

Mobile Video Telephony Service Adoption : A Value-based Approach

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Abstract

Korean telecommunications industry has a large scale market and boasts on high service quality and high technologies enough to provide the mobile video telephony service(the VTS) satisfactorily. For many years, Korean telecommunications companies have been investing enormous amount of money to advertise their VTS widely and to allow their customers to change their cell phones for the 3G(the third generation) devices indispensable for the VTS. However, despite their efforts, the VTS adoption rate in Korea is very low as of January, 2010 and it seems that customers seldom feel the necessity to use. From this viewpoint, it becomes necessary to identify antecedents influencing the intention to use for the VTS empirically. For this purpose, we have proposed several hypotheses from the perspective of the Value-based Adoption Model(VAM). We conducted a survey and found the several factors which influence the value perception of VTS.

Keywords : The Mobile Video Telephony Service, Technology Acceptance Model, Value-based Adoption Model, Perceived Value, Self-expression

1. Introduction

Since CDMA was commercialized 10 years ago, the Korean telecommunications market has significantly matured with skyrocketing numbers of subscribers exceeding 41.1 million (almost 80% of the total population) as of March, 2007 [Hong and Kim, 2007].

Given this, telecommunications service providers in Korea have initiated to seeking new profit sources, focusing on the highly advanced, WCDMA-based mobile video telephony service (hereafter the VTS). To win the full-blown the VTS battle starting from March of 2007, the major service providers in Korea have significantly invested in distributing WCDMA-based terminals widely, as a sound platform for the VTS expansion. As a result, the number of the VTS-enabled handset holders among total mobile subscribers has reached 16 million as of October 2008.

However, despite such efforts, the VTS use rate has remained remarkably low : the average time-of-use ratio of the VTS call to non-the VTS call is no more than 5 percent as of January, 2010 [Ahn, 2010]. And the statistics of the providers indicates that the number of users utilizing the VTS more than once has been on the rise thanks to free promotion, but this growth has not been translated into actual sales [Jeong, 2007; Park, 2009]. Furthermore, a public survey on the VTS showed that the majority of 51.1% responded expressing that they had 'Feeling no need for the VTS' [Kim and Jeong, 2007]. In short, the role of the VTS in daily life has not yet materialized in Korea

[Kim, 2008].

During the past several decades, there were similar initiatives and expand the VTS use in Japan and the U. S., but this effort mostly failed [Schnaars and Wymbbs, 2004]. Many researchers concluded that the VTS technical issues such as 'image quality' or 'system quality' did not fully satisfy customer expectation, but at the same time, the overstretched attempts to create a new market based on the perspective of supplier/technology capability, without sufficient analysis on customer needs, also largely contributed to the failure [Noll, 1992; Schnaars and Wymbbs, 2004].

Therefore, Korean telecommunications providers should not pursue the same strategy, but rather create a service extension strategy based on a full understanding of customer needs.

A starting point of understanding customer needs in this area begins with an understanding of the critical elements that create user appreciation arising from the VTS service value proposition. However, most VTS studies have focused on technological aspects of the VTS. This is the motivation behind this study which aims to answering the following two questions.

1. *What elements do have impact on the VTS adoption?*
2. *Among them, what is the most decisive element in evaluating the VTS value?*

This study will help observe when and in which case users appreciate the value of the

VTS, bringing practical benefits in creating a new marketing strategy to the telecommunications service providers. Furthermore, implications of this study will have value not only for the Korean companies but also for other telecommunications companies around the globe, because they are based on the survey on the Korean market which has 'dynamic consumers', that is, very enthusiastic and educated users of high tech devices and services. In other words, it will help them forecast the market of their VTS [Kwon and Kim, 2008; Lee, 2003].

In the following section, the definition and implication of a Value-based Adoption Model, the key model of this research, will be addressed. Then, we will propose our research model of this study by developing number of research hypotheses based on theories and conducted empirical test to discuss the managerial implications.

2. Background and Hypotheses Development

2.1 Value-based Adoption Model (VAM)

Discovering the full value of systems or devices requires users to have the ability to sufficiently use it. And this sufficiency requires users to adopt it as his or her personal device, both physically and psychologically.

Many IT researchers have recognized the importance of user acceptance and have been studying the antecedents in making a new technology valuable to users. In regard to this, renowned theories such as 'Theory of Planned

Behavior [Taylor and Todd, 1995]', 'Social Cognitive Theory [Bandura, 1977; Bandura, 1978]', 'Unified Theory of Acceptance and User of Technology (UTAUT : [Venkatesh et al., 2003])', 'Theory of Diffusion of Innovations [Moore and Benbasat, 1991]', and 'Technology Acceptance Model (TAM : [Davis, 1989])' have been applied for studying technology adoption. Among these theories, the Technology Acceptance Model (TAM) is simple to understand and highly reasonable, and well-explained, thereby it is widely accepted by researchers. Davis insisted that elements directly affecting the level of user acceptance are (*perceived*) *usefulness* and (*perceived*) *ease of use* [Davis, 1989].

However, TAM has its own limitation in observing user acceptance and its antecedents for hedonic systems or hedonic products such as the VTS and mobile-internet where a user is both a technology user and a service consumer [Kim et al., 2007]. The reasons are two-fold as follows :

First of all, TAM originates from the field of Information Systems (IS) that increase productivity in the office environment [Van der Heijden, 2004]. In other words, TAM is about utilitarian systems which aim to provide utilitarian benefits to users such as increasing task performance [Van der Heijden, 2004]. In this context, hedonic benefits such as (*perceived*) *enjoyment* which comes from the sense of pleasure being enjoyed during the course of consumption are not considered as an important issue.

Secondly, TAM was designed based on the situation where the organizations make users

use IT artifacts mandatorily to carry on their daily operations [Kim et al., 2007]. The one who pays the cost required for utilizing IT artifacts is not an employee using it directly but an organization. Particularly, in most cases, the purpose of adopting and using an IT artifact is determined by organizations according to their business strategies. Furthermore, the authority to determine whether they use it in the future continuously or not is unlikely to be granted to users [Kim et al., 2007]. According to Zeithaml, however, 'the value' users perceive and appreciate after their product or service consumption is the sum of the benefits gained and the total (monetary and non-monetary) sacrifice required up to the final decision to purchase or use [Zeithaml, 1988]. Because it is not necessary for employees to pay cost for using IT artifacts of the organization they belong to, TAM only focuses on the benefit aspects resulting from the use of IT artifacts. As for various mobile services including the VTS, however, its consistent use is dependent on intended requirements of individual users and its future use is also largely determined by user's appreciation of the value following their service consumption.

In this sense, we need to consider both the benefit and the sacrifice aspects to figure out which factors have an impact on the degree of value perception clearly and sufficiently.

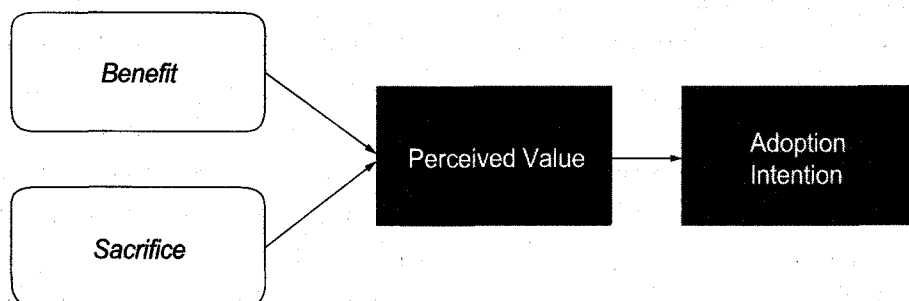
Kim et al.[2007] understood the area that cannot be explained by TAM, then suggested Value-based Adoption Model(VAM) to complement TAM. <Figure 1> shows a conceptual model of VAM which is designed based on the aforementioned concept *perceived value* of Zeithaml [1988]. In their study of mobile-internet adoption, Kim et al. compared VAM with TAM in terms of their explanatory power on the degree of adoption intention and found out that VAM is more powerful [Kim et al., 2007].

Therefore, this study will be also based on this model and we will develop number of research hypotheses from the following section.

2.2 Value Drivers

What factors do drive people to buy or use something?

By suggesting his motivational theory, Deci asserted that there are two fundamental drivers : an *extrinsic motivation* and an *intrinsic motivation* [Deci, 1975]. Van der Heijden ex-



<Figure 1> Conceptual Model of VAM

plains the meanings of these two concepts in terms of the system-user interaction as follows [Van der Heijden, 2004].

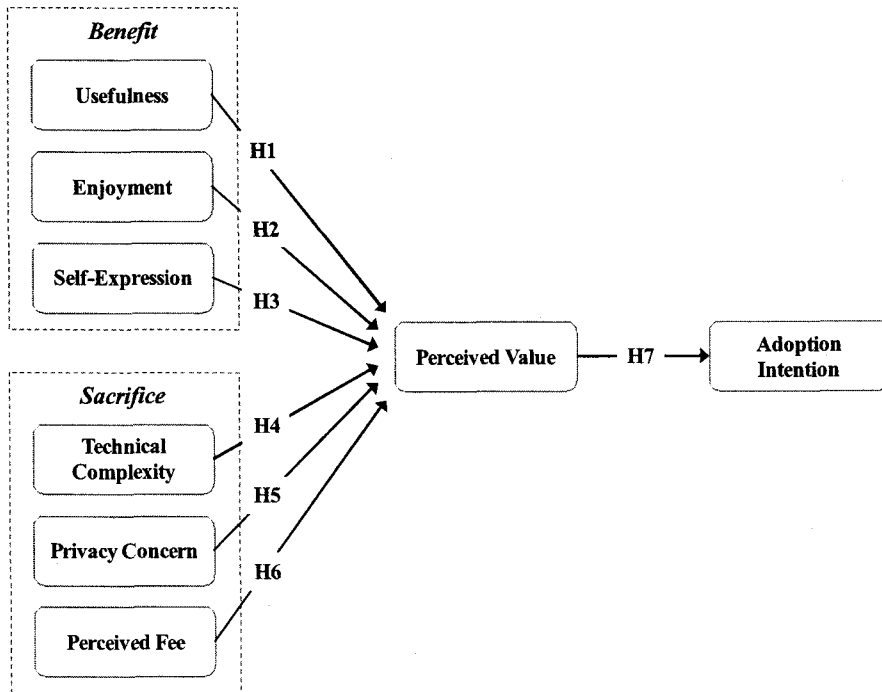
First, an extrinsic motivation refers to a driver which makes users expect some reward or benefits *external to their interaction* with systems. In other words, use or consumption can be understood as a means to accomplish some predefined end [Rintamaki et al., 2006]. For example, if we use digital devices to do our work more efficiently and effectively, it can be understood that we are extrinsically motivated. And the reward or

benefits we want to take in this situation are called as a *utilitarian benefit*.

Second, an intrinsic motivation refers to a driver which makes users expect benefits *derived from their interaction* with systems per se. In this situation, use or consumption can be understood as an end itself [Rintamaki et al., 2006]. And benefits pursued by intrinsically motivated ones are called as a *hedonic benefit*. In other words, hedonic benefit is a sense of pleasure being enjoyed during the course of consumption itself [Holbrook and Hirschman, 1982].

<Table 1> Main variables of the study

	Utilitarian	Hedonic	Social
Benefit	Usefulness	Enjoyment	Self-Expression
Sacrifice	Perceived Fee	Technical Complexity	Privacy-Concern



<Figure 2> Research Model

Furthermore, Rintamaki et al. [2006] argued that those two benefits cannot explain the whole picture of benefits we usually expect when consuming. Through reviewing literature reviews, they added the third concept named as a social benefit and proved statistically that they are mutually exclusive one another. A social benefit is a kind of a symbolic benefit we feel when we are able to express our personal values and think that we are distinguished ones among the public by consuming specific products or services [Chandon et al., 2000; Sweeney and Soutar, 2001; Veblen, 1967]. This is the reason why people buy luxuries despite their high prices.

This study also will be based on this tripartite conceptualization of a benefit and develop six hypotheses on that basis. Additionally, the value is the sum of the benefits gained and the portion that users have to give up or sacrifice for acquiring or using a product or service [Zeithaml, 1988] and the sacrifice is the concept which can be understood as the opposite side of the benefit. In short, we can think of and categorize the factors influencing the perceived value of the VTS into two dimensions: a *utilitarian-hedonic-social benefit* dimension and a *benefit-sacrifice* dimension as shown in <Table 1> and <Figure 2> shows our proposed research model to incorporate in this study. Benefit and Sacrifice categorize and represent three variables each.

2.3 Usefulness (US)

According to Davis, people perceive usefulness when they feel specific systems or pro-

ducts are helpful to improve their work performance [Davis, 1989]. In this sense, usefulness is about how effectively and/or efficiently users can solve their problem by using a system or a product as a tool.

The concept of usefulness has been recognized as a critical determinant factor for user behavior [Robey, 1979; Schultz and Slevin, 1975], and many IS studies confirmed that it is a significant factor for information technology adoption [Kim et al., 2007].

Because the VTS gives users an opportunity to communicate each other more effectively and/or efficiently by providing audio and visual information in an integrated manner, a user perceiving value of the VTS will be the one who expect and have already perceived usefulness of it.

Considering such study results above, following hypothesis can be established for this the VTS study.

H1 : A user's perceived usefulness of the VTS positively affects perceive value of the VTS.

2.4 Enjoyment (EJ)

Consumers are pursuing fantasies, feeling, and fun in their consumption. Holbrook and Hirschman[1982] define this phenomenon as hedonic consumption and explain that it significantly defines consumer behavior. Many marketing studies prove that a consumer's emotion and feeling, following their consumption, serve as critical variables in their appreciation of the value of a service (e.g., [Mathwick et al.,

2001)). If the previously mentioned usefulness is related to functional value of products or services, a hedonic benefit is more subjective and emotional one. Turel et al. [2007] coined the expression of emotional value, indicating the comprehensive feeling of enjoyment, pleasure or/and anxiety following the use of product or service. Among those feelings, this study particularly focuses on enjoyment while doing or following the VTS use.

Davis et al. [1992] confirmed that enjoyment affects intention to use by extensively applying existing TAM. However, they added that its impact is smaller than the one expected from perceived usefulness and ease of use. However, van der Heijden [2004] argued that such analysis results were originated from inappropriate categorization of IS. He insists that we need to separately observe the system designed to provide effective function and the system that delivers pleasure to users. He names the first as the utilitarian system while the second as the hedonic system [Van der Heijden, 2004]. According to his corroborative study on film information websites, the impact of enjoyment on intention to use in that hedonic system was much larger than that witnessed in perceived usefulness [Van der Heijden, 2004].

The VTS can be categorized into the utilitarian system according to the reason mentioned in the previous subchapter and the hedonic system as well, because it is basically a tool which is make it possible to communicate with family and friends undeterred by the limitations of time and space.

We therefore propose following hypothesis :

H2 : A user's perceived enjoyment of the VTS positively affects perceive value of the VTS.

2.5 Self-Expression (SE)

In the study, self-expression refers to the extent to which a user feels that the VTS help him/her express his/her own social status and personality to others. According to the seminal work of Veblen and many other existing studies, consumption itself can be described as 'social activity of expressing the individual to others' [Sheth et al., 1991; Veblen, 1967]. Consumers strongly confirm or strengthen their social identity [Firat and Venkatesh, 1995] and social status [Rintamaki et al., 2006] during product or service consumption.

In the media context, Rogers [1995] has also pointed out that higher-status individuals may be especially likely to adopt the new media because they are seen as status symbols. In their consecutive studies, Leung and Wei [1998, 2000] found out that 'fashion and status'-referring to the extent to which users can expect to be looked stylish and fashionable by using the media-is one of the main gratification dimensions of using pagers and cellular phones, and Pihlstrom and Brush [2008] confirmed that the social benefits delivered by the mobile service largely determines the service value.

The VTS gives users chances to express themselves to others in two ways. First, since it is still relatively new service, users can expect to be seen as early adopters and stylish people. Second, because the VTS trans-

mits both audio and visual information, users can show their appearances and facial expressions to other people more actively than any other existing communication tool (i.e., they can express their own identities to others in more active ways). In this sense, users may use the VTS and feel its value when they consider it as a better way to express their own social identities effectively.

H3 : The more a user thinks the VTS gives an opportunity to express his/her personality to others, the more s/he feels the value of the VTS.

2.6 Technical Complexity (TC)

Technical complexity refers to the extent to which a user feels that physical and mental effort is necessary to use the VTS. Complexity coupled with new innovation, impacting potential users, serves as an obstacle to its extension and application for business tasks [Tornatzky and Klein, 1982]. Rogers [1995] has asserted that a system is adopted promptly when a user does not feel any difficulties to learn how to use it and Ajzen [1991] found that there is a high level of correlation between difficulty to use and choices of services. Many studies on IT adoption have also confirmed that such complexity negatively affects a user's adoption intention to the new technology [Thompson et al., 1994; Venkatesh et al., 2003].

Because the VTS utilizes not only audio but also video technologies, users may have no choice but to be more influenced by the

conditions of space where they make or get phone calls. That is, they should take the degree of noise and illumination of space where they are into consideration when they would like to use the VTS. In addition, industrial experts say that the visual quality of the VTS cannot necessarily be improved as the number of pixels embedded camera has is increased given the fact that the higher the visual quality, the larger the amount of information to be transmitted and the higher the traffic costs of information. In this sense, the VTS users are more likely to feel the technical complexity when using it, which leads to following hypothesis.

H4 : The more a user experiences the VTS is technically too complex to use, the less s/he feels the value of the VTS.

2.7 Privacy Concern (PC)

The VTS was once thought to offer more natural and better communication than voice phone, becoming the choice of communication in the market [O'Hara et al., 2006]. However, against this expectation, the VTS failed to deliver business success [Noll, 1992], because the attitude of the majority the VTS users during a call was more likely to be formal, exaggerated, and unnatural, compared to the voice call [Sellen, 1995]. In particular, the users had privacy concern due to the VTS power of revealing the details of the backgrounds during calls [O'Hara et al., 2006].

Against this drawback, a hypothesis can be developed as follows.

H5 : The more a user concerns the privacy issue following the VTS use, the less s/he feels the value of the VTS.

2.8 Perceived Fee (PF)

Helson [1964] developed the 'Adaptation-Level theory', explaining how consumers build their attitude toward product price. According to this theory, consumers consider objective price (actual price), as well as their own internal reference price to evaluate the appropriateness of the price [Grewal et al., 1998; Helson, 1964]. As a psychological price in consumer cognition system, the internal reference price serves as a standard to determine whether the actual price is high or low [Erickson and Johansson, 1985; Grewal et al., 1998; Monroe, 1973; Winer, 1986]. The internal reference price is decided or adjusted by consumer's purchasing experience and expectation derived from similar products [Grewal et al., 1998]. Another study based on a similar logic, where consumer attitude toward mobile-internet service is affected by consumer's long-term experience of a free wired internet service [Andersson and Heinonen, 2002], supports that previous consumption experience influences a customer attitude toward further purchases. The Adaptation-Level theory implies that there is no appropriate price that all consumers can generally accept. In other words, the objective price cannot be a valid concept when evaluating the co-relationships between price and quality or between price and value, like in this study. Against this backdrop, Perceived Price appears to supplement the objective price. In

short, Perceived Price indicates consumer's subjective evaluation of the price, decided via the mechanism between the objective price and the internal reference price [Jacoby et al., 1977]. Chang and Wildt [1994] confirmed that the objective price and the internal reference price forge a positive and negative relationship with Perceived Price, respectively. And Perceived Price undermines Perceived Value, according to various studies (e.g., [Chang and Wildt, 1994; Dodds et al., 1991; Kim et al., 2007; Thaler, 1985]). The VTS charges a higher objective price than a voice call. Furthermore, the fee of the voice call (serving as the internal reference price to the VTS users), which is the long-term user choice and the VTS-similar service, is relatively more affordable. Given that, the VTS Perceived Price is likely to be decided at a higher level. Such a higher Perceived Price is expected to reduce the VTS's Perceived Value.

Therefore, following hypothesis can be developed.

H6 : The more a user perceives the fee for using the VTS is expensive, the less s/he feels the value of the VTS.

2.9 Adoption Intention (AI)

Intention is the anticipated or planned future behavior of individuals, meaning the subjective probability of user conviction and attitude being translated into actual behavior [Engel et al., 1982]. A 'behavioral intention in decision-making' model directly defines a specific behavior [Howard and Sheth, 1969] and

insisted that such a behavioral intention is highly likely to be translated into actual behavior [Ajzen and Fishbein, 1980]. Intention behavior in marketing indicates the user's psychological state created right before actual product purchase. Many studies prove that the behavioral intention is highly correlated with the actual purchase [Kim and Kim, 2002]. Diverse marketing studies confirm that Perceived Value does decisively influence the consumer purchase intention and purchase decision-making [McDougall and Levesque, 2000; Parasuraman, 1997; Zeithaml, 1988].

Therefore, it is reasonable to infer that high the VTS Perceived Value can be translated into a high adoption intention.

H7 : A user's perceived value of the VTS positively affects the adoption intention of the VTS.

3. Research Methodology

3.1 Constructs and Measures

The questionnaire contains a number of existing validated measure items that were adapted to the current context. Where validated items did not exist, new items were selected and modified from the relevance studies. All constructs were measured using 7-point Likert-style scale items ranging from strongly disagree (1) to strongly agree (7) including reverse-coded items. A pretest and a pilot test were conducted to validate the instrument and identify any weak points in the survey questionnaire. For the pretest, we con-

ducted in-depth interviews with a group of professors and related industrial workers and they initially examined the survey instrument. They were asked to find out any inappropriate or indefinite items and suggest their opinions. Based on their suggestions, some measure items were modified, added or deleted. The instrument was then pilot-tested to small group of the VTS users and the results confirmed the content validity of the revised questionnaire. Detailed explanations of constructs and measure items used are provided below.

(1) Usefulness (US)

The usefulness construct was measured with the items selected and modified from Davis [1989]. There are three items for the VTS : the extent to which a user believes that using the VTS will (i) enables him/her to accomplish tasks more quickly (US1, 4); (ii) makes it easier to do his/her work (US2); and (iii) saves him/her time and effort in performing task (US3, 5).

(2) Enjoyment (EJ)

Enjoyment was assessed with the items used in the extant studies [Sweeney and Soutar, 2001; Van der Heijden, 2004]. Items in enjoyment for the VTS are the extent to which (i) a user believes that using the VTS provides him/her with lots of enjoyment (EJ1, 3); and (ii) a user feels fun with the VTS (EJ2, 4).

(3) Self-Expression (SE)

Self-expression was measured with the items selected and modified from Rintamaki et al.

[2006], Sweeney and Soutar [2001] and Leung and Wei [1998, 2000]. Items in self-expression for the VTS are the extent to which a user believes that (i) using the VTS makes him/her feel like an early adopters (SE1, 3); and (ii) using the VTS gives him/her opportunities to express his/her identities to others (SE2, 4).

(4) Technical Complexity (TC)

The technical complexity construct was measured with items selected from Davis [1989] and Delone and McLean [1992] and modified for the VTS context : the extent to which a user feels that (i) the VTS is difficult to use (TC 1, 2, 5); and (ii) needs effort to be accustomed to its functions (TC3, 4).

(5) Privacy Concern (PC)

For measuring the privacy concern construct, we selected items dealt with by O'Hara et al. [2006] and modified them : the extent to which a user is concerned about his/her privacy when using the VTS (PC1, 2, 3, 4, 5).

(6) Perceived Fee (PF)

Perceived fee was measured with items selected and modified from the existing studies [Chang and Wildt, 1994; Voss et al., 1998]. These are the degree to which a user feels that (i) the fee that s/he should pay for the use of the VTS is too high (PF1, 3); and (ii) the fee level of the VTS is unreasonable (PF2, 4).

(7) Perceived Value (PV)

The perceived value construct was assessed with items selected and modified from

the extant research [Dodds et al., 1991; Kim et al., 2007; Sirdeshmukh et al., 2002; Zeithaml, 1988]. They are the extent to which a user believes that the use of the VTS (i) is beneficial to him/her when comparing to the effort s/he need to put in (PV1); (ii) is worthwhile to him/her when comparing to the time s/he need to spend (PV2); and (iii) offers value when comparing the fee s/he need to pay (PV3).

(8) Adoption Intention (AI)

For measuring the adoption intention construct, we selected items from the extant research [McDougall and Levesque, 2000; Parasuraman, 1997; Zeithaml, 1988] : the extent to which a user will intend to use the VTS in the future continuously (AI1, 2, 3, 4, 5).

3.2 Data Collection

Survey respondents participated in this study voluntarily. A total of 572 individuals were solicited to participate in this study and the survey was conducted through the web-based questionnaires from June 2009 to December 2009 (i.e., during 6 months). These individuals were from universities and corporations. Before filling out the questionnaire items, participants were given the general study goals and instructions by which they were asked to respond the questions only when they have experience with the VTS over the last 3 months or are still using the service. A total of 244 responses (response rate = 42.7%) were complete and included in the final analysis. <Table 2> shows the demographic data of the respondents.

<Table 2> Demographic information of the respondents

	Percent (%)		Percent (%)
<i>Gender</i>		<i>the VTS Usage Frequency</i>	
Male	57%	Everyday	
Female	43%	3~4 times in a week	24%
		1~2 times in a week	21%
<i>Age</i>		3~4 times in a month	17%
20~25	18%	1~2 times in a month	38%
26~30	50%	Do not use	00%
31~35	28%		
36~40	04%	<i>the VTS Usage Length</i>	
		<i>per Call</i>	
<i>Job</i>		Less than 1 minute	27%
Expert/Specialist	18%	1~5 minutes	38%
Office worker	47%	6~10 minutes	21%
Student	34%	11~20 minutes	09%
Self-employed	01%	More than 20 minutes	05%

4. Data Analysis and Results

Data analysis was performed using partial least squares (PLS), a structural equation modeling technique which takes a component-based approach to estimation. The first reason is because PLS allows both formative and reflective constructs [Fornell and Bookstein, 1982]. Secondly, it allows researchers to carry out an analysis with relatively fewer samples than covariance-based structural equation modeling methods, such as LISREL. However, it does not mean that PLS is free from the sample size issue. Any statistical technique including PLS relies on a sufficient sample sizes to maintain the necessary statistical power level (.80 or more is generally accepted level). In that sense, we got the proper sample size by referencing the standard Cohen suggested

[Cohen, 1988]. By doing so, we found that 98 samples are adequate for this research and it is well below the sample size we actually used (244 samples). We conducted our analyses in two stages. To begin with, we tested the measurement model to ensure that the constructs had sufficient psychometric validity and then conducted the structural model testing by which the hypotheses were tested.

4.1 Assessment of the Measurement Model

One construct (Perceived Value) was modeled as a formative construct and all other constructs were reflectively modeled. The reliability and validity of the constructs can be demonstrated in terms of item loadings, internal consistency and discriminant validity. Item loadings and internal consistencies great-

ter than .70 are considered acceptable [Fornell and Larcker, 1981]. As shown in <Table 3>, all the items were highly loaded on their respective constructs. With the exception of a few items (i.e., EJ1, SE3, TC3, TC4, PF4), most items from other constructs were loaded on each construct above 0.7, as demonstrated by the composite reliability scores in <Table 3>.

To assess discriminant validity, we followed criteria which are usually used in social science research [Chin, 1998]: (i) items should load more highly on the construct they are intended and (ii) the square root of the average variance extracted (AVE) should be larger than interconstruct correlations. As displayed in <Table 3>, items load more highly on their own construct than on other constructs. In addition, as shown by comparing the interconstruct correlations and AVE (shaded leading diagonal) in <Table 4>, all reflectively and formatively modeled constructs share more variance with their items than with other constructs. These results point to the discriminant validity of the constructs in the model.

4.2 Assessment of the Structural Model

The PLS structural model was assessed by examining the path coefficients and their statistical significance. Following Chin [1998], the significance of the paths was determined using the t-test calculated with the bootstrapping technique (300 resamples). <Figure 3> shows the path coefficients and the explained construct variances (R^2). <Table 5> presents a summary of the hypotheses testing.

<Table 3> Results of factor analysis

Items	US	EJ	SE	TC	PC	PF	PV	AI
US2	.90	.12	.15	.30	.18	.40	.13	.17
US1	.88	.35	.30	.21	.29	.25	.50	.30
US3	.87	.32	.31	.22	.44	.30	.41	.16
US5	.85	.26	.23	.15	.30	.20	.25	.17
US4	.85	.89	.09	.16	.18	.48	.06	.07
EJ3	.41	.78	.50	.22	.33	.08	.37	.45
EJ2	.35	.75	.36	.47	.53	.51	.46	.54
EJ4	.05	.73	.82	.49	.14	.30	.41	.12
SE4	.42	.42	.82	.39	.46	.11	.38	.39
SE2	.14	.26	.81	.05	.17	.36	.25	.46
SE1	.07	.29	.79	.41	.21	.16	.47	.14
TC2	.21	.08	.49	.81	.30	.44	.47	.18
TC1	.54	.26	.05	.76	.39	.40	.52	.51
TC5	.36	.39	.39	.71	.34	.51	.26	.21
PC2	.17	.09	.48	.53	.81	.30	.14	.13
PC1	.39	.25	.13	.45	.77	.09	.49	.16
PC4	.32	.46	.52	.33	.70	.52	.39	.18
PC3	.08	.22	.21	.18	.72	.19	.24	.34
PF1	.41	.32	.05	.23	.28	.88	.24	.33
PF2	.24	.11	.19	.44	.12	.87	.53	.29
PF3	.10	.35	.47	.37	.52	.86	.31	.24
PV2	.53	.54	.21	.33	.52	.82	.75	.44
PV3	.16	.55	.46	.05	.28	.31	.74	.20
PV1	.12	.05	.14	.51	.33	.09	.76	.14
AI4	.16	.31	.12	.48	.07	.34	.81	.97
AI2	.50	.43	.16	.11	.19	.07	.91	.96
AI3	.23	.46	.21	.45	.53	.31	.38	.95
AI1	.18	.24	.38	.40	.25	.47	.45	.89

US = Usefulness; EJ = Enjoyment;
SE = Self-Expression; TC = Technical Complexity;
PC = Privacy Concern; PF = Perceived Fee;
PV = Perceived Value; AI = Adoption Intention.

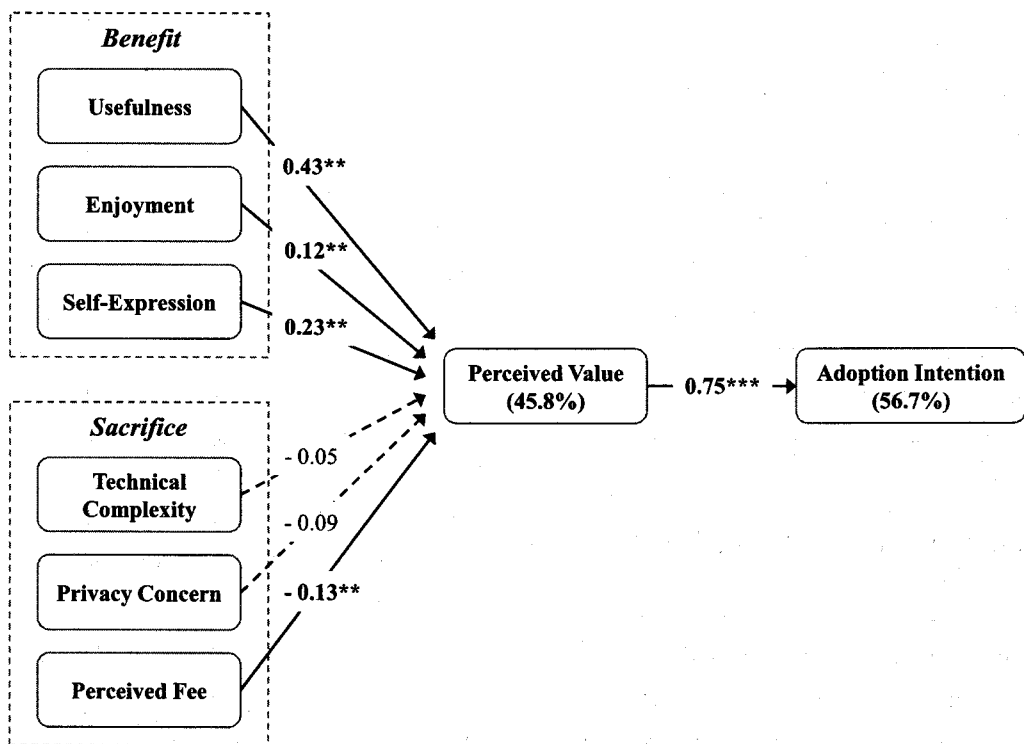
<Figure 3> and <Table 5> demonstrated that usefulness ($t = 5.62, p < 0.01$), enjoyment ($t = 3.92, p < 0.01$), self-expression ($t = 3.89, p < 0.01$) and

<Table 4> Interconstruct correlations

	Reliability (Number of items)	US	EJ	SE	TC	PC	PF	PV	AI
US	.96(5)	-.84**							
EJ	.87(3)	-.77**	.87**						
SE	.91(3)	.53**	.52**	.91*					
TC	.73(3)	-.19**	-.13**	-.18**	.81**				
PC	.74(4)	-.09**	-.07**	-.10**	-.11**	.83**			
PF	.88(3)	-.01**	-.04**	-.08**	-.12**	-.25**	-.85**		
PV	.84(3)	-.63**	-.56**	-.51**	-.01**	-.02**	-.12**	-.82**	
AI	.96(4)	-.71**	-.73**	-.48**	-.16**	-.02**	-.05**	-.75**	-.94**

Square root of AVEs reported along diagonal in bold.

* Significant at the .05 level; ** Significant at the .01 level.



*Significant at the .05 level; **Significant at the .01 level.

<Figure 3> PLS results for research model

perceived fee ($t = -2.72, p < 0.01$) are significant predictor of perceived value. However,

technical complexity ($t = -0.9, p > 0.05$) and privacy concern ($t = 1.84, p > 0.05$) did not emer-

〈Table 5〉 Summary of hypothesis tests

Hypotheses	Results
H1 : Usefulness → Perceived Value	Supported
H2 : Enjoyment → Perceived Value	Supported
H3 : Self-Expression → Perceived Value	Supported
H4 : Technical Complexity → Perceived Value	Rejected
H5 : Privacy Concern → Perceived Value	Rejected
H6 : Perceived Fee → Perceived Value	Supported
H7 : Perceived Value → Adoption Intention	Supported

ge as having a statistically effect on perceived value. Collectively, these antecedents explain 45.8% of the variance in perceived value. On the other hand, perceived value ($t = 17.84$, $p < 0.01$) appeared to have a statistically significant impact on adoption intention and its explanatory power of the variance in Adoption Intention is 56.7%.

4.3 Post Hoc Mediation Analysis

The evaluation of mediating effects was performed by using the generally accepted technique in the social sciences proposed by Baron and Kenny [1986]. This technique assesses mediating effects through a 3-step regression analysis. The first step is to regress the mediator variable on the independent variable; the second step is regressing the dependent variable on the mediator; the third regressing the dependent variable on both the independent variable and the mediator [Baron and Kenny, 1986]. If the results of these three regression analyses satisfy the following four conditions, mediating effects are confirmed:

First, the first regression analysis must indicate that the independent variable has significant influence on the mediating variable. Second, the second regression analysis must indicate that the independent variable has significant influence on the dependent variable. Third, the mediating variable must have significant influence on the dependent variable. If these conditions all hold in the predicted direction, then the effect of the independent variable on the dependent variable must be greater in the second equation than in the third. Perfect mediation holds if the independent variable has no effect when the mediator is controlled [Baron and Kenny, 1986]. By definition, in situations exhibiting a perfect (or full) mediation effect, a causal relationship between antecedents (e.g., Self-expression) and a dependent variable (e.g., Adoption Intention) can be explained only through a mediating variable (e.g., Perceived Value). On the other hand, in some situations, a partial mediation effect supports the attestation of a causal relationship between antecedents and a dependent variable through both their direct relationship through the intervention or mediation of a mediating variable.

The results shows that the perceived value construct, the mediating variable, has a perfect mediation effect on the relationship between all the statistically supported antecedents (i.e., usefulness, enjoyment, self-expression and perceived fee) and the adoption intention construct. It means that the variance of adoption intention can be explained only through the perceived value construct.

5. Discussion and Conclusion

5.1 Discussion and Conclusion

In this paper, two questions initiated our research motivation: (i) what elements do have impact on the VTS adoption?, and (ii) among them, what is the most decisive element in evaluating the VTS value? This study addressed these questions through developing and testing the research model based on theories and arguments which are used in the field of marketing and IS literatures.

(1) Findings

This study confirmed that the more users feel usefulness and enjoyment, the more they can appreciate the VTS value proposition. Our results shown that the consumers feel value of the service when they can better express themselves (i.e., self-expressions) by using it. Furthermore, it was found that the usefulness construct has the strongest explanatory power for the variance of perceived value construct among six antecedents (the path coefficient was 0.43). These results show that the reasons why they use the VTS lie not only in entertaining purposes but also in work purposes and the fashion and status still play as an important gratification factor in the VTS context just like the previous communication tools [Leung and Wei, 1998, 2000].

On the sacrifice side, however, it was found that only the perceived fee construct has a statistically significant impact on the variance of the perceived value construct. To interpret the reason why technical complexity does not

have a statistically significant impact, it is worth noting the demographical characteristics of participants in this research. As mentioned above, by age distribution, the proportion of respondents in their 20s and early 30s accounts for 96% of the total. Technical complexity of the VTS does not matter to them, given that they are so-called 'digital natives' [Prensky, 2001], that is to say, the generation who have been directly and indirectly influenced by IT innovation from their childhood. On the other hand, the reason why privacy concern does not have a statistically significant impact on perceived value may lie in the fact that users feel value when they believe that the service enables them to express their own identities. In this situation, privacy concern is less likely to act as a barrier.

(2) Implications

There are two theoretical implications that derive from the study. On top of that, this study found that perceived value acts as a perfect mediator the effects of usefulness, enjoyment, self-expression and perceived fee on adoption intention. From these results, we can reconfirm the fact that the perceived value is a good indicator to explain users' intention to adopt services or products.

Second, this is one of few studies that apply VAM to analyze the factors influencing the value perception of service. We could reconfirm out that VAM is more appropriate model than TAM in terms of explanatory power at least in mobile services context. As Kim et al. [2007] did, we have also compared

VAM with TAM by testing explanatory power of antecedents of these model to the variance of the adoption intention construct. As mentioned before, TAM consists of two independent variables (usefulness and ease of use) and one dependent variable (adoption intention). All of these variables are common both for VAM and TAM (the technical complexity construct is the exact opposite construct to the ease of use construct). Hence, it was found that TAM can explain the variance of the adoption intention construct by 33.2%, while VAM can explain it by 56.7%.

In terms of practical implications, the findings of the study imply that telecommunications service providers should leverage the aspects of usefulness, enjoyment and self-expression as advertisement appeals in order to promote the VTS to their customers in the 20s and 30s age range. At the same time, ease of use which is one of the widely employed appeals for new service or product should be reconsidered whether it is still be effective tool in order to position in the market or boost consumption.

5.2 Limitations and Future Research

This study has several limitations as follows. First, the majority (about 96%) of survey respondents were in their 20s and early 30s, thereby it is somewhat difficult to generalize the results obtained. Particularly, the fact that technical complexity was shown not to have any significant impact on perceived value can be largely attributable to the concentrated demographic distribution as above because their

attitudes toward the new technologies may be more flexible and their strength of self-efficacy [Compeau and Higgins, 1995] may be higher than any other age group. Therefore, future study should include respondents in their late thirties and above in order to allow a wider generalization of the findings. Alternatively it might be useful to survey diverse age groups, across demographic boundaries, to compare the result by age distribution thereby enabling conclusions to be drawn in this key aspect.

Second, another limitation can be raised since our survey was only conducted for Korean consumers. As a matter of course, the study was conducted in that way under the premise that Korean consumers are particularly enthusiastic about high tech devices and services, and in that sense, data collection can be reasonable to forecast the future of the global VTS market; however, in future research, the scope of the study is necessary to broaden in terms of the nationality of the respondents and the market regions.

Last but not least, there are some possibilities to raise a self-selection bias because this study was conducted through the online survey. Although the online survey has a lot of advantages in terms of time and cost, scholars should gather the relevant data in more comprehensive and complementary ways in order to test hypotheses rigorously in the future.

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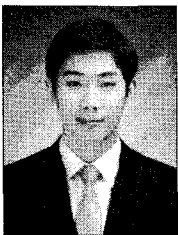
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