

WILL MOBILE VIDEO BECOME THE KILLER APPLICATION FOR 3G? - A THEORETICAL FRAMEWORK FOR MEDIA CONVERGENCE

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Abstract

Mobile carriers have continually rolled out 3G mobile video applications to increase their revenue and profits. The presumption is that video is superior to the already successful SMS, ringtones, and pictures, and can create greater value to users. However, recent market surveys revealed contradicting results. Motivated by this discrepancy, we propose in this paper a parsimonious framework for user acceptance of mobile entertainment as digital convergence. Integrating research on Information Systems and theories of Media Psychology, we take a unique approach to user acceptance of digital convergence – platform migration. Our key proposition is that the interaction between media types and the platform-specific constraints is the key determinant of user evaluation. Particularly, users' involvement in the media is determined by both the entertaining time span on the original platform and the attentional constraint of the new platform. The mismatch between the two spans can result in lower level involvement, which in turn cause no or even negative user emotional responses. We discuss the theoretical contributions, strategic and design implications, and future research directions derived from this theoretical framework.

Key Words: Media Psychology, Platform Migration, Digital Convergence, Mobile Entertainment.

1. INTRODUCTION

The advent of 3G mobile network provides more opportunities for mobile operators to increase their ARPU¹ and profits. Encouraged by the success of ringtones, pictures taken by camera phones, some analysts and operators believe that mobile videos for entertainment will be one promising candidate for 3G killer applications - "Watching video on cell phones could eventually easily surpass [demand for games, ringtones and wallpapers], to reach 100% of the population." (Olga 2005). Operators have spent billions to upgrade their infrastructure and launch a variety of mobile video contents, such as full-length movies, mobile-TV programs, and music videos (Reardon 2005). However, recent studies do question the mobile video hype. According to a survey conducted by RBC Capital Markets, about 75 percent of roughly 1,000 people polled said

¹ ARPU – Average Revenue Per User.

they had no interest in watching TV on their cell phones (Reardon 2006). Another study by In-Stat revealed that only one in eight respondents indicated they were interested in purchasing mobile video services from their wireless carrier, and two thirds of mobile phone subscribers are not yet ready for video services on their handsets (In-Stat 2005). This contradictory customer survey expectations challenge the huge investment of 3G suppliers.

User adoption of mobile applications has been examined by a number of Information Systems (IS) studies (e.g., Sharma and Deng 2002; Kim and Kim 2003). However, as will be discussed in next section, few of them have addressed the unique characteristics of mobile platform in digital convergence and the experiential aspect of mobile entertainment. Furthermore, most research in digital convergence is at the firm level and focusing on competing strategies and standardization (e.g., Yoffie 1997). This stream of research is short on the insights into end users' psychological process when evaluating the converged media. There is a niche to provide a theoretical framework to explain the contingency fit in putting video into mobile platform.

Therefore, the current research attempts to address the above theoretical gap so as to derive strategic insights into the business problem of mobile video. Using mobile entertainment² as the focal case, we take a platform-migration approach to the issue of media convergence and propose a theoretical framework from end users' perspective. Two major research questions are:

- (1) What are the key factors that influence user preferences with media convergence, especially mobile entertainment?
- (2) What is the role of platform migration in user evaluation of the converged entertainment media?

The rest of the paper is arranged as follows. Section II does a brief literature review and identifies the theoretical gap. Section III defines key constructs and proposes a theoretical framework for user evaluation of mobile entertainment as media convergence. Our contributions to IS research and managerial implications are discussed in Section IV. Finally, future research directions are suggested in Section V.

2. LITERATURE REVIEW & THEORETICAL FOUNDATIONS

2.1 Research on Mobile Application Adoption

IS research on Mobile Application Adoption is mainly based on theoretical frameworks such as Technology Acceptance Model (TAM) (e.g., Sharma and Deng 2002), Consumer Behavior Models such as risk perceptions and perceived value (e.g., Kim and Kim 2003), and Media Richness (e.g., Chen et al. 2002). For instance, Sharma and Deng (2002) replicated TAM in the case of PDA acceptance. Lu et al. (2004) extended TAM by considering the effects of social influence and personal innovativeness in wireless internet adoption. Kim and Kim (2003) studied post-adoption behavior of mobile internet users and find consumer perceived value and consumer type are two important factors besides other technology characteristics. Finally media richness was incorporated into existing adoption models. Chen et al. (2002) found that media richness could increase user perceived playfulness, usefulness, and ease of use of Multimedia Messaging Services.

² In the current study we focus on linear media contents for mobile entertainment. By linearity we refer to the fact that end users cannot change or actively control the sequence of delivery of the content. Thus mobile gaming is not included in our study though our framework can be extended to accommodate it.

Although existing literature identified several important factors for mobile application adoption, such as consumer value, media richness, and playfulness, we find several limitations. First, research based on TAM or Consumer Behavior usually falls short of media richness in mobile contents and users' experiential / emotional response. On the other hand, media richness and playfulness alone cannot fully explain why video contents receive user resistance in the real world, considering the fact that video is richer and more enjoyable than SMS or MMS.

In this paper we propose that previous research neglected one important dimension of IT artifact – the platform and its constraint on user experience with the converged entertainment media. Based on this rationale and using mobile entertainment as the focal case, we build a theoretical framework that integrates research on media convergence, psychology of media entertainment, Human-Computer Interaction, and the platform-application dichotomy. Next we will briefly review relevant literature from these research streams.

2.2 Research on Digital Media Convergence

Digital convergence is generally described as a unification of the functions, and a coming together of the previously distinct digital technologies. Particularly, the last couple of decades have witnessed widespread digitization of information and content, increasing incorporation of digital technologies into the products of diverse industries, and often, an accompanying shift to using von-Neumann-like platform-based product architectures (Mentana and Sundrarajan 2003). One important development is the so-called Media Convergence, where content and services previously offered through various media will in the future be conveyed to a single artifact (Boczkowski and Ferris 2005). Research on digital convergence separates contents from their platforms like the von-Neumann-like platform-based product architectures or the single artifact. However, this stream of research focuses more on competing strategies for firms rather than further considering the characteristics of the platform and its role in user evaluation of media convergence (e.g., Yoffie 1997). Furthermore, no explicit definition of platform is available in this research.

2.3 The Platform-Application Dichotomy

A platform is a set of subsystems and interfaces that form a common structure from which a stream of derivative applications can be effectively developed and distributed (McGrath 1995). This reflects the widely-accepted metaphor of technology layering in which an IT artifact is a layered system in which technologies in the lower layer serve as the “platform” upon which technologies in the upper layer (i.e., “applications”) function. For instance, the Wintel combination is the platform while Microsoft Word is the application with Word documents as the benefits. In the case of mobile entertainment, Video Call, TV Clips, Movie Trailers, are the applications while the network and mobile device with the embedded OS form the platform³.

In digital convergence, applications are transferred (and maybe transformed) from the original (old) platform to a new one. For instance, a common ‘platform’ for a full-length movie can be a TV set at home together with the underlying TV broadcasting network, while a 3G movie service is based on the platform consisting of the mobile network, the mobile device and the associated usage context, etc. Thus from end users’ perspective, digital convergence is essentially a ‘platform-migration’ to them.

³ Platforms can be identified at different layers of the technology, we target at the physical device & network level.

2.4 Psychology of Media Entertainment

The concept of IT experience has been widely examined in IS research. It is mainly defined and measured as either skill level or length and width of feature usage (e.g., Thompson et al. 1994). Recently the concept of user experience in HCI literature has been studied in the IS discipline, including the discussion of emotion, affect, and flow. The focus is still on how a user experiences a particular interface or technology⁴. In the case of mobile entertainment, end users are consumers of contents with an emphasis of having a good time. Thus, users' attentional involvement and emotional response during the content delivery gain more weight than factors such as user skills or interface.

Research on media psychology has a direct focus on the explanation of entertainment experiences. Particularly, two key concepts are related to our research. One is attentional involvement (Calvert 1994) that refers to perceptual focus on mediated information and the avoidance of stimuli that do not belong to the media offering, such as unrelated own cognitions or external cues that undermine the nonmediation experience, i.e., the phenomenon of audiences being "captured" by a medium. Particularly, Vorderer (1992) differentiates two levels of involvement: a distant, analytical way of witnessing the events presented by the medium (low involvement); and, in contrast, a fascinated, emotionally and cognitively engaged way of enjoying the presentation (high involvement).

Involvement acts as the antecedent to users' emotional response to the entertainment media, that is, enjoyment (Vorderer et al. 2004) - a "pleasant" experiential state that includes physiological, cognitive, and affective components. This state is also termed "pleasure" and considered as the "heart of media entertainment" (Vorderer et al., 2004). Bosshart and Macconi (1998) continued their dimensional analysis and subdivide pleasure into four sub-categories:

- (1) pleasure of the senses, as in the use of physical abilities, or in the experience of motor and sensory activity;
- (2) pleasure of the (ego-) emotions, as in evoking and experiencing emotions, or in mood-management;
- (3) pleasure of personal wit and knowledge, as in the use of cognitive or intellectual powers or competence in being able to use one's wit; and
- (4) pleasures of the (socio-) emotions, such as the ability to feel an emotion with and for others, to identify with others.

In the context of this paper, the second and fourth dimensions are the most relevant. Therefore, whether users can experience pleasant emotions - "having a good time" is the key determinant of their evaluation of the converged media - mobile entertainment.

2.5 Human-Computer Interaction Literature on Mobile Technology

HCI research recognized the attentional constraint of the mobile platform. For instance, Oulasvirta et al. (2005) discussed the fragmented nature of attentional resources in mobile HCI and pointed out that user interactions "on the move" usually happens in "bursts" like four to eight seconds. Also, users tend to shift their attention to environment several times during the delivery of content.

⁴ We thank one of the reviewers for bringing the distinction between IS usage experience and HCI user experience to our attention.

However, most of mobile entertainment applications, especially video and music, require a non-stop (i.e., linear) session to get users involved for the joyful experience – enjoyment. Thus, attentional constraints of the mobile platform can moderate user involvement and emotional response to the entertainment media. This is the key interaction we propose in our theoretical framework.

3. THE THEORETICAL FRAMEWORK FOR USER EVALUATION OF MEDIA CONVERGENCE

Building upon the theoretical foundations reviewed above, we propose a theoretical framework for user evaluation of media convergence – as mobile entertainment in the current research (See Figure 1). We already defined most of the key constructs in last section. So here we will focus on explaining the paths in the model.

We categorize entertainment media based on the time span of attentional involvement they create for end users. For instance, a full-length movie watched in theater has an involvement span of 100 minutes on average; a movie trailer of 90 seconds, a video music of 5 minutes, a TV program of 30 minutes, and a novel of the time for reading one chapter (and maybe more).

Proposition 1. *Different media content types create different time spans of attentional involvement to users when viewed on their original platforms;*

This proposition is readily supported by research on psychology of entertainment (e.g., Vorderer et al., 2004). When movies are viewed in theatres, TV viewed at home, or novels read in a quiet place, attentional involvement can be achieved for an optimal time span.

Proposition 2. *User attentional involvement determines the level of enjoyment a user derives from the entertainment;*

Again, this is an established relationship in media psychology. Involvement is a key prerequisite to the occurrence of entertainment experience (enjoyment). It captures the user's sense of being there, that is, of being transported to the site of the action, actually being there along with those who participate in the action while actually facing a screen. Enjoyment can thus be derived from this sensation of nonmediation (Biocca, 2001; Lee, 2004).

Proposition 3. *In digital convergence, the attributes of the new platform constraints the level and span of attentional involvement;*

This path is the key component of our theoretical framework. The platform-specific constraint on attention span may be caused by:

- (1) Usage Context, e.g., the mobile context with many interruptions and / or distractions;
- (2) Prior Usage Pattern with other applications, e.g., always making short voice calls with a mobile phone, or reading entertainment news with photos, and
- (3) User Interface, e.g., the small form of mobile platforms, media player interface.

As found in Mobile HCI literature, end users usually cannot concentrate on the content for long due to the above reasons. However, time is needed to create the optimal level of involvement so that enjoyment can be felt by end users. Consider the following user comments on Music Video⁵:

“I downloaded a music video yesterday to a Vodafone 3G mobile phone. The quality of the sound was fine. The image, given the small screen size, was adequate. But

⁵ <http://blogs.smh.com.au/entertainment/archives//003536.html>

watching the video in my outstretched hand while a crowd gathered around, I found myself losing interest after about 40 seconds.

In the end I couldn't bring myself to watch all three minutes of the video - besides sending me cross-eyed, it was annoying to stand there staring at the tiny screen. Does anyone actually enjoy watching music and television clips on small portable screens?"

This description illustrates that, though the quality of the converged content is acceptable as compared to the one on its original platform, the attentional constraint of the mobile platform (*the usage context - a crowd gathered around; and the small form factor of user interface – the tiny screen*) decreases the involvement level (*the outstretched hand & being cross-eyed*), which leads to less or even no enjoyment (*losing interests in 40 seconds and being annoying*).

Proposition 4. Emotional enjoyment determines user acceptance of 3G Mobile Entertainment Services;

Emotional enjoyment is one dimension of hedonic value that users derive from their consumption experience (Hirschman and Holbrook 1982). Both utilitarian and hedonic values are found as important dimensions of consumer attitude, which leads to purchase and usage behavior (Voss et al. 2003). Furthermore, in some situations consumers may choose hedonic options over utilitarian alternatives of the same product category (Dhar and Wertenbroch 2000). Also, Hedonic outcomes are also found as a determinant of Home PC adoption (Venkatesh and Brown 2001). Given that enjoyment is the central component of entertainment experience (Vorderer et al. 2004), we propose that emotional enjoyment is the most important factor that influences user acceptance of mobile entertainment, as compared to other possible determinants, such as utilitarian outcomes, social influence, etc.

4. CONTRIBUTIONS AND IMPLICATIONS

In this paper we outline a parsimonious framework for user acceptance of mobile entertainment as digital convergence. Integrating research on Information Systems and theories of Media Psychology, we take a unique approach to user acceptance of digital convergence – platform migration. Our key proposition is that the interaction between media types and the platform-specific constraints as the key determinant of user evaluation. Particularly, users' involvement in the media is determined by both the entertaining time span on the original platform and the attentional constraint of the new platform. The mismatch between the two spans can result in lower level involvement, which in turn cause no or even negative user emotional responses.

We summarize our theoretical contributions in the following.

We contribute to the literature on digital convergence by taking end users' perspective. The success of any digital convergence ultimately depends on if the converged media can create value to end users. Thus end user evaluation can be the key factor for devising competing strategies for digital convergence.

We enrich IS research on technology adoption with two contributions. First, examine user acceptance of a particular type of IT artifact – the converged media and unfold it into two layers, i.e., applications and platforms. We also theorize their interaction in the case of media entertainment. This approach sheds new insights into the psychological process of end user evaluation of digital convergence.

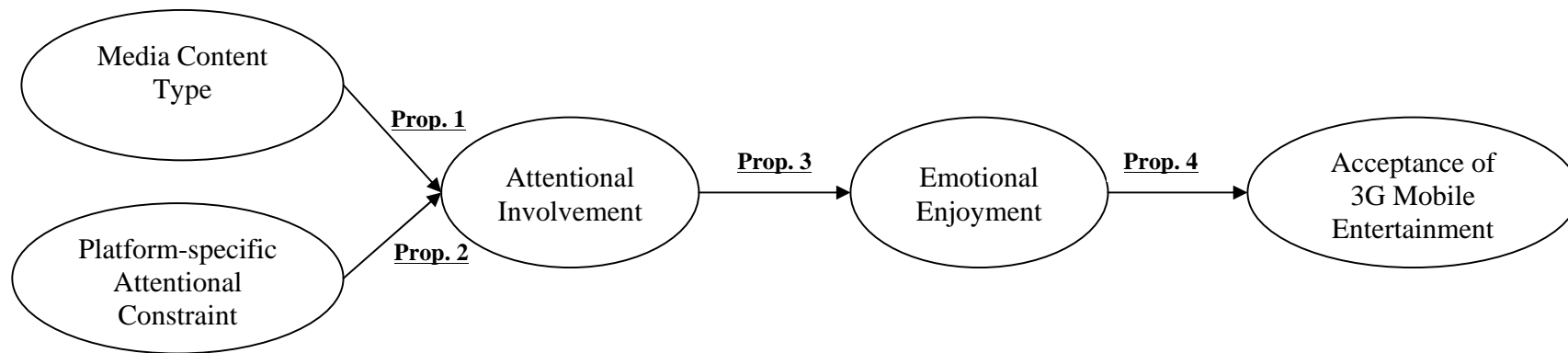


Figure 1. A Theoretical Framework for User Acceptance of Mobile Entertainment as Digital Convergence

Secondly, we study the experiential aspect of IT. Previous IS research defined and measured IT experience mainly as a skill, length of usage, or width of feature usage. We go deep into the course of usage process and propose that user involvement as a key determinant of their emotional response.

Digital Convergence is a pervasive phenomenon in the ICT industry (Yoffie 1997). In the mobile computing and communication sector, this issue is of paramount importance because it involves huge amount of investment on infrastructure and the survival and growth of business facing declining ARPU. Our research provides both strategic and design implications for players in the mobile value chain, especially for content integrators (e.g., mobile carriers) and content developers. We summarize below three key action points for practitioners to achieve optimal media convergence:

(1) Careful Selection of Existing Media for Convergence

To answer the question of “what are the right media that business players should choose for their convergence strategy”, practitioners should follow the basic principle of selecting entertainment contents that fit the attentional constraints of the new platform. Recently some mobile carriers have announced the introduction of full-length movies and long TV programs as new services. Our model cast doubts on the success of these initiatives because most mobile users cannot concentrate as long as the movie or TV program goes. The only possible outcome for users who try these services will be frustrated as described in the case of Video Music. In contrast, contents that can create arousal in a short burst may be more acceptable to mobile users, for instance, movie trailers, and short clips for exciting moment of sport events like goals in football or a fantastic round of tennis (as users can see clearly the scenes with 3G technology).

(2) Transformation of Existing Media for Optimal User Experience

Content developers may take into account the attentional constraints of the mobile platform when they design their offerings. Some design tactics have already been suggested by HCI researchers (e.g., Oulasvirta et al. 2005). For example, chopping contents into short clips and providing more controls during the content delivery, such as postponing, delaying, restarting, interrupting. However, the transformation must be done with the goal of user enjoyment. For instance, although movies can be chopped into short clips by 5 minutes to fit the short attention span, this may not lead to optimal user experience. The reason is that movies are edited by natural scenes as represented by changes of camera angle or changes of context / time. Naïve and simple segmenting may break the flow of these scenes, which results in negative user experience. Instead, movies should be cut into clips of short but also variable length based on film editing principles.

(3) Design for the New Platform

Finally, practitioners can also consider offering new forms of contents that are “made for mobile”. These forms of entertainment are designed from the very beginning to fit the new platform. For instance, recently Vodafone launched "24: Conspiracy", a new made-for-mobile drama inspired by the blockbuster Fox TV series "24". These “mobisodes” consist of a series of one-minute video clips that will evolve its own style, its own stars and possibly award categories in acting, writing, directing and editing. As the original '24' fills each 60-minute episode with a precise hour of action, so '24: CONSPIRACY' fills each 60 second mobisode with a parallel slice of cliff-hanging narrative⁶.

⁶ http://www.3gnewsroom.com/3g_news/jan_05/news_5414.shtml, we thank one of the reviewers for bringing this case to our attention.

5. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This paper focuses on mobile entertainment and use 3G video as an anecdotal case. In future research, our theoretical framework can be readily extended to the general digital convergence, i.e., other types of media and applications such as nonlinear and interactive media - video phone call, gaming, etc. This extension can be simply achieved by include all the dimensions of pleasure to the enjoyment construct. For instance, the social emotional response corresponds to video communications, while the pleasure from using wits can represents enjoyment from playing games.

However, our model still needs to be tested by empirical data. Case studies and focus group discussions are appropriate as the first step for gathering in-depth knowledge about “what constitutes good or ideal media convergence” and for validating our framework by mapping it to the cases. Well designed empirical studies, both surveys and experiments, can be implemented to fully test our propositions. Most constructs in the model can be readily operationalized by either psychometric method (e.g., Likert scales) or neurological method (e.g., heart rates). These require future work in the area.

Finally, our framework focuses on the experiential constraint aspect of the platform, but neglects the positive side – benefits provided by the new platform (e.g., mobility). Whether and when users make trade-off between the benefits and the constraints need further theorizing work. Another theoretical expansion is to consider the segmentation of end users. As suggested by Linda Stone, “continuous partial attention” is a common character of post-multitasking users who tend to shift their attention to the environment several times during the delivery of the content. Therefore, users accustomed to a work environment where attention continuously switches between the mobile device and the environment may find it easier to adopt or accept the interruptions associated with mobile entertainment. Users unaccustomed to such environments, on the other hand, may find it extremely frustrating and hence forgo the use of mobile entertainment media altogether⁷.

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⁷ http://radar.oreilly.com/archives/2005/06/supernova_2005_2.html, we thank one of the reviewers for bringing this point to our attention.

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