AN EMPIRICAL STUDY OF ACCEPTING MOBILE DEVICES USING TAM

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ABSTRACT

In a few years, a variety of mobile devices are expected to be utilized as a necessity for business as well as personal communications. Thus it is needed to conduct a comprehensive study on the acceptance of mobile devices in the mature market like Korea. This paper develops an extended technology acceptance model by including technological attributes of cellular phone and examines the determinant factors causing accepting cellular phones. Our empirical analysis through the internet survey shows that 1) among the determinant factors, perceived usefulness, perceived enjoyment or fun, and social pressure have positive direct impacts on the intention of accepting cellular phone, while personalization has a negative impact on it, and 2) technological attributes of cellular phone affect the determinant factors differently.

KEYWORDS: technology acceptance model, mobile device, cellular phone, product attributes.

1. INTRODUCTION

Drastic changes in the market are causing a noticeable turnover period in the world telecommunications terminal industry that has maintained an active growth rate. The growth spur, which began in 1995 and continued for five years with an annual growth rate of 60%, has come to an end and is heading into maturity. In 2001, the world telecommunications terminal showed a result of 399,580,000 in sales, a 3.2% decline from the previous year. It was year 2001 that the telecommunications terminal market began to decline. The analysis that the market is in its maturity is further supported by the 2001 to 2005 8% expected annual growth rate (Gartner Group, 2002). The world's key markets are devastated, thus making the analysis and solution to the switching market ever more necessary. In 2001 alone, the switching market exceeded the new subscribing market 56 to 54, a ratio that is expected to grow to 75 to 25 by year 2005 (Ha, 2002).

The switching market's changing situation is creating an increase in the necessity of identifying the influencing factors in the motivation of cellular phone adoption. This is because despite the fact that new cellular phone sales surpassed over half of previous sales, as the cellular market moves from the new subscription market to the switching market, the influencing factors may differ from first-time cellular phone purchase and switching purchase. Thus, choosing what customers view as important in the product or service, or analyzing and removing unwanted features and problems can be probable methods to increase the acceptance and expansion of cellular phones (Venkatesh & Davis, 1996). Furthermore, when expecting the development of various mobile terminals, another

helpful method of prediction is analyzing the current users.

The importance of research into the quickly developing acceptance process (Technology Acceptance Model, or TAM) of innovative technology as the mobile terminal, or information technology (IT) continues to be recognized, especially the relating of many factors in the acceptance of technology with behavior science phenomena (Davis, 1989; Adams, Nelson & Todd, 1992; Hendrickson, Massey & Cronan, 1993; Subramanian, 1994; Chin & Todd, 1995). TAM proves to be useful in identifying factors that influence the process of new cellular phone adoption.

Although TAM best describes the acceptance process of technology, previous studies disregarded IT's various technological factors, focusing only on the psychological aspects of users. Generally, the studies did not consider the factors influencing the user's perceived usefulness and ease of use. However some researchers voiced their views regarding the existence of influencing factors in the product's features and its effects on the actual use and selection of a product, as well as the existence of decisive factors (Myers & Alpert, 1968; Crawford, 1983; Reibstein, Bateson, & Bouling, 1987; Green & Srinivasan, 1990).

In the case of new cellular phone subscription, a company can efficiently allocate support in improving the usefulness of a product simply by understanding customers' preferences on the importance of product features (Lian & Huang, 1998). Recently, when considering personalization, increase in importance of fashion, combining and merging of functions, it will become inevitable to reflect influencing factors in the planning of product application during the product planning stage (Cho, 2002). The cellular phone's technological characteristic, analyzing the influencing factors in selection that is based on TAM, is expected to provide the actual value in the technological acceptance phenomenon. Hence, this study, with the inclusion of various technological factors, attempted to analyze and expand the TAM. Therefore, the relationship between technological attributes and those presented in previous TAM studies were included in the analysis of and establishing of a model on the cellular phone's various technological attributes. Finally, the technological attributes and the decisive factors affecting the motive in selection of a cellular phone were examined.

2. THEORETICAL BACKGROUD

2.1 TECHNOLOGY ACCEPTANCE MODEL (TAM)

Research on individual response to technology has continued to be active in the field of information technology. Moore & Benbasat (1991)'s Diffusion of Innovations (DOI), Davis et al. (Davis 1989; Venkatesh & Davis 1996)'s Technology Acceptance Model (TAM), Azjen (1985) and Taylor & Todd (1995)'s Theory of Planned Behavior (TPB), and Compeau & Higgins (1995)'s Social Cognitive Theory (SCT) have all researched this field from various theoretical aspects. TAM, which adapted the Theory of Reasoned Action (TRA) model, best describes the user's acceptance and usage of technology (Fishbein & Ajen, 1975; Azjen & Fishbein, 1980). TAM theorizes that perceived ease of use and perceived usefulness are important factors in the usage of technology. Davis(1989) states that usefulness and ease of use determines usage and attitude towards technology. It is accepted that attitude affects behavior intention at the point of actual use, and behavior intention is in turn related to the actual use of technology.

In 1990, the expansion and generalization with various variables of TAM and the application of technology was attempted in many researches (Venkatesh & Davis, 1996; Karahanna, Straub & Chervany, 1999; Lucas & Spitler, 1999; Venkatesh & Morris, 2000). Such researches investigated various complex factors affecting technology acceptance, including individual motivational factors and not just usefulness and ease of use described in TAM. Igbaria(1993), Rogers(1995), Taylor & Todd(1995), and Downing(1997) understood social influences as affecting technology acceptance, and Mathieson(1991), Dordick & LaRose(1992) and Williamson(1993) viewed fun/enjoyment as the influencing variable. For Zmud(1979), Assael(1981) and Kwon & Chidambaram(2000), the idea

that an individual's characteristics had an effect on technology acceptance was dominant. Thus, TAM was extended to include all the variables influencing the acceptance of technology.

In prior studies, however, specific technological attributes in IT was neglected and leaned towards an individual's psychological factor. Furthermore, due to the fact that researches have been done with focus on the identifying of influencing factors through TAM validity examination and modeling, identifying influencing factors in the acceptance of technology is quite limited when the characteristic of technology is taken into consideration from a technology perspective. This makes it difficult to understand which factors influence the acceptance of technology. However, studies have proved that product attributes exist in usage and purchasing decision, as well as decisive influencing factors (Myers & Alpert, 1968). The product then does not include a single factor, but multiple features, among which influence the decision to purchase a product. A company can benefit by understanding and adding certain attributes since it will gear towards the increase of product sales and expansion. The product's attributes will be discussed further in the next section.

2.2 PRODUCT ATTRIBUTES

In TAM, Davis (1989) focuses on the perception, or in other words the psychological aspect of technology, while placing less attention on the product and technology from the user's perspective. Usefulness, ease of use, and attitude discussed in TAM, however, can be considered as the formation of an individual's usefulness and attitude perceived through the product's attributes. Furthermore, how and to what degree technology and product attributes have an influence on an individual's perceived ease of use and usefulness, as well as attitude must be considered.

Product attributes discussed in related studies is the product's attributes that satisfy the customer's physical, social and psychological needs (Ferber, 1974). Diverse methods for analyzing product attributes have been presented, among which the method of measuring importance of product attribute is widely used. A product attribute's importance is described as the feature that users feel must exist and when missing, negatively alters the user's preference and trust of the product. Generally, a user evaluates the product's individual features inclusively. Therefore, the user ultimately judges the product's overall quality during the evaluation process, deciding whether or not it will satisfy one's desire to purchase the product. Yet, the degree to which a product's features affects the overall quality works differently. This is known as the relative importance of the product's attributes, however research on the evaluation of product attributes, while considering such relative importance during purchase has been done (Reibstein et al., 1987; Green & Srinivasan, 1990; Leeflang & Wittink, 1994).

Alpert (1971) presented the following three methodologies: direct questioning, indirect questioning, and observation experiment; thus, three methods for categorizing attributes were given. Among the three, direct questioning method proved to be the most effective. The direct questioning method relies on the direct questions based on the assumption that the user perceives importance of product attributes and is able to specifically express it during the time of purchase, to find the importance of an evaluation standard (Engel & Blackwell, 1982). Although this method contains the risk of the questioned individual to criticize a product attribute that one does not approve of but is accepted by society, it continues to be viewed as an effective methodology.

The first stage of this study consisted of extracting specific technology attribute[1] variable of the cellular phone through direct questioning. In order to collect technology attributes, one hundred cellular phone users were surveyed in November 2002. The survey consisted of thirty-five specific technology attributes that were gathered through previous literature and industrial documents. From the thirty-five, the relatively important attributes were measured on a 5-point scale measure, which resulted in 18 attributes presenting a mean of over 3.2. The 18 attributes were then constructed into

[1] In this study, the cellular telephone's attributes are viewed from a technological aspect. Therefore, instead of using product attributes, the terminology technology attribute will be used.

six technology attribute categories.

<Table 1> The Concepts of Cellular Phone's Technology Attributes and Sub Attributes

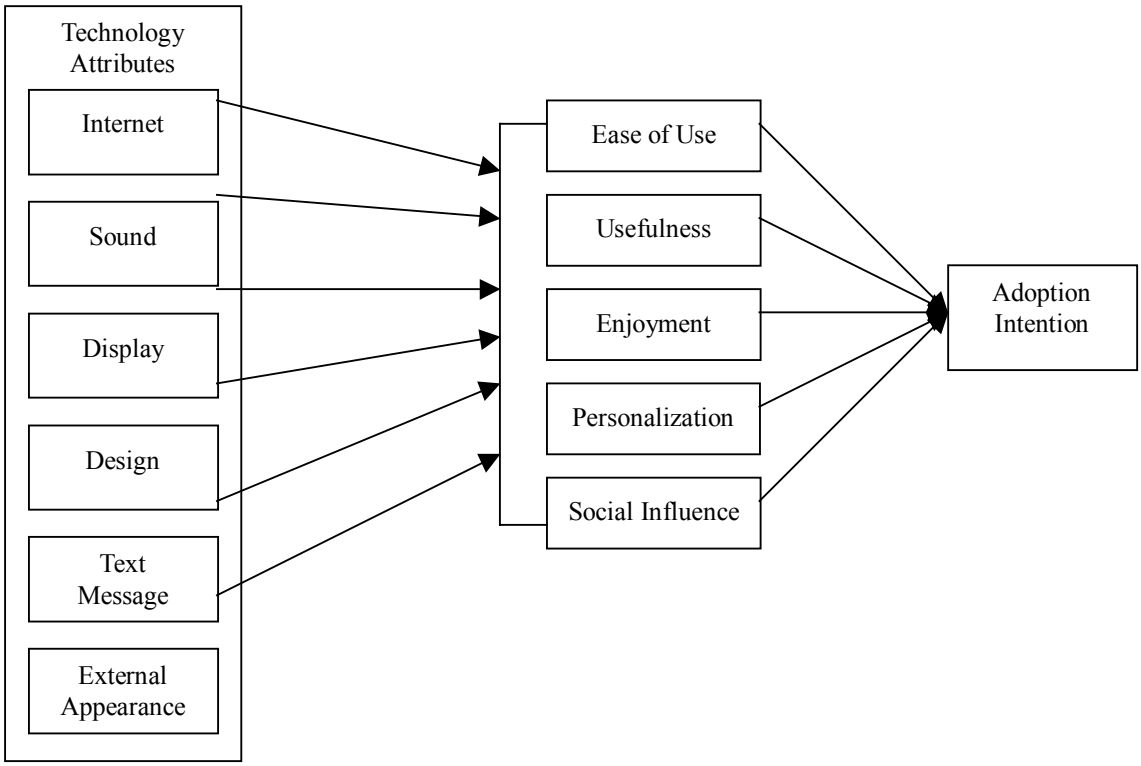
Technology Attribute	Sub Attributes	Technology Attribute	Sub Attributes
Internet	· Internet Connection	Design	· Design of Cellular Phone
	· CDMA 1X EV-D0*		· Color of Cellular Phone
	· Multi-Media Service		
Sound	· Quality of the Sound of the Bell	Text Message	· Capacity of Receiving Text Message
	· Editing the Sound of the Bell		· Entering Mode for Text Message
	· Stereo AMP**		· Long Message Service
Display	· Resolution of LCD Color	External Appearance	· Size of Cellular Phone
	· Size of LCD		· Weight of Cellular Phone
	· Dual Color LCD		· Capacity of Battery
	· Style of Cellular Phone		

The analysis on the reliability of the six variables resulted in all the attributes with a Cronbach's alpha beyond 0.6, thus proving to be reliable. Each factor in the survey was extracted to prove the variable's validity. Therefore, in this study the six technology attributes and TAM was brought together and analyzed to understand which technology attribute affected the purchase of a new cellular phone. This study aims at helping the understanding and prediction of the actual technology acceptance phenomenon in the continually changing cellular phone.

3. THEORY AND HYPOTHESES

In this study's model, the technology attributes examined through direct questioning are set into the following six categories: internet, sound, display, design, text message, and external appearance. Also, it was perceived that with TAM, the user's ease of use, usefulness, enjoyment, personalization, and social influence affected cellular phone selection. Also, like other TAM studies (Davis, Bagozzi, & Warshaw, 1992a; Jackson, Chow, & Leitch, 1997; Igbaria et al., 1997; Straub, Limayem, & Karahanna-Evaristo, 1995; Sznjna, 1996; Venkatesh, 1999; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Venkatesh & Speier, 1999) the attitude concept was excluded[2]. The cellular phone's technology attributes have a significant relation to each decisive factor, and the new phone selection intention was set as the dependent variable. Intention refers to the individual's planned future behavior, thus it is the subjective probability of belief and attitude moving into behavior (Engel & Blackwell, 1982). In the decision making model, behavioral intention is presented as the factor that directly decides a specific behavior (Howard & Sheth, 1973). Ajzen & Fishbein(1980) has once stated that behavior intention is directly related to behavior. Although a high cost is demanded in the measuring of actual behavior, the study of behavior intention can lower cost while achieving the goal. Thus it is often used as an alternative to the actual behavior study. The research model is shown in Figure 1.

[2] A comparative research on TAM and TRA by Davis, Bagozzi, & Warshaw(1989) showed that the intermediary role of the attitude variable in the previous TAM was weak and that perceived ease of use and perceived usefulness directly influences adoption intention. Following this study, TAM with the attitude variable excluded was adopted and is being followed(Davis, Bagozzi, & Warshaw, 1992; Jackson, Chow, & Leitch, 1997; Igbaria et al., 1997; Straub, Limayem, & Karahanna-Evaristo, 1995; Sznjna, 1996; Venkatesh, 1999; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Venkatesh & Speier, 1999).



<Figure 1> Research Model

3.1 EASE OF USE, USEFULNESS AND ADOPTION INTENTION IN NEW CELLULAR PHOPNE

Davis(1989, 1993) introduces the concept of two important perspective factors in technological acceptance: usefulness and ease of use. Usefulness is defined as the degree to which an individual believes that one's work ability will improve by using a certain technology. Work ability is related to work efficiency, productivity and the importance of IT in the work. Also, ease of use is defined as the degree to which an individual believes that using a particular system would be effort free. Thus IT use must not require much physical or mental effort. In later researches, the convergent validity and discriminant validity of the two concepts were re-evaluated (Adams et al., 1992; Hendrickson et al., 1993; Subramanian, 1994; Chin & Todd, 1995; Argawal & Prasad, 1999). Davis, Bagozzi, & Warshaw(1989) stated that usefulness and ease of use were very strong predicting variables in IT use, where usefulness was especially proved as an important factor in the change or use of technology (Mathieson, 1991; Szajna, 1996; Dishaw & Strong, 1998).

Furthermore, the fact that there is a direct influence of ease of use in technology use intention refers to the fact that the user's degree of technology acceptance can be improved directly. In Adams et al.(1992)'s research findings, ease of use was shown as having a significant influence on technology use, and Igbaria, Zinatelli, Cragg & Cavaye(1997)'s small business research results showed that ease of use was more significant than usefulness. Moreover, Thompson, Higgins & Howell(1991), in the context of ease of use, proved that short-term complexity was a negative influencing factor in computer user. Likewise, previous studies showed that ease of use and usefulness affects the use of technology. Therefore, this study makes the following hypotheses on ease of use and usefulness in the intention of cellular phone selection.

Hypothesis 1: Ease of use has a positive influence on the intention of new cellular phone adoption.
Hypothesis 2: Usefulness has a positive influence on the intention of new cellular phone adoption.

3.2 ENJOYMENT AND ADOPTION INTENTION IN NEW CELLULAR PHOPNE

Perceived enjoyment refers to the degree to which the use of technology brings energy to life (Webster & Martocchio, 1992; Dishaw & Strong, 1998). In Malone (1981)'s computer game research, enjoyment was presented as an important factor in the user's intention and behavior. Also, Davis, Bagozzi, & Warshaw(1992b) discovered that perceived enjoyment was a significant influence on the use of word processing programs. Recently Kwon & Chidambaram(2000) revealed that a first and foremost significant factor was enjoyment. Like external intention, such as usefulness, internal intentional factors such as enjoyment and fun proved to be influential in the actual technology acceptance behavior.

The use of new technology can be facilitated by the internally existing psychological factor such as pleasure, which is an internal intention regarding usage of new technology. People who experience direct enjoyment through the use of new technology or those naturally-inclined to having positive attitudes showed higher tendencies of using new technology than those who were not (Mathieson, 1991). Thus if one gains enjoyment from the use of cellular phones, the individual's use will increase and the intention of buying the product to increase that enjoyment is strengthened. Therefore, in this study, the following hypothesis is made on enjoyment and the intention of new cellular phone selection.

Hypothesis 3: Enjoyment has a positive influence on the intention of cellular phone adoption.

3.3 SOCIAL INFLUENCE AND ADOPTION INTENTION IN NEW CELLULAR PHOPNE

Social influence is a common influencing factor in various theories of technology use such as TRA, TPB and innovation theory. As one concept of social influence, subjective norm is the "perception of an individual's perception of the performance of their behavior that conforms to an important individual or group (Ajzen & Fishbein, 1980)." In TRA, TPB and specific TPB models, many researchers proved that subjective norms can be a decisive factor in technology acceptance and use (Laudon, 1985; Cooper & Zmud, 1990; Hartwick & Barki, 1994). Taylor & Todd(1995) actually proved that social influence, a subjective norm, has direct influence in technology use and acceptance. Furthermore, as another concept of social influence, image "strengthens an individual's status within the social system through the use and acceptance of technology (Moore & Benbasat, 1991), thus it is related to raising an individual's social position (Chau, 1996).

At the point of a technology acceptance behavior, the consideration of social influence is a generally occurring phenomenon, and especially works as an important factor in purchasing product and technology acceptance (Venkatesh, 1996; Yu, Choi, & Kim, 2002). Through a TAM research Dawning(1997) shows that an individual's perception and social influence makes an important influence on an individual's behavior, and Fishbein & Ajzen(1975) defines such behavior as a social norm in the appropriateness of behavior. Kwon & Chidambaram(2000) also states that social influence including subjective norm and image has an influence on cellular phone use. Therefore, this research with the presumption that the intention of selecting a new cellular phone is a way of achieving one's goal to gain social status makes the following hypothesis.

Hypothesis 4: Social influence has a positive influence on the intention of new cellular phone adoption.

3.4 PERSONALIZATION AND ADOPTION INTENTION IN NEW CELLULAR PHOPNE

The marketing strategy recently coming into focus is one-to-one marketing (Peppers, Rogers & Dorf, 1998). One-to-one marketing provides personalization and service to customers, thus making

the maintenance of personal relationships important. Personalization is providing a product with appropriate personalization services according to a customer's preferences or desires.

Mittal & Lassar(1996) defines personalization as a socially mutual content between the service provider and the customer, concluding that personalization is an important factor in deciding the quality of the service. Adelman, Ahuvia & Goodwin(1993) states that the positive personalization between the service providers and the customer can result in the removal of tedious feelings, console worries or express personal thoughts. Among the personalization in the service industry, Suprenant & Solomon(1987) focused on option personalization, defining it as the most general form of personalization or the personalizing of the result of a service. In other words, it means that various services are provided from which the customer can choose. As the number of provided services grow, the degree of personalization that the customer perceives grows, simultaneously as the customer's satisfaction increases.

Such personalization has been evaluated as having a positive influence on conclusion variables such as service evaluation and purchase (Bateson, 1985; Suprenant & Solomon, 1987; Adelman et al., 1993; Mittal & Lassar, 1996). Recently, as cellular phones began growing as a personal necessity, many people have begun perceiving personalization of functions such as sound, coloring, and screen as important (Cho, 2002). Therefore, it can be assumed that such factors will be important influencing factors in new cellular phone selection. Therefore, in this study makes the following hypothesis regarding personalization and the intention of cellular phone selection.

Hypothesis 5: Personalization has a positive influencing factor on the intention of new cellular phone adoption.

3.5 TECHNOLOGY ATTRIBUTES AND PERCEPTIVE FACTORS IN NEW CELLULAR PHOPNE ADOPTION

Generally, a product is regarded as the bundle of attributes that brings the differentiating desire of cost and efficiency to an individual or market (Wilki & Pessemier, 1973). However, such detailed elements were not considered in previous TAM researches. Certain technology, such as word processing, spread sheet, and internet are considered as having the same attributes, thus being considered as one type of technology. However, as it was presented before, many product attributes that have an influence on the actual use and purchase of the product exists and among such attributes, there are those that have decisive influences and those that do not have such an influence (Myers & Alpert, 1968; Crawford, 1983; Reibstein et al., 1987; Green & Srinivasan, 1990; Leeflang & Wittink, 1994). Therefore, because a single product or technology is made up of many attributes, such attributes all have individual influences on the decisive factor in choosing a product or technology.

In the first stage of this research, important attributes in cellular phones were discovered. The six attributes chosen were the internet, sound, display, design, text message, and external appearance. Especially in the case of cellular phones, as the user's demand becomes more complex in desiring multiple functions, entertainment, personalization, fashion, and so on (Cho, 2002), the cellular phone manufacturers' quick solution, in other words, the consideration of technological attributes is urgently needed since the reflection of product development and marketing strategy is being demanded. Therefore, this study makes the following hypothesis on the important factors in technological attributes and new cellular phone adoption.

Hypothesis 6: A cellular phone's technological attributes will have a different influence on ease of use, usefulness, enjoyment, personalization and social influence.

4. RESEARCH METHODOLOGY

4.1. SAMPLE AND DATA COLLECTION

The population in this study is identified as mobile telecommunication subscribers. A survey was given in two stages to examine the influencing factors in new cellular phone selection according to the technological attributes. As mentioned above, in order to gather the phone's key product attributes, a hundred cellular phone users were surveyed in November 2002. The six technology attributes from the thirty-five product attributes were extracted from previous literature and industrial documents. In the second stage of the survey, an internet survey in a formalized form was done. Internet survey is the method of putting a formalized survey into hypertext form and utilizing the cyber space by making the survey public for all internet users (Kim & Kim, 1999). The internet survey method is recognized as a confident research method for its convenience and improvement of sampling (Kehoe & Pitkow, 1996). Also, this method is advantageous in that it can measure opinions on new products and technology, such as was done in this study (Malhotra, 1999).

This research put in effect the internet survey method[3] which allows voluntary participants to participate without prior notice and was held for a month beginning December of 2002. From the 4,157 surveys submitted, 3,622 valid surveys were collected and the 213 surveys that gave the same answers as well as 322 of those with blanks were eliminated.

The demographic distribution of the 3,622 participants is as follows. Participants consisted of 75% male and 25% female participants, with a majority of males (50%). In education, 16.8% were high-school graduates, 58.0% college graduates or above, thus showing a 75% difference between the educational classes. The difference in age group ranged from 10.9% in their teens, 31.6% in the twenties, 24.2% in the thirties, and 33.3% in the forties and above. A total of 62.3% of the participants reported that the number of times they experienced purchasing a cellular phone was two to four times.

4.2. VARIABLE MEASUREMENT

Ease of use is defined as the feeling of simplicity when using a cellular phone or the degree of belief that no intellectual energy needs to be invested in usage. In the case of usefulness, it is defined as the improvement of one's work through the purchase of a cellular phone and the degree to which one believes that it will increase usefulness. To measure these variables, three survey questions were developed for the research and altered to a 7-point scale according to Venkatesh & Davis(1996). Enjoyment is defined as "the degree to which cellular phones bring excitement to an individual's life, which was measured on a 7-point scale by adapting three categories mentioned in Dishaw & Strong(1998) and Kwon & Chidambaram(2000)'s research was measured. Furthermore, social influence is defined as the gaining of social status by the user or the degree to which an individual uses the cellular phone so that they are not excluded from their from peer groups. Three categories from Kwon & Chidambaram(2000)'s research was adapted for a 7-point scale. Personalization is defined as the degree to which one feels that one's character is provided by the phone's functions. Thus, not just the technology itself, but how much the product can provide an individual with an abundance of personal functions. Three categories from Suprenant & Solomon(1987) were altered to fit a 7-point scale. The intention of cellular phone adoption can be seen as the decision of adopting a cellular phone. Three categories were also developed for a 7-point scale.

4.3 ANAYSIS OF THE RELIABILITY AND VALIDITY OF MEASUREMENT VARIABLES

[3] The self-selected survey method, in which participants were not selected prior to the survey, was exercised. In such surveys, the participant showed interest and knowledge of the survey topic, resulting in a tendency for participants to show stronger extremities than uninterested participants (Asher, 1995; Wu & Weaver, 1997). To resolve the limitations, this study attempted at retrieving a wider range of participants by inducing participants with prizes.

Prior to hypotheses testing, examination of the measurement's validity and reliability was examined. Validity is the concept of exactly and appropriately testing what the measuring instrument intends to test. Thus in the research model, factor analysis of the research variable proceeds the analysis of technology attributes and decisive factor. Principal Component Factor Analysis and Varimax factor rotation analysis resulted in the extraction of eighteen technology attributes, and verified the fact that the survey category regarding the five decisive factors in the intention of cellular phone and the choosing of intention of adoption as the dependent variable was correctly extracted.

The reliability of a measuring instrument is the evaluation of the degree of stability in obtaining the same measurement through a repetition of the same measurement method by using Cronbach's alpha (Nunnally, 1978; Nunnally & Bernstein, 1994). There is no absolute criterion, however, in the social sciences, a value above 0.6 is generally considered satisfactory (Nunnally, 1978). However, in this study, all reliability values must exceed 0.7 to be recognized as reliable.

5. RESULTS

5.1 MODEL FITNESS

In order to prove the degree of fitness between the data and model in this study, refer to figure 1, the structural equation modeling with LISREL analysis was used. Although there is no absolute standard in order to evaluate the fitness of structural equation modeling (Bentler & Bonett, 1980; Fornell, 1983; Hayduk, 1987), however, because the chi-square statistical value is sensitive to the distribution of observation variable or the size of the sample, several fitness indexes must be considered simultaneously for evaluation (Etezadi-Amoli & Farhoomand, 1996).

Generally, when chi-square statistics is not satisfactory, RMSR must be smaller than 0.1, GFI larger than 0.9, AFGI larger than 0.8 to be recognized as an appropriate model (Hayduk, 1987). As seen in the analysis result of the research model (see Table 4), the figures representing the model's fitness: RMSR(0.052), GFI(0.92), and AGFI(0.90), all meet the requirements, thus the research model proves to be appropriate.

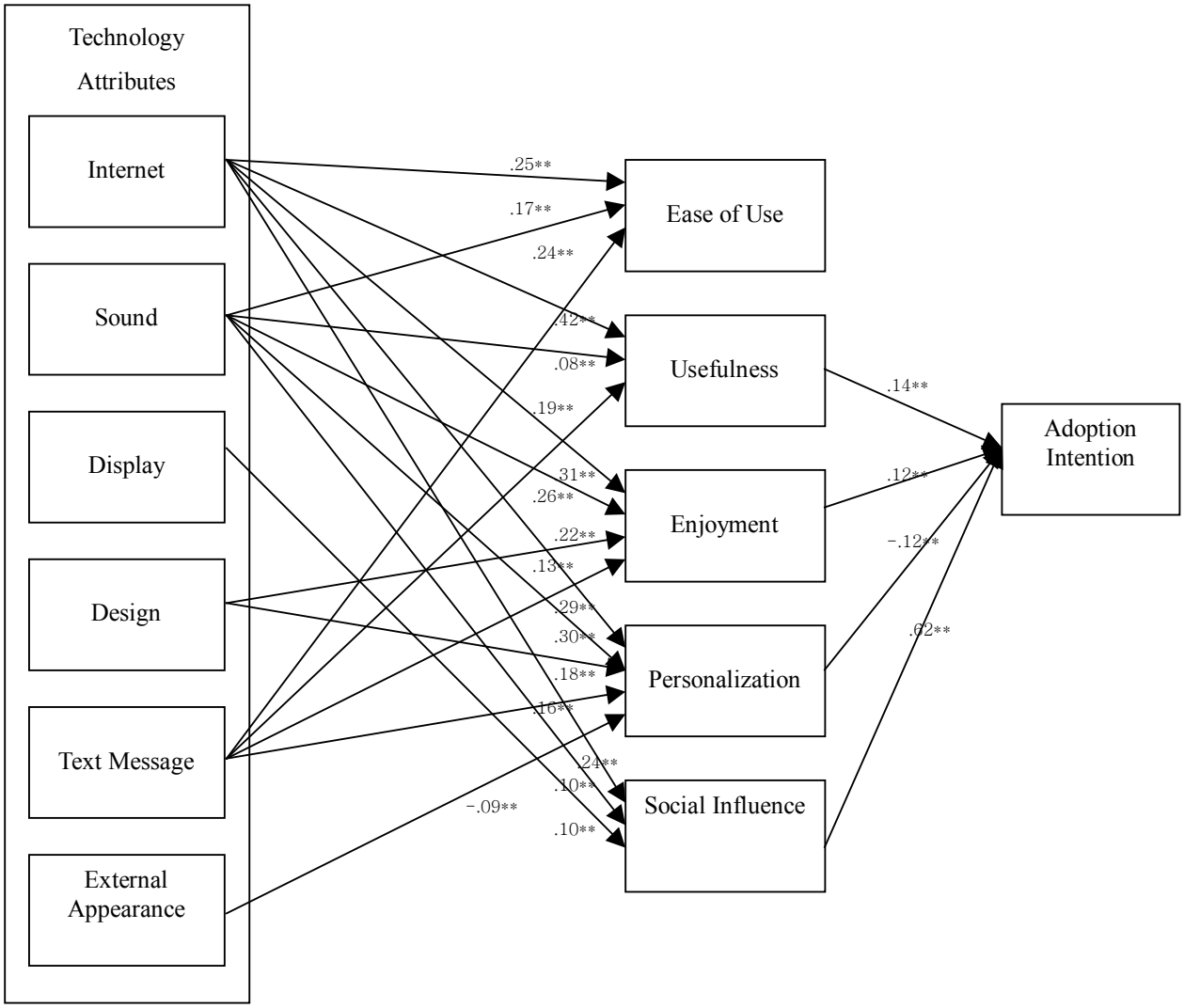
5.2 PATH COEFFICIENT ANALYSIS

Following the examination of the research model discussed above, the significance of the path was analyzed. The result of the LISREL analysis can be seen in Figure 2.

(1) ANAYSIS OF PATH COEFFICIENT BETWEEN PERCEPTIVE FACTORS AND ADOPTION INTENTION

Hypothesis one of this study states that ease of use has a positive influence on the intention of cellular phone adoption. As shown in Figure 2, the results showed that ease of use did not have a significant influence on adoption, thus not supporting hypothesis one. The result of analyzing hypothesis two, which states that usefulness has a positive influence on the intention of cellular phone adoption, showed that the path coefficient of usefulness was 0.14 with 95% of significant level influence on adoption intention. Thus hypothesis two was supported. Likewise, the results of hypothesis three and four which stated that enjoyment positively influenced the intention of cellular phone adoption and that social influence positively affected the intention of cellular phone adoption, respectively, showed enjoyment as having a path coefficient of 0.12 and 95% significant level and social influence as having a path coefficient of 0.62 and 95% significant level, presenting a significant influence on adoption intention. Therefore, hypothesis three and four were supported. On the other hand, the analysis of hypothesis five, which states that personalization has a positive influence on the intention of cellular phone adoption, showed personalization as having a path

coefficient of –0.12 and 95% significant level. Therefore, rather than a positive influence on adoption, a negative one existed, resulting in the reject of the hypothesis.



The insignificant relations are not reported here.

** $p < 0.05$

<Figure 2> Path Coefficient of Research Model

(2) ANALYSIS OF PATH COEFFICIENT BETWEEN TECHNOLOGY ATTRIBUTES AND PERCEPTIVE FACTORS

The results of the LISREL analysis between technology attributes and perceptive factors can be seen in Table 6. Hypothesis six states that technology attributes of cellular phones have individually different influences on ease of use, usefulness, enjoyment, personalization and social influence.

According to the results of the analysis, although the hypothesis on ease of use was not supported, internet, sound, text message of the technological attributes had an influence. Like ease of use, usefulness was influenced by the internet, sound, and text message. In the case of enjoyment, the internet, sound, message, and design had an influence. Furthermore, the internet, sound, display had influence on social influence. Finally, although the personalization hypothesis was not supported, when viewing the influence that technology attributes have, all aspects such as the internet, sound, design, text message and external appearance excluding display showed significant influences. Technology attributes do not have the same influence on each perceptive factor, instead, only a few

technology attributes, in this case the internet and sound, influences all perceptive factors, whereas design only influences enjoyment and personalization, and display on social influence. Also, the path coefficient has different influences on the intention of cellular phone adoption. Thus hypothesis six was supported.

6. CONCLUSIOSN

This research attempted to analyze what the perceptive factors for cellular phone adoption were, and the kind of influences given. Also, this paper considered the technological attributes of technology that previous TAM researches neglected, thus trying to analyze the kind of influence TAM's IT adoption had on the perceptive factors. The important results made through this research can be summarized as follows. First, usefulness, enjoyment, and social influence had a positive influence on cellular phone adoption, while personalization had a negative effect. Secondly, technology attributes had individually different influence on each of the perceptive factors in cellular phone adoption.

This research made the following academic and practical contributions. First in academics, by attempting to expand the technology adoption theory using technology attributes of cellular phone, this study geared towards the correction and expansion of a more realistic technology adoption theory. In previous TAM researches, technology was considered as a single factor, however, in this study, the various attributes of technology were understood and specific technological influences were added to the TAM model and proved that each technology attribute had a significant influence on TAM's perceptive factors. Secondly, personalization was added to TAM's perceptive factors. Although personalization had a negative influence on cellular phone adoption, due to the fact that recently personalization is being researched in the marketing field, its level of importance is strengthening (Cho, 2002), it must be considered and examined in not only TAM researches, but also future cellular phone researches.

From a practical business point of view, because the important technology attributes were extracted, this study can help in the understanding of how important technology attributes is in a company's cellular phone production. Secondly, the change in the re-buying motivation in the cellular market due to the switching market trend, the identifying of the perceptive factors in cellular phone adoption, according to the judgment of the key point of a continual demand production, can become useful in product development and marketing strategies by providing specific solutions. It also finds its importance in the fact that it can help in predicting the important factors in the expansion of the cellular phone terminal market.

Despite such significance, this research has a few limitations. First, because this study made a cross-sectional study, it was not possible to measure the influence from the variables than occur with the length of time. Recently, a study that the influence of ease of use in social influence as well as technology use may be influenced by time had been done (Venkatesh & Morris, 2000). Therefore, in the future, a longitudinal study on time and technology usage must be done. Secondly, in the case of the object of this study, or new cellular phone adoption, the technology attributes or the user's perceptive factor as well as the demand in the actual market, government grant decisions, sorted guaranteed sales and other regulations and policies is expect ed to have a great influence, all of which were not considered in this research.

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