

# An Empirical Study on Consumer Acceptance of IPTV Service

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## Abstract

In recent years, IPTV attracts great attention along with the digital convergence of communication and media technologies. IPTV combines the advantages of TV and Internet and changes our lifestyle dramatically. In addition, the IPTV service is capable of becoming a new business model which has huge growth potentials in technology-converging marketplaces.

This study examines critical factors on the consumer's adoption of the IPTV service. Based on the Innovation Diffusion Theory (IDT), IPTV specific attributes and personal characteristics, we derive eight key factors in the research model—compatibility, ease of use, image, diversity of contents, interactivity, monetary value, social influence, and user satisfaction. Using the partial least square (PLS) method on the data collected through a web-based survey, we test our research model with several hypotheses. From this study, we find that diversity of contents, compatibility and interactivity have a significant indirect effect on the use of IPTV service via user satisfaction, and user satisfaction and social influence also have a significant direct impact on the IPTV use. These findings not only provide practical insights on the consumer acceptance of new technology-converging services, but also help managers to plan their marketing strategies better.

## 1. Introduction

In recent years, Internet Protocol Television (IPTV) attracts great attention along with the digital convergence of communication and media technologies, and it is capable of becoming a new business model which has huge growth potentials in technology-converging marketplaces.

IPTV is a technology of distributing television contents over IP that enables a more customized and interactive user experience [4]. IPTV service is different from traditional, cable and satellite TV services, which used a passive one-to-many system, and it has been fostering a more interactive multimedia system using streaming technologies through the network.

Therefore, IPTV can provide converging services between users and service providers combining the traditional broadcasting on TV with the interactivity of the Internet. It also has a simple user interface with large reformation, additional personalizing function, and user-operating channel.

According to Gartner [2], worldwide IPTV subscribers will total about 19.6 million this year, marking a 64 percent increase from the 12 million IPTV subscribers recorded in 2007. And, worldwide IPTV revenue is forecasted to reach \$4.5 billion this year, a 93.5 percent increase compared to the year of 2007.

The deployment of converging services of TV, telephony, and Internet access over IP entails a significant initial investment for service providers. Thus, service providers need to carefully plan and manage the IPTV service deployment to

maximize the return-on-investment while providing a good quality of experience to the subscribers. Therefore, the goal of this study is to address the following two questions: (1) what factors influence consumers to use IPTV service? and (2) how do these factors affect the consumer intention to use IPTV service continuously?

## 2. Theoretical Framework

This study examines critical factors on the post-adoption behavior of IPTV service consumers. Lee et al. [6] suggest that users may evaluate their experience based on usage stage, and then formulate their post-adoption beliefs. In this study, based on the innovation and diffusion theory (IDT) [8, 9], IPTV specific attributes, and personal characteristics, we derive eight key factors in our research model (see Figure 1).

### 2.1. Innovation attributes

Moore and Benbasat [8] adapted the characteristics of the innovation presented in Rogers [9] and added two specific constructs that could be used to measure the potential adopters' perceptions of an information technology innovation. IPTV is a revolution, and it combines the advantages of TV and the Internet and changes our lifestyle dramatically. In this study, we focus on three attributes of innovations derived by Moore and Benbasat [8] to examine the consumer adoption of IPTV service. The definitions of constructs are summarized in Table 1.

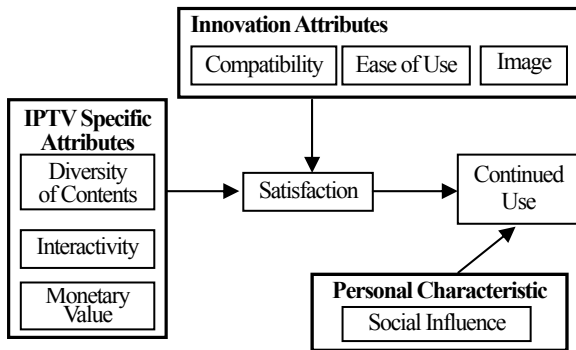
Because the samples in this study are restricted to individual

IPTV users who had experience in using the IPTV service, we expect that compatibility, ease of use and image will have indirect effects on continuance intention via user satisfaction:

*H1: Compatibility of IPTV service will have a positive effect on user satisfaction.*

*H2: Ease of use of IPTV service will have a positive effect on user satisfaction.*

*H3: Image of IPTV service will have a positive effect on user satisfaction.*



**Figure 1. Research Model**

**Table 1. Innovation Attributes**

Constructs	Definitions
Compatibility	The degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters
Ease of use	The degree to which an innovation is perceived as being difficult to use
Image	The degree to which use of an innovation is perceived to enhance one's image or status in one's social system

## 2.2. IPTV specific attributes

IPTV can provide various multimedia contents through the use of communication and media technologies to satisfy the users' different needs. Thus diversity of contents is expected to indirectly affect the continuance intention of IPTV users via user satisfaction:

*H4: Content diversity of IPTV service will have a positive effect on user satisfaction.*

Traditional, cable and satellite TV services use a passive one-to-many system, but IPTV has been fostering a more interactive multimedia system using streaming technologies via the network. Therefore, IPTV could provide converging services between users and service providers combining the traditional broadcasting on TV with the interactivity of the Internet.

Interactivity has been defined in many ways. Liu and Shrum [7] define interactivity as "the degree to which two or more communication parties can act on each other, on the

communication medium, and on the messages and the degree to which such influences are synchronized." In addition, they specify three dimensions of interactivity—active control, two-way communication, and synchronicity.

In this study, we expect that interactivity of IPTV services will have an indirect effect on continuance intention via user satisfaction:

*H5: Interactivity of IPTV service will have a positive effect on user satisfaction.*

Zeithaml [12] argue that the economic value is derived from the quality the consumer gets for the price he/she pays. In the development of a decision-making process, customers compare the benefit from the service to the cost of using the service. Thus, in this study, monetary value is defined as the benefits of the IPTV service compared to its financial costs.

Lee et al. [6] find that perceived monetary value have an indirect influence on continuance intention of mobile Internet users via user satisfaction. IPTV service providers offer a huge price cut for the consumer through bundling services (e.g., TPS, QPS), so we expect that:

*H6: Monetary value of IPTV service will have a positive effect on user satisfaction.*

## 2.3. Social influence

In this study, social influence is defined as the degree to which an individual perceives that important others believe he or she should use the innovation [9]. Social influence that leads an individual to use a technology has been found to direct effect on adoption intention [5, 11]. Therefore, we hypothesize the following:

*H7: Social influence will have a positive effect on continued use of IPTV service.*

## 2.4. User satisfaction

User satisfaction is defined as a user's post-usage evaluation of initial or ongoing experiences with a specific technology [1]. Evidence for the impact of satisfaction on behavioral intention comes from a wide variety of research in marketing and information systems, and points out that customer satisfaction has a positive influence on behavioral intention of continued use [10]. So we hypothesized that:

*H8: User satisfaction will have a positive effect on continued use of IPTV service.*

## 3. Research Methodology

### 3.1 Data Collection

A Web-based survey was conducted to collect the data. We created a site for the Web survey, and then the consumers were requested to participate in the survey.

In the beginning of the questionnaire, respondents were asked about IPTV usage experience and then asked to answer some questions about their use of IPTV using a seven-point Likert scale. Finally, respondents were asked about some demographic information. The sample of this study is restricted to individual IPTV consumers who had experience in using IPTV services. Among the valid responses, 63 respondents have IPTV usage experience. Detailed descriptive statistics related to the respondents' characteristics are reported in Table 2.

**Table 2. Demographic Statistics of Respondents**

Measure	Value	%
Gender	Male	74.6
	Female	25.4
Age	20-29	54.0
	30-39	30.2
	40-49	14.3
	>50	1.6
Average time of IPTV use (per day)	<1 hour	55.6
	1-3 hour	38.1
	3-5 hour	6.3
Education	Technical college	1.6
	Undergraduate	46.0
	Bachelor degree	14.3
	Graduate student	14.3
	Master/Doctoral degree	23.8

### 3.2 Instrument Validity and Reliability

In this study, exploratory factor analyses were performed to check the validity of the measurement model. Table 3 shows the factor loadings of the measurement items. All items surpass the recommended level for factor loading 0.50 [3]. Internal consistency reliability was assessed by computing Cronbach's alpha. Hair et al. [3] suggest that the lowest limit for Cronbach's alpha be 0.70. The alpha values for each construct range from 0.801 to 0.974, exceeding the acceptable threshold value.

Convergent validity was also assessed by looking at the composite reliability and the average variance extracted (AVE) from the measures [3]. Values of AVE for each construct all surpass the acceptable threshold value 0.50, and the composite reliability values range from 0.885 to 0.98, exceeding the recommended value 0.7.

As shown in Table 4, we checked the correlation of latent variables. The results revealed that the square root of AVE for each construct is greater than the correlations between it and all other constructs.

## 4. Empirical Results

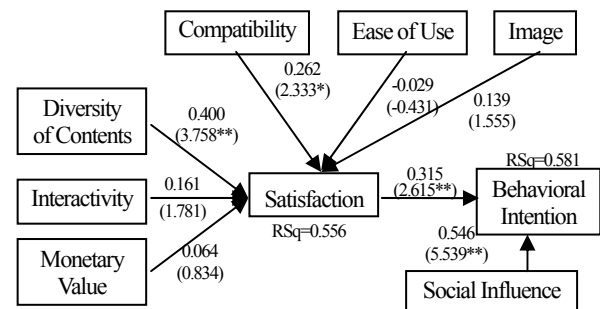
A partial least square (PLS) method was performed using Visual PLS to test the model. Figure 2 illustrates the research results.

**Table 3. Factor Analysis and Reliabilities**

Construct	Item	Factor loading	Composite Reliability	AVE	Cron's alpha
Compatibility	COM1	0.788	0.959	0.822	0.945
	COM2	0.853			
	COM3	0.833			
	COM4	0.828			
	COM5	0.816			
Image	I1	0.900	0.947	0.782	0.929
	I2	0.861			
	I3	0.830			
	I4	0.763			
	I5	0.858			
Ease of Use	EOU1	0.879	0.980	0.925	0.974
	EOU2	0.943			
	EOU3	0.948			
	EOU4	0.967			
Diversity of Content	DOC1	0.685	0.887	0.724	0.801
	DOC2	0.662			
	DOC3	0.690			
Interactivity	INT1	0.508	0.885	0.611	0.859
	INT2	0.871			
	INT3	0.801			
	INT4	0.787			
	INT5	0.817			
Monetary Value	MV1	0.824	0.917	0.787	0.866
	MV2	0.888			
	MV3	0.803			
Social Influence	SI1	0.731	0.903	0.757	0.838
	SI2	0.805			
	SI3	0.673			
Satisfaction	SAT1	0.762	0.958	0.852	0.941
	SAT2	0.835			
	SAT3	0.804			
	SAT4	0.816			

**Table 4. Correlation of Constructs and  $\sqrt{AVE}$  Values**

-	SAT	INT	MV	DOC	SI	COM	EOU	Image
<b>SAT</b>	<b>0.979</b>							
<b>INT</b>	0.469	<b>0.941</b>						
<b>MV</b>	0.368	0.376	<b>0.958</b>					
<b>DOC</b>	0.65	0.464	0.337	<b>0.942</b>				
<b>SI</b>	0.535	0.317	0.376	0.489	<b>0.950</b>			
<b>COM</b>	0.564	0.288	0.266	0.474	0.443	<b>0.939</b>		
<b>EOU</b>	0.251	0.232	0.018	0.254	0.167	0.429	<b>0.99</b>	
<b>Image</b>	0.403	0.212	0.278	0.26	0.506	0.435	0.196	<b>0.973</b>



**Figure 2. Research Results**

\*P<0.05  
\*\*P<0.01

## 5. Discussion

### 5.1 Findings from the Results

This study examined critical factors on the post-adoption behavior of IPTV service users based on the Innovation Diffusion Theory, IPTV specific attributes and personal characteristics. The samples in this study are restricted to individual IPTV users who had experience in using IPTV services. From the results of our study, we found that: (1) Among the three innovation attributes, compatibility indirectly influenced continuance intention via user satisfaction, but ease of use and image have no significant effects. (2) Among the IPTV specific attributes, diversity of contents have a stronger effect than interactivity on continuance intention via user satisfaction, but monetary value has no significant effects. (3) In the personal characteristics, social influence has a great impact on continuance intention.

### 5.2 Implications

It is very interesting to know what the users adopting IPTV services feel satisfied and have an intention to use continuously. There are both theoretical and practical implications from this research. In the theoretical perspective, our study developed a post-adoption model of IPTV services. It provides some evidence of the technology adoption related to converging and bundling services. In practical point of view, the findings of our study help managers to plan their marketing strategies better. In this paper, the results reveal that diversity of contents make user's satisfaction from IPTV use higher. In the results, diversity of contents is the most effective to the user's satisfaction. Thus, technology-convergence from broadcasting and communications services provides better and more contents than traditional, cable, and satellite TV services, and then it make the users higher loyalty. Therefore the service provider should try to develop more contents and improve the service to use easily.

### 5.3. Limitations

The limitations of this research are as follows. First of all, the sample of respondent is a little small although the sample size is appropriate to use ten times of the number of constructs. This is because the IPTV service is in a beginning stage for diffusion. And also it hurts the relevance of result because the most respondents are skewed to men, and watch the service in much shorter IPTV playing time. So in future research, we will get more samples from various groups, and evaluate the user cognition for IPTV. Finally, we will study influent factors of adoption for IPTV through the survey from non-users of IPTV, and compare with this research results.

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