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# Cognitive Media Attributes and Motivation of IPTV for Agricultural Information

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## ABSTRACT

New digital media forms have broaden new business opportunities. Internet Protocol Television (IPTV) has emerged as a major contender, from these new digital media options. Agricultural and food industries are especially excited and looking forward to employing IPTV as they see it as a viable means in promoting their markets. This study examines whether the effects of media attributes and motivations affect cognitive necessity and usefulness on viewers. 254 observations of survey were collected from members of an agriculture-related web-site which shows how media attributes can impact the cognitive necessity of viewers and how motivational factors of use can influence cognitive usefulness of those viewers. From these results, IPTV service providers can obtain insight on their future programs and the proper use of their application.

## Keywords

Internet Protocol Television (IPTV), agricultural information, media attributes, usage motivation, information necessity, information usefulness.

## INTRODUCTION

With the rapid development of communication technologies, media markets have undergone a great amount of transformation and have faced stiffer and greater competition among all forms of media outlets. In accordance with technical developments as well as media expansion, however, a variety of media forms competed with each other more fiercely so that the user's selection had become most important above all else (Lim, 2007). Various digital media forms including internet, satellite broadcasting and mobile phone services are competing with traditional media forms such as terrestrial television, radio and newspapers for audiences time and attention which is obviously a limited resource. The digital environment in the 21<sup>st</sup> Century has ushered us in to a multimedia era unexpectedly, and the convergence phenomena of broadcasting and telecommunication changes the characteristics of media itself. Several characteristics which define the broadcasting environment in this digital era are as follows: multimedia, multi-channels era, interactive service for mass media, change of broadcasting concept and consumers' media usage behavior, and consumer-centric marketing environment (Kim, 2003).

The media convergence phenomena and eventually how the media characteristics changes above-mentioned can be seen by the advent of IPTV (Internet Protocol Television). IPTV is a system where a digital television service is delivered by Internet Protocol over a network infrastructure, which may include delivery by a broadband connection. IPTV also has the possibility of using multicast technology which can transmit a digital signal to several clients' terminals simultaneously. For residential users, IPTV is often provided in conjunction with Video on Demand and may be bundled with internet services such as Web access and Voice over Internet Protocol (VoIP). Commercially, IPTV, VoIP and Internet access service, even mobile phone service can be offered by one service provider as "bundled service." These phenomena come from the media convergence substantially. Figure 1 shows the outline of IPTV service flow. First, content produced by the content provider would be digitized and then sent to the service provider. A service provider could then deliver the digital signal to a network provider. In Korea, usually one company functions as a service and network provider simultaneously. Then the network provider distributes the digital signal to be decoded to each viewer.

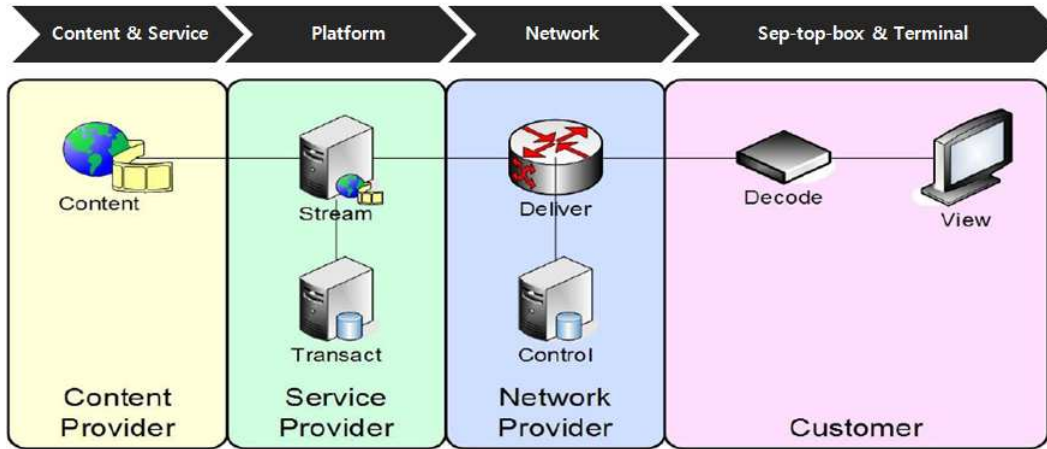


Figure 1. IPTV service outline

Recent forecast of IPTV in Korea are fairly encouraging. It is projected that by 2013, the number of IPTV subscribers will increase to more than 4.7 million. This means that the IPTV market will hold 22% of the pay-television market. In a competitive media environment, understanding IPTV’s characteristics and motivation is necessary to realizing the prospect and the possibility of IPTV. IPTV has gained appeal because of its core characteristics, “access to internet and Interactivity (Kang and Lee, 2006).” Precisely, different characteristics and use-motivation of IPTV from other media outlets will be most likely important factors, which have an effect on necessities and usefulness of IPTV. Therefore this study empirically examines how IPTV’s characteristics and user motivations affect on both cognitive necessities and usefulness respectively.

(Unit: thousand household)

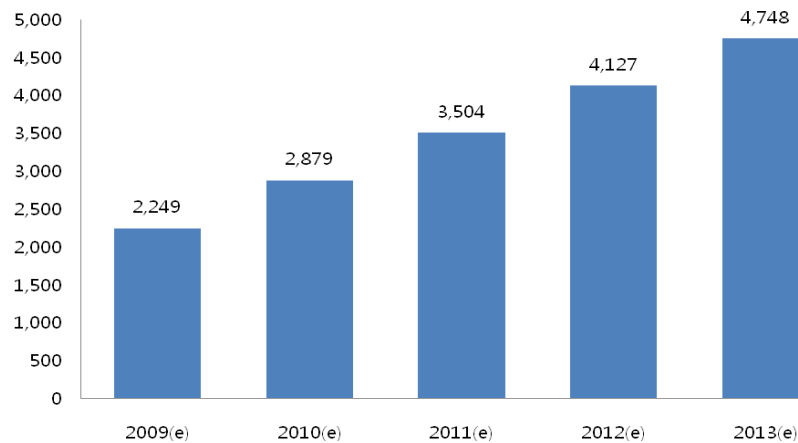


Figure 2. Forecast of the number of IPTV subscribers in Korea

(Media\_&\_Future\_Institute, 2009)

## ATTRIBUTES AND MOTIVATIONS OF NEW MEDIA

### Characteristics of Media

Each time a new media appears, a study examining the characteristics of the new media is necessary. Because new media’s adapted new technologies and have different traits from the older and already established media forms. Different traits of new media forms may determine whether or not that media can be received by a specific consumer segment. If the new media form is received, its characteristics will then decide how the new media form is used. Therefore studying characteristics of new media forms can be important work in estimating whether the possibility of the new media form can be allowed to operate and if that new media form in the long run is used. Usually, new media forms are subjected to remediation of old

media forms (Bolter and Grusin, 1999). So, many studies examine the characteristics of new media forms in comparison with the old ones.

First of all, there is a study that examines media traits and the usability of internet and television to understand the media using patterns of audiences. These results showed that television has had much higher user motives than internet due to its reality and usability. Even those audiences still considered television as a more familiar media form, they are regarding internet as a interactive and informative media form (Park and Oh, 2001). Second, Park (Park, 2003) researched the media characteristics of cellular phone services, internet and television in Korea. The results showed that media audiences regarded internet as an unfamiliar, technical-oriented but active, informative medium with incredible information sources, while television is considered as passive, non-personal, familiar and convenient one-way medium with credible information sources. Cellular phone services are considered as an interactive, private and individual medium (Park, 2003). Next, as advertising media, Chon, Park and Lee (Chon, Park and Lee, 2007) researched the characteristics of internet media, Newspaper and terrestrial broadcasters. Their conclusion is that internet media has strengths in creativeness and timeliness. Newspapers have advantages in timeliness and reach, and terrestrial broadcasters have strengths in reach and advertising exposure effects (Chon, Park and Lee, 2007).

### Media Use Motivations

It is important to study for not only the characteristics of new media but new media use motivations. Because media use motivations is closely connected with the characteristics of media. When specific media use motivation corresponds to characteristics of media, what characteristics of media work best. Consequently, the studies for media use motivations have to be carried out taking the characteristics of media into consideration.

Park(2003) comprised the media use motives of internet, television and cellular phone services. He concluded internet ranked the highest compared to the other two media forms in terms of “stimulate and sexuality.” While television has the highest use motive, cellular phone services have the lowest use motive among three media types. This result means that up till now, Media users in Korea regard their cellular phone service as a communication device. The reason why internet has been partially positioned as one of popular mass media means in replacing television in Korea is that internet has interactivity, individuality and activity (Park, 2003). Secondly, Song found that there would be six factors of positive gratification patterns. And there would also be six factors of negative ones (Song, 1999). Finally, using multivariate factor analysis, Korgaonkar and Wolin (Korgaonkar and Wolin, 1999) suggested the presence of seven motivations regarding Web usage. The results are as follows.

1. Social escapism motivation
2. Transaction-based security and privacy concerns
3. Information motivation
4. Interactive control motivation
5. Socialization motivation
6. Non-transactional privacy concerns
7. Economic motivation (Korgaonkar and Wolin, 1999)

### Characteristics of Media & Media Use Motivations of IPTV

As state above, IPTV is a digital television service using Internet Protocol. To grasp the characteristics and use motivations of IPTV, It is effective to secularize existing research for television and internet at the same time. Kang and Lee aim to identify consumer’s actual demand for IPTV. First, they attempt to define an IPTV prototype and then explore predictors that affect potential consumers in adopting IPTV from amongst competing media forms like television and internet. Results of research show five primary motives for adopting the IPTV prototype: interactive communication, diversity, convenience, risk aversion and multitasking. These motivations are significant predictors of internet and the use of IPTV in the near future. Their study also finds that IPTV is functionally similar to existing television services and may replace these services. The study empirically supports the functional similarity principle using two concepts of perceived functional similarity and media substitution (Kang and Lee, 2006).

### Necessity and Usefulness

Acceptance of a new idea usually means that a individuals cognition on the subject in terms of necessity and usefulness. Perceived usefulness means the degree to which a person believes that using a particular system would enhance his or her job performance(Davis, 1989). In this study, the concept of usefulness is used for capturing IPTV consumers’ perception on their evaluation for their personal purposes. “Necessity is the mother of invention.” That means necessity on a subject leads to

acceptance of that. As a proxy of motivation on a certain action, the concept of necessity is considered as a precedent variable of acceptance.

Necessity and usefulness can be regarded as a preliminary measurement for acceptance of new technology. This study applies to these concepts to measure consumers' action of acceptance. In particular, in case of media contents, consumers' decision on acceptance can be identified from their cognitive necessity and usefulness on contents. Thus, in this study, consumers' cognitive necessity and usefulness is used as dependent variables.

## RESEARCH MODEL

The research question raised here is what kind of attributes and motivational factors does IPTV have on as a media impact on users' cognitive necessity and usefulness of IPTV. To answer these questions, we have developed two theoretical models which are based on traditional media studies. Previous literature says that media attributes and motivation factors effect media adoption. Differences of media attributes and motivation lead to adoption of different kinds of media. As an IPTV service provider, it is crucial to know what factors, those are attributes and motivation factors, the potential users want to have from IPTV services. Based on this research, this study investigates what kinds of attributes and motivation factors impact the adoption of IPTV.

This study approaches in two discrete ways. One is to explain users' cognitive necessity of IPTV, and the other is to show users' cognitive usefulness of IPTV. Two different models are proposed: Attributes model (Model 1) and Motivation model (Model 2).

### Attributes Model (Model 1)

Media attributes determine selection of media. Users search to find appropriate media in order to satisfy their own demands. In this process of searching, cognitive media attributes play a leading role in selecting media. In this process, users' cognition of media rather than technical specifications by experts is more likely to impact the users' selection.

In case of agricultural information, consumers feel more of a necessity when certain attributes of media will meet the consumers wants. Users' necessity of media comes from the media's attributes which the users believe the media possess.

Regarding media attributes, several studies identified interactivity as one of the critical aspects of digital media. Users can respond to information from digital media, such as asking questions, writing their opinions, ordering and searching for information. From a perspective of information searching, cognition of media which has professional information leads to a personal belief in the information transmitted by the media source. Traditional information systems (IS) literature tell us familiarity and ease of use is the basis of adoption for information systems. We can apply this relationship into media adoption. Digital media has another factor in that it can be personalized for each customer. The media can record user's viewing habits and adjust to each customer accordingly and individually. Last, the economic factor is of course one of the fundamental issues in selecting media forms. The underlying logic is that customers make their own decisions based on their economic perspective.

This study, in sum, proposes a hypothesis of the relationship between media attributes and users' cognitive necessity on media as following. This hypothesis has six sub-hypotheses which test six different attributes of media.

Hypothesis 1: Cognitive media attributes (interactive, professional, familiar, easy to use, personal, and expensive) of IPTV impact on the necessity of IPTV channel for agricultural program. (Attributes-Necessity Model: Model 1)

### Motivation Model (Model 2)

Motivation factors of media adoption determine the usefulness of the media. Motivation factors to adopt media are related to the evaluation of how useful media is from the perspective of users. In other words, motivational factors are the reasons users adopt the media form. Thus, as an IPTV service provider, it is important to know what kinds of motivational factors lead IPTV users to adopt its service. From the perspective of agricultural information, the IPTV service providers should know what kinds of characteristics on information make the incumbent users adopt the agricultural channel of IPTV. This could be a starting point to prepare the agricultural channel of IPTV for its service provider.

Literature on the motivational factors of media showed a variety of purposes of users and the effects of users' adoption of media. One of these factors is users want to be relaxed while watching TV. The agricultural channel of IPTV should also include those kinds of benefits for their users. Another aspect of traditional media for users is that television programs provide users with entertainment. Only enjoyable channels can capture the attention of viewers. When traditional television moves to digitalized media, such as IPTV, television programs and media contents can provide viewers with richer

information than the previous standard. Information gathering becomes one of the major motivation factors of selecting IPTV. Demand to have the subject be able to communicate could be a basic purpose of having broadcasting media. Knowing commonly shared information makes the viewer become a leader in a group and feel more comfortable in participating in discussion.

This study, based on previous media literature, proposes a hypothesis that the relationship between motivational factors and the cognitive usefulness of users of IPTV channel. This hypothesis has four sub-hypotheses which test four different motivational factors of media selection.

Hypothesis 2: Motivation factors (relaxing, enjoyable, information gathering, and topics to chat) of IPTV impact the usefulness of IPTV channel for an agricultural program. (Motivation-Usefulness Model: Model 2).

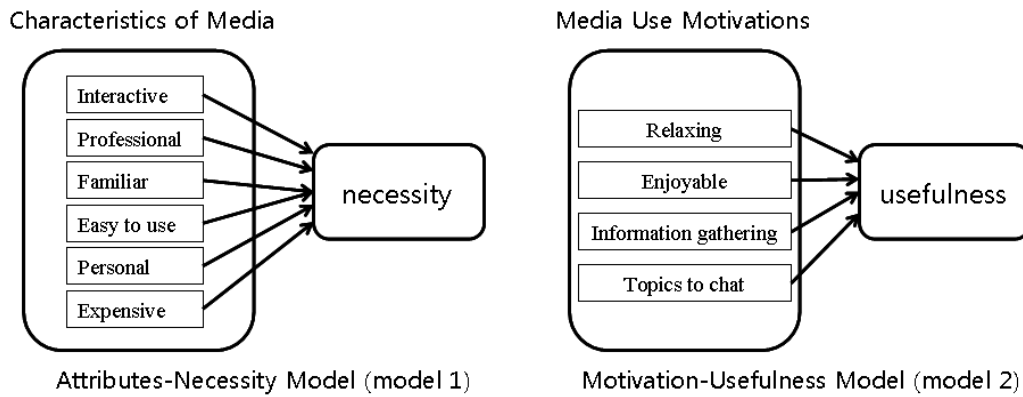


Figure 3. Research models

RESEARCH DESIGN

Data Collection

Media & Future Institute conducted a survey of people interested in information systems for agriculture and fisheries to evaluate attribution and motivation and in understanding the usefulness and necessities of a media channel about agriculture and fisheries according to the media platform. Media & Future Institute sends out e-mail to ask for participation in a survey to 3,000 panelist organized by the Agriculture Forestry Fisheries Information Service. The online survey included both e-mails responses and a website participation that encouraged 457 panelists who agreed to participate in the survey. The e-mail which asked panelist to cooperate was sent on September, 24<sup>th</sup> and October, 2<sup>nd</sup> 2008, the survey was performed from September, 25<sup>th</sup> to October, 5<sup>th</sup>, 2008.

Table 1 shows demographic feature of survey sample.

Category	Group	The number of participants (ratio)	Category	Group	The number of participants (ratio)
Gender	Female	63(25.0%)	Age	Teens	1(0.4%)
	Male	189(75.0%)		Twenties	19(7.5%)
Household income	Under 1 million KW	18(7.1%)		Thirties	60(23.8%)
	1~2 million KW	78(31.0%)		Forties	88(34.9%)
	2~3 million KW	68(27.0%)		over fifties	84(33.3%)
	3~4 million KW	52(20.6%)	Occupations	Agriculture, fishery and forestry	149(59.1%)
	4~ million KW	26(10.3%)		self-employed	16(6.3%)
Educational	Over 5 million KW	10(4.0%)		sales and services	5(2.0%)
	Junior high and high school	12 (4.8%)		office workers and engineers	30(11.9%)

background	students					
	College and graduate students	11(4.4%)			administrators and executives	4(1.6%)
	Elementary school graduates	12 (4.8%)			Professionals	16(6.3%)
	High school graduates	83 (32.9%)			Housewives	17(6.7%)
	College graduates	111 (44.0%)			Students	4(1.6%)
	Postgraduate school graduates	19 (7.5%)			Inoccupation	6(2.4%)
	The others	4 (1.6%)			the others	5(2.0%)

**Table 1. Demographical feature of the survey sample**

In order to test the models, *Attributes model* (model 1) and *Motivation model* (model 2), of this study a survey study was carried out. The survey questionnaire was distributed to members of a web-site which is related to agricultural information from October 2008 for 2 weeks. After e-mailing the site members, participants were encouraged to log-into a web based survey site and answer the survey. Among the 457 responses, 254 observations came from users had experience and were knowledgeable with IPTV, and those are subject to test the research model in this study. IPTV service in Korea is still at a beginning stage however pre-IPTV services which provide video-on-demand (VOD), already launched since July 2006. As of December 2008, the number of subscribers of IPTV were around 1.6 million.

**Methodology**

In this study, multiple linear regression analysis was applied to test the two models. For some variables, such as *professional*, *easy to use*, and so on, data are coded reversely due to the appropriate expressions of the Korean language. Among selecting methods of independent variables of regression analysis, Enter method is applied. Each variable is answered by Likert’s 5-scale type.

**RESULTS**

Prior to regression analysis, a correlation analysis was run to verify the discriminant validity among the variables. Each model was tested by each regression analysis.

**Discriminant Validity**

Table 1 shows the results of the correlation analysis on the variables of media attributes. The results verify that there is no high correlation among variables of media attributes. Thus, it is proved that attributes variables of IPTV have discriminant validity. As a result, these variables can be used for the following statistical analysis.

	Interactive	Professional <sup>+</sup>	Comfort	Easy to use <sup>+</sup>	Personal <sup>+</sup>	Expensive <sup>+</sup>
Interactive	1					
Professional <sup>+</sup>	-0.008	1				
Familiar	0.219**	0.118	1			
Easy to use <sup>+</sup>	-0.101	-0.019	-0.441**	1		
Personal <sup>+</sup>	0.180**	0.184**	0.185**	0.082	1	
Expensive <sup>+</sup>	0.302**	0.157*	0.398**	-0.265**	0.210**	1

<sup>+</sup> Reverse-coded

**Table 2. Results of Correlation Analysis (Attributes Model)**

**Attributes Model (Model 1)**

Table 2 shows the results of regression analysis on the attributes-necessity model (model 1). *Interactive* and *Expensive* (reverse-coded) are shown to be significant at 10%.

	Unstandardized		Standardized	t	p-value
	B	Standard error	B		
Constant	3.568	0.312		11.434	0.000
Interactive	0.079	0.046	0.114	1.704	0.090
Professional <sup>+</sup>	0.056	0.051	0.072	1.107	0.270
Familiar	0.079	0.058	0.103	1.359	0.176
Easy to use <sup>+</sup>	-0.043	0.052	-0.060	-0.832	0.406
Personal <sup>+</sup>	0.031	0.053	-0.040	-0.585	0.559
Expensive <sup>+</sup>	-0.117	0.062	-0.136	-1.872	0.062

<sup>+</sup> Reverse coded

**Table 3. Results of Model 1 (Attributes-Necessity Model)**

These results show that viewers who recognize that IPTV is more interactive and cheaper enjoy the necessity of IPTV more.

#### Motivation Model (Model 2)

Table 3 shows the results of regression analysis on the motivation-usefulness model (model 2). *Relaxing* and *Enjoyable* are shown to be significant at 1% and 5% of significance levels respectively.

	Unstandardized		Standardized	t	p-value
	B	Standard error	B		
Constant	3.639	0.187		19.411	0.000
Relaxing	-0.282	0.105	-0.308	-2.677	0.008
Enjoyable	0.228	0.110	0.248	2.068	0.040
Information gathering	-0.091	0.109	-0.100	-0.836	0.404
Topics (to) of chat	0.140	0.119	0.151	1.179	0.240

**Table 4. Results of Model 2 (Motivation-Usefulness Model)**

The results show that viewers who wanted to be more relaxed enjoy IPTV more and feel that IPTV is more useful.

#### CONCLUSION & FUTURE STUDIES

In this study, we discovered that the media attributes influencing the cognitive necessity of IPTV viewers and the motivational factors affecting the cognitive usefulness of IPTV and of its viewers.

The results of the attributes-necessity model reflect the new attributes of digital media and show that they are consistent to traditional media literature as well. It is shown that the evaluation of necessity by viewers depends on the service's price. And it was found that interactivity, which is a major difference of digital media from traditional analog media.

The motivation-usefulness model show consistent results with traditional media literature. From the results, we can estimate that IPTV viewers want to relax and enjoy the IPTV programs. When IPTV provides those kinds of programs, viewers feel IPTV is more useful. (Media\_& Future\_Institute, 2009) From the results of this study, we can infer that IPTV has expectations of new media as well as traditional media attributes. Thus, IPTV providers are better prepared than traditional entertainment with its usages of components and interactivity as well.

Building information systems in rural communities is closely connected with profits and quality of life of the people who live in those areas. Because it is material to businesses related to agricultural and fishery industries to be able to find information



pertaining to the cultivation of agricultural, fishery and forestry. But there is not yet enough of the types of informational systems needed to provide the kinds of adequate and reliable information needed for those rural communities. Though some people use internet to get information that they need, a number of people cannot truly put internet to good use on account of certain characteristics of internet having complicated interfaces and requiring constant maintenance and technical knowhow. Therefore internet usually has limitations for usage in the agricultural, fishery and forestry industries in terms of information gathering as for most of the people in those fields generally have little technological experience. On the other side, IPTV to use television device, one of most intimate media forms is expected to deliver essential information for rural communities effectively and efficiently.

There are still some limitations in this study. Measurements of conceptual cognition did not come from constructs, but from individual indicators. That could produce measurement errors. The online survey has validity, because early adopters are more likely to participate in an online survey at the time of the launching of IPTV. However, it needs to be expanded further to majority users who are not still familiar with online surveys.

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