056
Model H1b	219	2985.405	1341	.000	2.226	.902	.056
Model H1c	219	2992.493	1341	.000	2.232	.902	.056
Model H1d	219	2999.281	1341	.000	2.237	.901	.056
Model all H1	216	3013.817	1344	.000	2.242	.900	.056

Table 4.11. Results of Hypothesis 1 and Standardized Regression Weights

Hypothesis 1	Estimates (America)	Estimates (Korea)	χ^2 Test	Result
H1a: The relationship between <i>functional value</i> and <i>perceived usefulness</i> is different between American and Korean consumers.	.036	-2.130**	.000	H1a is supported
H1b: The relationship between <i>social value</i> and <i>perceived usefulness</i> is different between American and Korean consumers.	.007	-.029	.877	H1b is not supported
H1c: The relationship between <i>monetary value</i> and <i>perceived usefulness</i> is different between American and Korean consumers.	-.009	.466**	.008	H1c is supported
H1d: The relationship between <i>emotional value</i> and <i>perceived usefulness</i> is different between American and Korean consumers.	.256*	2.286**	.000	H1d is supported
All set of Hypotheses 1: tested all set of hypotheses 1(H1a,H1b, H1c, and H1d are different between two countries)			.000	All H1 is supported

*p<.1

**p<.05

samples respectively at p-value <.001. However, H2b was not statistically supported in the American consumer sample and the effect of perceived ease of use on attitude for Korean consumers was negative with p-value <.1. Thus, H2b was not supported. The results of hypothesis 2a and 2b are presented in Table 4.12.

Hypothesis 3

The next set of hypotheses were formulated to examine whether perceived usefulness positively affects on attitude and behavioral intention to use mobile data services. All paths of hypothesis 3a and 3b were significant with a p-value less than .05 and its estimates are provided in Table 4.13. From the results of hypothesis 3, this study concludes that perceived usefulness has a positive effect on both attitude and behavioral intention to use mobile data service in each country.

Table 4.12. Results of Hypothesis 2 and Standardized Regression Weights

Hypothesis 2	Estimates (America)	Estimates (Korea)	Results
H2a: The greater the <i>perceived ease of use</i> , the greater the <i>perceived usefulness</i> .	.658***	.675***	H2a is supported in both countries
H2b: The greater the <i>perceived ease of use</i> , the more positive the <i>attitude</i> toward using mobile data services.	.025	-.214*	H2b is not supported in both countries

*p<.1

**p<.05

***p<.001

Table 4.13. Results of Hypothesis 3 and Standardized Regression Weights

Hypothesis 3	Estimates (America)	Estimates (Korea)	Results
H3a: The greater the <i>perceived usefulness</i> , the more positive the <i>attitude</i> toward using mobile data services.	.953***	1.321***	H3a is supported in both countries
H3b: The greater the <i>perceived usefulness</i> , the stronger the <i>behavioral intention</i> to use mobile data services.	.410***	.447**	H3b is supported in both countries

**p<.05

***p<.001

Hypothesis 4

This study examined the effect of subjective norm on the adoption of mobile data services for American and Korean consumers. Hypothesis 4a is tested to examine the direct effect of subjective norm on attitude. The direct effect of subjective norm on behavioral intention is measured by hypothesis 4b. The result of hypothesis 4a, the direct effect of subjective norm on attitude, shows a significant negative path in each country. Thus, hypothesis 4a is not supported. The direct effect of subjective norm on behavioral intention to use mobile data services (H4b) is not statistically supported for the American model and hypothesis 4b is marginally significant for the Korean model with a negative effect. Therefore, hypothesis 4b is not supported in each country.

Hypothesis 4c is tested to examine whether the effect of subjective norm on behavioral intention (H4b) is greater than the effect of subjective norm on attitude (H4a). To test H4c, this study first created a model that constrained H4a and H4b to be equal. By using a chi-square difference test, the H4a and H4b equal model compared to the freely

estimated model is not different. In other words, there is no difference between H4a and H4b. Thus, this study concludes that there is no significant difference in the effect of subjective norm on attitude (H4a) and the effect of subjective norm on behavioral intention (H4b). Hypothesis 4c is not supported.

Hypothesis 4d is formulated to determine whether the indirect effect of subjective norm on behavioral intention through attitude is stronger for Korean consumers than American consumers. To test this hypothesis, a nested model was created that constrains the path from subjective norm to attitude (H4a) for each model to be equal (i.e., AH4a equal to KH4a) and the path from attitude to behavioral intention (H5) in each model to be equal (i.e., AH5 equal to KH5). A chi-square difference test (see Table 4.15) revealed no difference between the two parameter constraints in the model and the freely estimated model. In other words, the indirect effect of subjective norm on attitude and behavioral intention is not different between American and Korean consumers. Hence, this study concludes that hypothesis 4d is not supported. The summary of results for hypotheses 4 a-d and a chi-square difference test presented in Table 4.14 and Table 4.15.

Hypothesis 5

Hypothesis 5 is tested to examine whether there is a positive effect of attitude on behavioral intention to use mobile data services in each country. The hypothesized path H5 is significant at $p\text{-value} < .001$ in each country. Table 4.16 provides standardized regression weights in each country.

Table 4. 14. Results of Hypothesis 4

Hypothesis 4	Estimates (America)	Estimates (Korea)	χ^2 Test	Results
H4a: The higher the level of <i>subjective norm</i> , the more positive the <i>attitude</i> toward using mobile data services.	-.093*	-.288**	NA	H4a is not supported
H4b: The higher the level of <i>subjective norm</i> , the stronger the <i>behavioral intention</i> to use mobile data services.	.008	-.163*	NA	H4b is not supported
H4c: The effect of <i>subjective norm</i> on <i>behavioral intention</i> (H4b) is greater than the effect of <i>subjective norm</i> on <i>attitude</i> toward using mobile data services (H4a).	NA	NA	.299	H4c is not supported
H4d: The effect of <i>subjective norm</i> on <i>attitude</i> toward using mobile data services and <i>behavioral intention</i> is stronger in Korean consumers than American consumers.	NA	NA	.276	H4d is not supported

*p<.1

**p<.05

Table 4.15. Hypothesis 4 Chi-square Difference Tests

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Equal H4a-H4b	2	2.417	.299	.000	.000	.000	.000
Equal H4a-H5	2	2.576	.276	.000	.000	.000	.000

Table 4.16. Result of Hypothesis 5 and Standardized Regression Weights

Hypothesis 5	Estimates (America)	Estimates (Korea)	Results
H5: The more positive the attitude toward mobile data services, the higher the behavioral intention to adopt mobile services.	.521***	.613***	H5 is strongly supported in both countries

***p<.001

Summary of Hypothesis Testing

Since this study is designed to compare the adoption of mobile data services between American and Korean consumers, this study provides the structural equation modeling invariant test for each path between the two countries. Table 4.17 presents the comparative analysis of each path by using chi-square difference tests between two countries. Table 4.18 provides the summary of hypotheses testing in this study.

Mobile Data Service Consumer Profile

Examining mobile data service consumer profiles is meaningful for two reasons: 1) mobile data service consumer profiles can enable American and Korean retailers or marketers to segment consumer groups, predict their market potential, and better position mobile marketing and 2) American and Korean retailers or marketers can develop advanced mobile data services based on the consumer group profiles.

Table 4.17. Comparative Analysis between U.S and Korea in Each Hypothesis

Hypothesis	U.S	Korea	χ^2 Test	Result
H1a: The relationship between functional value and perceived usefulness is different between American and Korean consumers.	.036	-2.130**	.000	Difference
H1b: The relationship between social value and perceived usefulness is different between American and Korean consumers.	.007	-.029	.877	No difference
H1c: The relationship between monetary value and perceived usefulness is different between American and Korean consumers.	-.009	.466**	.008	Difference
H1d: The relationship between emotional value and perceived usefulness is different between American and Korean consumers.	.256*	2.286**	.000	Difference
H2a: The greater the perceived ease of use, the greater the perceived usefulness.	.658***	.675***	.478	No difference
H2b: The greater the perceived ease of use, the more positive the attitude toward using mobile data services.	.025	-.214*	.158	No difference
H3a: The greater the perceived usefulness, the more positive the attitude toward using mobile data services.	.953***	1.321***	.060	Slightly difference
H3b: The greater the perceived usefulness, the stronger the behavioral intention to use mobile data services.	.410***	.447**	.649	No difference
H4a: The higher the level of subjective norm, the more positive the attitude toward using mobile data services.	-.093*	-.288**	.210	No difference
H4b: The higher the level of subjective norm, the stronger the behavioral intention to use mobile data services.	.008	-.163*	.122	No difference
H4c: The effect of subjective norm on behavioral intention (H4b) is greater than the effect of subjective norm on attitude toward using mobile data services (H4a).	NA	NA	.299	No difference
H4d: The effect of subjective norm on attitude toward using mobile data services and behavioral intention is stronger in Korean consumers than American consumers.	NA	NA	.276	No difference
H5: The more positive the attitude toward mobile data services, the higher the behavioral intention to adopt mobile services.	.521***	.613***	.405	No difference

*p<.1

**p<.05

***p<.001

Table 4.18. Summary of Hypotheses Test

Hypothesis	U.S	Korea	χ^2 Test	Result
H1a: The relationship between functional value and perceived usefulness is different between American and Korean consumers.	.036	-2.130**	.000	Supported
H1b: The relationship between social value and perceived usefulness is different between American and Korean consumers.	.007	-.029	.877	Not supported
H1c: The relationship between monetary value and perceived usefulness is different between American and Korean consumers.	-.009	.466**	.008	Supported
H1d: The relationship between emotional value and perceived usefulness is different between American and Korean consumers.	.256*	2.286**	.000	Supported
H2a: The greater the perceived ease of use, the greater the perceived usefulness.	.658***	.675***	NA	Supported in both countries
H2b: The greater the perceived ease of use, the more positive the attitude toward using mobile data services.	.025	-.214*	NA	Not supported in both countries
H3a: The greater the perceived usefulness, the more positive the attitude toward using mobile data services.	.953***	1.321***	NA	Supported in both countries
H3b: The greater the perceived usefulness, the stronger the behavioral intention to use mobile data services.	.410***	.447**	NA	Supported in both countries
H4a: The higher the level of subjective norm, the more positive the attitude toward using mobile data services.	-.093*	-.288**	NA	Not supported in both countries
H4b: The higher the level of subjective norm, the stronger the behavioral intention to use mobile data services.	.008	-.163*	NA	Not supported in both countries
H4c: The effect of subjective norm on behavioral intention (H4b) is greater than the effect of subjective norm on attitude toward using mobile data services (H4a).	NA	NA	.299	Not supported in both countries
H4d: The effect of subjective norm on attitude toward using mobile data services and behavioral intention is stronger in Korean consumers than American consumers.	NA	NA	.276	Not supported in both countries
H5: The more positive the attitude toward mobile data services, the higher the behavioral intention to adopt mobile services.	.521***	.613***	NA	Supported in both countries

*p<.1, **p<.05. ***p<.001

Sample Characteristics

Before creating mobile data service consumer profiles, descriptive information on the sample of consumers from each country is provided. Two- hundred participants in each country completed the questionnaire. Table 4.19 presents data on the sample characteristics including gender, age, and educational background for each country. In terms of age, one outlier (year of birth was 1990) was identified in the American data and considered a mistake by the participant. Excluding this outlier value, the mean age for the sample was 46.78 was substituted the as the age value for this outlier. The age distribution in the American data was not seriously effected since the outlier seems to be an apparent mistake by a participant and one outlier (.005% of data) is very trivial.

Descriptive Information of Mobile Services Usage

This study provides descriptive information on mobile data service usage and Internet usage as follows: the present usage of mobile data services, interest in using mobile retailing data services, the purpose of using mobile services, Internet usage, information sources of mobile data services, recommendations to others regarding mobile data services, The descriptive information regarding mobile service usage and Internet usage is presented in Table 4.20, Table 4.21, Table 4.22, Table 4.23, Table 4.24, Table 4.25, and Table 4.26 respectively.

Demographic results are presented in Table 4.19. The mean age of Korean sample was 36.14 years old and the American sample was 46.78 years old. On average the American respondents were older than the Korean respondents in the study.

Table 4.19. Sample Characteristics: Age, Gender, and Education

America (n=200)			Korea (n=200)		
Age			Age		
Categories	Frequency	Percent	Categories	Frequency	Percent
Between 18 and 29	23	11.5	Between 18 and 29	57	28.5
Between 30 and 39	55	27.5	Between 30 and 39	70	35.0
Between 40 and 49	41	20.5	Between 40 and 49	61	30.5
Between 50 and 59	51	25.5	Between 50 and 59	12	6.0
Between 60 and 69	28	14.0	Between 60 and 69	0	0
Over 70	2	1.0	Over 70	0	0
Total	200	100.00	Total	200	100.00
Gender			Gender		
Categories	Frequency	Percent	Categories	Frequency	Percent
Male	84	42.0	Male	100	50
Female	116	58.0	Female	100	50
Total	200	100.00	Total	200	100.00
Education			Education		
Categories	Frequency	Percent	Categories	Frequency	Percent
High School graduate	14	7.0	High School graduate	36	18.0
Some college	47	23.5	Some college	31	15.5
College graduate	80	40.0	College graduate	104	52.0
Postgraduate	57	28.5	Postgraduate	28	14.0
Others	2	1.0	Others	1	.5
Total	200	100.00	Total	200	100.00

Table 4.20. Use of Mobile Data Services

Mobile data service categories*	America		Korea	
	Frequency	Percent	Frequency	Percent
Sending/receiving SMS (Short Message Service)	85	42.5	190	95
Downloading graphics (e.g., wallpaper, screensaver)	79	39.5	74	37
Downloading games	53	26.5	86	43
Using mobile emails	81	40.5	53	26.5
Downloading ringtones	81	40.5	140	70
Sending/receiving video/photo messaging	83	41.5	67	33.5
Accessing news, weather, sports, map information	84	42	64	32
Receiving alert messages	79	39.5	21	10.5
Web browsing	60	30	20	10
Shopping online	40	20	14	7
None	40	20	3	1.5
Other**	4	20	7	3.5

* This study asked respondents to check all that apply for each of the mobile data service categories.

** Others included: American sample “banking, fax, games, and financial transaction” and Korean sample: “trading stock, listening music, finding friends, stock, only receiving SMS, searching phone numbers, and mobile instant messenger” .

Table 4.21. Most Frequently Used Mobile Data Services

Mobile data service categories	America		Korea	
	Frequency	Percent	Frequency	Percent
Sending/receiving SMS (Short Message Service)	48	24	174	87
Downloading graphics (e.g., wallpaper, screensaver)	2	1	0	0
Downloading games	7	3.5	1	0.5
Using mobile emails	23	11.5	6	3
Downloading ringtones	13	6.5	7	3.5
Sending/receiving video/photo messaging	9	4.5	1	0.5
Accessing news, weather, sports, map information	16	8	5	2.5
Receiving alert messages	17	8.5	1	0.5
Web browsing	13	6.5	2	1
Shopping online	8	4	0	0
None	42	21	2	1
Other*	2	1	1	0.5

*Other included as: American sample “banking and playing games” and Korean sample “trading stock”.

Table 4.22. Interest in Using Retailing Related Mobile Data Services Use

Retailing related mobile data service categories*	America		Korea	
	Frequency	Percent	Frequency	Percent
Scanning barcodes at a store to access product information	46	23	32	16
Comparison shopping services	54	27	30	15
Receiving targeted local shopping information and news	31	15.5	49	24.5
Checking shipping & availability of products	41	20.5	50	25
Voice directions to a store	45	22.5	25	12.5
Accepting and viewing advertisements	16	8	11	5.5
Receiving alerts regarding auctions (e.g., e-bay)	37	18.5	17	8.5
Receiving special promotional messages (e.g., limited time offers, coupons)	43	21.5	79	39.5
Paying for products	44	22	88	44
Cell-phone based payment authorization (e.g., digital wallet)	46	23	114	57
Other**	27	13.5	4	2

* This study asked respondents to check all that apply for each of the mobile data service categories.

** Others included: Korean sample “bus guide or schedule services and none” and American sample “e-mail access and none”.

Table 4.23. Information Sources: Where Heard about Mobile Data Services

Information Sources	America		Korea	
	Frequency	Percent	Frequency	Percent
Spouse	22	11	7	3.5
Parents	0	0	1	0.5
Children	10	5	17	8.5
Friends	30	15	23	11.5
Colleagues	20	10	13	6.5
School/University classmates	27	13.5	7	3.5
TV, Radio	20	10	30	15
Print media	56	28	9	4.5
Internet	15	7.5	90	45
Other*	10	5	3	1.5

*Others included: Korean sample “by self” and American sample “none, siblings, all above, and brother”

Table 4.24. To Whom Have You Recommended the Mobile Data Services, You Use?

	America		Korea	
	Frequency	Percent	Frequency	Percent
Spouse	23	11.5	38	19
Parents	6	3	9	4.5
Children	12	6	8	4
Friends	93	41.5	60	30
Colleagues	32	16.5	36	18
School/University classmates	3	1.5	10	5
Other*	40	20	38	19.5

* Others included: Korean sample that “relatives, older sister, and none” and American sample “mobile service provider, none, and work”.

Table 4.25. Reasons for Use of Mobile Phone

Reasons	America		Korea	
	Frequency	Percent	Frequency	Percent
Exclusively for private purposes	74	37	67	33.5
More for private, than for business purposes	55	27.5	51	25.5
About 50/50 private and business	46	23	63	31.5
More for business, than private purposes	20	10	18	9
Exclusively for business purposes	5	2.5	1	0.5

Table 4.26. Usage of Internet Services

Internet Service Categories	America		Korea	
	Frequency	Percent	Frequency	Percent
Banking and financial services	160	80	123	61.5
Shopping	169	84.5	121	60.5
Entertainment	137	68.5	87	43.5
Information and News	163	81.5	128	64
Travel booking (hotels, flights etc.)	152	76	64	32
Ticket reservation (Theatre, concerts etc.)	133	62.5	78	39
E-mail	179	79.5	128	64
Other**	7	3.5	7	3.5

* This study asked respondents to check all that apply for the Internet service categories.

** Others included: Korean sample “downloading screen saver, ringtones, downloading graphics, SMS, sending photo, and messenger” and American sample “research, and none”.

Additional Findings

By utilizing descriptive information on mobile data services usage, mobile data service consumer profiles were created for each country. Five clusters were created by using a k-means clustering analysis method. Each cluster has internally coherent subgroups which represent different mobile data service usage subgroups. The variables used in the K-means clustering were as follows: the use of mobile data services, information sources of mobile data services, recommendations to others regarding mobile data services, purposes of mobile data service use, age, gender, and educational background. Table 4.27 and Table 4.28 present five consumer profile clusters for each country. K-means clustering is the simplest method to segment consumer groups. The sample for this study is not random, thus, the consumer profiles may not represent the populations. However, retailers and marketers can initially screen and predict their potential consumer market positioning for mobile data services and retailing.

Table 4.27. American Mobile Data Service Consumer Profile Clusters

	Cluster 1 (n=37)	Cluster 2 (n=48)	Cluster 3 (n=24)	Cluster 4 (n=48)	Cluster 5 (n=43)
The use of mobile data services	Sending/receiving Video/Photo messaging	Sending/receiving Video/Photo messaging	Accessing news, weather, sports, map information	Using Mobile e-mail	Accessing news, weather, sports, map information
Information sources	TV, Radio	Colleagues	TV, Radio	TV, Radio	School/ University classmates
Recommend mobile data services to	Colleagues	Friends	Colleagues	Friends	Friends
Purpose of using mobile data services	About 50/50 private and business	More for private, than for business purposes	More for private, than for business purposes	More for private, than for business purposes	More for private, than for business purposes
Age	48	39	65	29	57
Gender	Male	Female	Male	Female	Male
Education	College Graduate	College Graduate	College Graduate	College Graduate	College Graduate

Table 4.28. Korean Mobile Data Service Consumer Profile Clusters

	Cluster 1 (n=56)	Cluster 2 (n=38)	Cluster 3 (n=9)	Cluster 4 (n=48)	Cluster 5 (n=49)
The use of mobile data services	Short Message Services	Short Message Services	Accessing news, weather, sports, map information	Short Message Services Downloading graphics (e.g., wallpaper, screensaver)	Short Message Services Downloading graphics (e.g., wallpaper, screensaver)
Information sources	School/ University classmate	School/ University classmate	TV, Radio, Print media	TV, Radio, Print media	TV, Radio
Recommend mobile data services to	Children, Friends	Friends, Colleagues	Children, Friends	Colleagues	Friends
Purpose of using mobile data services	More for private, than for business purposes	Exclusively for private purposes	About 50/50 private and business	More for private, than for business purposes	More for private, than for business purposes
Age	46.04	24.21	48.22	31.79	38.98
Gender	Male and Female	Male and Female	Most of Male	Male and female	Male and female
Education	College Graduate	Some College	College Graduate	College Graduate	College Graduate

CHAPTER V

DISCUSSION AND CONCLUSIONS

This chapter provides an overview of the study and a discussion of the results. Specifically, the chapter includes: 1) a summary and discussion of the research questions, hypotheses, and theory testing, 2) limitations of the study, 3) research and practical implications, and 4) conclusions.

Research Questions, Hypotheses, and Theory Testing

The purpose of this study and research questions can be summarized in the following question: can consumer perceived value and subjective norm explain differences in the adoption of mobile data services between American and Korean consumers? Even though there may be other factors that may explain the difference in the adoption of mobile data services between the two countries, values and norms are considered as critical determinants to explain the adoption of mobile data services among American and Korean consumers. The theoretical framework for this study is based on the Technology Acceptance Model (TAM), which is an alternative version of the Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) in order to measure consumers' technology acceptance behavior. The research model for this study, based on TAM, was developed for testing consumers' mobile data service adoption behavior between American and Korean consumers. Consistent with the TRA and TPB, the research model included subjective norm as an influence on attitude and behavioral intention. A unique

addition to the research model for this study was the inclusion of consumer perceived value as an antecedent variable influencing mobile data service adoption behavior and the direct and indirect effect of subjective norm on attitude and behavioral intention in TAM.

Research Questions

Effects of Subjective Norm

Since consumer behavior is open to be influenced by the norms of the social group (Ackerman & Tellis, 2001), this study proposed that subjective norm might affect consumption behavior and it could be a determinant of consumers' mobile data service adoption behavior. In general, Americans are considered to be more individualistic in nature than Koreans (Hofstede, 1990). Thus, the study predicted that the effect of subjective norm, which measures the group conformity pressures on consumer behavior, might generate different consequences of consumers' adoption behavior between American and Korean consumers. Moreover, a culture with strong group conformity pressures (i.e., Korea) would foster strong interactions between individual and societal attitudes, and thus the effect of subjective norm on attitude and behavioral intention would likely be more prominent in group-oriented cultures (i.e., Korea) than individualistic cultures (i.e., America) (Lee et al., 1991).

In this regard, the first research question was “*can subjective norm explain differences in attitude and behavioral intention to use mobile data services between American and Korean consumers?*”. To explore this research question, the subjective norm construct was used for measuring the indirect and direct effect on attitude and behavioral intention to use mobile data services in the research model. Hypothesis 4 a-d

was designed to answer this research question. Hypothesis 4a and 4b were tested to determine the direct and positive effect of subjective norm on attitude and behavioral intention to use mobile data services respectively. The results of hypothesis 4a and 4b showed that subjective norms did not positively effect consumer attitude toward using mobile data services and behavioral intention to use mobile data services in each country. Interestingly, the effect of subjective norm on Korean consumers' attitude (hypothesis 4a) and behavioral intention (hypothesis 4b) to use mobile data services was negative. Likewise, a negative effect of subjective norm on attitude was found in the American group.

Hypothesis 4c was tested to examine whether the effect of subjective norm on behavioral intention (H 4b) was greater than the effect of subjective norm on attitude toward using mobile data services (H 4a). Hypothesis 4c was tested by using a chi-square difference test and the results revealed that the path loadings were not different between the two paths. In other words, the effect of subjective norm on attitude and the effect of subjective norm on behavioral intention are similar in each country. Thus, hypothesis 4c was rejected. Moreover, the results of comparative analysis using the SEM invariance test indicated no difference in the direct effect of subjective norm on attitude and no difference in the direct effect of subjective norm on behavioral intention to use mobile data services between American and Korean consumers. Hypothesis 4d was formulated to measure whether the effect of subjective norm on attitude toward using mobile data services and behavioral intention was stronger for Korean consumers than American consumers. Hypothesis 4d was tested to examine whether there was a difference in the indirect effect of subjective norm on attitude and behavioral intention to use mobile data

services between the two countries. The SEM invariance test revealed no significant difference between the two countries in terms of the indirect effect of subjective norm on behavioral intention between American and Korean consumers. Therefore, the effect of subjective norm on the adoption of mobile data services between American and Korean consumers was not supported in the study.

This study proposed that subjective norm effects on the adoption of mobile data services might explain the differences in consumer mobile data services adoption behavior because of the cultural differences between Korean and American consumers. However, the results of some of the hypothesis testing did not reveal differences between the American and Korean consumers. One explanation may be that the effect of subjective norm on adoption of mobile data services is not a distinct cultural determinant between the two countries. In other words, the group norm influence for American and Korean consumers has become similar since Koreans have been influenced by Western culture and globalization has increased. Also, consumer's adoption of mobile data services is not influenced by subjective norm, thus, the hypothesized direction of the effect of subjective norm on attitude and behavioral intention to use mobile data services showed negative directions in the study.

Effect of Consumer Perceived Value

The second research question focused on whether consumer perceived value as an antecedent of behavioral intention to use mobile data services generates differences in the adoption of mobile data services between American and Korean consumers or not.

Research questions regarding the effect of consumer perceived value on using mobile data services were as follows:

- *Does each dimension of consumer perceived value differ between American and Korean consumers in using mobile data services?*
- *Which dimension of consumer perceived value plays a more significant antecedent role in behavioral intention to use mobile data services between American and Korean consumers?*

The first sub-question regarding the effect of consumer perceived value was answered by testing hypothesis 1 a-d. By conducting invariance tests, the results indicated that the effects of functional value, monetary value, and emotional value on the perceived usefulness of mobile data services showed different path loadings between American and Korean consumers. Hypotheses 1 a-d were tested to assess whether the relationship between each of the four consumer perceived value dimensions and perceived usefulness of mobile data services were different between the two countries. Chi-square difference tests showed that differences existed in the relationship between each consumer perceived value and perceived usefulness of mobile data services between the two countries, except for the relationship between social value and perceived usefulness of mobile data services. Since the relationship between social value and perceived usefulness was not significant, hypothesis 1b was not supported. Overall, this study revealed differences in the relationship between consumer perceived value and perceived usefulness of using mobile data services for American and Korean consumers regarding functional, monetary, and emotional value.

The second sub-question examined which dimension of consumer perceived value played a more significant antecedent role in using mobile data services for American and Korean consumers. The results indicated that for both countries, “emotional value” had the highest standardized coefficients on perceived usefulness in the adoption of mobile data services. Thus, “emotional value” played the most significant antecedent role in the adoption of mobile data services in each country.

Comparing the “emotional value” standardized coefficients on perceived usefulness between the two countries, this study found that the “emotional value” factor loading was much higher for the Korean model than the American model. One explanation may be that the entertainment aspect of mobile data services is more developed than other dimensions of consumer perceived value in Korea. The emotional or entertainment characteristic of mobile data services is the most significant value influencing use of mobile data services for Korean consumers. However, the path for functional value on perceived usefulness was negative for the Korean consumers. This negative path may be attributable to measurement error (e.g., the offending variance of perceived usefulness for the Korean sample). There was item redundancy between the functional value and perceived usefulness scales, thus the scales might be scrutinized to reduce any redundancy in the measurement items.

Summary of Hypothesis Testing

In addition to testing hypothesis 1a – 1d and hypothesis 4a-4d, other hypotheses were tested to examine the components of the extant TAM model in the adoption of mobile data services model. Hypothesis 2 a and 2 b were tested to examine the causal

relationship between perceived ease of use and perceived usefulness and the relationship between perceived ease of use and attitude in each country. The result of hypothesis 2a was significant and positive in each country. Perceived ease of use positively affects perceived usefulness in each country. However, hypothesis 2b was not significant for American consumers, but was marginally significant with a negative relationship for Korean consumers. The results of hypothesis 2b showed that the perceived ease of use of mobile data services was negative for Korean consumers. Thus, this study concludes that perceived ease of use is not positively related to consumers' attitudes toward using mobile data services for Korean consumers. Since Korean consumers have access to a wider range of mobile data services than American consumers, some of the mobile data services available in Korea may have complex functional features and be more complicated to use. Thus, the negative effect of perceived ease of use on attitudes toward mobile data services in the Korean sample may be in response to the complexity of the mobile data services available.

Hypothesis 3a and 3b were tested to see the hypothesized path from perceived usefulness to attitude and perceived usefulness to behavioral intention respectively. The results indicated that the two hypothesized paths were significant and positive in each country. Thus, the greater the perceived usefulness of mobile data services, the more positive the attitude toward using mobile data services and the more positive the behavioral intention to use mobile data services in each country.

Hypothesis 5 examined the casual relationship between attitude and behavioral intention to use mobile data services in the research model. The hypothesis testing results indicated that the relationship between attitude and behavioral intention was significant

and positive in each country. Moreover, the casual relationship between attitude and behavioral intention has been supported in previous study for American consumers, but it has not been studied extensively with non-American consumers. The result of hypothesis 5 revealed that the relationship between attitude and behavioral intention was strongly supported in the Korean sample.

Research Model Testing

The core of the research model in the study, the Technology Acceptance Model (TAM), was tested to examine whether TAM was applicable for Korean consumers or not. Since this theory was developed and tested with American consumers, it was important to explore whether the TAM model was applicable in other cultures. Moreover, testing TAM including the cultural determinants (i.e., consumer perceived value and subjective norm) may contribute to predicting consumers' technology-based services adoption behavior (i.e., mobile data services in this study) across cultures. The measurement model in each country showed a good model fit index (Chi-square of 2949.969, DF of 1318, CMIN/DF of 2.238, CFI of .903, and RMSEA of .056) with all significant hypothesized paths (all loadings are at $p < .001$). The reliability and construct validity of each construct in each country exceeded recommended levels. Therefore, this study concluded that the research model including all constructs was applicable to both American and Korean consumers.

Limitations of the Study

Limitations regarding the methodology are presented. Specifically, limitations are addressed regarding the measurement scales and the sample.

Measuring Scale

There are two important measuring scales in examining difference in the adoption of mobile data services between the two countries, consumer perceived value and subjective norm. The two constructs have been used as antecedent variables to predict consumption behavior in previous research (e.g., Sweeny & Soutar, 2001; Parasuraman & Grewal 2000; Eagly & Chaiken, 1993; Sheth, Newman, & Gross, 1991; Zeithaml, 1988; Fishbein & Ajzen, 1975).

Subjective Norm

The scale of subjective norm is usually used as a unidimensional construct, but sometimes it is used as a two dimensional construct (societal norm and social influence). Subjective norm in this study was used as a unidimensional construct. Using a two dimensional measure of subjective norm might generate different results. The decision to use a unidimensional measure of subjective norm instead of using a two dimensional measure limited the level of detail and analysis in this study.

Consumer Perceived Value

There are a number of different perspectives, definitions, and measuring scales for consumer perceived value found in previous research (e.g., Sweeny & Soutar, 2001;

Parasuraman & Grewal 2000; Sheth, Newman, & Gross, 1991; Zeithaml, 1988). Moreover, consumer perceived value is a complex term to define since consumer perceived value occurs during purchase, and pre- and post- purchase stages. Thus, when conceptualizing consumer perceived value, measurement error can occur when one mistakenly concludes important value components are unimportant (Lin, Sher, & Shih, 2005) and different methodological approaches may generate different consequences as well. Since the measuring scales of consumer perceived value in the study were developed and validated in the context of using products in previous research, the attempt to use the measuring scales to measure use of services could generate confounding results.

In addition, since mobile data services are still in the development and adoption stage for American consumers (FCC, 2005), it may be hard to measure consumer perceived value in using mobile data services. In other words, the limited experience or knowledge of using mobile data services may have generated the three insignificant hypothesized paths (functional value, monetary value, and social value) in regard to consumer perceived value of using mobile data services for American consumers. Hence, each dimension of consumer perceived value may not significantly explain using mobile data services for American consumers.

Sampling Limitations

Despite the effort to match the sample on characteristics such as age and gender between the two countries, this study found some differences in the age distribution between the two countries. Comparing the mean age between American and Korean

consumers revealed that the Korean sample had more respondents in the younger age categories than the American sample. In addition, this study used consumer panels obtained from marketing research companies in each country. Thus, the results may not represent the population in each country and may be not generalized to all American and Korean consumers.

Implications

Research Implications

Research implications provide suggestions for other possible approaches to measuring consumer mobile data service adoption behavior and conducting cross-cultural research. Based on the study limitations, suggestions for future research are proposed.

Consumer Perceived Value

Using unidimensional measuring scales can be appropriate when the objective is to assess overall value perceptions. First-order multidimensional specifications are appropriate when the objective of the study is to assess value perceptions at the component level (Lin, Sher, & Shih, 2005). Researchers may measure different aspects of consumer perceived value toward using mobile data services. This study did not support consumer perceived value (functional, social, and emotional value paths were insignificant) as antecedent variables in using mobile data services for American sample. Using a unidimensional measure of consumer perceived value may generate different results. Further, this study found that emotional value in consumer perceived value has a strong effect on using mobile data services in each country. Emotional value has been

substantially investigated in relation to hedonic value or experiential value (e.g., Arnold, Reynolds, & Kristy, 2003; Mathwick, Malhotra, & Rigdon, 2001; Hirschman, Holbrook, & Morris, 1982; Holbrook & Hirschman, 1982). By adding hedonic or experiential value constructs measuring consumer mobile data services adoption behavior may provide more detailed analysis of consumer emotional value in future research.

Subjective Norm Effects

This study revealed insignificant effects of subjective norm on attitude and behavioral intention to use mobile data services using Structural Equation Modeling. However, by using Analysis of Variance or t-tests, future research might compare the mean difference of subjective norm effects on attitude and behavioral intention between the two countries. It may reveal the extent of subjective norm effects on attitude and behavioral intention in each country.

Sampling

Since the age distributions for the American and Korean sample were not matched, comparing a median split on age group might be used. By dividing age groups into the youngest group and the oldest group, research might compare the differences by using a chi-square difference test. Separate analyses would determine whether the age distribution might significantly affect the research model. Further, a stratified sampling method might be used in future research.

Measures of Cultural Differences

This study attempted to measure the cultural differences in adoption of mobile data services between American and Korean consumers by using consumer perceived value and subjective norm. However, consumer perceived value and subjective norm was used as an indirect measure of cultural determinants in the study. Future research may use a more direct measure of culture such as Hofstede's cultural dimensions (e.g., individualism vs. collectivism, power distance, Uncertainty avoidance) in comparing the cultural effects on consumer mobile data service adoption behavior across countries. Using other measures of culture in consumer behavior may more explicitly explain the cultural differences in consumer adoption behavior across countries. Finally, other cultural determinants (i.e., symbol, other value scales) causing the different consumption behavior might be investigated in future research.

Practical Implications

This study provides practical implications based on the results of the study. Practical implications regarding the antecedent effects of consumer perceived value on mobile data services are provided. In addition, practical implications in relation to mobile data service consumer profiles, the applications of retailing related mobile data services and Internet related mobile data services are suggested based on the study findings.

Consumer Perceived Value

In the study, functional value did not have a significant effect on American consumers' intention to use mobile data services. Further, functional value had a negative

effect on Korean consumers' intention to use mobile data services. Based on these results, retailers and marketers should enhance the functional features of mobile data services and create marketing messages that promote the functional features. Functional value is characterized by efficiency, timeliness, and reliability. Using the functional value characteristics in developing and marketing mobile data services may increase consumer perception of the functional value of mobile data services.

As shown in the results, this study found one of the dimensions of consumer perceived value "emotional value" had the strongest effect on using mobile data services. This was true in each country. Emotional value can be enhanced when providing entertainment aspects of mobile data service (i.e., gaming, downloading ringtones, downloading graphics). Also, developing an effective interface of using mobile data services (e.g., interface of transmitting mobile data services, interface of multimedia operation) may enhance consumer emotional value to use mobile data services in both countries.

Social value was not significant in influencing American and Korean consumers' intention to use mobile data services in this study. Providing social networking opportunities via mobile data services (e.g., virtual community) may increase the social value of using mobile data services for both countries.

Mobile Data Service Consumer Profiles

The American mobile data service consumer profiles showed that female consumers between 20 and 40 years old are likely to use mobile e-mail and send/receive video/photo messages through mobile data services and tend to use mobile phones more for private

than for business purposes. Retailers may send promotional shopping information and advertisements via mobile e-mails and picture coupons via mobile data services to this consumer group. Moreover, American mobile data service consumer profiles indicated that the older male consumer group (more than 50 years older) is more likely to access news, weather, sports, and map information through mobile data services. They use mobile phones more for private purposes than for business purposes. Mobile data service providers may provide additional fact-based information sources for this consumer group.

The Korean mobile data service consumer profiles showed that the age group between 20-30 years old is more likely to use Short Message Services and to download graphics (e.g., wallpaper, screensaver). This age group uses mobile phones more for private purposes than for business purposes. This study suggests that retailers can send personalized shopping information via Short Message Services to this age group.

Retailing Related Mobile Data Services

This study obtained information on consumers' interest in using retailing related mobile data service. The results indicated that the top three retailing related mobile data services categories for American consumers were comparison shopping services (27%), cell-phone based payment authorization (e.g., digital wallet) (23%), and scanning barcodes at a store to access product information (23%). For Korean consumers, cell-phone based payment authorization (e.g., digital wallet) (57%), paying for products (44%), and receiving special promotional messages (e.g., limited time offers, coupons) (34.5%) are the three retailing related mobile data services uses of highest interest. Based

on the findings, both American and Korean retailers need to develop and position the applications of retailing mobile data services to match these areas of highest interest.

Internet Related Mobile Data Services

The results related to the usage of Internet service categories in each country can be used to integrate mobile data services with other technology services in mobile markets. M-commerce could also be developed based on the research findings. Since many American consumers use e-mail (89.5%) followed by shopping (84.5%), information and news (81.5%), banking and financial service (80%), American mobile data service and m-commerce developers may utilize this information and integrate these popular Internet services into mobile data services or m-commerce. Korean consumers indicated that e-mail (64%) and information and news (64%) are the most popular Internet services followed by banking and financial services (61.5%), and shopping (60.5%). Korean mobile data services developers can utilize this information and provide the popular Internet services through mobile handheld devices.

Conclusions

This study attempted to reveal whether the effect of consumer perceived value and the effect of subjective norm might explain differences in consumer mobile data services adoption behavior between American and Korean consumers. The effect of consumer perceived value explained the differences in using mobile data services between the two countries. Moreover, the results indicated that emotional value in using mobile data services might be emphasized in developing and positioning mobile data services in each

country. However, the effects of subjective norm on attitude and behavioral intention were not significantly supported to explain the differences in consumer mobile data services adoption behavior between the two countries. The results may indicate that consumers in the two countries are becoming similar since globalization has increased. However, in order to provide more explicit explanation in cross-cultural research, this study also suggests using the direct measures of culture to compare the cultural differences in consumer behavior for future research.

Additionally, the suggestions of the applications of retailing related mobile data services and Internet related mobile data services may provide direction for retailers, mobile data services developers, and m-commerce developers in positioning mobile data services in mobile markets. Finally, the research model proved that the Technology Acceptance Model (TAM) is also applicable with non-American samples such as a Korean sample. Overall, this study provides a conceptual approach to understand consumer mobile data service adoption behavior in the two countries and presents empirical findings by testing the hypothesized research model with American and Korean consumers. This study contributes to increasing the knowledge of consumer values driving the use of mobile data services in each country and provides the applications and directions for success in mobile markets.

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APPENDIXES

Appendix 1.1. English Version Instrument

Mobile Data Service Survey

This survey is designed to learn about consumers' perceptions and uses of **mobile data services**. **Mobile data services**, including m-commerce services, are defined as transactions over a mobile telecommunications network using a handheld device. For example, mobile data services include such things as Short Message Service (SMS), e-mail, Multi-media Messaging, mobile games, weather, news, e-tickets, and stock trading.

Thank you for your participation! Please note that all of your answers to this survey are private and confidential and will only be used for research purposes.

Section I. Value of Mobile Data Services

The following question is about the value mobile data services provide. Please mark your level of agreement regarding the value of mobile data services.

<u>I believe that:</u>	Strongly Disagree						Strongly Agree
V1.Mobile data services are reliable.	☐	☐	☐	☐	☐	☐	☐
V2.Using mobile data services makes me feel accepted by others	☐	☐	☐	☐	☐	☐	☐
V3.Mobile data services are good for the price.	☐	☐	☐	☐	☐	☐	☐
V4. Mobile data services have good functions.	☐	☐	☐	☐	☐	☐	☐
V5.I feel relaxed when I use mobile data services.	☐	☐	☐	☐	☐	☐	☐
V6.Mobile data services are well provided.	☐	☐	☐	☐	☐	☐	☐
V7.Mobile data services are reasonably priced.	☐	☐	☐	☐	☐	☐	☐
V8. I feel good when I use mobile data services.	☐	☐	☐	☐	☐	☐	☐
V9.Mobile data services are provided in a timely manner	☐	☐	☐	☐	☐	☐	☐
V10.Using mobile data services makes a good impression on other people.	☐	☐	☐	☐	☐	☐	☐
V11.The price of using mobile data services is economical.	☐	☐	☐	☐	☐	☐	☐
V12.Mobile data services fulfill my needs well.	☐	☐	☐	☐	☐	☐	☐
V13.Using mobile data services is enjoyable.	☐	☐	☐	☐	☐	☐	☐
V14.Mobile data services offer value for the money.	☐	☐	☐	☐	☐	☐	☐
V15.Using mobile data services gives me pleasure.	☐	☐	☐	☐	☐	☐	☐
V16.Using mobile data services gives me social approval	☐	☐	☐	☐	☐	☐	☐
V17.Using mobile data services improves the way I am perceived by others	☐	☐	☐	☐	☐	☐	☐
V18.Mobile data services offer consistent service quality	☐	☐	☐	☐	☐	☐	☐
V19.Using mobile data services is interesting	☐	☐	☐	☐	☐	☐	☐
V20.Mobile data services make me want to use them.	☐	☐	☐	☐	☐	☐	☐

Section II. Perception of Mobile Data Services

The following questions ask you about how you perceive mobile data services. Please mark your level of agreement regarding using mobile service.

<u>I believe that:</u>	Strongly Disagree					Strongly Agree	
V21. Using mobile data services makes me save time	☐	☐	☐	☐	☐	☐	☐
V22. I feel that the important people in my life want me to use mobile data services	☐	☐	☐	☐	☐	☐	☐
V23. Learning to use mobile data services is easy for me.	☐	☐	☐	☐	☐	☐	☐
V24. People who influence my behavior think that I should use mobile data services	☐	☐	☐	☐	☐	☐	☐
V25. Using mobile data services improves my efficiency	☐	☐	☐	☐	☐	☐	☐
V26. Most people who are important to me probably consider mobile data services as useful	☐	☐	☐	☐	☐	☐	☐
V27. My interaction with mobile data services is clear and understandable	☐	☐	☐	☐	☐	☐	☐
V28. Mobile data services are useful to me	☐	☐	☐	☐	☐	☐	☐
V29. People who are important to me think that I should use mobile data services	☐	☐	☐	☐	☐	☐	☐
V30. It is easy to make mobile data services do what I want them to	☐	☐	☐	☐	☐	☐	☐
V31. Most people who are important to me probably consider my use of mobile data services to be wise	☐	☐	☐	☐	☐	☐	☐
V32. It is easy to use mobile data services	☐	☐	☐	☐	☐	☐	☐
V33. Most people who are important to me probably consider using mobile data services as valuable	☐	☐	☐	☐	☐	☐	☐

Section III. Attitude toward Mobile Data Services

The following questions are about your attitude toward using mobile data services. Please mark your level of agreement with the following statements.

	Strongly Disagree					Strongly Agree	
V34. Using mobile data services is a good idea	☐	☐	☐	☐	☐	☐	☐
V35. I am favorable about using mobile data services	☐	☐	☐	☐	☐	☐	☐
V36. Using mobile data services is a wise idea	☐	☐	☐	☐	☐	☐	☐
V37. I am positive about using mobile data services	☐	☐	☐	☐	☐	☐	☐

Section IV. Intention to Use Mobile Data Services

This section is about your intention to use mobile data services. Please mark your level of agreement with the following statements.

	Strongly Disagree					Strongly Agree	
V38. Given the chance, I intend to use mobile data services.	☐	☐	☐	☐	☐	☐	☐
V39. I expect my use of mobile data services to continue in the future	☐	☐	☐	☐	☐	☐	☐
V40. I intend to purchase products or services via mobile data services	☐	☐	☐	☐	☐	☐	☐

Section V. Demographic Information and the Usage of Mobile Data Services

Please, provide information about yourself and your usage of mobile data services.

V41. Which mobile data services do you use? (Please, select as many as apply)

- Sending/receiving SMS (Short Message Service)
- Downloading graphics (e.g., wallpaper, screensaver)
- Downloading games
- Using mobile e-mail
- Downloading ringtones
- Sending/receiving Video/Photo messaging
- Accessing news, weather, sports, map information
- Receiving alert messages
- Web browsing
- Shopping online
- None
- Other (Please specify)

V42. Which mobile data service do you use the most frequently? (Please, select only one)

- Sending/receiving SMS (Short Message Service)
- Downloading graphics (e.g., wallpaper, screensaver)
- Downloading games
- Using mobile e-mail
- Downloading ringtones
- Sending/receiving Video/Photo messaging
- Accessing news, weather, sports, map information
- Receiving alert messages
- Web browsing
- Shopping online
- None
- Other (Please specify)

V43. Which of the following retailing related mobile data services do you intend to use?

(Please, select as many as apply)

- ☐ Scanning barcodes at a store to access product information
- ☐ Comparison shopping services
- ☐ Receiving targeted local shopping information and news
- ☐ Checking shipping & availability of products
- ☐ Voice directions to a store
- ☐ Accepting and viewing advertisements
- ☐ Receiving alerts regarding auctions (e.g., e-bay)
- ☐ Receiving special promotional messages (e.g., limited time offers, coupons)
- ☐ Paying for products
- ☐ Cell-phone based payment authorization (e.g., digital wallet)
- ☐ Other (Please specify)

V44. How did you hear about the mobile data services you use?

- ☐ Spouse
- ☐ Parents
- ☐ Children
- ☐ Friends
- ☐ Colleagues
- ☐ School/University classmates
- ☐ TV, Radio
- ☐ Print media
- ☐ Internet
- ☐ Other (Please specify)

V45. To whom have you recommended the mobile data services, you use?

- ☐ Spouse
- ☐ Parents
- ☐ Children
- ☐ Friends
- ☐ Colleagues
- ☐ School/University classmates
- ☐ Other (Please specify)

V46. For what purposes do you use a mobile phone?

- ☐ Exclusively for private purposes
- ☐ More for private, than for business purposes
- ☐ About 50/50 private and business
- ☐ More for business, than private purposes
- ☐ Exclusively for business purposes

V47.What kind of Internet services do you use? (Please, select as many as apply)

- ☐ Banking and financial services
- ☐ Shopping
- ☐ Entertainment
- ☐ Information and News
- ☐ Travel booking (hotels, flights etc.)
- ☐ Ticket reservation (Theatre, concerts etc.)
- ☐ E-mail
- ☐ Other (Please specify)

V48.In what year were you born?

V49.What is your gender?

☐ Male

☐ Female

V50.What is the highest level of formal education that you have completed?

- ☐ High school graduate
- ☐ Some college
- ☐ College Graduate
- ☐ Postgraduate
- ☐ Others (Please specify)

Thank you for your participation!!

Appendix 1.2. Korean Version Instrument

모바일 데이터 서비스 설문 조사

본 설문지는 소비자들의 모바일 데이터 서비스 에 관한 인식도와 이용정도를 조사하기 위해 만들어졌습니다. 모바일 데이터 서비스는 모바일 커머스를 통해 제공되는 서비스를 포함하며 휴대폰을 사용하여 텔레 커뮤니케이션 네트워크를 통해 이루어지는 업무및 상거래로 정의 되어있습니다. 예를 들어, 모바일 데이터 서비스란 문자 메시지 서비스(SMS), 멀티 미디어 서비스(MMS), 이메일, 모바일 게임, 날씨, 뉴스, 티켓구입 및 주식정보등을 들 수 있습니다.
설문조사에 참여해 주셔서 감사합니다. 이 설문 조사의 질문에 대한 답은 오직 연구 목적으로 사용 될 것 임을 알려 드립니다.

섹션 I. 모바일 데이터 서비스 가치에 관한 질문

다음은 모바일 데이터 서비스가 제공하는 가치에 관해 묻는 질문입니다. 모바일 데이터 서비스의 가치에 관한 질문에 대해 동의 하는 정도를 표시해 주십시오.

...한 것 같다	전혀 그렇지 않다					매우 그렇다
V1.모바일 데이터 서비스는 믿을 만 하다.						
V2.모바일 데이터 서비스 를 이용함으로써 다른 사람들에게 인정되어짐을 느낀다						
V3.모바일 데이터 서비스는 이용 요금은 적당하다						
V4.모바일 데이터 서비스 기능은 유용하다						
V5.모바일 데이터 서비스를 이용할 때 편안함을 느낀다						
V6.모바일 데이터 서비스는 알맞게 제공 되어지고 있다						
V7.모바일 데이터 서비스 가격은 적당하다						
V8.모바일 데이터 서비스를 이용할 때 기분이 좋다						
V9.모바일 데이터 서비스는 신속하게 제공 된다.						
V10.모바일 데이터 서비스를 이용함으로써 다른 사람들에게 좋은 인상을 줄 수 있다						
V11.모바일 데이터 서비스 이용요금은 경제적이다						
V12.모바일 데이터 서비스를 통해서 내가 하고 싶은 것들을 할 수 있다						
V13.모바일 데이터 서비스를 이용하는 것은 즐겁다.						
V14.모바일 데이터 서비스는 금전적 가치가 있다						
V15.모바일 데이터 서비스를 이용하는 것은 재밌다						
V16.모바일 데이터 서비스를 이용함으로써 나는 사회적으로 인정 받았다는 생각을 한다						
V17.모바일 데이터 서비스를 이용하는 것은 사람들이 나를 보는 시각을 향상 시켜준다						
V18.모바일 데이터 서비스는 일관된 서비스를 제공 한다						
V19.모바일 데이터 서비스는 흥미롭다						
V20.모바일 데이터 서비스는 내가 모바일 데이터 서비스를 이용하고 싶도록 만든다						

섹션 II. 모바일 데이터 서비스에 대한 인식

다음 질문들은 모바일 데이터 서비스에 대해 어떻게 인식하고 있는지를 묻는 문항입니다. 모바일 데이터 서비스를 사용하는 것에 관한 질문에 동의하는 정도를 표시해 주십시오.

....한 것 같다	전혀 그렇지 않다					매우 그렇다	
V21.모바일 데이터 서비스를 이용하는 것은 내 시간을 절약하도록 해 준다	☐	☐	☐	☐	☐	☐	☐
V22.나에게 중요한 사람들은 내가 모바일 데이터 서비스를 이용하길 바라는 것 같다	☐	☐	☐	☐	☐	☐	☐
V23.모바일 데이터 서비스 이용법을 배우는 것은 쉬운 일이다	☐	☐	☐	☐	☐	☐	☐
V24.내 행동에 영향을 미치는 사람들은 내가 반드시 모바일 데이터 서비스를 이용해야 한다고 한다	☐	☐	☐	☐	☐	☐	☐
V25.모바일 데이터 서비스의 이용은 나의 능력을 향상 시켜준다	☐	☐	☐	☐	☐	☐	☐
V26.나에게 중요한 사람들은 모바일 데이터 서비스가 유용하다고 생각할 것이다	☐	☐	☐	☐	☐	☐	☐
V27.나는 모바일 데이터 서비스를 주고 받는 것을 명확하게 이해하고 있다	☐	☐	☐	☐	☐	☐	☐
V28.모바일 데이터 서비스는 내게 유용하다	☐	☐	☐	☐	☐	☐	☐
V29.내게 중요하다고 생각하는 사람들은 내가 반드시 모바일 데이터 서비스를 이용해야 한다고 생각한다.	☐	☐	☐	☐	☐	☐	☐
V30.나는 모바일 데이터 서비스를 이용해서 하고 싶은 것들을 쉽게 할 수 있다	☐	☐	☐	☐	☐	☐	☐
V31.나에게 중요한 사람들은 내가 모바일 데이터 서비스를 이용하는 것에 대해 나를 현명하다고 생각 할 것이다	☐	☐	☐	☐	☐	☐	☐
V32.모바일 데이터 서비스를 이용하는 것은 쉽다	☐	☐	☐	☐	☐	☐	☐
V33.나에게 중요한 사람들은 모바일 데이터 서비스를 이용하는 것은 가치 있다고 생각할 것이다	☐	☐	☐	☐	☐	☐	☐

섹션 III. 모바일 데이터 서비스 이용에 대한 태도

다음 질문은 모바일 데이터 서비스 이용에 대한 태도에 관한 문항입니다. 다음 질문에 대한 동의하는 정도를 표시해 주십시오.

	전혀 그렇지 않다					매우 그렇다	
V34.모바일 데이터 서비스를 이용하는 것은 좋은 생각이다	☐	☐	☐	☐	☐	☐	☐
V35.나는 모바일 데이터 서비스를 이용하는 것에 호의 적이다	☐	☐	☐	☐	☐	☐	☐
V36.모바일 데이터 서비스를 이용하는 것은 현명한 생각이다	☐	☐	☐	☐	☐	☐	☐
V37.나는 모바일 데이터 서비스를 이용하는 것에 긍정적이다	☐	☐	☐	☐	☐	☐	☐

섹션 IV. 모바일 데이터 서비스 이용에 대한 의향

다음 질문은 모바일 데이터 서비스 이용에 대한 의향을 묻는 문항입니다. 다음 질문에 대한 동의하는 정도를 표시해 주십시오.

	전혀 그렇지 않다						매우 그렇다
V38. 기회가 된다면, 모바일 데이터 서비스를 이용할 의향이 있다	☐	☐	☐	☐	☐	☐	☐
V39. 나는 앞으로도 모바일 데이터 서비스를 계속 이용할 것이라고 예상한다	☐	☐	☐	☐	☐	☐	☐
V40. 나는 모바일 데이터 서비스를 통해 제품과 서비스를 구매할 의향이 있다	☐	☐	☐	☐	☐	☐	☐

섹션 V. 인적사항 및 모바일 데이터 서비스 이용 정도

인적 사항 및 모바일 데이터 서비스 이용 정도에 대해 답해 주십시오.

V41. 귀하는 다음중 어떤 모바일 데이터 서비스를 이용 하십니까? (해당되는 것에 모두 체크해 주십시오)

- 문자 메시지 전송과 수신
- 그래픽 다운로드 하기 (예, 배경화면)
- 게임 다운로드 하기
- 이메일 사용하기
- 벨소리 다운로드 하기
- 비디오 또는 사진 전송과 수신
- 뉴스, 날씨, 스포츠, 지도등의 정보 이용하기
- 경보 메시지 수신
- 웹 검색하기
- 온라인 쇼핑하기
- 해당사항 없음
- 그외 다른 서비스 (구체적으로 입력해 주세요)

V42. 귀하는 다음중 어떤 모바일 데이터 서비스를 가장 많이 이용하십니까? (한개만 체크해 주십시오)

- 문자 메시지 전송과 수신
- 그래픽 다운로드 하기 (예, 배경화면)
- 게임 다운로드 하기
- 이메일 사용하기
- 벨소리 다운로드 하기
- 비디오 또는 사진 전송과 수신
- 뉴스, 날씨, 스포츠, 지도등의 정보 이용하기
- 경보 메시지 수신
- 웹 검색하기
- 온라인 쇼핑하기
- 해당사항 없음
- 그외 다른 서비스 (구체적으로 입력해 주세요)

V43.귀하는 다음중 어떤 상업적 모바일 데이터 서비스를 이용하는 것에 흥미를 느끼십니까?
(해당되는 것에 모두 체크 해 주십시오)

- ☐ 제품 정보를 얻기 위해서 상점에서 모바일 데이터를 이용하여 제품 바코드 읽기
- ☐ 제품들을 비교할 수 있는 쇼핑 서비스
- ☐ 알고 싶은 지역 쇼핑 정보나 뉴스를 받는 서비스
- ☐ 제품 배송과 제품 구매 가능 여부 조회
- ☐ 상점 위치를 알려주는 음성안내 서비스
- ☐ 광고 수신을 신청하고 받아 보는 서비스
- ☐ 경매 현황에 대해 실시간 알려주는 서비스
- ☐ 특별 할인 또는 이벤트 정보를 주는 서비스
- ☐ 결제 서비스
- ☐ 휴대폰 인증 결제 서비스
- ☐ 그외 다른 서비스 (구체적으로 입력해 주세요)

V44.귀하는 어떻게 모바일 데이터 서비스 이용에 대해 알게 되었습니까?

- ☐ 배우자
- ☐ 부모님
- ☐ 아이들
- ☐ 친구들
- ☐ 동료들
- ☐ 학교 또는 대학 친구들
- ☐ TV, Radio
- ☐ 광고지
- ☐ 인터넷
- ☐ 기타 (구체적으로 입력해 주세요)

V45.다음 중 누구에게 귀하께서 이용한 모바일 데이터 서비스를 추천하신 적이 있으십니까?

- ☐ 배우자
- ☐ 부모님
- ☐ 아이들
- ☐ 친구들
- ☐ 동료들
- ☐ 학교 또는 대학 친구들
- ☐ 기타 (구체적으로 입력해 주세요)

V46.귀하는 어떤 목적으로 휴대전화를 사용하십니까?

- ☐ 오직 개인적인 용도
- ☐ 업무 용도 보다는 개인적인 용도로 더 많이 사용
- ☐ 개인적인 용도와 업무 용도가 비슷함
- ☐ 개인적인 용도 보다는 업무 용도로 더 많이 사용
- ☐ 오직 업무 용도

V47.귀하께서 사용하시는 인터넷 서비스는 어느 것입니까? (해당되는 것에 모두 표기해 주십시오)

- ☐ 은행이나 재정업무에 관련된 서비스
- ☐ 쇼핑
- ☐ 오락에 관련된 서비스
- ☐ 정보와 뉴스
- ☐ 여행및 숙박 예약 (호텔, 비행기 예약등)
- ☐ 티켓 예약 (극장, 콘서트 티켓등)
- ☐ 이메일
- ☐ 기타 (구체적으로 입력해 주세요)

V48.귀하는 몇년 생이십니까?

V49.귀하의 성별은 어떻게 되십니까?

☐ 남성

☐ 여성

V50. 귀하의 최종학벌은 어떻게 되십니까?

- ☐ 고등학교 졸업
- ☐ 단과 대학 졸업 또는 대학 재학 중
- ☐ 대학 졸업
- ☐ 대학원 졸업
- ☐ 기타 (구체적으로 입력해 주세요)

설문에 응해 주셔서 감사합니다!

Appendix 2.1. Assessment of Normality for American Sample

Variable	min	max	skew	c.r.	kurtosis	c.r.
v22	1.000	7.000	-.119	-.685	-.372	-1.073
v24	1.000	7.000	-.091	-.524	-.708	-2.042
v26	1.000	7.000	-.291	-1.679	-.475	-1.370
v29	1.000	7.000	-.125	-.722	-.464	-1.340
v31	1.000	7.000	-.126	-.729	-.343	-.990
v33	1.000	7.000	-.125	-.723	-.469	-1.355
v20	1.000	7.000	-.135	-.780	-.093	-.269
v19	1.000	7.000	-.209	-1.204	.070	.202
v18	1.000	7.000	-.324	-1.871	.214	.619
v38	1.000	7.000	-.497	-2.869	-.149	-.431
v39	1.000	7.000	-.542	-3.131	-.297	-.856
v40	1.000	7.000	-.268	-1.546	-.384	-1.110
v37	1.000	7.000	-.313	-1.807	-.042	-.120
v36	1.000	7.000	-.251	-1.449	.142	.409
v35	1.000	7.000	-.430	-2.485	.024	.070
v34	1.000	7.000	-.327	-1.887	.053	.154
v23	1.000	7.000	-.380	-2.193	-.151	-.435
v27	1.000	7.000	-.218	-1.260	.081	.234
v30	1.000	7.000	-.205	-1.182	.099	.287
v32	1.000	7.000	-.171	-.986	-.064	-.185
v28	1.000	7.000	-.370	-2.136	-.117	-.337
v25	1.000	7.000	-.351	-2.024	-.065	-.187
v21	1.000	7.000	-.429	-2.477	-.251	-.725
v3	1.000	7.000	-.146	-.842	.455	1.314
v7	1.000	7.000	-.258	-1.492	.324	.935
v11	1.000	7.000	-.319	-1.839	-.043	-.125
v15	1.000	7.000	-.237	-1.366	-.029	-.084
v13	1.000	7.000	-.288	-1.661	.025	.072
v8	1.000	7.000	-.013	-.074	.410	1.183
v5	1.000	7.000	-.039	-.224	.172	.498
v2	1.000	7.000	-.119	-.687	-.335	-.968
v10	1.000	7.000	-.191	-1.105	-.308	-.889
v16	1.000	7.000	.012	.069	-.569	-1.641
v17	1.000	7.000	-.003	-.018	-.699	-2.017
v12	1.000	7.000	-.213	-1.228	-.012	-.034
v9	1.000	7.000	-.309	-1.783	.074	.213
v6	1.000	7.000	.011	.063	.286	.825
v4	1.000	7.000	-.336	-1.938	-.066	-.192
v1	1.000	7.000	-.142	-.821	-.158	-.457
Multivariate					533.118	66.661

Appendix 2.2. Assessment of Normality for Korean Sample

Variable	min	max	skew	c.r.	kurtosis	c.r.
v22	1.000	7.000	.019	.112	-.638	-1.841
v24	1.000	7.000	.124	.716	-.933	-2.695
v26	1.000	6.000	-.343	-1.978	-.698	-2.016
v29	1.000	7.000	.216	1.250	-.677	-1.953
v31	1.000	7.000	-.033	-.190	-.722	-2.085
v33	1.000	7.000	-.193	-1.115	-.698	-2.014
v20	1.000	7.000	-.108	-.623	-.281	-.812
v19	1.000	7.000	-.329	-1.897	-.262	-.755
v18	1.000	7.000	-.275	-1.588	.238	.687
v38	1.000	7.000	-.394	-2.274	-.053	-.154
v39	1.000	7.000	-.432	-2.492	-.160	-.463
v40	1.000	7.000	-.196	-1.132	-.508	-1.466
v37	1.000	7.000	-.217	-1.253	-.235	-.677
v36	1.000	7.000	-.390	-2.252	-.166	-.478
v35	1.000	7.000	-.493	-2.845	-.369	-1.066
v34	1.000	7.000	-.557	-3.217	.435	1.256
v23	1.000	7.000	-.367	-2.121	.111	.320
v27	1.000	7.000	-.178	-1.028	-.231	-.666
v30	1.000	7.000	-.340	-1.961	.008	.023
v32	1.000	7.000	-.404	-2.332	.226	.652
v28	1.000	7.000	-.287	-1.660	-.375	-1.083
v25	1.000	6.000	-.403	-2.327	-.777	-2.244
v21	1.000	7.000	-.453	-2.615	.001	.004
v3	1.000	6.000	.482	2.781	-.485	-1.401
v7	1.000	6.000	.492	2.841	-.645	-1.863
v11	1.000	6.000	.529	3.054	-.393	-1.135
v15	1.000	7.000	-.298	-1.723	-.477	-1.378
v13	1.000	7.000	-.388	-2.242	-.393	-1.135
v8	1.000	6.000	-.312	-1.801	-.710	-2.051
v5	1.000	7.000	-.080	-.459	-.482	-1.393
v2	1.000	7.000	-.140	-.805	-.538	-1.552
v10	1.000	7.000	-.048	-.275	-.503	-1.453
v16	1.000	6.000	.007	.042	-1.014	-2.926
v17	1.000	7.000	-.032	-.183	-.810	-2.337
v12	1.000	7.000	-.350	-2.023	-.240	-.692
v9	1.000	7.000	-.279	-1.612	-.410	-1.185
v6	1.000	6.000	-.303	-1.747	-.376	-1.085
v4	1.000	7.000	-.315	-1.821	.487	1.405
v1	1.000	7.000	-.367	-2.122	1.038	2.997
Multivariate					427.260	53.424

Appendix.3.1.Observations farthest from the centroid (Mahalanobis Distance) for American Sample

Observation number	Mahalanobis d-squared	p1	p2
197	104.127	.000	.000
47	99.358	.000	.000
51	98.810	.000	.000
57	97.489	.000	.000
59	96.167	.000	.000
112	95.146	.000	.000
100	94.206	.000	.000
118	89.508	.000	.000
34	88.408	.000	.000
119	84.843	.000	.000
76	82.138	.000	.000
124	80.247	.000	.000
87	80.145	.000	.000
35	77.587	.000	.000
194	76.350	.000	.000
120	73.403	.001	.000
121	72.089	.001	.000
10	71.266	.001	.000
96	70.718	.001	.000
184	70.380	.002	.000
17	69.750	.002	.000
40	68.676	.002	.000
200	68.009	.003	.000
125	66.678	.004	.000
168	66.367	.004	.000
16	65.733	.005	.000
195	65.197	.005	.000
157	64.874	.006	.000
144	64.223	.007	.000
62	64.007	.007	.000
196	63.539	.008	.000
31	62.568	.010	.000
32	61.677	.012	.000
19	61.294	.013	.000
103	60.977	.014	.000
130	60.704	.015	.000
5	60.686	.015	.000
4	60.494	.015	.000
146	60.436	.015	.000
126	59.618	.018	.000

Observation number	Mahalanobis d-squared	p1	p2
133	59.348	.019	.000
15	58.843	.022	.000
136	58.661	.022	.000
94	58.474	.023	.000
140	57.962	.026	.000
22	57.418	.029	.000
167	57.265	.030	.000
176	56.863	.032	.000
188	56.615	.034	.000
108	56.554	.034	.000
61	56.346	.036	.000
90	56.155	.037	.000
111	55.841	.039	.000
95	54.994	.046	.000
109	54.110	.054	.000
23	53.701	.059	.000
192	53.653	.059	.000
171	53.091	.066	.000
173	52.734	.070	.000
169	52.181	.077	.000
106	52.142	.078	.000
36	51.254	.090	.000
117	51.219	.091	.000
73	51.208	.091	.000
105	51.085	.093	.000
52	50.977	.095	.000
53	50.817	.097	.000
86	50.722	.099	.000
81	50.566	.102	.000
63	50.081	.110	.000
164	49.763	.116	.000
69	49.648	.118	.000
21	49.235	.126	.000
161	48.323	.146	.000
128	47.217	.172	.000
43	47.195	.173	.000
139	47.105	.175	.000
55	46.977	.178	.000
180	46.635	.187	.000
193	46.493	.191	.000
189	46.457	.192	.000
8	46.279	.197	.000
83	46.055	.203	.000

Observation number	Mahalanobis d-squared	p1	p2
9	45.429	.222	.000
104	45.266	.227	.000
70	44.296	.258	.000
134	43.726	.278	.000
97	43.211	.296	.000
141	41.300	.370	.018
177	41.220	.374	.016
122	40.625	.399	.061
85	40.063	.423	.161
54	40.055	.423	.130
74	39.887	.430	.145
129	38.950	.472	.495
24	38.795	.479	.518
60	38.551	.490	.586
1	37.384	.544	.944
79	37.113	.556	.965
29	36.740	.573	.985

Appendix 3.2. Observations Farthest from the Centroid (Mahalanobis Distance) for Korean Sample

Observation number	Mahalanobis d-squared	p1	p2
147	106.976	.000	.000
165	100.594	.000	.000
194	94.382	.000	.000
169	90.216	.000	.000
125	87.657	.000	.000
158	86.143	.000	.000
181	86.066	.000	.000
36	86.048	.000	.000
127	85.807	.000	.000
132	83.275	.000	.000
161	79.730	.000	.000
82	79.274	.000	.000
86	78.062	.000	.000
12	76.286	.000	.000
159	76.175	.000	.000
84	75.116	.000	.000
20	74.242	.001	.000
157	73.917	.001	.000
14	73.405	.001	.000
136	73.208	.001	.000
56	73.183	.001	.000
49	72.957	.001	.000
200	72.711	.001	.000
94	70.627	.001	.000
143	70.185	.002	.000
186	70.174	.002	.000
15	69.608	.002	.000
177	68.116	.003	.000
27	66.990	.003	.000
152	65.851	.005	.000
39	62.703	.009	.000
96	62.460	.010	.000
149	62.059	.011	.000
123	61.805	.011	.000
119	61.627	.012	.000
5	61.431	.012	.000
188	60.506	.015	.000
160	60.277	.016	.000
62	59.625	.018	.000
32	59.559	.019	.000

Observation number	Mahalanobis d-squared	p1	p2
34	56.682	.033	.000
197	56.622	.034	.000
89	56.486	.035	.000
144	56.390	.035	.000
179	55.915	.039	.000
11	55.240	.044	.000
98	53.390	.062	.000
87	53.101	.065	.000
190	52.653	.071	.000
130	52.603	.072	.000
164	52.345	.075	.000
48	52.222	.077	.000
8	51.863	.081	.000
17	51.793	.082	.000
66	50.650	.100	.000
183	50.461	.103	.000
121	50.308	.106	.000
74	49.789	.115	.000
69	49.781	.116	.000
61	49.760	.116	.000
139	49.397	.123	.000
128	49.354	.124	.000
176	49.152	.128	.000
156	47.838	.157	.000
170	46.756	.184	.000
173	45.994	.205	.000
3	45.449	.221	.000
91	44.327	.257	.006
180	43.887	.272	.014
44	43.602	.282	.021
137	43.333	.292	.031
13	43.012	.303	.050
31	42.495	.323	.116
107	41.991	.343	.228
90	41.841	.349	.237
198	41.718	.353	.237
25	40.536	.402	.716
99	40.101	.421	.833
43	39.531	.446	.937
40	39.470	.449	.928
4	39.447	.450	.911
26	39.275	.458	.923
35	38.566	.490	.986

Observation number	Mahalanobis d-squared	p1	p2
199	38.002	.515	.997
45	37.998	.515	.996
110	37.741	.527	.998
185	37.606	.533	.998
175	37.565	.535	.997
78	37.415	.542	.998
57	37.082	.558	.999
142	36.480	.585	1.000
53	36.446	.587	1.000
100	36.317	.593	1.000
120	36.258	.596	1.000
195	36.203	.598	1.000
41	35.529	.629	1.000
171	35.102	.648	1.000
118	34.414	.679	1.000
64	34.220	.687	1.000
22	34.180	.689	1.000

Appendix 4.1. Regression Weights and Critical Ratio For American Sample

			Estimate	S.E.	C.R.	P	Label
v1	<---	Functional	.895	.083	10.772	***	par_83
v4	<---	Functional	1.036	.086	11.988	***	par_84
v6	<---	Functional	.975	.074	13.126	***	par_85
v9	<---	Functional	.953	.081	11.820	***	par_86
v12	<---	Functional	1.206	.086	14.061	***	par_87
v17	<---	Social	1.498	.085	17.716	***	par_88
v16	<---	Social	1.503	.081	18.496	***	par_89
v10	<---	Social	1.247	.088	14.223	***	par_90
v2	<---	Social	1.121	.090	12.479	***	par_91
v5	<---	Emotional	.977	.088	11.123	***	par_92
v8	<---	Emotional	1.110	.078	14.192	***	par_93
v13	<---	Emotional	1.185	.079	14.920	***	par_94
v15	<---	Emotional	1.242	.080	15.477	***	par_95
v11	<---	Monetary	1.115	.074	14.994	***	par_96
v7	<---	Monetary	1.147	.071	16.117	***	par_97
v3	<---	Monetary	1.016	.076	13.392	***	par_98
v21	<---	Perceived Usefulness	1.323	.086	15.418	***	par_99
v25	<---	Perceived Usefulness	1.285	.080	16.038	***	par_100
v28	<---	Perceived Usefulness	1.395	.081	17.250	***	par_101
v32	<---	Perceived Ease of Use	1.245	.079	15.748	***	par_102
v30	<---	Perceived Ease of Use	1.140	.078	14.614	***	par_103
v27	<---	Perceived Ease of Use	1.166	.079	14.758	***	par_104
v34	<---	Attitude	1.322	.075	17.651	***	par_105
v35	<---	Attitude	1.416	.076	18.596	***	par_106
v36	<---	Attitude	1.327	.074	17.969	***	par_107
v37	<---	Attitude	1.455	.076	19.160	***	par_108
v40	<---	Intention	1.255	.097	12.931	***	par_109
v39	<---	Intention	1.608	.087	18.594	***	par_110
v38	<---	Intention	1.538	.081	18.912	***	par_111
v18	<---	Functional	.830	.081	10.293	***	par_113
v19	<---	Emotional	.933	.081	11.522	***	par_114
v20	<---	Emotional	1.104	.088	12.559	***	par_115
v33	<---	Subjective	1.515	.083	18.270	***	par_116
v31	<---	Subjective	1.449	.080	18.013	***	par_117
v29	<---	Subjective	1.444	.085	16.981	***	par_118
v26	<---	Subjective	1.467	.089	16.500	***	par_119
v24	<---	Subjective	1.293	.096	13.481	***	par_120
v22	<---	Subjective	1.389	.086	16.152	***	par_121
v23	<---	Perceived Ease of Use	1.193	.093	12.825	***	par_161

Appendix 4.2. Regression Weights and Critical Ratio for Korean Sample

			Estimate	S.E.	C.R.	P	Label
v1	<---	Functional	.627	.073	8.642	***	par_1
v4	<---	Functional	.931	.080	11.573	***	par_2
v6	<---	Functional	.965	.074	13.048	***	par_3
v9	<---	Functional	.956	.089	10.784	***	par_4
v12	<---	Functional	1.081	.082	13.181	***	par_5
v17	<---	Social	1.343	.079	17.017	***	par_6
v16	<---	Social	1.280	.078	16.446	***	par_7
v10	<---	Social	1.201	.089	13.556	***	par_8
v2	<---	Social	1.103	.088	12.482	***	par_9
v5	<---	Emotional	1.024	.086	11.878	***	par_10
v8	<---	Emotional	1.068	.083	12.831	***	par_11
v13	<---	Emotional	1.147	.076	15.014	***	par_12
v15	<---	Emotional	1.177	.083	14.122	***	par_13
v11	<---	Monetary	1.034	.077	13.480	***	par_14
v7	<---	Monetary	1.172	.069	16.905	***	par_15
v3	<---	Monetary	1.045	.075	13.873	***	par_16
v21	<---	Perceived Usefulness	.975	.082	11.864	***	par_17
v25	<---	Perceived Usefulness	1.124	.083	13.547	***	par_18
v28	<---	Perceived Usefulness	1.235	.077	16.072	***	par_19
v32	<---	Perceived Ease of Use	1.030	.085	12.106	***	par_20
v30	<---	Perceived Ease of Use	1.106	.079	14.082	***	par_21
v27	<---	Perceived Ease of Use	1.102	.089	12.404	***	par_22
v34	<---	Attitude	1.052	.068	15.381	***	par_23
v35	<---	Attitude	1.327	.075	17.586	***	par_24
v36	<---	Attitude	1.203	.073	16.506	***	par_25
v37	<---	Attitude	1.314	.080	16.518	***	par_26
v40	<---	Intention	1.191	.083	14.294	***	par_27
v39	<---	Intention	1.307	.074	17.559	***	par_28
v38	<---	Intention	1.311	.081	16.104	***	par_29
v18	<---	Functional	.874	.076	11.529	***	par_31
v19	<---	Emotional	1.109	.085	13.031	***	par_32
v20	<---	Emotional	1.123	.080	14.117	***	par_33
v33	<---	Subjective	1.173	.079	14.832	***	par_34
v31	<---	Subjective	1.254	.081	15.569	***	par_35
v29	<---	Subjective	1.046	.083	12.599	***	par_36
v26	<---	Subjective	1.129	.079	14.296	***	par_37
v24	<---	Subjective	1.026	.084	12.143	***	par_38
v22	<---	Subjective	1.114	.082	13.587	***	par_39
v23	<---	Perceived Ease of Use	.805	.095	8.504	***	par_79

Appendix 5.1. Correlations for American Sample

			Estimate
Emotional	<-->	Monetary	.633
Functional	<-->	Social	.555
Social	<-->	Emotional	.766
Monetary	<-->	Perceived Usefulness	.497
Perceived Usefulness	<-->	Attitude	.917
Attitude	<-->	Intention	.909
Intention	<-->	Subjective	.611
Functional	<-->	Subjective	.619
Social	<-->	Monetary	.484
Functional	<-->	Monetary	.709
Functional	<-->	Perceived Usefulness	.787
Functional	<-->	Intention	.761
Social	<-->	Perceived Usefulness	.484
Social	<-->	Perceived Ease of Use	.402
Social	<-->	Intention	.406
Social	<-->	Subjective	.693
Emotional	<-->	Perceived Usefulness	.743
Emotional	<-->	Perceived Ease of Use	.734
Emotional	<-->	Attitude	.714
Monetary	<-->	Perceived Ease of Use	.503
Monetary	<-->	Attitude	.506
Monetary	<-->	Intention	.493
Monetary	<-->	Subjective	.419
Perceived Usefulness	<-->	Intention	.897
Perceived Usefulness	<-->	Subjective	.709
Perceived Ease of Use	<-->	Intention	.780
Perceived Ease of Use	<-->	Subjective	.653
Attitude	<-->	Subjective	.599
Functional	<-->	Emotional	.857
Perceived Usefulness	<-->	Perceived Ease of Use	.873
Perceived Ease of Use	<-->	Attitude	.806
Functional	<-->	Attitude	.753
Emotional	<-->	Subjective	.796
Functional	<-->	Perceived Ease of Use	.812
Social	<-->	Attitude	.414
Emotional	<-->	Intention	.713

Appendix 5.2. Correlations for Korean Sample

			Estimate
Emotional	<-->	Monetary	.496
Functional	<-->	Social	.788
Social	<-->	Emotional	.826
Monetary	<-->	Perceived Usefulness	.420
Perceived Usefulness	<-->	Attitude	.877
Attitude	<-->	Intention	.899
Intention	<-->	Subjective	.649
Functional	<-->	Subjective	.750
Social	<-->	Monetary	.557
Functional	<-->	Monetary	.624
Functional	<-->	Perceived Usefulness	.830
Functional	<-->	Intention	.725
Social	<-->	Perceived Usefulness	.765
Social	<-->	Perceived Ease of Use	.509
Social	<-->	Intention	.631
Social	<-->	Subjective	.834
Emotional	<-->	Perceived Usefulness	.884
Emotional	<-->	Perceived Ease of Use	.717
Emotional	<-->	Attitude	.843
Monetary	<-->	Perceived Ease of Use	.304
Monetary	<-->	Attitude	.395
Monetary	<-->	Intention	.355
Monetary	<-->	Subjective	.584
Perceived Usefulness	<-->	Intention	.838
Perceived Usefulness	<-->	Subjective	.848
Perceived Ease of Use	<-->	Intention	.701
Perceived Ease of Use	<-->	Subjective	.665
Attitude	<-->	Subjective	.701
Functional	<-->	Emotional	.972
Perceived Usefulness	<-->	Perceived Ease of Use	.826
Perceived Ease of Use	<-->	Attitude	.699
Functional	<-->	Attitude	.788
Emotional	<-->	Subjective	.761
Functional	<-->	Perceived Ease of Use	.750
Social	<-->	Attitude	.683
Emotional	<-->	Intention	.806

VITA

Kiseol Yang was born in Kunsan, Korea in 1974 and graduated from Kunsan Women's High School in 1992. She received a Bachelor of Sciences in French language and literature from Wonkwang University in 1996. She obtained a Master of Science degree in Human Ecology with a concentration in Retail and Consumer Sciences at the University of Tennessee at Knoxville in 2002. Her Master's thesis, Consumers' attitudes toward customized interactive apparel marketing on the Internet, was presented for the partial fulfillment for her Master degree in May of 2002. After completing master degree, she worked for the advertising department in Korean Daily News in Los Angeles, CA. She began her doctoral program in Retail and Consumer Sciences at the University of Tennessee in 2003 and completed her doctoral degree in December 2006.