



The integration of value-based adoption and expectation–confirmation models: An example of IPTV continuance intention

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ABSTRACT

Expectation–confirmation theory (ECT) has long been adopted to study continuance intention with respect to various types of products or services. A popular trend in this research stream is examination of the impact of performance confirmation on usefulness (or playfulness) and satisfaction in the context of organizational information system usage or free website access. However, studying the positive attitude of consumers alone is inadequate, especially when access to the products or services is not without cost. That is, costs or sacrifices should be taken into account so as to clarify the antecedents of continuance intention. Based on this idea, this study took the “net value” concept from the value-based model and incorporated it into ECT in order to provide a more comprehensive viewpoint. We argue that continuance intention is determined by net value, a thorough comparison of benefits and costs, and satisfaction, which is also a function of net value. After collecting data from 172 IPTV customers, we confirmed all proposed hypotheses. The results show that perceived net value, a function of perceived sacrifices and perceived benefits, is a strong predictor of satisfaction and continuance intention. Discussions and implications for academics and practitioners are also provided.

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1. Introduction

Internet protocol television (IPTV), the delivery of various digitized TV programs and video clips plus interactive functions through the Internet, has emerged as one major application of broadband technology [49]. From a business perspective, IPTV is expected to provide new revenue opportunities for Internet channel providers [11]. However, despite a significant number of resources having been invested in its development, IPTV is still not an influential threat to older technologies [66]. In fact, the number of subscribers has been frozen during past few months. Since 2009, ChungHwa Telecom (CHT), the sole provider of IPTV in Taiwan, has continued to reduce its subscriber estimates for IPTV. The company originally projected the number of subscribers of its IPTV application – multimedia-on-demand (MOD) – to have reached 700,000 by the end of 2009 and to have increased to 1 million by the end of 2010 [87]. However, although CHT is able to attract new subscribers, the total number of MOD subscribers has remained at 665,000 since June 2009 [76]. This implies that CHT is unable to effectively retain current customers. Given that the cost of recruiting new customers is much higher than retaining current ones, understanding why customers are (or are not) willing to continue to use IPTV constitutes a field of interest and value for IPTV providers.

The adoption of IPTV also has attracted the attention of academics. A number of well-known theories, such as the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB), have been adopted to explain individuals' acceptance of IPTV (e.g., [25,46,67,83]). Those studies concluded that some variables, such as perceived usefulness and perceived ease of use, play an important role in the adoption decision. However, several research gaps suggest a need for further investigation. First, given that those studies only focused on initial adoption intention, the high discontinuation rate mentioned above implies that more effort is needed to understand the causes of low continuance intention. Second, in contrast to traditional information systems, IPTV is a non-organizational information system, not a productivity tool, and is used in non-work settings. As users may be viewed as consumers who expect to receive both utilitarian value and hedonic value from system usage, Yoo's [86] proposed term, “Experiential Computing,” is an appropriate one to adopt. Therefore, understanding its usefulness and using it to predict behavioral intention are both limited and inadequate. Third, differing from most online services, the content of IPTV is not given for free. Consumers are charged a minimum fee plus a variety of additional fees based on consumption. Furthermore, similar to other information systems or online websites, users may need to adapt themselves to the interface and style of use. This implies that, in addition to the benefits or usefulness of the system, consumers take into consideration potential sacrifices when evaluating its worth. Therefore, since behavioral intention is a function of the values delivered by those fee-based services [79], a more complex model is needed to provide a more comprehensive understanding of continuance intention.

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Drawing on the above practical needs and theoretical issues, the purposes of this study are two-fold: 1) to focus on continuance intention towards IPTV, and 2) to attempt to examine the role played by “net value” in this context. With respect to the first purpose, expectation–confirmation theory (ECT) serves as a useful framework to explain the satisfaction and post-purchase behavior of consumers. We attempt to achieve the second purpose of the study by extending current ECT through incorporation of the concept of perceived value. Specifically, based on the concept proposed in the value-based adoption model (VAM), perceived usefulness in ECT is replaced by perceived value, “an overall assessment of the utility of a services based on perceptions of what is received and what is given” [35]. We argue that perceived sacrifices should be taken into consideration in order to gain a better understanding of the driving forces of users' continued use of IPTV, a fee-paying service.

In this paper, we provide a new theoretical viewpoint along with empirical evidence to support our arguments. We propose a theoretically integrated model based on VAM and ECT. Guidance for practitioners is also provided based on our findings. The remainder of this paper is organized in the following way. The second section includes a brief introduction to IPTV, and a review of ECT and VAM. The development of hypotheses is detailed in Section 3. In the fourth section, the method for examining the proposed model is introduced. Finally, the research results and implications are presented and discussed.

2. Literature review and theoretical background

2.1. IPTV in Taiwan

Internet television is an open, evolving framework in which a very large number of small and medium-sized video producers contribute niche content along with offerings from more traditional retail and distribution channels [65]. However, video requires significantly higher bandwidth, reliability, scalability, and security than the Internet's best-effort legacy might be able to provide [77]. This has led service providers to embark on major investments in new IP networking technologies to better support high quality video transformation. The consequence of this is the emergence of a new form of television called Internet protocol television (IPTV), which aims to combine the high visual quality and reliability expectations of digital television with the interactivity, flexibility, and rich personalization that IP technology facilitates [77]. IPTV is defined as a broadcast or on-demand video service that makes use of the Internet protocol (IP) and is streamed to a set-top box (STB) that can be connected to a PC or a television set [9]. It differs considerably from the earlier forms of Internet-based TV, in which data are transmitted via the public Internet and packets may be delayed or entirely lost. The IPTV video signal is encoded and travels solely through the carrier's own servers and network [65]. In Taiwan, Chunghwa Telecom (CHT, <http://www.cht.com.tw>) is the sole provider of IPTV services. As an integrated service provider, CHT has packaged its IPTV product, called multimedia-on-demand (MOD), with its own dominant Asymmetric Digital Subscriber Line (ASDL) or Fiber to the Building (FTTB) network to ensure transmission quality. In addition to TV programs provided by traditional cable TV, MOD has embedded several value-added functions such as video on demand, interactive online learning and interactive video games [32].

2.2. Expectation–confirmation theory (ECT)¹

ECT has been widely used to explain consumers' satisfaction and repurchase decisions in post-purchase contexts (e.g., [15,54,55,78]). Overall, it has been used to explain the pre-behavior (expectation) and post-behavior (perceived performance) variables rather than

¹ ECT was referred to as expectation disconfirmation theory, proposed by Oliver and DeSarbo [55]. This theory was then applied in the IS field by Bhattacharjee [6].

solely pre-behavior variables [47]. According to this theory, consumers first form expectations of a product or service before the purchasing decision has been made. After consuming that product or service, consumers build their perceptions about the performance based on consumption experiences. Next, an evaluation is made to compare perceived performance with the initial expectation. The perceived performance may either confirm or contradict the pre-purchase expectations. Finally, there is a positive relationship between expectation and satisfaction. At the same time, the confirmation of expectation leads to consumers' satisfaction with the product or service. Higher satisfaction can be observed when expectation is either high or has been confirmed. As an outcome, satisfied consumers possess higher repurchase intention compared with those who are dissatisfied [15,47,55,78].

Bhattacharjee [6] applied a slightly modified ECT in the IS area, arguing that the original ECT ignores potential changes in consumers' expectations following their consumption experience, which impacts subsequent cognitive processes. Pre-acceptance expectation is typically based on the opinions of others or information disseminated through mass media, while post-acceptance expectation is tempered by the consumers' firsthand experience and is, therefore, more realistic [6,20]. As the revised model focuses exclusively on post-acceptance variables, those pre-acceptance variables are omitted. In the revised model attention is also drawn to the substantive differences between acceptance and continuance behaviors. Empirical results confirmed the above argument and suggested that continuance intention is a function of satisfaction and perceived usefulness of continued IS use. User satisfaction is determined by both perceived usefulness and confirmation of expectation. Moreover, confirmation has an impact on perceived usefulness.

As indicated above, in the model proposed by Bhattacharjee [6], perceived usefulness plays an important role in determining continuance intention. Usefulness, adopted from TAM, is often used to explain the adoption intention toward various technologies, including IPTV [67]. However, given that the aim of TAM is to understand the initial adoption intention of technologies in organizational settings, it is important to highlight that those technologies are for work purposes, and the cost of mandatory adoption and usage is borne by the organization [35]. In contrast, we argue that TAM provides an inadequate explanation of consumers' intention because IPTV adopters should be treated not only as technology users, but also as service consumers. The major difference between users and consumers is that consumers have to bear the cost and risks by themselves. When making decisions, consumers estimate the value of each alternative through consideration of all relevant benefit and sacrifice factors [33,35,75,88]. Indeed, for this discussion to be meaningful in practical terms, there is a need to understand the value of service toward consumers so as to identify problems related to satisfaction and to provide guidance for managers [85]. Since usefulness can only reflect the benefits of perceived value, factors relating to sacrifice also need to be taken into consideration [35]. Therefore, one major purpose of this study is to argue that in the context of consuming fee-paying online services, perceived usefulness should be replaced with perceived net value in order to reflect the very nature of cost/benefit evaluation. Drawing on this issue, the value-based adoption model (VAM) is then reviewed in the following section. Based on the integration of ECT and VAM research streams, our research model and hypotheses are developed, accordingly.

2.3. Value-based adoption model (VAM)

VAM is proposed by Kim et al. [35], for the study of M-commerce adoption. They argue that TAM is limited in explaining the adoption of new information and communication technology (ICT). New ICT adopters are consumers rather than simply technology users. While for technology users in organizations the major concern is usefulness and ease of use, for rational consumers it is value maximization. VAM

borrowing the cost/benefit paradigm from the decision-making research stream on the basis that adoption decisions are often based on comparisons of the uncertain benefits of the new invention with the uncertain costs of adopting an alternative [62,67]. Assuming value maximization in the economics and marketing arenas, Kim and his colleagues show that VAM can be used to understand the adoption decision of new ICT based on net value. Specifically, adoption intention is determined by the evaluated value, a thorough comparison of benefits (e.g., usefulness and enjoyment) and sacrifices (e.g., technicality and perceived fee) [35]. Although VAM is developed to understand the initial adoption intention, we believe this concept can be applied to our research context because, in a vein similar to initial adoption decisions, customers also take value into consideration while making continuance decisions (e.g., [27,38]). However, in contrast to initial adoption decisions, in which satisfaction has no place, continuance decision should incorporate the impact of satisfaction.

Value plays an important role in decision making and has been described in different ways [35] such as consumption value [63,80], acquisition and transaction values [75], consumer value and perceived value [88], service value [85] and customer value [29]. It may be viewed as consumers' overall assessment of the utility of a product based on what is received and given [88]. Alternatively, it can be perceived as a comparison of weighted "get" attributes to "give" attributes [56,61] involving a tradeoff between perceived benefits received and perceived sacrifices [10,51,52,56,71].

Initial value-based studies mainly focused on quality-oriented benefits and monetary-based sacrifices (e.g., [12,18,23,82]). The following studies articulated these two factors in a more complex manner in diverse contexts. For example, Lapiere [41] developed a scale including 13 drivers to measure customer-perceived value in a business-to-business context. These 13 drivers included benefits (alternative solutions, product quality, product personalization, responsiveness, flexibility, reliability, technical competence, supplier's image, trust and supplier solidarity (with customers)) and sacrifices (price, time/effort/energy, conflict). In the marketing strategy-forming field, Ulaga and Chacour [81] utilized benefits (including quality-related components, product-related components, service-related components and promotion-related components) and sacrifices (price-related) to measure customer value. Sweeney and Soutar [72] proposed that the value of a consumer-durable good at brand level can be assessed on the basis of benefits (quality, emotional value, and social value) and costs (or price). Petrick [58] also adopted the benefits (including emotional response, quality, and reputation) and costs (including behavioral price and monetary price) model to measure the perceived value of a service.

2.4. Perceived benefits of IPTV

Perceived benefits refer to advantages brought by IPTV services. Recent IPTV adoption studies have indicated that interactivity, customization, and personalization are the most desired features [44,65,70]. There are five main motives for adopting the IPTV prototype: interactive communication, diversity, convenience, risk aversion and multitasking. These motivations are significant predictors of near-future Internet and IPTV use [34,43]. Based on the literature review and interviews with several IPTV users, we identified five factors contributing to the perceived benefits of IPTV use: time flexibility, personalization, high quality, content richness, and value-added services. Please note that time flexibility and personalization were integrated into one construct in later stages based on (1) the pre-test result and (2) the fact that both of them reflect the way customers can better control their viewing behaviors.

2.4.1. Time flexibility

Time flexibility refers to the extent to which consumers are able to watch programs at any time. In traditional TV contexts, including cable and satellite, users are passive receivers and have to comply

with the schedule predefined by the service provider. IPTV allows users to watch programs in a more flexible manner as programs are stored in local storage devices so that users can watch them at any time [36]. In addition, consumers can easily use the remote control to determine the viewing pace (through stop, fast forward, rewind facilities) and bookmark favorite programs.

2.4.2. Personalization

Personalization means that consumers are able to personalize the IPTV package based on their own preferences. IPTV is a system of television content distribution over an Internet protocol that enables a more personalized and interactive user experience [26,67]. One major problem of the traditional TV service is that customers have to pay for some channels bundled in the basic service, even though they are not interested in or do not view those channels at all. As customers urge the TV service to be more interactive, and personalized [70], IPTV that provides high flexibility and allows customers to customize or personalize their favorite programs is considered another advantage. This type of advantage is achieved by allowing customers to select individual channels based on their preferences, then recording their viewing habits and adjusting to each individual customer accordingly [43].

2.4.3. High quality

High quality refers to high definition video or use of better compression that enhances consumers' viewing experiences. Compared with analog-based information transmission, a digital-based system allows service providers to deliver high quality content through new transmission devices. Customers have also become accustomed to high quality programs brought about by the emergence of new storage devices such as DVD and Blu-ray disc. Facing ever-growing consumer demand and competitive pressure, IPTV operators are scrambling to deliver more high definition programs. Since IPTV is able to provide high quality video content, this feature is considered positive [64].

2.4.4. Content richness

Content richness refers to customers' ability to find a variety of interesting programs or content on IPTV. In contrast to analog or cable TV, both of which adopt broadcasting strategies whereby programs are necessarily fixed due to their capacity to use only a limited frequency to transfer information, IPTV adopts a transfer strategy based on demand and, therefore, needs only to transfer selected data via the Internet. As customers view one video or movie at any one time, only the program that has been selected needs to be transferred at that time. Therefore, IPTV operators are able to provide as many choices as possible, as long as they own the rights to those videos. For this reason, content richness is treated as a positive benefit in our study. Previous studies also pointed out that customers do expect IPTV to be a content reservoir for enjoying a variety of content and innovative services [67].

2.4.5. Value-added services

Value-added services refer to the availability of additional services over and above basic TV programs. Possible value-added services include Karaoke, interactive games, ATM, and digital frames. These value-added services are extremely important in IPTV adoption [44,65,70], and are a significant factor which drives customers to continue to subscribe to the service. In contrast to cable or analog-based TV, in which information can be transferred only from providers to customers, IPTV allows dual direction information transmission, which makes possible interaction between service providers and customers. Interactivity has been identified as one critical aspect of digital media [43]. In addition, IPTV service providers effectively utilize its intrinsic nature and provide new value-added services in a seamless manner. This study also treats value-added services as important benefits brought by IPTV.

2.5. Perceived sacrifices of IPTV

Perceived sacrifices refer to both monetary and non-monetary costs, such as potential threats or weaknesses, brought by IPTV services. Sacrifices identified in this study include perceived fee, technicality, knowledge of alternatives and change of viewing habits.

2.5.1. Perceived fee

Perceived fee is the most intuitive and immediate cost of using the IPTV service. Zeithaml [88] proposed that price is what is given up or sacrificed to obtain a product. Defining price as a sacrifice is consistent with conceptualizations by other pricing researchers [52]. Price is one of the fundamental issues in selecting media, the underlying logic of which is that customers make their own decisions based on their economic perspective [43]. Bolton et al. [8] emphasized that consumer perceptions of price fairness are derived from past prices, competitors' prices, and vendor costs, which elicit perceptions of a product's current price and represent an individual's assessment of whether a product or service price is reasonable or acceptable [46].

The price of using IPTV includes the basic monthly fee and extra charges for the additional content or value-added services. The pricing policy in the telecommunications market shows that a small variation in charge directly relates to the amount of use and affects the purchase decision [37,46]. For this reason, past studies also treated perceived cost, or price perception, as a critical variable in the development of IPTV adoption intention [46,67].

2.5.2. Technicality

Technicality is defined as the degree to which new technology is perceived as being technically excellent in the process of providing services. Monetary price is not the only sacrifice that consumers may perceive. Customers may also consider non-monetary costs including time costs, search/effort costs, convenience costs and psychological costs as sacrifices [88]. For example, loading and response time may be considered as time costs, while ease of use and connectivity can be viewed as effort and convenience costs. In addition, new technologies may cause psychological discomfort, such as inner conflict, frustration, depression, discomfort, anxiety, tension, annoyance and mental fatigue [5,35]. Hence, Kim et al. [35] suggested that, in addition to perceived fee, sacrifice should include the technicality of the system, a combination of these non-monetary costs.

Following the concept proposed by Kim et al. [35], we define the technicality of IPTV as customers' perceptions of ease of use (whether using the system is free of physical, mental and learning efforts), system reliability (whether the system is error-free, consistently available and secure), connectivity (whether connection and stream are instant and straightforward), and efficiency (whether loading and response time is short). Furthermore, since the operation of IPTV is significantly different from traditional TV program viewing, the effort involved in learning and operation is unavoidable. Therefore, in this study, we consider technicality as a sacrifice.

2.5.3. Knowledge of alternatives

With the increase in downloading speeds, the sharing of audio and video files has become ever-more popular. This has boosted the growth of the digital entertainment market. Video-sharing sites such as YouTube and Google video are salient examples of this phenomenon. Distributed users can upload video clips and publish them to a global community [68]. In addition to those video-sharing sites, consumers can access various videos through existing P2P applications, such as BitTorrent, BitComet and eMule, and P2P streaming applications like Sopcast, PPLive and PPStream [22]. If consumers are able to obtain videos over the Internet with ease and without cost, their intention to try out or even to use IPTV will be reduced. In contrast, if consumers do not know the alternatives to obtaining free videos via the Internet,

they might be more willing to use IPTV. Therefore, we propose that knowledge of alternatives is a sacrifice component.

2.5.4. Change of viewing habits

Most customers in Taiwan are accustomed to the traditional style of watching TV. Compared with this traditional way, which requires customers simply to turn on the TV and switch to the correct channel, watching IPTV programs requires customers to change a number of viewing habits. In addition, most users are accustomed to cable TV, and know which program can be found on which channel. They have also become used to the new program-channel settings on IPTV. A number of programs that can be found on cable TV are now unavailable on IPTV. Such differences as these force users to change their viewing habits after switching to IPTV. Since people may be unwilling to change if they are satisfied with their current situation [3], we propose that change of viewing habits should be considered as a sacrifice component.

3. Hypotheses development

The purpose of this study is to apply the value-based adoption model in the continuing usage context. We incorporate customer-perceived value and its antecedents into the research model, given that perceived usefulness in ECT is inadequate in predicting continuance intention toward the fee-paying service. We argue that, in order to better reflect the physical context, perceived usefulness should be replaced with perceived value to predict the continuance intention of IPTV. As shown in Fig. 1, the upper rectangle (denoted by dotted lines) represents the value-based adoption model, and the lower rectangle (denoted by solid lines) represents ECT.

3.1. VAM-based links

3.1.1. Perceived benefits, sacrifices, and value

According to VAM, proposed by Kim et al. [35], perceived value can be viewed as a weighted result determined by perceived benefits and perceived sacrifices. When perceived sacrifices are constant, a positive relationship between perceived benefits and value may be observed. In contrast, when perceived benefits are constant, the perceived value of new technology tends to be lower when the perceived sacrifice increases. Based on the concept of VAM, if sacrifices are ignored, the perceived value of IPTV to consumers tends to be higher when they believe IPTV can bring benefits such as time flexibility, personalization, high quality, content richness, and value-added services. In contrast, if the perceived benefits are ignored, consumers tend to rate perceived value lower when they believe that they have to pay a fee, change their viewing habits, and face a number of technical issues. When consumers are interested in the IPTV service, a benefit-sacrifice evaluation is undertaken to generate the perceived net value before making the final decision. Hence, in line with past studies, we propose the following two hypotheses:

H1. Perceived benefits of IPTV are positively associated with perceived value of IPTV.

H2. Perceived sacrifices of IPTV are negatively associated with perceived value of IPTV.

3.1.2. Perceived value and continuance intention

In VAM, Kim et al. [35] also proposed and confirmed the relationship between perceived value and behavioral intentions. Based on the economic theory of utility, customers try to achieve maximum utility or satisfaction given their resource limitations. The definition of perceived value reflects this by comparing benefits with sacrifices and is, therefore, an indicator of adoption intention [35]. Customers' behavioral intention, or even behavior, is determined by the value assessments of

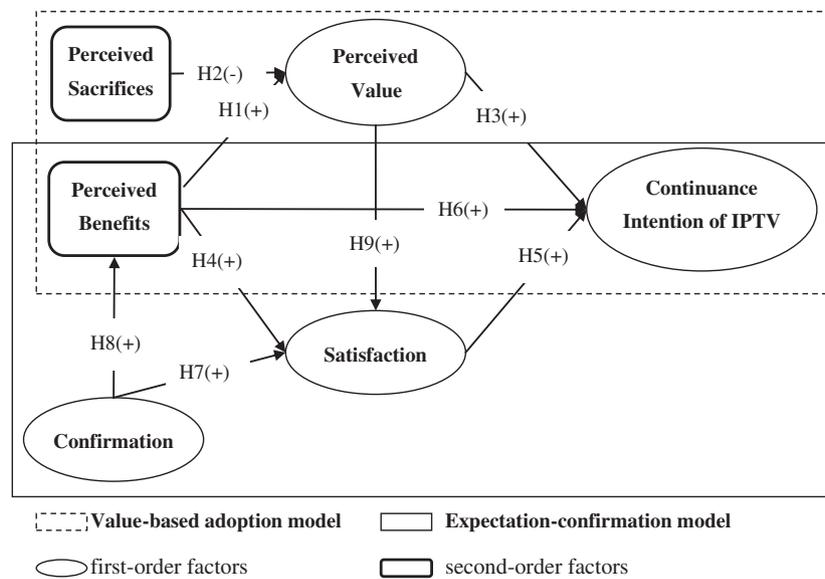


Fig. 1. Conceptual research model.

specific services [7,50]. Consumers are more likely to adopt or purchase a new service or product when they perceive the value of this service or product to be high. Although VAM is used in the context of the initial adoption decision, in this study, we argue that the concept proposed in VAM can also be applied to the continuance or repurchase context because it has been identified as an important factor affecting customers' evaluations of satisfaction and post-purchase behavior [73]. Some empirical evidence suggests that value perceptions may become more diagnostic and more closely related to repurchase decisions as relationships grow longer [19,28,48]. Hence, we propose that:

H3. Perceived value of IPTV positively influences use continuance intention towards IPTV.

3.2. ECT-based links

3.2.1. Perceived benefits, satisfaction and continuance intention

The original authors of ECT [55] theorized about the relationships among perception, satisfaction, and continuance intention. Various empirical studies also showed that continuance intention is a function of satisfaction, which is determined by the extent to which users or customers find the system or product useful, high quality, or playful (e.g., [6,13,47,48]). Furthermore, based on the technology acceptance model proposed by Davis et al. [16], Bhattacharjee [6] argued that extrinsic rewards (e.g., perceived usefulness) drive individuals to perform instrumental behaviors not only in the initial acceptance stage, but also in the later continuance stage. The empirical result endorses this argument by showing a strong and significant coefficient between perceived usefulness and continuance intention. Therefore, based on the model proposed by Bhattacharjee [6] and a number of empirical studies, we propose the following hypotheses:

H4. Perceived benefits positively influence satisfaction with IPTV.

H5. Satisfaction positively influences use continuance intention towards IPTV.

H6. Perceived benefits positively influence continuance intention towards IPTV.

3.2.2. The impact of confirmation

According to Oliver and DeSarbo [55], consumers' confirmation level and expectations positively affect their satisfaction with the product or

service. Consumers tend to be more satisfied when their expectations are confirmed; conversely, they tend to be dissatisfied when the perceived performance cannot meet prior expectations. This notion has been verified by various empirical studies (e.g., [6,47]). Given this strong theoretical and empirical support, we hypothesize that:

H7. Confirmation of expectations positively influences satisfaction with IPTV.

Bhattacharjee [6] modified and applied the ECT concept to the online banking continuance intention study. In the proposed modified ECT model, in addition to its effect on satisfaction, confirmation has an impact on usefulness. He suggested that confirmed users tend to evaluate perceived usefulness highly, and that a feeling of disconfirmation will reduce such perception. Perceived usefulness then generates impacts on satisfaction. The following research extends this concept by incorporating other consequences of confirmation in order to clarify our understanding. For example, a confirmed user also tends to view the target system as being more playful and relatively easy to use [30,31,47].

Given that the present research attempts to study consumers' continuance intention in a fee-paying service context, we argue that consumers tend to rate the service as being more valuable when their expectations are confirmed during the utilization process. In the organizational setting, the purpose of using an information system is to facilitate task performance. Therefore, a confirmed user is more likely to find the system useful in improving the efficiency and effectiveness of work performance. In the fee-paying entertainment context, the purpose of the service is to provide entertaining content. Thus, users with confirmed expectations will find that the service is useful in terms of entertainment purposes. Furthermore, they will find the service valuable in terms of the cost or sacrifices they have made. This confirmation–value relationship is confirmed by empirical studies. For example, Lai et al. [40] found a positive relationship between service recovery confirmation and customer lifetime value. Confirmation has also been found to have both a direct and an indirect effect on value through quality [7]. Therefore, we hypothesize that:

H8. Confirmation of expectations positively influences perceived benefits of IPTV.

3.3. From perceived value to satisfaction

The link between perceived value and satisfaction has been confirmed by studies based on different levels of analysis. Patterson and

Spreng [56] proposed a conceptual model and empirically examined the impact of perceived value on satisfaction and repeat purchase intention in a business-to-business services context. Their results confirmed the influence of value on satisfaction, and the influence of satisfaction on repurchase intentions. For individual level research, McDougall and Levesque [50] indicated that perceived value influences satisfaction, which, in turn, influences future intentions. Similarly, Lai [39] empirically proved that perceived value is correlated with customer satisfaction. Chiu et al. [13] also pointed out that the users of online learning systems tend to be more satisfied when they find the system valuable. Therefore, we hypothesize that:

H9. Perceived value of IPTV positively influences satisfaction.

4. Research method

4.1. Instrument development: perceived benefits and sacrifices

In order to ensure that high quality data were obtained, several methods were adopted to increase validity and avoid measurement errors. Adopting an instrument from past research, we modified each item to fit our research context. Items for perceived benefits and sacrifices were developed based on the literature review above. Indicators for perceived value of IPTV were adapted from Kim et al. [35], and indicators for continuance intention, confirmation, and satisfaction were adapted from Bhattacharjee [6]. Table 1 shows the operational definition and sources of measurement of variables.

The modified items were reviewed by four Information Systems faculties, three Ph.D. students, and three practitioners. Given that the IPTV concept is relatively new and measurements of benefits and sacrifices of IPTV are absent, the determination of final measurement was based on one expert panel discussion. The initial instrument, as shown in Appendix A, consisted of 35 items (20 for perceived benefits and 15 for perceived sacrifices). A content validity ratio (CVR) was computed for each item based on the response from the 10 experts mentioned earlier. The CVR for each item was evaluated for statistical significance, based on recommendations made by Lawshe [42]. Of the 35 items, 31 were found to be valid in content significance ($CVR > 0.62$). A total of 37 part-time MBA students with either IPTV knowledge or experience were invited to complete the pre-test survey to ensure the quality of our instrument. All items in the survey were presented in Likert scale format with anchors ranging from 1 (strongly disagree) to 7 (strongly agree).

Table 1
Operational definitions.

Constructs	Operational definitions	# of items	References
Perceived benefits	The advantages provided by IPTV	18	New scale developed
Perceived sacrifices	The potential cost or risks arising from IPTV	13	Adapted from Kim et al. [35], and new scale developed
Perceived value	Users' overall perception of IPTV based on consideration of its benefits and sacrifices	4	Adapted from Kim et al. [35]
Confirmation	Users' perception of the congruence between expectation of IPTV use and its actual performance	3	Adapted from Bhattacharjee [6]
Satisfaction	Users' feelings about prior IPTV use	4	Adapted from Bhattacharjee [6]
Continuance Intention of IPTV	Users' intention to continue or repurchase IPTV service	3	Adapted from Bhattacharjee [6]

4.2. Sampling

A survey study was conducted to examine the proposed hypotheses. Participants in this study were household users who had installed the IPTV service at home and had experienced the MOD service provided by Chunghwa Telecom. Data for this study were primarily collected via an Internet survey. An announcement was posted on a TV program-based discussion forum to recruit participants. The announcement stated the purpose of this study and specified that only those with MOD experiences would be qualified to participate in the survey. To ensure confidentiality, all participants were informed that their responses would remain anonymous and would be used for academic purposes only. The data collection ran from April 1 to May 1, 2010. After discarding the incomplete questionnaires, the effective sample size was 172. Given that approximately 800 people logged into the system during that month, the presumed response rate was 21.5%. The demographic information of these respondents is shown in Table 2. "Current TV SET" at the bottom of Table 2 represents the types of service currently received by respondents. It is noticeable that, among those 172 respondents, 60 of them had MOD service only while 89 had both MOD and traditional cable services, and 23 had terminated MOD and switched back to cable or other services.

Finally, a comparison of the early and late respondents on all variables (with the late respondents being assumed to be similar to non-respondents) was conducted in order to assess non-response bias [1]. No significant differences were found between these two groups in all constructs (perceived benefit, F -value = 0.598, p -value = 0.442; perceived sacrifice, F -value = 0.383, p -value = 0.538; perceived value, F -value = 0.759, p -value = 0.386; confirmation, F -value = 0.859, p -value = 0.357; satisfaction, F -value = 0.052, p -value = 0.821; and continuance intention, F -value = 0.199, p -value = 0.657). Therefore, non-response bias was not expected to have an effect on the results of our study. Furthermore, as the sample structure of the respondents in this study was similar to that used in the study of Liao et al. [46], whose target sample was also MOD users in Taiwan, the representativeness of our sample was assured.

Table 2
Descriptive statistics of respondents' characteristics (N = 172).

Measure	Categories	Frequency	Percent (%)
Gender	Male	102	59.3
	Female	70	40.7
Age	1–30	41	23.8
	31–45	86	50
	46–60	39	22.7
	61 and over	6	3.5
Education	High school graduate	10	5.8
	College education	116	67.4
	Master's or above	46	26.7
Salary	US\$ 1–690	41	23.8
	US\$ 691–1380	51	29.7
	US\$ 1381–2070	52	30.2
	US\$ 2071–2560	20	11.6
Household members	US\$ 2561 and over	8	4.7
	At least 3 members	115	66.9
Job	Couple	31	18
	Lives alone	26	15.1
	Works for government	21	12.2
	Works in private enterprise	96	55.8
Current TV set	Self-employed	17	9.9
	Others	38	22.1
	Only cable TV	19	11
	Only MOD	60	34.9
	Both have cable TV and MOD	89	51.7
	Others	4	2.3

4.3. Reliability and validity

Partial least square (PLS) was employed to test our measurement and proposed hypotheses. PLS is considered an appropriate statistical tool when the research model is in the exploratory stage, and where content and variables have not been extensively tested [74]. PLS was also chosen because our research model contained formative constructs. SmartPLS 2.0 M3 was employed for analysis.

Reliability can be assured through composite reliability (CR), Cronbach's alpha, and factor loading. High factor loadings (>0.70) and item-total correlation (ITC >0.30) indicate high internal consistency [24,53]. Convergent and discriminant validity should be assured when multiple indicators are used to measure one construct, and can be examined by factor loadings and average variance extracted by constructs (AVE) [21]. To have the required convergent validity, factor loadings should be greater than 0.70, and AVE should be greater than 0.50. To achieve adequate discriminant validity, the correlation between pairs of constructs should be less than 0.90, and the square root of AVE should be greater than the inter-construct correlation coefficients [14,21]. Data shown in Tables 3 and 4 indicate that all minimum requirements were met, thus confirming the quality of our measurement.

4.4. Second-order perceived benefits and perceived sacrifices

Following the suggestion offered by Petter et al. [59], perceived benefits and sacrifices should be treated as second-order formative constructs. This study followed the approach adopted by Pavlou and El Sawy [57] to examine the appropriateness of such an approach, which includes several guidelines. First, theoretically, the second-order constructs should be formed by the first-order constructs. Second, a moderate rather than a high level of correlation among the first-order constructs should be expected. Third, since the second-order constructs

are affected by – and not a reflection of – the first-order constructs, low collinearity among the first-order constructs is expected.

Perceived benefit of IPTV is treated as a second-order formative construct formed by four first-order reflective constructs. The weights of the first-order constructs are calculated by using principal component analysis [17]. As shown in Fig. 2, the impact of all first-order constructs on perceived benefits is significant ($p < 0.001$). In addition, as shown in Table 3, the correlations among the first-order factors are all below 0.62 ($p < 0.01$), which indicate that a reflective model is less likely to be present [57]. Finally, low VIF values (personalization = 1.72, high quality = 1.30, value-added services = 2.16, content richness = 1.69) indicate minimized possibility of there being a collinearity problem. This evidence indicates that a more parsimonious second-order representation is able to fully capture the predictive power of those first-order constructs [14].

Similar tests were performed to assess the formative second-order construct of perceived sacrifices, as shown in Fig. 3. Perceived sacrifices can also be treated as a second-order formative construct because: (1) these first-order constructs are theoretically independent, (2) the coefficients of the correlations among the first-order variables are low (all below 0.50), and (3) there is a low VIF value (perceived fee = 1.25, change of viewing habits = 1.04, technicality = 1.31, knowledge of alternatives = 1.07).

Because we collected independent and dependent data from the same source by using the same method, common method variance (CMV) was deemed a potential concern in this study [2]. For this reason, several measures were taken to avoid and detect CMV. First, we obtained the instrument from past research and modified each item to fit our research purpose. The modification was reviewed by several practitioners and refined through a pilot study to eliminate possible vague or confusing questions. Respondents' confidentiality was ensured to eliminate potential biases, such as social desirability. In addition, the Harman's single factor test was implemented to ensure that there was no significant method effect on the predefined causal relationship.

Table 3
The results of factor analysis.

Constructs	Items	Factors		Constructs	Items	Factors		
		Loading	ITC			Loading	ITC	
Perceived benefits [personalization] CR = 0.92 Alpha = 0.90 AVE = 0.62	P1	0.72	0.71	Perceived sacrifices [perceived fee] CR = 0.94 Alpha = 0.90 AVE = 0.84	PF1	0.89	0.89	
	P2	0.80	0.80		PF2	0.91	0.92	
	P3	0.85	0.86		PF3	0.93	0.93	
	Perceived benefits [high quality] CR = 0.95 Alpha = 0.91 AVE = 0.85	P4	0.79	0.81	Perceived sacrifices [change of viewing habits] CR = 0.88 Alpha = 0.80 AVE = 0.71	CVH1	0.79	0.82
		P5	0.78	0.78		CVH2	0.95	0.90
		P6	0.81	0.80		CVH3	0.78	0.82
		HQ1	0.96	0.95	Perceived sacrifices [technicality] CR = 0.93 Alpha = 0.90 AVE = 0.78	TEC1	0.80	0.80
HQ2	0.97	0.95	TEC2	0.92		0.91		
HQ3	0.83	0.87	TEC3	0.93		0.93		
Perceived benefits [value-added services] CR = 0.93 Alpha = 0.90 AVE = 0.72	VAS1	0.80	0.79	Perceived sacrifices [knowledge of alternatives] CR = 0.79 Alpha = 0.67 AVE = 0.57	KA1	0.88	0.63	
	VAS2	0.85	0.86		KA2	0.95	0.88	
	VAS3	0.88	0.89		KA3	0.93	0.81	
	VAS4	0.89	0.89		Confirmation CR = 0.96 Alpha = 0.94 AVE = 0.89	C1	0.95	0.94
	VAS5	0.82	0.81	C2		0.95	0.96	
CR1	0.88	0.90	C3	0.93		0.94		
Perceived benefits [content richness] CR = 0.94 Alpha = 0.91 AVE = 0.84	CR2	0.93	0.93	Satisfaction CR = 0.93 Alpha = 0.90 AVE = 0.77	S1	0.88	0.88	
	CR3	0.94	0.93		S2	0.93	0.93	
	Perceived value CR = 0.97 Alpha = 0.96 AVE = 0.89	PV1	0.92		0.92	S3	0.90	0.89
PV2		0.96	0.95	S4	0.79	0.80		
PV3		0.95	0.95	Continuance intention CR = 0.94 Alpha = 0.91 AVE = 0.85	CI1	0.96	0.95	
PV4		0.95	0.95		CI2	0.94	0.93	
			CI3		0.86	0.88		

CR: composite reliability; Alpha: Cronbach's alpha; AVE: averaged variance extracted; ITC: item-total correlation.

Table 4
Descriptive statistics and correlation matrix.

Variables	Mean	Std. dev.	M3	M4	VIF	Correlation matrix													
						CI	P	HQ	VAS	CR	PF	CVH	TEC	KA	PV	C	S		
Continuance intention (CI)	4.57	1.52	-0.50	-0.58	N/A	0.92													
PB: personalization (P)	5.12	1.10	-0.48	-0.25	1.72	0.35	0.79												
PB: high quality (HQ)	5.27	1.22	-0.90	0.77	1.30	0.33	0.41	0.92											
PB: value-added services (VAS)	4.80	1.17	-0.26	-0.36	2.16	0.46	0.62	0.43	0.85										
PB: content richness (CR)	4.13	1.41	-0.36	-0.46	1.69	0.49	0.47	0.38	0.62	0.92									
PS: perceived fee (PF)	3.59	1.27	0.18	-0.41	1.25	-0.44	-0.40	-0.37	-0.46	-0.48	0.91								
PS: change of viewing habits (CVH)	2.24	0.72	0.72	0.50	1.04	-0.02	-0.10	-0.19	-0.25	-0.13	0.12	0.84							
PS: technicality (TEC)	3.38	1.12	0.42	-0.42	1.31	-0.40	-0.37	-0.51	-0.42	-0.48	0.43	0.16	0.88						
PS: knowledge of alternatives (KA)	2.35	1.10	0.80	-0.03	1.07	-0.01	-0.08	-0.18	-0.13	-0.09	-0.04	0.11	0.20	0.75					
PV: perceived value (PV)	4.87	1.27	-0.53	-0.46	2.23	0.72	0.41	0.42	0.50	0.55	-0.62	-0.12	-0.45	-0.11	0.94				
Confirmation (C)	4.39	1.26	-0.48	-0.26	2.13	0.67	0.42	0.41	0.50	0.53	-0.51	-0.10	-0.49	-0.06	0.67	0.94			
Satisfaction (S)	4.50	1.18	-0.49	-0.12	2.23	0.73	0.47	0.46	0.54	0.68	-0.45	-0.10	-0.58	-0.09	0.69	0.67	0.88		

M3: skewness; M4: kurtosis.
The diagonal line of the correlation matrix represents the square root of AVE.

This approach assumes that more than one factor should be generated through a factor analysis process. Both exploratory factor analysis and confirmatory factor analysis were conducted. The exploratory factor analysis shows that more than two factors can be derived, the first factor explaining 37.93% of variance (<0.50 [60]). Total variance explained was 76.67% in an un-rotated factor analysis. From this, we infer that common method bias in this research study is not high. In addition, following Podsakoff et al. [60], and Williams et al. [84], we included a method factor whose indicators included all the principal constructs' indicators in the PLS model. We then calculated each indicator's variances substantively explained by the principal construct and by the method. The results demonstrate that the average substantively explained variance of the indicators is 0.74; while the average method based variance is 0.02. The ratio of substantive variance to method variance is around 37:1. In addition, most method factor loadings are not significant. According to Williams et al. [84], if the method factor loadings are insignificant and the indicators' substantive variances are substantially greater than their method variances, common method bias is unlikely to be a serious concern [45]. Therefore, given the small magnitude and insignificance of method variance, we contend that the method is unlikely to be a serious concern for this study.

5. Data analysis and results: structural model

In this study, we assessed the hypotheses by using structural equation modeling (SEM) because of its ability to validate multiple causal relationships simultaneously. SmartPLS 2.0 M3 with bootstrapping as a resampling technique (500 random samples) was used to estimate the structural model and the significance of the paths. Path

coefficients and the R² were used jointly to evaluate the model [14]. As shown in Fig. 4, all hypotheses are supported, with the exception of one (H6). First, H1 and H2 examine the links between users' perceived value, perceived benefit and perceived sacrifice. Perceived value is significantly associated with perceived benefit ($\beta=0.32$, t-value=3.99) and perceived sacrifice ($\beta=-0.43$, t-value=4.80). These two variables, in total, explain the 47% variance of perceived value. Hence, H1 and H2 are supported. Second, for satisfaction, three proposed antecedents are also found to have strong positive impacts. The coefficient from confirmation to satisfaction is 0.25 (with t-value=3.19), the coefficient from perceived value to satisfaction is 0.30 (with t-value=3.71), and the coefficient from perceived benefit to satisfaction is 0.37 (with t-value=5.32). This result indicates that H4, H7 and H9 are also supported. In addition, the combination of perceived value, perceived benefit and confirmation explains the more than 50% variance of satisfaction (R²=63%). Third, both perceived value ($\beta=0.42$, t-value=5.76) and satisfaction ($\beta=0.49$, t-value=5.38) are found to have impacts on continuance intention. Therefore, H3 and H5 are supported. These two variables explain over 60% of the variance of continuance intention of IPTV (R²=63%). Finally, confirmation is significantly associated with perceived benefit ($\beta=0.60$, t-value=10.45). The confirmation in total explains the 36% variance of perceived benefit, thus supporting H8.

Furthermore, because we argue that *perceived value* plays a critical role in determining the continuance intention in the fee-paying context, a direct/indirect effect analysis was conducted to clarify the importance of all variables with respect to continuance intention towards IPTV. The calculation results, as shown in Table 5, show that the total effect is -0.24 for perceived sacrifice and -0.35 for confirmation. As the

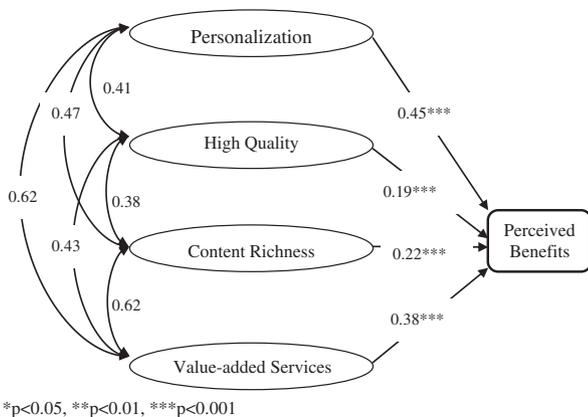


Fig. 2. The second-order formative construct of perceived benefits.

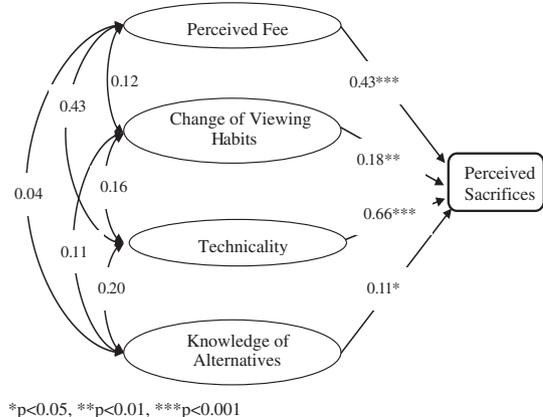


Fig. 3. The second-order formative construct of perceived sacrifices.

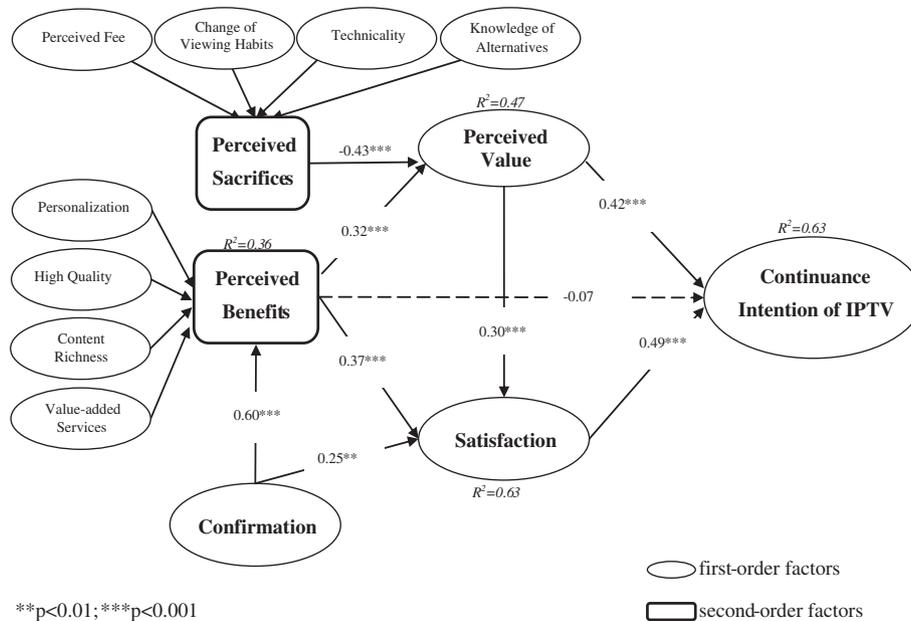


Fig. 4. Structure model and path coefficients.

direct effect of perceived value on continuance of IPTV is 0.42 and the indirect effect of perceived value on continuance intention towards IPTV through satisfaction is 0.15, the total effect of perceived value on continuance intention towards IPTV is 0.57. The indirect effect of perceived benefit on continuance intention towards IPTV is -0.07 (through satisfaction), -0.18 (through perceived value) and -0.18 (through perceived value and then satisfaction). Therefore, the total effect of confirmation on continuance intention towards IPTV is -0.43 . Finally, the total effect of satisfaction on continuance intention towards IPTV consists of a direct effect only and the value is 0.49. As shown above, because perceived value contains the highest total effect on continuance intention, perceived value appears to be the most critical determinant of continuance intention towards IPTV.

6. Mediating analysis

Kim et al. [35] confirmed that perceived value serves as a full mediator which transfers the effect of sacrifices and benefits to adoption intention. In this study, having modified the content of sacrifices and benefits, there remains ambiguity as to whether perceived value still mediates their impacts on the consequential variable. In addition, in contrast to Kim et al.'s [35] model in which adoption intention is the final dependent variable, the focus of this study is continuance intention. Therefore, there is a need to examine whether the proposed mediating role of perceived value still applies in this context. In order to clarify the above issues, we followed the three steps proposed by Baron and Kenny [4] to test the mediating relationship, the results of which are listed in Table 6. Firstly, as shown in Model 1, continuance intention of IPTV regression was regressed with perceived benefits and perceived sacrifices. The results indicate that perceived benefits ($\beta = 0.35, p < 0.001$) and perceived sacrifices ($\beta = -0.28, p < 0.001$)

are all significantly related to continuance intention towards IPTV with $R^2 = 0.33$. Secondly, perceived value regression was regressed with perceived benefits and perceived sacrifices. The results indicate that perceived benefits ($\beta = 0.32, p < 0.001$) and perceived sacrifices ($\beta = -0.43, p < 0.001$) are significantly related to perceived value with $R^2 = 0.47$. Finally, to test its mediating role, perceived value was added into the model (in Step 1) to serve as the third independent variable, as shown in Model 2. The effect of perceived benefits on the continuance intention of IPTV decreases from ($\beta = 0.35, p < 0.001$) to ($\beta = 0.16, p < 0.01$) and the effect of perceived sacrifices decreases from ($\beta = -0.28, p < 0.001$) to ($\beta = 0.03, p > 0.05$). The results show that the effects of perceived benefits and perceived sacrifices on continuance intention are fully mediated by perceived value [4]. In addition, after joining perceived value as the mediator, the explained variance of continuance intention of IPTV is increased significantly ($R^2 = 0.53$). In addition, we conducted two Sobel tests to examine the significant level of mediation effects [69]. The results show that the effects of perceived benefits ($z\text{-value} = 3.675, p < 0.001$) and perceived sacrifices ($z\text{-value} = 4.164, p < 0.001$) on continuance intention are significantly mediated by perceived value. Therefore, we can conclude that perceived value is an important mediating variable in a continuance adoption context.

Table 5 The total effect of each construct on continuance intention towards IPTV.

Construct	Direct effect	Indirect effect	Total effect
Perceived value	0.42	0.15	0.57
Satisfaction	0.49	N/A	0.49
Perceived benefit	-0.07	-0.36	-0.43
Confirmation	N/A	-0.35	-0.35
Perceived sacrifice	N/A	-0.24	-0.24

Table 6 Analysis of mediating effect.

Dependent variable: continuance intention of IPTV		
Mediator: perceived value		
Independent variable	Direct effect	Mediated effect
	Model 1	Model 2
Perceived benefits	0.35 ^{***}	0.16 ^{**}
Perceived sacrifices	-0.28 ^{***}	0.03
Perceived value	-	0.64 ^{***}
R ²	R ² = 0.33	R ² = 0.53
R ² difference		0.20 ^{***}

Note: The f value of R^2 difference is estimated by $[(R_2^2 - R_1^2) / (df_2 - df_1)] / [(1 - R_2^2) / (n - df_2 - 1)]$.
 * $p < 0.05$.
 ** $p < 0.01$.
 *** $p < 0.001$.

7. Discussion

The results of this study are consistent with VAM, namely that perceived benefits and perceived sacrifices have significant effects on perceived value. This indicates that continuance intention toward IPTV is based not only on the perceived benefits, but also on the perceived sacrifices. Moreover, compared with perceived benefits, the perceived sacrifices have a stronger impact on perceived value. This implies that the extent to which users have to make sacrifices plays a more critical role in determining the value of that service. Fee increases or operating difficulty will significantly reduce the value of the IPTV service for customers. In addition, the strong impact of perceived value on continuance intention implies that the reduction of perceived sacrifice cannot be neglected by the IPTV service provider. It is noticeable that in H6, the link between perceived benefits and continuance intention is found to be insignificant. This result aligns with the following mediation analysis which shows that perceived benefits are less important after perceived value has been taken into consideration. This result implies that, in contrast to past studies which focused on free service where only positive outcomes should be taken into account, customers consider the overall value while making the continuance decision in a fee-paying context.

Among the four identified benefits, with the exception of high quality which has a slightly lower weighting (0.19), the weightings for the various types of benefits are similar (ranging from 0.22 to 0.45). This indicates that high quality is not as important as the other three types of benefits. This is understandable due to the high quality of other TV services in Taiwan, leading users not to regard this as the most important benefit. The remaining three types of benefits contribute to the second-order perceived benefits in a similar manner and, therefore, are of equal importance. However, the weightings of the three perceived sacrifices range slightly differently. Perceived fee and technicality have relatively strong weighting (0.43 for perceived fee and 0.66 for technicality), compared with change of viewing habits (0.18) and knowledge of alternatives (0.11). This result indicates that both perceived fee and technicality can be considered as critical sacrifices while change of viewing habits is not as critical as the other two.

The strong and significant relationship between confirmation and perceived value indicates that our results are consistent with the concept proposed by ECT. That is, confirmed customers tend to have a positive attitude toward the service or product. In contrast to past studies that have emphasized the value of perceived usefulness and playfulness, this study has successfully shown that consumers tend to rate a service as valuable when their expectations are confirmed.

Finally, with respect to continuance intention, perceived value has the highest total effect. This result indicates that customers emphasize the value of service more than their degree of satisfaction. Aligning with our proposal, perceived value should be emphasized in the context of experiential computing or fee-paying based service. In addition, perceived value has an impact on satisfaction. In contrast to other free service-based studies where confirmation has the strongest impact on satisfaction (e.g., [47]), this study finds that perceived value suppresses the effect of confirmation and plays a more critical role in determining the level of satisfaction.

8. Conclusion

The purpose of this study was to apply the integration of VAM and ECT to the study of continuance intention towards IPTV in Taiwan. We argued that perceived value should be used to replace perceived usefulness in order to better reflect the fee-paying nature of the IPTV service. After collecting data from 172 consumers experienced in IPTV, all our hypotheses were supported. The results supported VAM, namely that perceived value is a comparative result affected by perceived sacrifices and perceived benefits. Consumers whose expectations are confirmed are more highly satisfied and tend to perceive the service as valuable.

Finally, consumers are more likely to continue IPTV if they find it valuable and are satisfied with it. This study serves to provide a better understanding of the continuance intention of IPTV service customers.

8.1. Implications for researchers

Through application of the integrated model of VAM and ECT to understand continuance intentions regarding IPTV in Taiwan, this study contributes to academia in the following ways. First, we successfully show that perceived value should be employed to study continuance intention in an experiential computing or fee-paying context. This finding is critical because early IPTV research in the non-work setting persisted in adopting TAM as the main theory to explain the forming of adoption intention (e.g., [25,46,67,83]). Our results suggest that it is insufficient to consider only the positive outcomes of using a product or service. Instead, the cost of using it should also be taken into consideration so as to truly reflect the trade-off paradigm. The main reason for doing so is that the adopters of IPTV are not pure technology users, but also service consumers. Extremely high costs or sacrifices may prevent users from continuing the service given that a certain level of benefit can be experienced. We have advanced the ECT research stream by showing that studies regarding experiential computing or within a fee-paying context cannot test the impact of positive benefits alone. Researchers should also include potential sacrifices in the result model.

The importance of including perceived value is also reflected in the fact that (1) the total effect on continuance intention attributed to perceived value is much higher, and (2) the path coefficient of perceived value is higher than satisfaction (on continuance intention). This result differs from past studies which found satisfaction to be the major determinant of continuance intention (e.g., [6,47]). This implies that consumers may not continue the service, even when they feel satisfied, if they find it not to be valuable because the sacrifices outweigh the benefits.

To the best of our knowledge, to date, no attempt has been made to integrate VAM and ECT in order to examine users' continuance intention in a non-work setting. In light of this, we suggest that future studies should apply and extend this integrated model to explain continuance intention in the context of consuming products such as mobile service and IPTV. Since consumers take sacrifices into consideration in most situations, the more comprehensive model developed in this study should be used to investigate the post-acceptance behavior to provide better insights.

Second, this study also proposed possible benefits and sacrifices of IPTV. Specifically, we identified three perceived sacrifices (perceived fee, technicality, and change of viewing habits) and four perceived benefits (personalization, high quality, content richness, and value-added services). In addition, the relatively strong impact of perceived sacrifices on perceived value, compared with the impact of perceived benefits, implies that perceived sacrifices play a more critical role in determining the value of the IPTV service.

8.2. Implications for practitioners

Several implications for practitioners can be drawn from this study. First, the study identified four types of benefit in the IPTV context. Given the significant coefficient from perceived benefits and perceived value, marketing managers should attempt to promote the benefits that IPTV can bring through employment of various types of marketing strategies. In addition, service providers should attempt to enhance the content or provide other possible benefits to attract and retain customers. Given that personalization and value-added services have the strongest weightings, they might provide a good starting point.

However, compared with sacrifices, the positive effect obtained from increasing perceived benefits is limited. Increasing perceived fee, technicality, and change of viewing habits will significantly reduce the perceived value. This indicates that, in addition to increasing perceived

benefits, there is a need to minimize perceived sacrifice so as to retain current customers. In particular, perceived fee and technicality should be dealt with first. Service providers should aim to improve the user interface, system reliability, connectivity and efficiency or change the pricing policy in order to reduce the sacrifices required of consumers. Perceived fee in IPTV is not limited to a basic flat fee. Customers may be charged for extra channels or services depending on individual needs. Perceived value is one critical sacrifice because traditional TV programs are free and cable TV charges a flat fee only. Therefore, understanding how to reduce the perception of paying high level fees is critical for IPTV providers.

Technicality is another critical sacrifice of IPTV use. Traditional TV watchers receive TV programs passively, being required to do only two things: turn on the TV and switch the channel. However, IPTV requires service receivers to learn how to handle the function screen. This definitely reduces the adoption or continuance intention of elderly people or those who are computer-averse. Therefore, providing a user-friendly interface is the first priority. Customer education may be provided when it is needed. Improvement in technicality will enable consumers to obtain better usage experience. As a consequence, they will regard the service as valuable.

Finally, the results also showed that perceived value influences satisfaction more than confirmation does, indicating that perceived value is more important than confirmation. That is, although consumers might not be able to confirm their expectation during the service delivery process, they may still feel satisfied if they find the service valuable.

8.3. Limitations and suggestions for future study

This study is not without limitations. First, in contrast to the expectation–disconfirmation theory proposed by Oliver and DeSarbo [55], this study adopted the revised model proposed by Bhattacharjee [6] and, therefore, expectation is not included. Future researchers should consider the inclusion of expectation in a longitudinal study to examine the impact of expectation. Second, although this study has identified some critical factors that determine continuance intention towards IPTV, there remain other factors that may have an effect on the continuance decision, such as social influence or government policy. Future researchers are encouraged to take those factors into consideration. Finally, we identified perceived benefits and sacrifices based on the extant literature and interviews with users. Future researchers should conduct systematic studies to clarify the full benefits and sacrifices of innovative information technology applications.

Acknowledgements

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Appendix A. Questionnaire items

All items used 7-point Likert scales anchored from “strongly disagree (=1)” to “strongly agree (=7)”.

Perceived benefits—personalization

- P1: Using MOD is convenient to stop, fast forward and rewind the video clips.
- P2: Using MOD allows me to choose the most convenient time to watch.
- P3: Using MOD enables me not to miss any program.
- P4: Using MOD makes it convenient for me to play the video from the last location.
- P5: Using MOD allows me to conveniently bundle my channels or services.

- P6: Using MOD gives me the choice not to buy the channels or services I don't like.
 - P7: Using MOD allows me only to buy the channels or services I like.
- Perceived benefits—high quality

- HQ1: MOD provides high picture quality programs.
 - HQ2: MOD provides high definition programs.
 - HQ3: MOD provides high signal quality programs.
- Perceived benefits—content richness

- CR1: MOD provides rich TV channel content.
 - CR2: MOD provides rich video-on-demand content.
 - CR3: MOD provides rich up-to-date content.
- Perceived benefits—value-added services

- VAS1: Using MOD makes it easy for me to make my payment at home.
 - VAS2: Using MOD makes it easy for me to browse my photos and music on a flash drive.
 - VAS3: Using MOD makes it convenient for me to sing karaoke at home.
 - VAS4: Using MOD makes it convenient for me to play interactive games at home.
 - VAS5: Using MOD makes it convenient for me to watch sports at home.
- Perceived sacrifices—perceived fee

- PF1: I think the monthly rental for MOD services is unacceptable.
 - PF2: I think the fee for paid-channels for MOD services is unacceptable.
 - PF3: I think the total fee for MOD is unacceptable.
- Perceived sacrifices—technicality

- TEC1: I think the operation interface of MOD is difficult to use.
 - TEC2: Learning to operate MOD is difficult for me.
 - TEC3: My interaction with MOD does require a lot of mental effort.
 - TEC4: It is difficult for me to become skillful at using MOD.
- Perceived sacrifices—change of viewing habits

- CVH1: I think there are some channels I like on cable TV that cannot be found on MOD.
 - CVH2: I think the programs to which I am used are different from the ones on MOD.
 - CVH3: I think the way to watch MOD is quite different from the way to watch cable TV.
- Perceived value

- PV1: Compared to the sacrifice/fee I need to pay, the use of MOD offers value for money.
 - PV2: Taking all the pros and cons into consideration, the use of MOD is beneficial to me.
 - PV3: Despite my unfamiliarity with MOD, the use of MOD is worthwhile for me.
 - PV4: Overall, the use of MOD gives me good value.
- Confirmation

- C1: My experience with using MOD was better than what I expected.
 - C2: The service level provided by MOD was better than I expected.
 - C3: Overall, most of my expectations from using MOD were confirmed.
- Satisfaction

- S1: I am very satisfied with MOD.
- S2: I am very pleased with MOD.
- S3: I am very content with MOD.

- S4: I am extremely delighted with MOD.

Continuance intention

- CI1: I intend to continue using MOD rather than discontinue its use.
- CI2: My intentions are to continue using MOD than to use any alternative means (traditional TV).
- CI3: If I could, I would like to discontinue my use of MOD (R).

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