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IPTV in Korea: The Effect of Perceived Interactivity on Trust, Emotion, and Continuous Use Intention*

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The principal objective of the work is to confirm the effects of perceived interactivity, trust, and emotion on intentions to use IPTV service. The empirical investigation into IPTV service users suggests that (i) the perception of interactivity should be directly related with trust, (ii) Users' trust should bolster users' emotion in a positive or negative aspect, and (iii) such emotion is verified to affect the intention to use IPTV continuously. More specifically, we demonstrate that positive and negative emotions influence user intentions positively and negatively. Additionally, we find that the trust mediates perceived interactivity and emotions, and both trust and emotion mediate the relationship between perceived interactivity and intentions to use IPTV. The work indicates that trust and emotion of users should be considered from IS perspective in an attempt to build the intention to use IPTV. IPTV firms should consider in their IPTV design and offering strategy how to enhance positive emotions for user retention and eventually bolster intentions to use IPTV continuously.

Keywords : IS Usage, IPTV, Perceived Interactivity, Web Experience, Trust, Emotion, Usage Intention

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Ⅰ. Introduction

TV industry is under a paradigm shift. We are currently facing a new generation of 'doing' over IPTV (Internet Protocol Television) rather than 'watching' a TV. There are more than 4.5 million subscribers in three firms that provide IPTV in Korea; and the scale of this service is increasing considerably. IPTV is a relatively new concept in television, which employs Internet protocols to provide real-time broadcasting, multi-media contents and two-way services. IPTV is capable of two-way services including VOD (Video on Demand), games, finance, and shopping. Moreover, IPTV is branching out toward internet-only services such as widget services.[1] Such capabilities permit IPTV to be used as a medium that enables interactivity via Computer Mediated Communications, deploying the combination of network devices and TV including commerce, SMS (Short Message Service), chatting, and e-mail [Quico, 2003]. These functions require user participation, and clear usage intention. Therefore, it is important to conduct research into the manner in which interactivity enhanced by IPTV protocols influences usage intention and its related variables.

In regard to its functional aspects, IPTV provides a more diverse menu of features than TV previously. Additionally, Shin [2007] stated in a prior study that: 'If former TV used a push-mechanism, IPTV is based on a pull-mechanism due to the fact that IPTV induces user participation." Recently, a series of research studies into interactivity as the principal influence on IT media were conducted [Rafaeli, 1988; Steuer 1992; Zack, 1993; Ha and James, 1998; Liu and Shrum, 2002; Stromer-Galley, 2004; Johnson *et al.*, 2006]. The results of current research indicate that the interactivity users perceive when using the information system positively influences usage intentions [Wu, 1999; Liu and Shrum, 2002; McMillan and Hwang, 2002; Fiore and Jin, 2003; Johnson *et al.*, 2006]. Former research into interactivity has focused on the cognitive area, and individual features such as trust and emotion were not fully explored. The cause of such a cognitive perspective was the predominant TAM (Technology Acceptance Model) approach [Davis *et al.*, 1989], which holds that the use of IT devices depends on cognitive factors. In particular, unlike former offline services in which direct communication is possible, an online medium requires an extraordinary function that attracts consumers, thus allowing them to communicate continuously with the medium. However, such requirements have not been extensively considered. The principal task begins in focusing on the internal features of the IT medium - for instance, trust and emotion - as opposed to functional features. Similar acts may appear in IPTV however, in order to attract continuous usage intention; fundamentally building trust and understanding the mechanisms of emotion are critically important.

Based on the results of various studies concerning the rapid development of interactivity, this work confirms the perceived interactivity in IPTV and attempts to assess the influence of perceived interactivity on trust and emotion, which eventually confirms the cause-and-effect relationship previously elucidated.

The primary questions this study sought to answer are as follows:

1) Widgets are small applications that hold specific content, and are widely regarded as a service that enables users to readily access and use information.

What is the mechanism through which perceived interactivity affects usage intention?

How does the perceived interactivity affect the individual features of trust and emotion?

What influences might perceived interactivity have on trust according to the level of web experience?

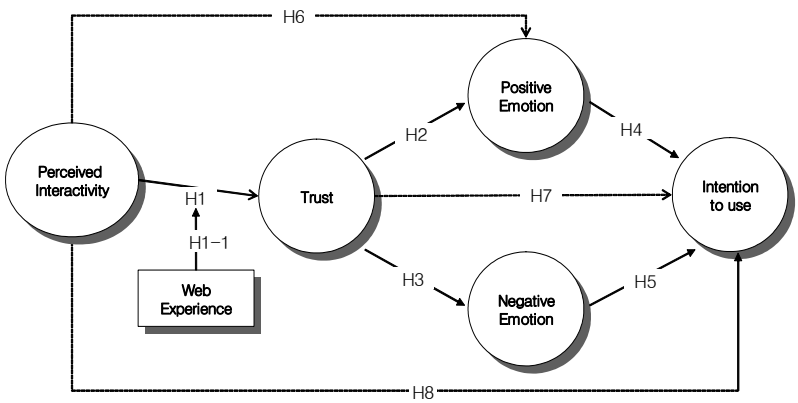
Ⅱ. Research Model

IPTV research, which has grown in popularity in recent years, has made great progress in terms of communication: most recent studies in the field have focused on the difference between traditional face-to-face communication styles and the newer computer-based two-way communication style [Hu *et al.*, 2004, Quico, 2003]. Until now, studies of IPTV have progressed largely via the functional perspective, and involved assessments of individual's satisfaction levels with communication. Further research is clearly required regarding the influence on usage intentions, as IPTV is being diffused broadly among a large number of users. More specifically, research into the variety of individual features that affect usage intentions is imperative, as opposed to measurements of functional satisfaction levels.

2.1 Research Model

The principal objective of this study is to measure the effects of perceived interactivity in order to examine the impact of perceived interactivity on usage intentions. Only a minimal amount of research has been conducted thus far on the effects of trust in non-face-to-face services such as IPTV. Some previous studies have provided important insights into trust in the online context; however, further research is clearly warranted into the function and role of trust in the new media, including IPTV with its panoply of interactive features.

Emotion is a crucial factor that cannot be ignored in the process of decision making. Finding the reason for users selecting a particular IT has its limits only through cognitive factors, including ease of use. This is because similar IT products with basically the same cognitive factors, which include ease of use, are clearly being discriminated



<Figure 1> Research Model

by users. This research model assumes that users familiar with interactive environments would experience different results, depending on the level of experience.

Each variable of the research model is explored in the following before moving on the hypothesis in the next section.

2.1.1 Interactivity

Many researchers [Cho and Leckenby, 1997; Hoffman and Novak, 1996; Stromer-Galley, 2004] define interactivity via three distinct paradigms: user-media interactivity, user-information interactivity, and user-user interactivity. In an effort to integrate these disparate but related definitions of interactivity, Liu and Shrum [2002] have suggested a three-dimensional interactivity concept, with the following dimensions: Active control, Two-way communication, and Synchronicity.

Previous research into interactivity has been largely concentrated on the process of information exchange [Rafaeli, 1988, 1990; Rafaeli and LaRose, 1993; Zack, 1993], as well as on specific chat rooms or search engine response features that serve to enhance interactivity [Ha and James, 1998]. However, Newhagen *et al.* [1995] has elevated the research concept to a combinational perspective that includes perceptions. From this perspective, interactivity can be classified into process, feature, perception, and combination [McMillan and Hwang, 2002].

Wu [2005] distinguished interactivity into two distinct categories: actual interactivity (based on objective perception) and perceived interactivity (which is perceived from a subjective perspective). Practically speaking, the level of interactivity can be determined in accordance with the users' perceptions [Williams *et al.*, 1988]. Therefore, perceived interactivity plays a crucial role in specifying the effects of actual interactivity to participants [Wu, 2005]. Reeves and Nass [1996] argued that 'perception is more effective than objective facts,' arguing for the relevance of perception. Lee [2005], who activated research into perceived interactivity, claimed that 'interactivity is not measured by the features or process analysis, but rather by the perception or experience of users.' Schumann [2001] emphasized the perception of users by stating that perception is the user's choice to interact, which is a user feature rather than a media feature.

According to research conducted thus far into perceptions of interactivity, whether or not the media is interactive may be a matter for users to decide. For this reason, interactivity is predicated on users' subjective perceptions. Some researchers have uncovered clues to this by developing ways to explore interactivity through user perception [Moon, 2009]. From this perspective, Steuer [1992] defined interactivity as "the level of participation to modify the contents and form of real time media." Such statements underline the important role of users in defining interactivity.

2.1.2 Trust

The definition of trust varies according to the relevant discipline: philosophy, psychology, and business marketing all have different views on trust, and the concept continues to be relevant in all these disciplines. However, Wang and Emurian [2005] have stated that the abstract concept is associated with credibility, assurance, certainty and multifarious concepts associated with

cognitive, emotional, and behavioral areas. To sum up the common view of researchers, trust can be defined as the absence of doubt in a partner's words, and a construct built through a continuous relationship between parties [Ellen and Johnson, 1999].

Hoffman [1999], in his studies of trust, asserted that public disclosures of financial and personal information in e-commerce constitute the most daunting obstacles to trust. Adopting a similar perspective, Wang and Emurian [2005] argued that the formation of trust is a difficult proposition in the online context: however, they determined, once trust has been built online, sensitive information can often be exchanged. In the field of electronic commerce research, Mohr and Sohi [1995] showed that two-way communication increases users' satisfaction, hence resulting not only in re-visits but also in an expansion of trust between the online shopping mall and users.

As the importance of trust is increasingly recognized, the number of studies addressing the effective factors in trust building also has increased. Chreskin Research [1999], showed that the important factors in preserving the professional impression created by a website include the following: safety guarantee, brand, easy-searching, request fulfillment, presentation, advanced technology, *etc.* According to that study, trust is formed over time and repeated experience, viz. trust is formed when users become familiar with a specific website and gain experience within a given amount of time. Such experience is required to become a form of trust. Additionally, users with experience in logging onto a specific website must decide whether or not they will visit the website again in the future; therefore, trust is built through the accumulation of knowledge [Flavian *et al*., 2006]. Urban [2000] states that in order to form trust online, there must be trust in the website, trust in the information provided on the website, and trust in the services provided; additionally, trust in the website was identified as a prerequisite for other forms of trust.

Owing to the absence of control of online personal information, assuring users about the safety of their personal information is vital in building trust [Hoffman *et al*., 1999]. Considering the threats of anonymity, uncertainty and complicated online networks, organizations should inevitably guarantee the safety of personal information and increasing interactivity on the Internet. Under such circumstances, trust enables parties to build mutual trust.

<Table 1> Precedence to Trust

Name	Year	Precedence to trust-building
Koh Il Sang, Choi Soo Jeong	2005	Trust value of internet shopping malls (ability, hospitality, faultlessness); trust in system (structural stability, situational stability)
Gefen	2002	honesty, ability, hospitality
McKnight *et al*.	2002	Perceived reputation of provider, perceived quality of website, structural stability
Jarvenpaa *et al*.	2000	Perceived size, Perceived reputation
Cheskin Research	1999	Safety guarantee, brand, easy-searching, request fulfillment, presentation, technical skills

Source: Jeong Cheol Ho, Jeong Young Soo [2006], modified.

2.1.3 Emotion

Emotions are incisive and strong-short psychological/biological changes, which have immense power to stimulate or inhibit a variety of situations [Rosenberg, 1998]. Emotions can involve decisions regarding a particular issue, or can be immediate feelings derived from a person's instantaneous thought processes [Bagozzi *et al.*, 1999]. Emotions are not always simple constructs leading from superficial decisions, but rather often are complicated perceptions derived from secondary decisions; therefore, emotions can be just as strongly associated with caution, effort, and control of external factors as with the reverse [Dunn and Shchweitzer, 2005].

Most studies of emotions based on the stimuli that elicit a given emotion, or on the manner in which a given emotion affects the individual: this model is referred to as the Stimulus-Organism-Response model. Hwang [2007] discovered previously that emotions are 'pleased/depressed, joyful/unfortunate, satisfied/unsatisfied' feelings, thus placing them firmly into a three-dimensional Pleasure-Arousal-Dominance paradigm [Mehrabian and Russell, 1994]. This paradigm was previously employed to explain interest, time-spent and tendency to revisit a particular online shopping mall. According to Anderson and Kumar [2006], users experienced a positive emotion when they found what they were seeking, and experienced a negative emotion when they did not.

Emotion is a crucial motive in selecting a product and IT products are not likely to be an exception; thus, research on emotions is drawing an increasing amount of attention from researchers in the field of information technology [Hirchman and Holbrook, 1982]. Under similar conditions, Conger [1998] previously claimed that users believed themselves to be rational with regard to their decision-making processes, but research demonstrated that emotional motives were actually the relevant variables. Robinette and Lenz [2003] previously stated that emotions are active along with reasoning when selecting a product, and that emotion could often overpower reason in this process. These results decouple long-term Human Computer Interaction research from the Taylorist notions of interactivity previously posited [Picard and Klein, 2002]. In other words, in interactions between users and devices, where the user is the principal point of concern rather than the interaction between devices, emotions should not be regarded as any less important than any other consideration.

2.1.4 Usage Intention and Experience

As Davis [1989] stated in the TAM (Technology Acceptance Model), the results of several lines of inquiry have shown that "intention is the psychological state before using a particular mechanism and has direct influence on the actual usage of the information technology" [Cha, 2007; Davis *et al.*, 1989]. Research results on the TAM Ⅱ demonstrated that perceived usefulness and perceived intention without variables directly affect intentions to use [Davis *et al.*, 1992]. To date, most previous research has revealed that perceived interactivity exerts a positive effect on the intention to use and on users' attitudes; this effect is both direct and indirect [Wu, 2005].

Two theories are associated with the formation of subjective perceptions through repeated experience. The first is the Social Cognitive

Theory which involves the interactivity of environmental, personal, and behavioral factors [Bandura, 1977]. This theory holds that interactivity influences personal, environmental, and individual behavioral factors. LaRose and Eastin [2004] describe the experiential relation between the usage and satisfaction of the media on the basis of Bandura's Social Cognitive Theory. The second is the Expectation-Disconfirmation Theory, which holds that as the divergence of evaluation between the experience prior to or following the purchase of a product grows larger, the Expectation-Disconfirmation of a product or service also increases. The term Expectation-Disconfirmation is formed when users obtain experience from actual usage, and is affecting the final decision-making process when using a product. Bhattacherjee [2001] claimed that Expectation-Disconfirmation is the core element in the continuous usage of a product, in the context of e-commerce research.

2.2 Hypothesis

2.2.1 Perceived Interactivity and Trust

In Woszczynski [2002], there were PC users who operated in a voluntary and innovative manner when interacting with computers, and this interaction allowed to individuals to enjoy a high level of trust and satisfaction. Using reinforced Information systems with more online interactivity, such as IPTV, would be expected to be affected by former experience with an interactive medium. Venkatesh and Davis [2000] proved that usage experience increases continuous usage intentions, thereby proving that usage experience is an appropriate control variable. Using the former research results as evidence, the relationship between perceived interactivity and trust are expected to be as follows:

H1: In IPTV, perceived interactivity should result in a positive effect on trust.

H1-1: In IPTV, users with extended web experience would have a greater level of perceived interactivity and trust than those with inferior web experience.

2.2.2 Trust and Emotion

Wang and Huff [2007] pointed out that trust involves both cognitive and emotional aspects. Additionally, they emphasized that emotions may trigger a cognitive re-evaluation of trust and experience from the perspective of trust and emotion. Wang and Huff [2007] asserted that the objective of trust is to allow the relationship to mature, such that the provider will represent the consumers. Moreover, consumers respond in a manner that is simultaneously emotional and reasonable.

Young [2006] claimed previously that emotion is the principal factor affecting behavior, and is an indispensable aspect of business relations. Young [2006] proposed that positive emotions are the principal component, prerequisite, and final outcome of trust; in fact, the terms are frequently employed synonymously. However, this study will attempt to clarify the complex relationship between trust and emotions, focusing on the manner via which trust affects emotions. In particular, this study hopes to approach the concept of trust in a way that resolves the inconsistencies of previous research results. Additionally, our work includes the hypothesis that pos-

itive emotions would strengthen as trust is built, whereas negative emotions would grow as trust is reduced.

H2: In IPTV, positive emotions would strengthen as trust is built.
H3: In IPTV, negative emotions would increase as trust is reduced.

2.2.3 Emotions and Usage Intentions

Previous works of consumer intentions argued that emotions such as happiness or disappointment from perceived performance evidence a direct and positive relationship with intentions in the future [Swan and Trawick, 1981; Patterson and Spreng, 1997]. Additionally, satisfaction in portal websites was shown to exert a profound impact on intentions [Van Riel *et al*., 2001]. In relation to Information Technology, it is expected that users will use a particular information technology continuously, so long as the users evaluate the technology positively. The term 'positive emotions' is related to the individual's decision to maintain such feelings, but the term 'negative emotions' is oppositely related to decision-making. Bagozzi [1999] stated that positive emotions lead to sharing of emotions with others; however, negative emotions lead to negative behavior.

Hypotheses 4 and 5 can be proposed as a background for related research results:

H4: In IPTV, positive emotions would have a positive effect on continuous usage intention.
H5: In IPTV, negative emotions would have a negative effect on continuous usage intention.

In regard to trust, greater usage of IT services results in an effect on trust in a particular aspect of IT, which can be either positive or negative in its direction. For example, the results of Chaudhuri and Holbrook's [2001] study revealed a relationship between brand trust and emotions with brand likeliness. Additionally, brand trust and emotions are important sources of brand likeliness or concentration. In other words, as trust accumulates, it generates a positive impact on emotion, and thus user concentration.

Positive emotions such as favorability influence others's behaviors, and a variety of studies are currently underway to determine how emotions influence the perception of trust [Kumar, 1997]. Positive outcomes, such as interactivity, tend to strengthen trust, whereas negative outcomes tend to damage it [Anderson and Kumar, 2006].

Until now, studies into this topic have primarily focused on negative emotions; however, DeWitt [2008] previously addressed both positive and negative emotions. Dewitt's study also revealed the huge role played by trust and mediation of emotions, by empirically researching the effects of trust and emotions on the recovery process.

Considering hypotheses 1, 2, 3, 4, and 5, hypotheses 6, 7 and 8, which are related to trust and emotion, may also be possible:

H6: In IPTV, the relation between perceived interactivity and emotions could be mediated by trust.
H7: In IPTV, the relation between trust and intention could be mediated by emotions.
H8: In IPTV, the relation between perceived interactivity and continuous usage in-

tention could be mediated by trust and emotions.

Ⅲ. Empirical Approach

3.1 Definition and Measurement of Construct

The survey regarding interactivity research involves two factors: response and reaction time, both of which measure the perceived interactivity on the basis of the former interactivity research [Johnson, 2006; McMillan and Hwang, 2002; Davis, 1992]. Additionally, validity and reliability are appropriately modified and selected as measured variables via trust [Gefen, 2002], emotion [Davis, 1992], and intention [Venkatesh and Davis, 2000]. Prior to conducting the survey, the collected articles were confirmed twice to ensure the accuracy and specificity of the data.

The verified measured variables of reliability and validity identified in previous research were collected to enhance the tool of measurement. The perceived interactivity was employed as a measured variable, and then supplemented and modified to the following research from Wu's [2000] 9 indices.

<Table 2> Definition of Construct

Construct	Definition	Related Research
Perceived Interactivity	The level of perception related to communication such as suitable response and fast reaction in a particular situation.	Alba *et al.* [1997], Burgoon *et al.* [2002], Johnson *et al.* [2006], Rafaeli [1998]
Trust	The level of reliance the other party: expectancy satisfaction through promised performance and consumption.	Gefen [2000]
Positive Emotions	The level of positive emotion, self-reinforcement, on the basis of joyful emotions through accomplishment.	Hoffman and Novak [1996], Anderson and Kumar [2006]
Negative Emotions	The level of negative emotions, self-reinforcement, on the basis of depressing experience when failed to accomplish goals.	
Intention	The level of tendency using IPTV continuously.	Venkatesh and Davis [2000]
Web experience	The level of web experience which can be divided into two: high and low	Kim Sung Byuk [2005]

<Table 3> Measurement Factors of Variables

Observed Variable	Measurement factor	No.	Related Research
Perceived Interactivity	◦ All time reaction, suitable response, interactive communication	3	Jonhson *et al.* [2006], Wu [2003], McMillan and Hwang [2002]
Trust	◦ Accuracy, convenience, stability	4	Park Soo Young [2003]
Positive Emotions	◦ Happy, warm, admiration, fun feelings	5	Heijden [2003], Davis *et al.* [1992]
Negative Emotions	◦ confusion, anger, boring, worried feelings	4	
Intention	◦ Will use continuously ◦ Tendency to recommend	3	Venkatesh and Davis [2000]
Web experience	◦ Familiarity	1	Kim Sung Byuk [2005]

3.2 Research Method and Data Collection

The targets of the study were experienced consumers above the age of 20 who are capable of continuous IPTV use, as well as subscribers who are provided with similar levels of the IPTV service in the capital area.

Data Collection was assessed for 3 months, from 1st July to 30th September 2009, with the target population consisting of the IPTV users surveyed by the interviewers. A total of 480, excluding 22 with response errors among 502, were used as the dataset for analysis. 221 (46%) were women and 259 (54%) were men; the age distribution was categorized into three groups: 20~29 (28%), 30~39 (41%) and above 40 (30%).

Ⅳ. Data Analysis

4.1 Reliability and Validity Analysis

Prior to verifying reliability and validity, we employed SPSS 15.0 software for the statistical analysis of the research data. For the reliability analysis, we employed the Cronbach's Alpha to verify the research model's reliability. The research results were regarded as suitable when the Cronbach's Alpha value was 0.7 and the composed credibility was over 0.7 [Fornell and Lacker, 1981].

<Table 4> Reliability Verification results

Construct	Credibility	AVE	Cronbach Alpha
Interactivity	0.904	0.758	0.833
Trust	0.905	0.705	0.859
Positive emotions	0.892	0.625	0.849
Negative emotions	0.928	0.764	0.897
Intention	0.944	0.848	0.908
Standard value	over 0.7	over 0.5	over 0.7

PLS confirmative analysis was employed to confirm the discriminant validity and convergent validity. AVE (Average Variance Extraction) was employed to verify the discriminant validity, which is an easier and more accurate method than comparing the Chi-square Distribution values among each construct. The verification of the confirmative analysis was compared with the AVE value and relativity value of the construct. The AVE value (grey area) was over 0.6, which indicates that it was relatively greater than the cross-loading value of the construct.

Additionally, the loading value of the distributed measured variable from the confirmative analysis was substantially greater than the other loading values [Gefen, 2002]. As a result, the individual loading value of the measurement factors was 0.7 at a minimum, thereby indicating

<Table 5> Validity Verification Results

Construct	Interactivity	Trust	Emotion(+)	Emotion(-)	Intention
Interactivity	**0.871**				
Trust	0.340	**0.840**			
Emotion(+)	0.382	0.639	**0.791**		
Emotion(-)	-0.198	-0.409	-0.526	**0.874**	
Intention	0.403	0.671	0.700	-0.626	**0.921**

<Table 6> Loading Value and Cross-Loading Value

Construct	Q.	Interactivity	Trust	Emotion(+)	Emotion(-)	Intention
Interactivity	PI-1	**0.870**	0.209	0.244	-0.110	0.268
	PI-2	**0.919**	0.356	0.389	-0.210	0.402
	PI-3	**0.827**	0.290	0.333	-0.173	0.355
Trust	Tr-1	0.265	**0.849**	0.532	-0.296	0.536
	Tr-2	0.293	**0.824**	0.447	-0.259	0.468
	Tr-3	0.288	**0.803**	0.573	-0.453	0.682
	Tr-4	0.298	**0.888**	0.577	-0.338	0.544
Positive emotion	PE-1	0.273	0.433	**0.724**	-0.300	0.415
	PE-2	0.360	0.584	**0.833**	-0.399	0.564
	PE-3	0.249	0.467	**0.780**	-0.377	0.532
	PE-4	0.264	0.466	**0.728**	-0.407	0.452
	PE-5	0.351	0.562	**0.885**	-0.560	0.746
Negative emotion	NE-1	-0.099	-0.279	-0.360	**0.854**	-0.463
	NE-2	-0.219	-0.425	-0.491	**0.892**	-0.615
	NE-3	-0.186	-0.264	-0.495	**0.884**	-0.562
	NE-4	-0.171	-0.433	-0.479	**0.874**	-0.532
Intention	ITU-1	0.360	0.628	0.698	-0.633	**0.947**
	ITU-2	0.356	0.647	0.607	-0.588	**0.932**
	ITU-3	0.404	0.584	0.630	-0.505	**0.889**

that the measurement factors were appropriately converged to each construct, because the loading value was substantially in excess of that of the same columns.

These results lead us to conclude that a suitable level of reliability and validity were procured from the measurement tools of the research model.

4.2 Hypothesis Verification

4.2.1 Measurement Model Analysis

Prior to verification of our hypothesis of the relativity between the constructs, the work verified the measurement model via the PLS. Measurement model verification involves the confirmation of the significance between the potential variables and the observed variables. If the significance between the potential variables and observed variables is positive, we can conclude that one construct was measured as MIMIC [Bagozzi and Yi, 1988]. Generally, significance is positive when the loading value of the distributed measured-variable is in excess of 0.7. The loading value for each construct in the work is over 0.7; this result indicates significance. As a result of the verification of the relativity of the measured variable and potential variable via the Bootstrap method, all t-values in the observed variables were in excess of 2.58 ($p < 0.01$) which describes the potential variables well.

<Table 7> Measurement Model Analysis

Construct	Q.	Estimate Value	Standard Error	T
Interactivity	Pi-1	**0.868**	0.024	35.940
	Pi-2	**0.917**	0.011	80.597
	Pi-3	**0.825**	0.023	35.824
Trust	Tr-1	**0.848**	0.012	70.039
	Tr-2	**0.822**	0.017	49.046
	Tr-3	**0.801**	0.020	40.092
	Tr-4	**0.886**	0.010	89.511
Positive Emotion	Pe-1	**0.723**	0.031	23.467
	Pe-2	**0.831**	0.015	55.434
	Pe-3	**0.778**	0.018	43.594
	Pe-4	**0.727**	0.030	24.578
	Pe-5	**0.883**	0.009	102.119
Negative Emotion	Ne-1	**0.853**	0.017	49.667
	Ne-2	**0.890**	0.010	91.700
	Ne-3	**0.882**	0.014	61.799
	Ne-4	**0.872**	0.011	83.226
Intention	Itu-1	**0.945**	0.006	172.490
	Itu-2	**0.930**	0.007	140.103
	Itu-3	**0.887**	0.013	68.654

4.2.2 Structure Model Analysis

(1) Direct Cause-and-Effects

Along with the confirmation of the measurement model, we verified the validity of the proposed hypotheses, via structure model analysis. With regard to the relationship between the variables, first, the perceived interactivity appeared to exert a positive effect on trust (path coefficient = 0.340, t-value = 8.948, $p < 0.001$). Second, trust had a positive impact on positive emotions (path coefficient = 0.639, t-value = 22.149, $p < 0.001$). Third, trust appeared to exert a positive effect on negative emotions as well (path coefficient = -0.409, t-value = -9.795, $p < 0.001$). Fourth, positive emotions exert positive effects on intention (path coefficient = 0.513, t-value = 13,130, $p < 0.001$). In short, positive emotions play a positive role in decision-making. Fifthly, our results demonstrated that negative emotions exert a negative effect on intention (path coefficient = -0.356, t-value = -8.196, $p < 0.001$).

<Table 8> Direct Effects on Hypotheses

Hypothesis (Path)	Estimate value	T-value	Significance	Result
Interactivity → Trust	0.340	**8.948**	**P < 0.01**	**SIG**
Trust → Positive emotion	0.639	**22.149**	**P < 0.01**	**SIG**
Trust → Negative emotion	-0.409	**-9.795**	**P < 0.01**	**SIG**
Positive emotion → Intention	0.513	**13.130**	**P < 0.01**	**SIG**
Negative emotion → Intention	-0.356	**-8.196**	**P < 0.01**	**SIG**

<Table 9> Comparison Based on Experience

Path	Experience (people)	Path Coefficient	Standard Error	T	Result
Interactivity → Trust	High(349)	0.386	0.0456	1.583	Non-significant
	Low(131)	0.256	0.0571		

(2) Moderating Effect of Media Interactivity Experience

In order to examine how the media interactivity experience affect the relationship between interactivity and trust, we employed the formula proposed by Chin [2003] to confirm the differences between groups with advanced web experience and little web experience. In our work, experience is assumed to play a moderator role that affects the direction or strength of the relation between interactivity and trust.

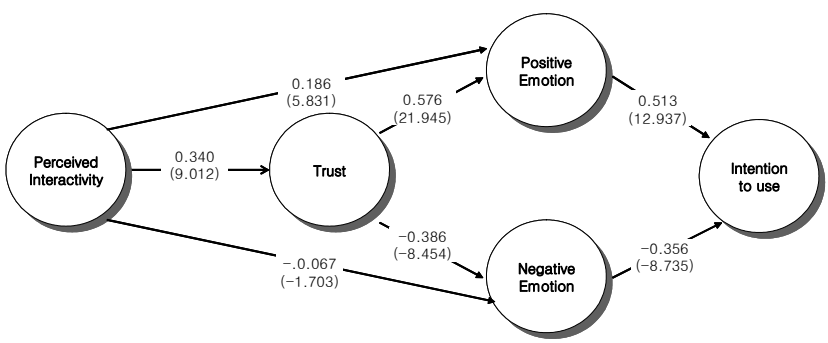
The two groups were found not to be significant, as the t-value of 1.58 was smaller than 1.96, in accordance with the formula. As the result of our comparison of the high-experience and low experience groups' trust, the degree of significance at $p < 0.05$ (t-value > 1.96) showed no detectable differences. Hypothesis 1-1, that the interactivity with perceived experience can control the effects on trust, was not supported by our results.

(3) Mediating Effect of Trust and Emotion

The three stages of mediating effects proposed by Baron and Kenny [1986] to measure the mediating effects of trust and emotion are as follows. Baron and Kenny [1986] clearly states that moderator and mediator should not be used interchangeably. In our work, Trust is a mediator to the extent that the variable accounts for the relation between Interactivity and Emotion. In the same way, emotion is a mediator that account for the relation between Trust and Intention to Use.

1) Mediating effect of Trust

The effect of perceived interactivity on trust, trust on positive emotions and trust on negative emotions were all significant. In particular, the relation between perceived interactivity and positive emotions was indicated by the t-value of 5.8410, at $p < 0.01$. In this case, trust was shown to exert a proportional mediating effect on perceived interactivity and positive emotions.



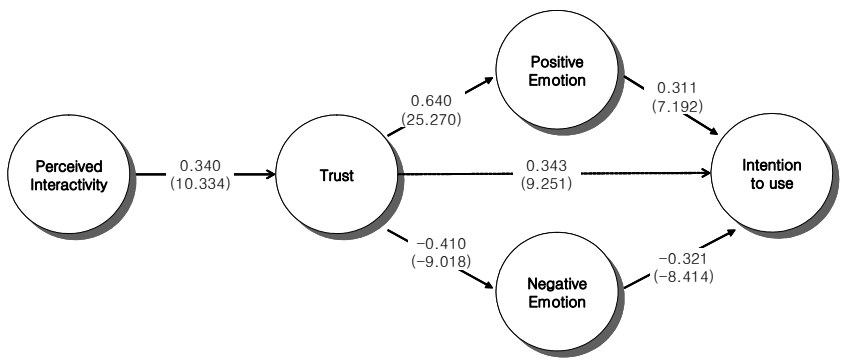
<Figure 2> Mediating Factor-Trust: 3-Stage Analysis

However, our results demonstrated that the effect of perceived interactivity on negative emotions was not significant, as shown by the t-value of 1.703 ($p < 0.05$). This implies that trust exerts a fully mediating effect on the effects of perceived interactivity on negative emotions.

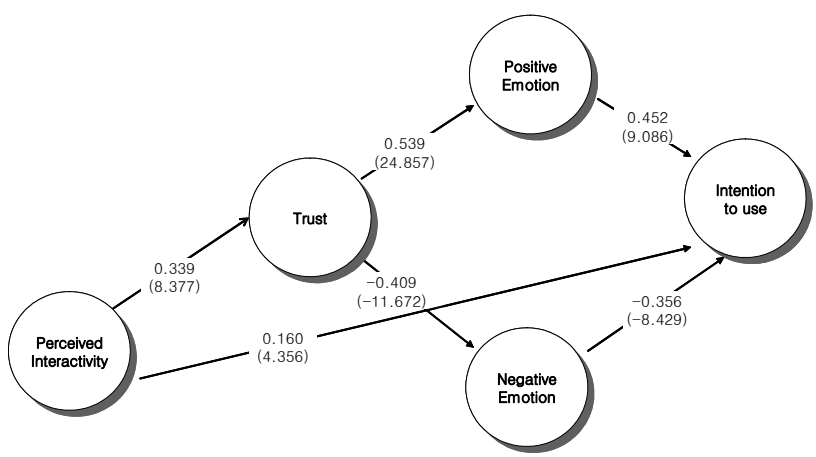
2) Mediating effect of positive and negative emotions

Trust was shown to exert a significant effect on positive emotions, and positive emotions appeared to have a significant effect on intentions. The relation between trust and positive emotions was significant: the t-value was 25.270 at $p < 0.01$ and the relation between positive emotions and usage intentions was verified by the t-value of 7.192 at $p < 0.01$. In this case, the relation between trust and usage intention was positive, as demonstrated by the t-value of 9.251 at $p < 0.01$; therefore, positive emotions exert a proportional mediating effect between trust and usage intention.

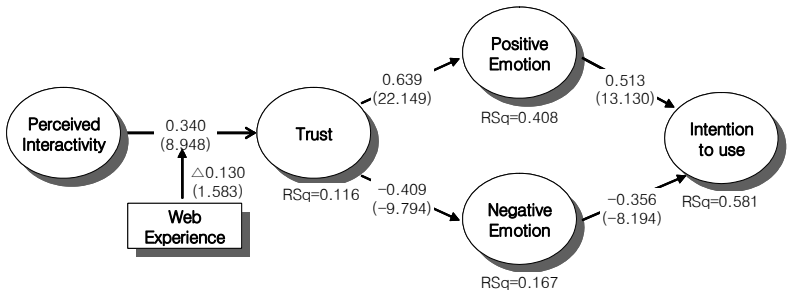
Additionally, the effect of trust on negative emotions and that of negative emotions on the intention to use was shown to exert a positive influence. The relation between trust and neg-



<Figure 3> Mediating Factor-Emotion: 3-Stage Analysis



<Figure 4> Dual Mediation Effect: 3-Stage Analysis



<Figure 5> Research Model Verification

ative emotions was significant, as demonstrated by the t-value of -9.018 at $p < 0.01$ and the t-value was 9.251 at $p < 0.01$ in the relation between negative emotions and usage intention. As previously stated, the relation between trust and intention to use was positive, as shown by the t-value of 9.251 at $p < 0.01$; therefore, negative emotions can also exert a proportional mediating effect between trust and intention to use.

3) The dual mediation effect of trust and emotion

According to the results of the final stage of analysis conducted to confirm the dual mediation effect of trust and emotion, perceived interactivity was shown to influence trust, positive emotions, and negative emotions. Trust, positive emotions, and negative emotions appeared to exert a positive influence on usage intentions. In this case, as a result of the analysis of the perceived interactivity's effect on usage intentions, the t-value of 4.356 at $p < 0.01$ was positive; therefore, trust and positive/negative emotions exert a proportional mediating influence.

Trust exerts a mediating effect between perceived interactivity/positive emotions and perceived interactivity/negative emotions. Trust was shown to exert a proportional mediating effect between perceived interactivity and positive emotions, whereas it appeared to exert a fully mediating effect between perceived interactivity and negative emotions.

Positive emotions exerted a proportional mediating effect between trust and the intention to use, whereas negative emotions also exerted a proportional mediating effect between trust and the intention to use. Trust and emotions exerted a dual mediating effect between perceived interactivity and the intention to use; therefore, the results of research analysis demonstrated that they exert a proportional mediating effect.

4.3 Hypothesis Results

8 of the hypotheses were supported by the results of our investigation. However, as web experience was anticipated to have an effect between perceived interactivity and trust, it showed no signs of significance. This may be attributable to the fact that it proved impossible to consistently translate the web experience to IPTV usage. As a consequence, web experience may not directly accelerate IPTV use, owing to differences between web-based user interfaces and IPTV.

Ⅴ. Conclusions and Implications

5.1 Conclusions

The principal objective of the work was to confirm the effects of perceived interactivity, trust, and emotion on intentions to use IPTV service. In service of this objective, we empirically researched the effects of individual features such as trust and emotions in perceived interactivity on users' intentions. As a consequence, the relations between perceived interactivity and trust, trust and emotions, and trust and user intentions were all as anticipated; therefore, the stated hypotheses were supported. Trust was affected as perceived interactivity was high and a positive relation appeared when trust was high; however, a negative relation was observed in terms of emotions as trust was low. The results of our empirical research demonstrated that positive and negative emotions influenced user intentions positively and negatively. Moreover, the relation between perceived interactivity and emotions was mediated by trust, and the relation between trust and perceived interactivity was mediated by emotions.

The results of our research clearly show that the trust and emotion of users should be considered from the MIS perspective in order to build consumer intentions to use the product. Additionally, viewed from the executive perspective, cost-effectiveness should be regarded as a factor to enhance positive emotions, thus improving user's intentions to retain and continue to use IPTV.

5.2 Theoretical Implications

Several academic implications may derive from the research presented herein. First, a combined model of perceived interactivity, trust, emotion, and user intention in IPTV has been put forth. The connection between interactivity, trust, emotion, and user intentions has been deemed insufficient in previous studies, but a theoretical outline of the effect of interactivity on user intentions is provided by the results of this research.

Second, the research area of interactivity can be expanded by our finding. Our research indicates the effect of relieved interactivity on trust and emotions, which leads to an effect on user intentions. The mediating role played by trust and emotions in user intentions is substantially supported by our results.

Third, the research may be viewed as the starting point of IPTV research model. Many of the studies conducted thus far have provided evidence to confirm the relationship between interactivity and user intentions. Our research provides empirical research results demonstrating that the relationships between interactivity, trust, emotion, and intention in current IPTV technology, which can be seen as the vanguard of a new generation of IT-based communications.

5.3 Managerial Implications

In the executive perspective, this work can derive a few implications. First, one of the results of our study of the factors affecting the continuous usage of IPTV is that it provided some practical implications regarding IPTV's design and technology development. The work implies not only some possibilities for technical improvements in interactivity, but also design, in that an effective design would focus on in-

creasing trust and boosting the effects of positive emotions.

Second, according to the empirical information regarding user intention standards and the cause of continuous usage in IPTV, the results outline some service improvements, technology, and marketing improvements of providers. The practical task in the subscriber retention is provided in the work. In other words, subscriber retention can minimize the cost associated with subscribing new costumers by earning trust and fostering positive emotions. Research into users is conducted in order to prevent early leavings and maintain long-term users, which is the primary goal of Korean companies where IPTV is currently in the fierce competition with other media. Our results provide correspondence and verification of the practical needs of consumers for marketing managers and IPTV design.

5.4 Future Works and Limitations

Positive results in trust and emotion were drawn during the process of empirical research on the direct and indirect effects of high interactivity on user intentions in the perceived interactivity perspective. However, there are several tasks for future research. First, the research objective was accomplished via empirical research but, the research subject was limited in using the IPTV service hence, external validity or generalizability aspects were not confirmed. Therefore, comparing the research results and applying them in diverse IT services such as the mobile research model is required to confirm external validity.

Second, additional research on uncertainty which is another research topic for trust is required to describe the relation in depth between perceived interactivity and trust. This is because the leverage from perceived interactivity can be diminished as the uncertainty elevates.

Third, due to the difference in user-interface between IPTV and web the control effect of experience could not be proven. However, when IPTV experience is accumulated in the future, research on interactivity, trust and emotion as to do with IPTV experience will be required. This is because elaborate analysis of sources that effects continuous IPTV usage is possible.

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Appendix: Survey Questionnaire

1. Perceived Interactivity

1-1. IPTV service properly responses to my needs.
1-2. IPTV service operates in an intelligent way.
1-3. IPTV service enables two-way communications.
1-4. IPTV service is interactive.

2. Trust

2-1. I expected IPTV service work exactly like I use telephone when I first use IPTV service.
2-2. I expected IPTV service would be convenient when I first use IPTV service.
2-3. I expected IPTV service would meet my service expectation when I first use IPTV service.
2-4. I expected IPTV service would work normally at any circumstances when I first use IPTV service.

3-1. Positive Emotion

3-1-1. Using IPTV service provides pleasant feeling.
3-1-2. Using IPTV service provides warm feeling.
3-1-3. Using IPTV service provides amazing feeling.
3-1-4. IPTV service is an interesting experience.
3-1-5. IPTV service excites my imagination.

3-2. Negative Emotion

3-2-1. Using IPTV service is embarrassing.
3-2-2. IPTV service makes me angry.
3-2-3. Using IPTV service worries me.
3-2-4. IPTV service is boring.

4. Intention to Use

4-1. I want to recommend IPTV I used for my friends.
4-2. I have an intention to use IPTV service continuously.
4-3. I have an intention to watch programs provided by IPTV continuously.

5. Experience on Interactive Media

5-1. I have enough experience in using interactive media like Internet.

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