CHAPTER- II

LITERATURE REVIEW
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2.1 Introduction

IP (Internet Protocol) and TV (Television) both are the two elements of Internet Protocol Television (IPTV). IP allows to transfer information (data) to a point, which is addressed earlier. Except the addressed point, no one can get this information. On the other hand, TV is a system where images, videos and sounds are transmitted via terrestrial, cable or satellite and anybody having a TV set and cable connection or DTH (Direct To Home) connection can receive the TV signal. IPTV is the addition of these two elements and the system is able to deliver video and sounds together through Internet. Therefore, IPTV system has features of both, Internet and TV. IPTV is a real time distribution service for multimedia contents (either broadcast or on-demand) over an IP network. IPTV provides digital TV services over Internet Protocol (IP) for residential and business subscribers. Video and sound can be delivered to any screen TV, Mobile or even in PC. IPTV has a different infrastructure from TV services. IP infrastructure is based on personal choices, depending on people’s needs and interests (Jain, 2005). Therefore, IPTV has a two-way interactive communication between operators and users, for example, streaming control functions such as pause, forward, rewind, and so on, which traditional cable television services lack. Triple play in a service operators’ package include voice, video, and data.

Now industries are focusing on users’ feelings about new technologies (motivation) and experiences, as the complexity and uncertainty of new technologies are increasing day by day. It is clear that, motivation, experience and adoption rate are directly linked. When motivation will be higher and experience will be better the user adoption rate also will be higher (Shin, 2009).

As TAM has been introduced for Information System (IS), we can apply TAM theory in IPTV also. IPTV using factors should be discussed in part by the technology acceptance model, TAM (Davis, 1989). TAM is a leading theory of technology acceptance in IS research. Empirical studies have indicated that TAM is a parsimonious
and highly fitted model of technology acceptance behavior in a large variety of IS. The original TAM model proposed by Davis (1989) does not adapt fully to the area of IPTV, because TV broadcasts provide fun and usefulness at the same time. Subscribers of IPTV will expect to get information, amusement, and enjoyment anywhere, anytime and in any device. These intentions are different from Information system ones that are based on increasing performance (Shin, 2008).

2.2 Evaluation of IPTV

Nowadays two main models of deployment of television over internet are available: 1) The traditional broadcast model like cable TV and satellite TV, and 2) A new model, where the TV program distribution develops to a mixture of “linear” and “nonlinear” / “on demand” system in the IP networks. The second model has the crucial element of interactivity giving rise to new business models, where the television service providers have direct access to the end users (Tadayoni, 2006).

Internet Protocol Television (IPTV) is addition of two components, one is ‘IP’ and another one is ‘TV’. IP stands for internet protocol, which allows information to move to a particular point, which has been addressed previously. TV is a system by which pictures and sounds move through cable or satellite or terrestrial space. IPTV is a system where TV signal is transmitted through Internet Protocol. In addition, many newer features can be included when distribution is done over IP. An IPTV service model offers both multi-channel video program and on-demand program.

The IPTV concept came-out in 1995 for the first time. In 1998, the AudioNet company initiated the first live webcasts with TV programs. In 2001, Kingston Communications was one of the first companies to introduce IPTV over ADSL and in 2003 Total Access Networks Inc. released its IPTV service consisting 100 free access channels. In 2006, AT&T launched in US an IPTV service, named U-Verse, with more than 300 channels in 11 different cities. In 2009, AT&T announced the introduction of more than 100 HD TV channels (Rodrigues, 2010). Later it was introduced in Japan, Korea, China, India and in many more countries.
Video distribution for PCs using the internet, started approximately in 1998. The name of this service was internet streaming. Internet streaming was an advanced service as it allowed for real-time video frames (Yamamoto, 2009). Yamamoto (2009) comments that, around 2003 an IPTV broadcasting service began with a degree of sufficient quality for displaying on TV sets, due to popularization of broadband, advancement in video compressing techniques and progress of IP technologies. By definition, IPTV is internet-streaming service for distributing video and audio through a closed IP network to normal TV sets linked to Set-Top-Boxes (STB), using broadband access network. Not only streaming the video, IPTV is also capable of offering services that converge with data distribution or use the two-way nature of IP services. Internet Protocol Television (IPTV) is a good example of digital convergence which can create new business opportunities and benefit consumers.

Moote (2006) addresses that the basic difference between Internet TV and IPTV and finds that Internet TV allows access to content everywhere, whereas IPTV is distributed within a closed environment, such as a city or regional area like a subdivision, basically a private network, which allows for restricted access of content in a closed network. We must also take note that the owner of an IPTV network has full control over content. Both IPTV and Internet TV delivers video using Internet Protocol which is a packet based technology. IPTV can be delivered through Telecom Operators’ system as well as through cable system. Moote also comments that telecom operators can grab long-term revenue opportunity by delivering content to national, regional, local and targeted audiences.

A recent study (Whitney, 2006) shows that there is a relationship between Television programming with a large number of household products positioning and the desire to remodel one’s house. The outcomes also indicate that audiences have a more positive perception of the brands they find embedded in TV programming. Mobile TV has the potential to modify the recent market for cellular services. Two future paths and scenarios are suggested; one where mobile TV is transmitted primarily over a dedicated broadcast network similar to conventional TV today. The other is a solution that uses the existing cellular networks that with some upgrades could support a “broadcast-like”
service where broadcasters and carriers can collaborate on technical hybrid solutions with broadcast streams being synchronized with mobile Internet usage (Bria, 2007).

IPTV systems are changing the style television is broadcasted and used, offering large advantages to TV broadcasters and users. It is not only the little distribution and transportation costs, but also the possibility to offer distinguished interactive services (Rodrigues, 2010). These untapped opportunities can be offered through various value-added services, such as VoD, Multiple Camera Angle, Karaoke, Gaming services, Ethnic program packages, Targeted advertising. Extra services like Voice over Internet Protocol (VOIP), E-mail, SMS, and Caller ID also can be added. Another important feature is Personal video recorder (PVR) (either as a hard disk in the Set-top box or on the network) permitting ‘time-shifted’ seeing of TV program, or ‘catch-up’ viewing if the user pauses a live broadcast program (Thomson, 2006).

A study on IPTV by Obrist (2008) comments that, IPTV will become more significant in European families in the near future and will allow for the technical basis for subscriber-generated content on the TV. As cohesion in communities is based on sharing the similar interests (bonding), local communities will be interested in user-generated content on TV.

With this new concept, each subscriber will have the power to determine which programs he wants to watch, when and where he / she will watch them, giving him/her a high mobility degree. The main thing about IPTV is that: it is not just another delivery channel, but the path to a far richer, more interactive user experience. The beauty of IPTV is that it is the response to a real user need for more interesting, personalized and interactive content. It is likely that IPTV providers will focus much on this personalization, for example, targeting TV programs and advertising content to different users according to their personal tastes and demographics (Christian, 2006).

In this way, IPTV systems should move from systems based on the selection of specific channels with rigid contents to systems based on the selection of the subject or content that each user wants to watch, thus having a high degree of versatility and personalization (Rodrigues, 2010). Karantanis (2009) considered six domains for IPTV value chain, namely, Consumer Domain, Network Provider Domain, Platform Provider
Domain, IPTV service Provider Domain, Content Provider Domain. Four different business models also were proposed by Karantanis (2009), namely, Triple play offerings (Traditional Triple Play, Hybrid Triple Play), IPTV bundled with VoD, VoD-only business model, Combination of IPTV-Internet TV business model.

It has been found that there are three potential market drivers for IPTV which are as follows.

Competitive Pricing- In current market scenario all service providers (Cable, Satellite and Telecom operators) are offering triple-play packages with a very thin profit margin. Quest for Delivering High speed Connection- telecom operators have to look for other alternatives that will help them to differentiate themselves in the market.

Building a Better Customer Experience- Service providers have to be creative in packaging of services that truly stimulate consumers. Service providers need to know about their customers and they need to analyze customers’ switching behavior (Iyer, 2006).

Bouwman (2008) described two types of drivers, Technological drivers (an increase in effective distribution capacity, an increase in the ability to process user feedback, an increase in the storage and processing power controlled by viewers, and the separation of applications from transport) and Market drivers / Commercial drivers. Market drivers may be type of market demand, Convergence of Information and Telecommunication and TV industries, and competition. Different types of domain are incorporated within the IPTV business model such as service Domain, technical domain, organizational domain, financial domain etc. The vital design alternative to offer packaging is the key to fulfilling the need of “standard” subscribers for convenient configuration and helping telecom operators to establish a leading place in the TV market.

Karantanis (2009) stated, from consumers’ point of view suggests that the critical success factors for IPTV are convenience/Usability (installation and handling), Attractiveness of offer, Consumer service pricing, Marketing and communication for the service, Broadcast quality, Time shift/PVR (Personal Video Recorder) functions, Coverage and reach, Strategic alliances, Legal aspects and Access to on-demand
content. Future effect of IPTV on the industry can be categorized into three areas: Content - Availability of more content with easier access will be the main objective, Convergence - IP network will permit an application program to be run over multiple end-user devices, in a single service network. Interactivity– The both-way type of the IP network will enable interaction among users, content providers, broadcasters and advertisers (BSF Broadband, 2006).

IPTV service providers need to have access to pleasing content to compete with cable and satellite pay TV providers (Thomson, 2006). With the advent of IPTV, users who were ‘passive viewers’ of the program of traditional television become ‘active selectors and users’ of varied contents of IPTV (Kim and Kim, 2009). Growth of IPTV service is closely associated with residential broadband. Penetration and growth of broadband access is a major policy and business topic in many regions of the globe. Now various IPTV service providers are participating in the growth of broadband applying a mixture of competitive technologies (Tadayoni, 2006).

Shin (2009) expects that IPTV will grow at a rapid pace in the coming days, because broadband is now available to more than 100 million households worldwide. IPTV services have been launched or trialed in 7 out of 13 Asia-Pacific economies.

2.3 Research Relating to Interactivity:

Interactivity is an intermediate component between a customer / prospect and company. Information technology may be only mediators which facilitate interactive communication. Interactivity comes as a result of changing environment and growing demand of customers’ to get personalized services / products (Virvilait, 2005).

**Table 2.1: Reviews of definitions of interactivity**

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<tr>
<th>Authors</th>
<th>Definitions of Interactivity</th>
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<tbody>
<tr>
<td>Rafaeli and</td>
<td>The extent to which message in a sequence relate to each other, and especially the extent to which the last message recount the</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Definition</td>
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<tr>
<td>Sudweeks (1997)</td>
<td>relatedness of earlier message.</td>
</tr>
<tr>
<td>Ha and James (1998)</td>
<td>The extent to which the communicator and the audience respond to each other’s communication need.</td>
</tr>
<tr>
<td>Liu and Shrum (2002)</td>
<td>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.</td>
</tr>
<tr>
<td>Steuer (1992)</td>
<td>The extent to which users can modify the form and content of a mediated environment in <em>real-time</em>.</td>
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Interactive marketing exposed new approach including new thought both in business and in management and marketing. Interactive marketing is treated as management of interaction, relations and networks.

The definition of interactivity may change according to the situation (Johnson, 2006). Many researchers (Hoffman and Novak, 1996; Stromer-Galley, 2004) classified interactivity in three aspects: user-media interactivity, user-information interactivity, and user-user interactivity. Another study (Liu and Shrum, 2002) suggested three-dimensional interactivity concept (Active control, Two-way communication, and Synchronicity). Earlier studies into interactivity was mostly concentrated on the process of information exchange (Rafaeli, 1988; Rafaeli and LaRose, 1993; Zack, 1993), as well as on particular chat rooms or search engine response characteristics that serve to increase interactivity (Shin, 2011). However, concept of combinational view includes perceptions and from this aspect, interactivity can be classified into process, feature, perception, and combination (McMillan and Hwang, 2002).
Wu (2005) added interactivity can be classified into two different categories: actual interactivity (based on objective perception) and perceived interactivity (based on subjective perspective). The level of interactivity depends on the users’ perceptions. This is why; perceived interactivity is a significant factor in specifying the effects of genuine interactivity to users. Another study (Schumann, 2001) argued that perception is the participants’ choice to interact, which is a user feature rather than a media feature. Interactivity is the level of participation to modify the content and form of real time media (Steuer, 1992).

The meaning of Interactive marketing is development of several forms of interaction and cooperation trying to find out prospects and establish a dialog with them. Through computer technology marketer, one can do micromarketing and can control marketing relationships better (Peattie, 1997). Interactivity is based on new IT which enables synchronous mutual communication during which a customer is engaged into the process of active mutual cooperation (Virvilait, 2005). Being a fresh marketing concept, interactive marketing exposes value of a long-term interaction between the marketer and a customer. It allows customers to choose program and interact in a two-way mode with the service delivery system. While conventional TV is passive, IPTV can be interactive. Many think that this interactivity provides IPTV the hope of converting the business of TV (Newberry, 2007).

New media has shifted the connection between customers and company. The rise of user created media has turned customers into content generators. Shift of power relations have not only modified the customer’s expectations, but also have changed buying decision-making. Signs that users are shifting their media usage are well established and there is extensive evidence of a decline in conventional media habits (Danaher and Rossiter, 2006; Higgs, 2008). In response, companies are changing expenditure away from conventional media and searching for new media options, which are often untried (PQ-Media 2006). The fresh media environment is not only just a new direction of reaching customers, but has transformed many aspects of marketing – segmentation, targeting positioning, distribution, customer relationship management (CRM) and the consumer value chain. Hyper-segmentation is now a reality due to technological developments (Christian, 2005). Companies can use interactivity to query
prospects throughout information interactions, thereby continuously rectifying the consumer profile (Higgs, 2008). Every successive interaction is able to yield rich data enabling continuous micro-segmentation. In the interactive media industry and in CRM literature this process is also referred to as progressive profiling (Christian, 2005; Dureau, 2004; Gal-Or, 2006). For gathering information on watching patterns and advertisement preferences, addressable advertising exploits the potential of personal video recorders (PVR). Interactive media offer customers new ways to derive brand experiences. However new media was slow to be structured, possibly due to deficiency of suitable media metrics (Higgs, 2008).

IP sets a completely newer standard in flexibility; being capable of delivering data to a single address, IPTV service providers can broadcast different TV programs to different subscriber irrespective of geographic location even in same street or even within the same family (Christian, 2006). IPTV takes up less bandwidth than current TV networks. This is due to the reason that whole channels are not present on the signal in the user’s house. Only the channel or channels that the viewer wants to watch are present in their home. This concept of interactivity is another great benefit of IPTV (Alessi, 2007).

2.4 IPTV as an Advertising Media

IPTV advertising has some inherent features like addressability, interactivity and measurability. TV advertising can be energized by IPTV, by using these features.

Addressability: Every internet subscriber has a unique IP address. Using this notable attribute targetable advertisement is possible. Using remote commander instruction, a program or advertisement can be viewed via TV and set-top-box (equipment which allows it and which is again an IP endpoint). A TV (generally known as smart TV) itself, also can be an IP endpoint. Due to its inbuilt addressability feature, many hundreds or even thousands of IPTV advertisements can be broadcasted simultaneously during a single timeslot and can be targeted to large groups, small groups or even individuals, viewers’ responses can also be collated (Hart, 2008). The specific address of the consumer may be obtained by searching viewer profiles from metadata server of any telecommunication company. Advertisers need to decide
whether the advertising content is appropriate for the recipient or not. It allows telecom operators to control where the ads go to, aim the major or minor groups, or even sets within a family. The ads can be calibrated to the people within a family who are most likely to be viewing at a certain time (Sur and Pandey, 2011).

Interactivity: One of the distinguished features of IPTV is its interactivity. Through IPTV system, viewers can choose the program they want to see on-demand, listen on-demand whenever they want, without any need to depend on the broadcast schedules of TV stations. Interactive TV will add services not yet delivered such as time shifting, Video-on-demand, network-based Digital Video Recorder (DVRs), where the content is potentially stocked on the network and streamed to the device wherever it might be (Akerkar, 2010). Recently, a series of studies into interactivity were conducted (Rafaeli, 1988; Steuer, 1992; Zack, 1993; Ha and James, 1998; Liu and Shrum, 2002; Stromer-Galley, 2004; Johnson, 2006). Previous research into interactivity has focused only on cognitive area, and individual features such as trust and emotion were not studied prominently (Shin, 2011), and the reason was predominant TAM approach (Davis et al. 1989).

Measurability: Since IPTV technology permits feedback, owing to data reception from a television household, real-time viewer measurement is possible. The study on return response can prove Return on Investment (ROI). IPTV advertising provides a new channel for user knowledge opportunities. The measuring process in IPTV ad is used to track what subscribers are doing, how they interact, how long they interact and what are their respective preferences for certain products and/or services.

2.5 Theoretical Framework

2.5.1 Technology Acceptance Model (TAM):

Davis (1989) proposed the Technology acceptance model (TAM), which explained an individuals’ acceptance of information technology. The goal of TAM is to provide an explanation of the determinants of computer acceptance among users. TAM is a leading theory of technology acceptance in Information Science (IS) study. Large numbers of empirical research have established that TAM is a robust model of
technology acceptance behaviors in a broad variety of IT. TAM hypothesizes the effects of external factors on intention to use by perceived usefulness (Gefen, 2003; Talyor and Todd, 1995b; Shin, 2008) and perceived ease of use (Venkatesh and Davis, 2000). TAM has demonstrated its robustness through a range of empirical research in IS study and has been applied across a variety of IT areas (Legris, 2003).

The objective of TAM is to provide a description of the determinants of computer acceptance that is in general adequate to explaining user behavior across a wide range of user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified. But because it incorporates findings accumulated from over a decade of IS research, it may be especially well suited for modeling computer acceptance (Davis, Bagozzi & Warshaw 1989).

Davis (1989) introduced and validated better measures for anticipating and briefing ‘use’, which aimed at two theoretical constructs: perceived usefulness and perceived ease of use, which were theorized to be key determinants of system use. TAM theorized that the effects of external variables (e.g., system characteristics, development process, training) on intention to use are intermediated by perceived usefulness and perceived ease of use. Perceived usefulness is also influenced by perceived ease of use, the reason is, if other things are equal, the easier the technology is, the more useful it can be (Venkatesh & Davis 2000). The original factor perceived ease of use (PEU) was defined as “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989). The perceived usefulness (PU) was defined as “the degree to which a person believes that using a particular technology would enhance his or her performance” (Davis, 1989).
2.5.2 Technology Acceptance Model 2 (TAM2)

TAM2 was introduced in 2000 (Venkatesh and Davis, 2000; and Venkatesh, 2000), a new edition of original TAM. The goal of TAM2 is a theoretical extension of the Technology Acceptance Model (TAM) to (1) incorporate extra fundamental determinants of TAM that explain perceived usefulness and usage intentions in terms of social influence (subjective norms) and cognitive instrumental processes (job relevance, image, quality, and result demonstrability); and (2) to understand how the effects of these factor alter with increasing user experience over time with the target technology.

The extended model (TAM2) was examined using longitudinal data collected from four different systems at four organizations, two involving voluntary use and two involving mandatory use. The extended model was strongly supported for all four organizations. Both social influence processes (subjective norm, voluntariness, and image) and cognitive instrument (job relevance, output quality, result demonstrability, and perceived ease of use) significantly determined user acceptance (Venkatesh & Davis 2000).
2.5.3 Augmented TAM or Combined TAM

TAM does not incorporate the effect of social and control factors on behavior but these factors have been found to have a significant influence on IT usage behavior (Moore & Benbasat 1991; Taylor & Todd 1995b).

Figure 2.3: Augmented TAM. (Source: Taylor & Todd, 1995a)
Taylor and Todd (1995a) suggest that augmented TAM provides proper explanation of IT usage for both experienced and inexperienced users. For both groups, all direct factors of intention, except attitude, were significant. Therefore, the augmented TAM can be used to predict subsequent usage behavior prior to users having any experience with technology. This proposes that this model can be used to anticipate the usage for people who have never used the technology before, as well as the ability to predict usage for people who have used the technology or for people who are familiar with the technology. So IT usage models may be tested prior to implementation or after implementation both with inexperienced and experienced users.

2.5.4 Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh, Morris, Davis, G.B. and Davis F.D. (2003) developed the Unified Theory of Acceptance and Use of Technology (UTAUT) with four key determinants of intention and usage, and up to four moderators of key relationships. The UTAUT was developed by hypothesizing four constructs to play a crucial role as direct determinants of user acceptance and usage behavior:

1) performance expectancy
2) effort expectancy
3) social influence
4) facilitating conditions

Attitude toward using technology, self-efficacy, and anxiety are hypothesized not to be direct determinants of intention. The key moderators in the model are gender, age, voluntariness, and experience.

The relationship among these constructs is shown in Figure 2.4
2.5.5 Other Studies Relating to Technology Acceptance

Agarwal and Karahanna (2000) said Playfulness and personal innovativeness have important effects on cognitive absorption. Venkatesh and Morris (2000) added, in case of moderator effect, men’s decisions were strongly determined by their perceptions of usefulness; whereas, ease of use and subjective norm were more important for women.

Usage of certain technology is mandatory for their employees in certain companies. However, some individuals will not agree to adopt such rules. Venkatesh & Davis (2000) observed that voluntariness has an effect on the subjective norm on intention to use. Hence, behavioral intentions vary within mandatory and voluntary usage (Gardner, 2004).

Heijden (2004) added perceived enjoyment to the TAM model. Perceived enjoyment can be defined as the degree to which a user perceives a system to be enjoyable in its own right after using it (Segars & Grover, 1993; Yi & Hwang, 2003). Previous TAM research exposed that enjoyment is one of the most important factor of intention (Sun & Zhang, 2006a, 2006b; Yi & Hwang, 2003).

Cheong and Park (2005) have developed a more comprehensive version of TAM to better reflect the mobile Internet context. Their model employs perceived playfulness,
content quality, system quality, internet experience and perceived price level, in addition to perceived usefulness and ease of use. According to Pavlou and Fygenson (2006), the perceived price level is important to developing intention for service usage. Weniger (2010) assumed that perceived price level and perceived enjoyment will play the most significant role in TAM acceptance. Wu and Wang (2005) stated, the behavioral intention of customers is affected by their valuation of the service which significantly relates to the perceived cost level. Dodds (1991) reported a negative relationship between price and perceived quality. Generally, customers measure the quality of a product or its value by the monetary and non-monetary paid. Another study (Shin, 2008) showed that prior experiences of service, effects on service adoption procedure and new services similarity to prior service also effect on service adoption.

Igbaria et al. (1996) tested complexity in terms of time taken to perform tasks, integration of computer results into existing work, and vulnerability. Thompson, et al. (1991, cited in Gardner and Amoroso, 2004) reported that the more complex the innovation, the lower the rate of acceptance. Igbaria, et al. (1995) found substantial relationships between perceived usefulness and perceived complexity with usage. Chau and Hu (2001) added that the more complex the technology, the less relevant experience and subsequently a weaker connection exists between perceived usefulness and behavioral intention of using.

Sun et al. (2013) examined the acceptance of mobile health service and found difference between professional users and consumer users. He also demonstrated, consumer users ease of use of the technology becomes important which may not be same in case of professional users.

Yu (2012) added that, the social influence is more important to young respondents and perceived financial cost is less important for the respondents aged below 30 or over 50.

2.6 Studies on Consumer Adoption of IPTV

This section is dedicated to investigating literature related to this aspect of IPTV technology acceptance in different countries.
IPTV has characteristics of both information and media technology, for this reason we can say it is a convergent of those two technologies. It broadcasts different contents to subscribers via IP network. Moreover, users can use telecom services with same terminal. As such, IPTV using intent should be described in part by the technology acceptance model, TAM (Davis, 1989).

As per previous studies, Perceived Ease of Use (PEU) and Perceived Usefulness (PU) are seen to be directly or indirectly associated with Behavioral Intention (Davis, 1989; Karahanna et al., 1999; Venkatesh and Morris, 2000; Moon and Kim, 2001). In the case of IPTV, it is assumed that usage will be effortless as improved ease of use will enable an individual to use a new service conveniently and frequently and the user’s sense of efficacy and personal control is known to be proportional to use of easier technology (Shin, 2008).

TV broadcasts provide entertainment and usefulness at the same time. That means, subscribers of IPTV will expect to get entertainment information anywhere, anytime, and in any device. These purposes are dissimilar from increasing performance. To suggest extended TAM model for Mobile IPTV Shin (2008) added extra factors as flow experience, perceived enjoyment, perceived loss, and social norm. Moreover, key purpose of TV is pleasure and enjoyment. Multiple research works have demonstrated that perceived enjoyment positively affect a user’s attitude (Shin, 2008). Particularly, in case of interactive TV, TV features like enjoyment of using and ease of inducing interest affected user’s attitude (Kim & Moon 2001). Kim & Moon (2001) also proposed the ‘playfulness’ concept as a person's intrinsic salient belief to describe the individual's intrinsically motivated behaviors. Perceived enjoyment is one of the salient factors of an IPTV service (Choi, 2010).

Ha (2009) pointed out that attitude, subjective norm and perceived behavior control are three factors influencing behavior intention. They also elaborated TAM to the interactive TV based shopping and T-commerce. The results demonstrated that perceived enjoyment is the most influencing factor affecting attitude and behavioral intention towards T-commerce. Hence, TAM is suitable for examining acceptance of IPTV.
For IPTV, Perceived usefulness (PU) is defined as “the degree to which a person believes that using IPTV would enhance a person’s performance without regard to time and space”, and Perceived ease of use (PEU) is the “degree to which a person believes that using IPTV would be free of effort” (Ha, 2009). From the view of media on IPTV, they incorporate ‘the use and gratifications’ construct, which is defined as the utilities that describe media selections by users. These psychological views motivate the user to purposefully choose certain media.

‘TV viewing habit’ factors and 'Internet use habit' factors have been generally used to describe current media usage instead of new media adoption (Ha, 2009). Since IPTV is convergence of TV and the Internet, the study (Ha, 2009) assumed that IPTV acceptance intentions would be also associated to habitual uses of TV and/or Internet. Thus, both ‘TV viewing habit’ factors and ‘Internet use habit’ factors were considered as critical aspects to viewing or not viewing IPTV. Their (Ha, 2009) result showed that entertainment is stronger indicator than information motivation is in perceived usefulness of IPTV.

The study of Shin (2011) evidently demonstrates that the trust and emotion of consumers should be considered from the Management Information System (MIS) perspective in order to build user intentions to use the product. Another research (Pedersen, 2005) has shown that stability of connection and geographical coverage are important factors of perceived relative advantage in wireless broadband. The perceived enhanced utility of mobile services is a powerful variable motivating use of t-commerce. Though previous research demonstrates important perceived variables, they still did not find factors particular to convergence technologies (Shin, 2009). The research (Shin, 2009) also adds that IPTV is a simpler system to use, and it is guessed that IPTV, as a variation of the Internet, presents little difficulty to consumers. In addition, because IPTV is a variety of television, so it will provide enjoyment, interest, and pleasure.

Perceived usefulness is defined as a type of extrinsic motivation and enjoyment as a type of intrinsic motivation (Davis, 1992). Extrinsic motivational factors on the behavioral intention have more influence for the experienced people than the
inexperienced people and the influence of intrinsic motivational factors on the behavioral intention are more powerful for the inexperienced people than for the experienced people (Choi et al., 2010). Choi et al. also identified four significant intrinsic motivational factors – ease of use, enjoyment, usefulness, and trialability – in the IP TV adoption behavior.

DeLone and McLean (1992) advocated ‘Perceived content quality’ in the use of reference systems. The information quality is an important factor for building successful IS. Perceived content quality along with other constructs was examined in evaluating Web-based reference systems (Shin, 2009). They found perceived content quality to be one of the important factors in the use of the reference systems. Recently, another study (Cheong and Park, 2005) employed perceived content quality to the acceptance model of mobile Internet. They showed content quality is a significant factor in the adoption of that technology.

Shin (2007) discussed that in the case of Perceived system quality, people become reluctant to use IS when they experience delays in reply, frequent disconnection, limited access, and poor security. Aladwani and Palvia (2002) focused on information quality, response time, and system accessibility as IS qualities and they said that these variables are useful predictors of perceived ease of use and perceived usefulness. Perceived system quality has positive causal relationship with perceived usefulness (Cheong and Park, 2005).

Shin (2009) added, in the construction of behavioral intention, subscribers compare the benefit from the service to the cost of utilizing the service. If the price exceeds the gain, they do not use the service. In IPTV various types of costs are related, initial investment for the set-top box and subscription charges through monthly charges, pay per-minute, pay-per-packet or mixed charges. The term ‘Service cost’ used by researchers so far has been subjective and not an objective term, because it mentions the perceived level of value that persons are willing to pay for the service. Their findings demonstrate that both perceived system quality and perceived content quality factors are influential in predicting behavioral intention to use IPTV (Shin, 2009).
Normative pressure is another important predictor which was revealed in studies based on the IS perspective (Hung, 2003). People often use technology in a social context in which they notice others’ interaction and in which they must adapt to others’ activities (Shin, 2009).

However, IPTV service has potential to become a crucial IT in the future, but only few studies have been conducted related to adoption behavior for an IP TV service. IPTV services can easily go wrong if its service providers do not realize what users want from it (Choi et al., 2010). IPTV service has unique features of public utility and interactivity. Unlike conventional Information Systems (IS) used in organizational environments, television media do not target a particular group but tend to be shared by users in family environments. Because of this feature, IP TV service is dissimilar from conventional IT as its intention is not productivity.

2.7 Major Limitations of TAM Studies

Self-reported usage is the most commonly reported limitation, most analysis trusted mainly self-reported use, accepting that self-reported usage successfully reflects real usage (Lee, 2003). However, self-reported usage is known to be subject to the usual method bias (Agarwal and Karahanna, 2000), which distorts and magnifies the causal relationship among independent and dependent variables (Podsakoff and Organ, 1986). The use of student subjects is also a limitation and can effect on generalizability of the findings. The major problems of TAM studies are low explanations of variance (Lee, 2003).

Straub et al. (1997, cited in Al-Qeisi, K.I. ,2009 ) suggested that TAM may not apply equally well throughout cultures . Anandarajan et al. (2000, cited in Al-Qeisi, K.I, 2009) admitted the cultural differences among less developed countries and developed ones. The authors said that the result of their research led to an interesting question about TAM boundaries, indicating that external validity (generalizability) of TAM in other cultures is questionable.

IPTV service using a traditional TAM has some limitations in explaining IPTV subscribers’ behavior, because an IPTV service is used in a different context and for a
different intention than new technologies in a work environment (Choi et al., 2010). Though there are various moderating factors, users’ prior experience has been detected as an important factor in their behavior (Gefen, Karahanna & Straub, 2003a; Taylor & Todd, 1995; Thompson, Higgins & Howell, 1994), the reason is experience has a strong consequence on determining attitude (Venkatesh, 2000). When experience increases, users have more familiarity with and knowledge about technology (Fishbein & Ajzen, 1975; Sun & Zhang, 2006b) and which can enable the change to different adoption behaviors.

Generally, IS system use in a work may become more routinized as experience grows, in the event of an IP TV service, growing experience increases the function of perceived enjoyment, because the service is primarily used to enjoy time instead of performing tasks (Choi, 2010). Enjoyment creates a less cognitive load because the users are feeling pleasure from the action and are willing to spend more effort on it (Sun & Zhang, 2006a, 2006b).

2.8 Summary

TAM has tested to be an important theoretical model in helping to interpret and explain usage behavior in IS implementation. This chapter discussed the related research with Technology Acceptance Model and IPTV. Learning the vital use of Technology Acceptance Model can lead to research design on various users’ interface for different online consumers and in different application areas. This study reviewed a number of studies to understand the relation between IPTV adoption behavior and Technology Acceptance Model. We discussed the related research to clarify the extension of Technology Acceptance Model.

As IPTV is still in nascent stage, various regions have different infrastructure so getting the generalized behavior may not be possible.