

The Conceptual Model of Mobile TV Service Adoption: A Triangulational Perspective

Rong Chen¹ Xin Luo² Heng Xu³ Wei Zhang⁴

¹The Pennsylvania State University, USA. Email: rxc317@psu.edu

²The University of New Mexico, USA. Email: Luo@mgt.unm.edu

³The Pennsylvania State University, USA. Email: hxu@ist.psu.edu

⁴University of Massachusetts Boston, USA. Email: wei.zhang@umb.edu
Corresponding author: Dr. Xin Luo (email: Luo@mgt.unm.edu)

Abstract

Mobile TV is a fledgling industry which has high profit expectations while with low adoption rates. To advance this line of research, this paper presents a comprehensive review on literatures related to mobile TV adoption, including traditional adoption theories, uses and gratification research, domestication research, cognitive research, service research, communication research, and so on. Drawing on theories reviewed, a triangulation of adoption model is proposed, viewing mobile TV as a technology, a service, and a form of new media. The model will provide useful implications not only for innovative technology adoption researchers but also for mobile TV service practitioners.

Keywords: Mobile TV, Technology adoption, Service, and Media

1. Introduction

Mobile TV combines the two bestselling consumer products in history – TVs and mobile phones [1] and embraces 4.5 billion mobile phone users as its potential subscribers worldwide [2]. However, the adoption rate of mobile TV services is still under expectation. Some people hold

that the small screen size of phones and the flawed quality of service are major factors hindering potential subscribers [3]. Also, the high subscription fee, low signal strength and less attractive content are considered to be drawbacks of the service.

Several definitions have been coined in regard to mobile TV, e.g. “real-time broadcast transmission of content to mobile devices” [4], “takeout TV” or “cellevision” [5]. However, most of these concepts have emphasized the functionality side, while comparatively neglecting the service characteristics embedded in Mobile TV. To an end-user, mobile TV is not only a technology, but also a service and a form of new media. As such, we conjecture that the three roles form a triangulation of perspectives that helps us define mobile TV as *the video content service package delivered to end-users through mobile technology*.

Although there are a growing number of literatures on mobile TV services, e.g. legal and regulatory issues, usability, technology solutions and so on, few have concentrated on the individual adoption research. The object of this paper is to fill the gap and investigate the demand-side requirements of mobile TV services specified by end-users. Guided by the triangulation of perspectives, we firstly

review mobile service papers in technology adoption aspect, including the theory of reasoned action, technology acceptance model, theory of planned behavior, and innovation diffusion theory. Originated for system use in work space, we think the adoption theories are insufficient for understanding customer choices in a market situation. Thus we expand the theoretical spectrum from technology adoptions to service-oriented and media-oriented streams both in general and particular mobile service domains. Based on the comprehensive review on literature, a conceptual model illustrating users' attitude and adoption intention towards mobile TV services is constructed. Since there is limited research on mobile TV adoption, this paper is one of the pioneer studies in this domain. In essence, this study ushers two unexplored dimensions: the service and media into mobile TV adoption research.

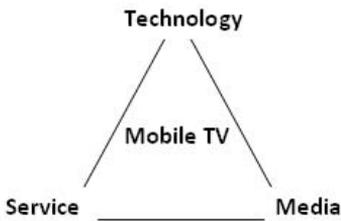


Fig. 1: Triangulation of perspectives toward mobile TV services.

The rest of this paper is organized as follows: Section 2 presents a review on existing adoption research on mobile services and the most discussed issues in service-oriented research and new media related research. A theoretical adoption model will be presented in Section 3. Conclusion and expect result will be discussed at the end of the paper.

2. Literature Review

2.2.2.1 Overview of major adoption research

Over the last two decades, a number of studies have provided us with abundant theoretical frameworks and models for the acceptance of information technology [6-9]. In this part, we go over the vast body of theories that are mostly used in mobile service adoption domain, including theory of reasoned action (TRA) [10-11], theory of planned behavior (TPB) [12-13], theory of acceptance model (TAM) [14], and innovation diffusion theory (IDT) [15-16].

TRA [10-11] is considered as a general theory and has been applied to explain behavior beyond adoption of technology [17]. In TRA, there are two constructs that lead to an individual's actual behavior: individual's attitude and subjective norms. The weakness of TRA is that it fails to specify its application to particular population and related behavior, thus making it difficult to verify the model in particular context [14]. On the basis of TRA, Ajzen [12] developed TPB. Besides attitudes and subjective norms, TPB asserts that the actual behavior is determined directly by perceived behavioral control. IDT is another line for IT/IS adoption research, which pays more attention to specific settings and external factors that influence technology adoption [18].

TAM has been the most widely acknowledged model in predicting IT/IS adoption and use [18]. TAM model has validated new scales for two specific variables, perceived usefulness (PU) and perceived ease of use (PEOU), both of which are the fundamental determinants of user acceptance for information technology. However, TAM does not include subjective norm as a determining construct as TRA does. This absence of the possibility of influence from institutional, social, and personal control factors constitutes the major theoretical

limitation of TAM [19]. In the study of Venkatesh *et al.* [20], TAM has been refined into TAM2 to solve the above-mentioned limitations. TAM2 incorporates additional theoretical constructs spanning social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use). In recent years, a number of further modifications have also been made to the TAM and TAM2 models. Among these, the most prominent is the Unified Theory of Acceptance and Use of Technology (UTAUT) [21]. This model has combined TAM, IDT and six other competing acceptance research approaches. It includes four key determinants toward intention and usage: performance expectancy (replacing perceived usefulness), effort expectancy (replacing perceived ease of use), social influence, and facilitating conditions. To address how various interventions can influence the known determinants of IT adoption and use on manager side, TAM3 was developed integrating previous work [22]. TAM3 raises three relationships that were not empirically tested before: (i) perceived ease of use and perceived usefulness; (ii) computer anxiety and perceived ease of use; (iii) perceived ease of use and behavioral intention.

Although the adoption research has lasted for many years, not many studies have yet to cover mobile TV, an emerging technological phenomenon. Among the 24 adoption papers we found that, up to 2009, only 3 articles have investigated mobile TV service in particular, with 2 of them published in 2009. In addition, although the word “service” is often used, the concept of service is a missing part in existing adoption literatures.

2.3 Mobile TV as service

In service context, customers are not buying a single technology, but a service enabled by the technology. Thus, the purchasing decision will be strongly affected by the marketing messages. Some studies have identified service quality as an important construct for user acceptance of mobile services. Recent research has shown that better service quality can lead to better acceptance by users [23]. Besides service quality, some researchers also use customers’ perceived value as a determinant for service adoption [24]. Compared with service quality, perceived value is more related to customers’ own trade-off between cost and benefits. Customers can easily perceive the values if they could identify products or services with the following benefits: safety, performance, appearance, comfort, economy, and durability [25]. In addition, Parasuraman *et al.* [26] argued that acquisition, transaction, redemption, and in use are four types of perceived values. However, the concept and construct of service is too immense and fussy in extant literatures. “Service”, “Service quality”, and “perceived value of service” are often exchangeable used in different papers while referring to the same thing. There also exist various subconstructs related to service. For example, Dickinger *et al.* [27] put the ease of use into service factors; Pagani [28] took mobility, availability, and personalization as important values of mobile multimedia services.

Pricing is another topic often mentioned in mobile service research studies. Curwen *et al.* [29] prove that persuading customers to pay is a holding back issue of the widespread dissemination of mobile TV services. Many customers view streamed mobile TV service and Web surfing as expensive and unnecessary [30]. Although the fulfillment of mobile TV services needs relatively high investment in terms of the

device costs, the network infrastructure costs and the content and application costs [31], most end-users would not understand why they have to pay an additional monthly subscription and “the new network costs money” is not sufficient as a reason for them [30].

2.4 Mobile TV as Media

The uses and gratifications theory has been applied in some scientific investigations as a valid approach to explaining people’s attitude and intention toward the initial state of mass medium. The general conclusion of this theory is that the audience attempts to fulfill certain psychological needs in media choice and these gratifications sought motivate the media uses [32]. Some mobile service studies have employed this theory to study gratification factors. For example, Leung et al. [33] identified seven gratifications to mobile telephones: fashion/status, affection/sociability, relaxation, mobility, immediate access, instrumentality, and reassurance.

Furthermore, the content factor and the entertainment factor of mobile TV are also proved to be significant in consumers’ adoption intention [3, 34]. In the mobile services research streams, hedonic need/enjoyment/fun/leisure/pleasure/playfulness factor is considered to be one of the gratifications end-users searching from services.

A fundamental feature of mobile services is ubiquity, which refers to the access to information and services regardless of spatial, temporal, or technical constraints [35]. In addition to portability, the network coverage of mobile TV is far more pervasive than traditional TV and even laptops. This obvious value of mobile TV on spatial mobility is positively confirmed in many prior studies by using concepts of “anywhere” and “anytime”. For example,

Schatz *et al.* [1] discussed that the growing number of technological and commercial trials in Europe confirms the following qualities of mobile TV as key user benefits: mobility and flexibility. Personalization is a relatively less discussed issue in mobile TV domain. However, it is a real superiority mobile TV can possess over traditional media on the ground that personalized mobile TV content can be customized and delivered to each individual user. That being said, mobile TV users can have a total control over the content. They can also evaluate the relevance of content and further decide whether and when to download it [36], and their power of control is even enhanced by transmitting self-produced contents through mobile TV platform [37].

As a whole, the potential of mobile TV as media is far from reached. However, this perspective is useful for us to identify the comparative advantages of mobile TV over other forms of media.

3. Mobile TV Adoption Model

To study the adoption of mobile TV service at the individual level, we tend to propose a research model that integrates the most important findings in general mobile services and in mobile TV in particular. Our starting point will be the traditional adoption models, TAM, TRA, TPB, and IDT. Their models and constructs have been modified and tested by many researchers over the time and, to a large extent, covered the major findings of technology adoption at the individual level. Some of the constructs can be adapted into mobile TV service adoption, e.g. perceived ease of use, mobility, enjoyment and so on.

However, the task-related nature makes the TAM and other traditional adoption theories value instrumental beliefs and overlook the effect of

extrinsic factors. Instead of implementing collections of useful features, the design of mobile services should be focused on key values provided to the consumers [38]. Thus, the service perspective is important because the choices of mobile TV consumers are shaped by the way they perceive the service with available information. We will therefore focus on end-users' perception toward mobile TV services, including perceived service quality, customer perceived value, and so on. In addition, a new perspective is added into the literature review, to consider mobile TV as a media. We want to investigate how end-users will respond to mobile TV based on its comparison with conventional TV. Many gratification factors have been identified during the process, e.g. mobility, enjoyment, and personalization. As shown in Figure 2, the variables are drawn and organized in triangulation manner: technical, service and media.

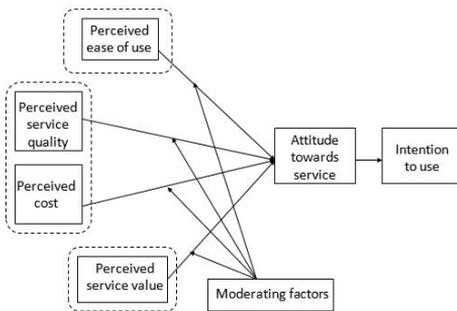


Fig. 2: Proposed model for the adoption of mobile TV services.

From the technology perception angle, perceived ease of use (PEOU) is adopted as important factor affecting users' attitude toward service. Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" [14], which has been used in the original TAM

and many of its later modifications. This angle can ensure the basic technical prerequisites needed for mobile TV. For the end-users of mobile TV services, whether the technical functionality is sufficiently good and reliable will directly affect their attitude toward adoption (Jung et al. 2009; Pagani 2004). We didn't adopt the perceived usefulness (PU), the other key construct of TAM into this model. PU examines the degree to which a person believes that using a particular system would enhance his or her job performance [14]. This cannot provide enough explanation for service adoption in a commercial context. In addition, its task-related nature will make researchers lean to overlook an effect of intrinsic factors [3] that are closely associated with user's purchasing behavior.

For the service perception aspect, we adopt the perceived service quality from existing literatures. Service quality represents customers' overall requirements on most kinds of services and will inspire customer perceived value. This factor may not be particular in mobile TV, but will serve as a basic requirement consumers seek in every qualified service. Perceive cost symbolizes the encoding of internalization of the objective selling price of a product/service [39]. It concerns with the purchasing intention of end-users, which is not included in TAM. When a consumer evaluates a potential purchase, he/she will assess the relative benefits and costs [35]. If the cost exceeds the benefit, he/she will not subscribe to the service. However, findings from many prior mobile services studies have proved that the price is one of the most important obstacles preventing users' adoption. Many customers view streamed mobile TV service and Web surfing as expensive and unnecessary [30].

From the perspective of media perception, content, enjoyment, mobility, and personalization are adopted as four customer perceived values. Content is a feature mobile TV services inherited from conventional television. It can be defined as the information and experience end-users get through the medium. For mobile TV service subscribers, content is the final object they want to receive from the purchase. Content in mobile TV should be assessed by customer as applicable (relevance), up-to-date (timeliness), and sufficient (sufficiency) [3]. Enjoyment is an intrinsic source of motivation referring to the performance of an activity for no apparent reason other than the process of performing by itself [40]. In Juniper's report [41], video services are envisaged among the key drivers of mobile entertainment revenues. Mobility means that content consumption takes place in various dynamic mobile contexts. As to mobile TV users, this feature can offer greater ubiquity of content access [42] than other medium. Personalization generally refers to adapting service to meet the specific needs of users [43]. In the mobile TV context, consumers are increasingly demanding the means of personalize their viewing [29]. Besides, the popularity of end-users' self-produced video content can serve as another proof of personalization's importance in the increasing user involvement.

In general, these four aspects are all comparative advantages specifically for mobile TV perceived by users, and can differentiate mobile TV from all the other media formats.

We also propose to employ two moderating factors, user characteristics and social interaction to adjust users' attitudes toward adoption. For example, prior evidence shows that gender and age might influence the adoption behavior

due to their moderating effects on other constructs [17].

4. Future Work and Conclusion

To test this model, we will recruit participants who have direct experience with mobile TV services for a survey study. The following variables will be measured in the survey: perceived ease of use, perceived service quality, perceived cost, perceived service value, attitude toward service, intention to use, user characteristics and social interaction. Scale development for the constructs will be based on an extensive survey of the existing literature. Validated standard scales will be adopted using the Linear Structural Relations Modeling (LISREL). To test the research model, a structural model will also be assessed using the structural equation modeling (SEM) techniques through LISREL.

In this paper, we propose to study mobile TV adoption from a triangulation of perspectives to view the phenomenon as a technology, a service, and a form of new media. The proposed model is rooted in traditional technology adoption theories. It also draws instrumental findings from other disciplinary areas such as the uses and gratification research, domestication research, cognitive research, service research, communication research, and so on. It is one of the early initiatives that integrate factors concerning three different roles of mobile TV. Using the groundwork laid down in this study, future data collection and analysis could contribute to extending our theoretical understanding and practical ability to foster the acceptance of mobile TV services.

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