

# **Adoption of Mobile TV Services Among Early Users: Convergence of Familiar Technologies and Emergence of Technology Induced Paradoxes**

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## **Abstract**

*With the convergence of telecommunication infrastructures, computer technology, and media content services, mobile TV offerings have become feasible. Mobile TV offerings are defined as real-time broadcast transmissions of content to mobile devices. Research on early adopters suggests that 3Italia's Mobile TV offerings, the world's first nationwide DVB-H Mobile TV offerings, are experiencing increasing use, user preferences for time sensitive content, and user satisfaction with content. Our analysis suggests that from a user perspective, Mobile TV offerings represent a convergence of familiar technologies. The familiar nature of offerings may lead to emergence of fewer technology induced paradoxes than what has been found with other mobile services. We find that only two paradoxes appear relevant to Mobile TV use: empowerment / enslavement and engagement / disengagement. Future research must wait for a richer set of paradoxes emerging from a stronger consideration of broadcast technology and services. This paper contributes to innovation research on mobile services.*

## **1. Introduction**

In this paper, we define Mobile TV as real-time broadcast transmission of content to mobile devices.<sup>1</sup> Mobile TV has become feasible as television signals are receivable on a mobile handheld device. Despite regulatory hurdles concerning standards, frequencies, and licenses [e.g., 18; 21; 48], Mobile TV has been on a constant growth path [e.g., 19; 27].

Mobile TV builds on either Digital Video Broadcasting Handheld (DVB-H)<sup>2</sup> or Digital Multimedia Broadcasting (DMB)<sup>3</sup> as infrastructure

- <sup>1</sup> We are aware that broadcast transmission is technically and conceptually different from IP-based transmission. We also acknowledge broader definitions of Mobile TV as 'any video played on a mobile device' [48] offering content with which users are familiar from traditional broadcast television on newly developed mobile devices [29; 39].
- <sup>2</sup> DVB-H broadcasts signals at frequencies below 3GHz using a hybrid architecture involving satellites for global transmission and complementary terrestrial stations for cell coverage [13]. It extends general DVB specifications to the requirements and constraints of handheld devices.
- <sup>3</sup> DMB (e.g., rolled out nationwide in South Korea) broadcasts signals between 174 and 216 MHz using both satellites and terrestrial stations. It is capable of transmitting audio, video, and plain data.

technology. User subscriptions of DVB-H-based Mobile TV are estimated to increase globally from 11 million in 2006 to 171 million in 2010 [e.g., 7]. Similarly, Mobile TV revenues from those subscriptions are expected to reach €10 billion by 2010 [e.g., 1; 30; 31].

Mobile TV represents a trend of an increasing convergence of telecommunication infrastructures, computer technology, and media content services - a development which facilitates mobile services beyond simple voice and data connections [5; 14; 33; 50]. Whereas some literature sources [e.g., 4] distinguish between mobile services and advanced mobile services, we refer to the mobile services for all such offerings.

Illustrating the effects of convergence, Mobile TV offerings typically build on media content that originates in creative industries [51]. It involves 'old media' content in a 'new media' transmission context, which implies altering relationships between existing technologies, industries, and markets [e.g., 26].

Researching Mobile TV, Rautio et al. [42] take an economics approach and investigate suitable pricing strategies. Marilly et al. [36] focus on the personalization of Mobile TV. Through a media management lens, Chan-Olmsted [6] identifies the need for mobile content, and Hu [23] explores the diffusion of Mobile TV.

Mobile TV offerings are primarily oriented towards private personal use rather than organizational use. However, such private personal use can still occur in professional environments such as the workplace rendering relevant the existing literature on mobile services for professional use in organizations [e.g., 3; 24; 49]. Hence, in this paper, we draw upon the literature related to mobile services for professional use.

According to Jarvenpaa and Lang [24], who study mainly mobile services with a professional focus, the use of mobile services implies technology induced paradoxes, which potentially constrain the user experience.

Such technology induced paradoxes describe a post-modernist consumer society in which consumers are confronted by multiple and conflicting consequences from the consumption of products and services that provide them with useful benefits but also enjoyment in using them. At some times, consumers reject their usefulness and enjoyment because of a fear of being overwhelmed by the technology. Such conflicting emotional responses give rise to technology induced paradoxes [37]. Among the information systems researchers, Orlikowski [40] and Chinn [8], for example, discuss the paradoxical nature of

information technology. In a paper debating IS research directions, Robey and Boudreau [45] call for IS research efforts that explicitly address the ambiguities that result from information technology (IT) rather than eliminate contradictions for methodological convenience.

In this paper, we extend technology induced paradoxes to Mobile TV offerings based on broadcast transmission. We investigate Mobile TV use in the light of the more general discussion of mobile services. We draw on 3Italia, Italy's third largest mobile telecommunication network provider, and its Mobile TV offerings, the first nationwide DVB-H ones worldwide. In May and June 2007, we collected data from eight in-depth interviews covering 3Italia's Mobile TV services and their use. In addition, to account for the user-centric nature of technology induced paradoxes, we attended two market research sessions to gather explorative qualitative user data which provided us with a first basis for interpreting user technology interaction.

The remainder of the paper is structured as follows: In Section 2, we provide a brief overview of mobile services, define and describe mobile services and point to some literature streams on mobile services. In Section 3, we then introduce technology induced paradoxes [24]. In Section 4, we portray Mobile TV as specific mobile services and, in Section 5, we present 3Italia's Mobile TV offerings. We discuss Mobile TV use with regard to the previously introduced technology induced paradoxes in Section 6. In Section 7, we conclude with a brief summary and an outlook.

## 2. Mobile Services

Mobility is narrowly defined as independence from geographical constraints [e.g., 34]. With regard to human interaction, a broader social definition includes spatial, temporal, and contextual mobility as dimensions [28]. Spatial mobility covers the mobility of objects such as smaller handsets to be carried along and the mobility of symbols such as mobile services to be received when on the go [32]. Mobility facilitates a shift in user expectation from "wherever and whenever to right here and now" [29, p. 1].

According to the National Telecommunications and Information Administration [38], mobile services can widely be defined as a "radio communication service(s) between mobile and land stations, or between mobile stations". Zhang and Zheng [53, p. 170] define mobile services as "service(s) that (are) available through mobile radio access at anytime and anywhere possibly through heterogeneous mobile devices". Jarvenpaa et al. [25] take a more restrictive

approach requiring mobile services not only to be ubiquitous and mobile, but also personalized.

Mobile services definitions cover a variety of specific services; we point to four distinctions:

- ***One-to-one Mobile Services vs. one-to-many Mobile Services.*** Especially personalized one-to-one mobile services require a point-to-point connection [53], whereas one-to-many mobile services directed at a collective use a broadcast or point-to-multipoint transmission concept [41].
- ***Application Mobile Services vs. information Mobile Services.*** Application mobile services allow users to accomplish certain tasks by sending requests and by processing and storing data; they offer productivity enhancements. In contrast, information mobile services provide users with information or entertainment [4].
- ***User-controlled Mobile Services vs. user-received Mobile Services.*** User-controlled mobile services put the user in control of what the services deliver and require a certain degree of interactivity [3], whereas user-received mobile services assign their users a purely receptive role without, or with only very limited, interactivity.
- ***Software industry Mobile Services vs. media industry Mobile Services.*** Typically, software industry mobile services with an application core emerge from the software industry [2], whereas media industry mobile services with an information or entertainment core originate in creative media industries [12; 17].

Similar to the variety of mobile services, the literature follows several distinct streams: A technology-oriented stream asks how to enable and secure mobile services on the network, handset, or application level [e.g., 10]. A governance-oriented literature stream focuses on the emergence of standards as enablers of mobile services [e.g., 52; 50]. Yet another literature stream integrates technological, economic, and sociological aspects to explain the adoption and diffusion of mobile services [e.g., 5]. Closely related to the latter is a stream on the innovation of mobile services [e.g., 14]. Gao and Damsgaard [20] propose a framework integrating innovation approaches with an adoption and diffusion lens.

Yet, another literature stream on mobile services investigates the quantity and quality of use, the user experience, and implications for the individual [e.g., 4; 24; 25; 35; 53].

### 3. Technology Induced Paradoxes

In the stream concerned with the use and user experiences of mobile services, Jarvenpaa and Lang [24] and Jarvenpaa et al. [25] introduce eight technology induced paradoxes, which potentially constrain the user experience (see Table 1). The understanding of technology induced paradoxes is critical as they help to shed light to the user's cognitive and emotional responses which in turn shape the perceived value and hence the adoption and diffusion of the service. Compared to many products, services distinguish themselves in the sense that satisfaction unfolds over time, resulting from a dynamic user-service interaction process. Particularly with mobile services, the interaction process does not only depend on users' own responses to the technology but to a larger extent on other users. Users carry the services with them and show them to others. This promotes collective learning that shapes users' perceived value [44] and subsequently adoption and diffusion.

Mobile TV presents an interesting case to study technology induced paradoxes. Mobile TV results from the convergence of existing telecommunication infrastructures, computer technology, and media content services. Technologies and services that represent themselves as a combination of familiar services may reduce the presence of paradoxes. As users have already developed coping strategies for the familiar services, they will rely upon them in using the convergent technologies and services. This argument is based on the notion that it is largely the novelty in new services that gives rise to uncertainty in appreciating new technologies. Uncertainty largely relates to new competences that would be needed to reap the usefulness and enjoyment of the technology. It is the level of uncertainty that gives rise to paradoxes. Convergence of familiar technologies may reduce this appearance of novelty and hence uncertainty and consequently induce fewer paradoxes.

**Table 1. Technology induced paradoxes of mobile services [Source: 24]**

Paradox	Description
Empowerment / Enslavement	Users of mobile services are <i>empowered</i> by the newly gained, spatial mobile technology induced freedom. They can supervise and control their personal and professional environment. However, due to being continuously available, users feel <i>enslaved</i> . On their mobile handset, they can be reached at any time by anyone. The location of the user can also be observed. Continuous availability on one device under one number blurs the border between work time and free time.
Independence / Dependence	Benefiting from the capabilities provided by mobile handsets, users also become <i>independent</i> from other previously needed tools and instruments and independent from geographical constraints. Users become <i>dependent</i> on their mobile handset in performing a variety of tasks. Further, users are dependent on their mobile handsets to meet availability expectations raised by others.
Fulfilling Needs / Creating Needs	Users turn to mobile services to fulfill their needs. They perceive mobile services as problem-solving. With the variety of additional opportunities available, users are also confronted with new emerging needs in terms of quantity and quality.
Competence / Incompetence	Mobile services provide users with new <i>competencies</i> to accomplish previously impossible tasks. In contrast, users experience an <i>incompetence</i> concerning the use and configuration of mobile services due to the complexity of the services. Users experience incompetence in multi-tasking. They cannot simultaneously use mobile services and accomplish other tasks that require their focus.
Planning / Improvisation	With mobile services, users can better <i>plan</i> their activities and adjust existing plans. The availability of services also allows users <i>improvising</i> and hence omitting time consuming and costly planning efforts. As users cannot efficiently coordinate improvisation, they suffer from the threat of disorganization.
Engagement / Disengagement	Based on interactivity, users can exploit mobile services to <i>engage</i> in social discourses. They can draw on information or entertainment content from mobile services as object of social discourse. Users also suffer from <i>disengaging</i> effects. By shifting their attention from social discourses to mobile handsets, they increasingly disengage from their social environment. Such distraction can lead to a break of social ties.
Privacy / Public	Users redraw their <i>privacy</i> boundaries. Encounters with mobile services concerning private issues increasingly occur in <i>public</i> spaces, extending the perceived boundaries of privacy. Users potentially suffer from private information leaking to the public. Also, they potentially disturb the privacy of others.
Illusion / Disillusion	Users believe in the ubiquity of mobile services, which requires full network coverage and redundant systems to support many users at the same time. However, users are often <i>disillusioned</i> by physical or technological constraints hampering the ubiquitous availability of mobile services.

#### 4. Mobile TV Offerings as Mobile Services

Based on the broad definition of mobile services as "service(s) that (are) available through mobile radio access at anytime and anywhere possibly through heterogeneous mobile devices" [53, p. 170; see also Section 2 of this paper], we regard Mobile TV offerings as mobile services with specific characteristics (see Table 2). Hence, we consider it worthwhile to subsequently investigate the use of

Mobile TV – along the case of 3Italia's Mobile TV offerings – in the light of technology induced paradoxes [25]. We pursue this research direction, even though the mobile technology induced paradoxes were written with a definition of mobile services (requiring service personalization) in mind that - for now - would not include Mobile TV offerings.

**Table 2. Mobile TV offerings as mobile services**

Mobile TV Offerings as Mobile Services	
One-to-many Mobile Services	Mobile TV defined as 'real-time broadcast transmission of content to mobile devices' uses 'one-to-many infrastructures' such as DVB-H and DMB. DVB-H - with promotion by the European Commission [47] – seemingly becomes the standard in Europe, whereas DMB plays a larger role in Asia, especially South Korea.
Information Mobile Services	Mobile TV offerings neither provide users with the ability to solve tasks by requesting, processing, or storing data, nor do they enhance users' productivity. Instead, Mobile TV broadcasts predefined content to inform and entertain users.
User-received Mobile Services	Mobile TV allows users only little control by letting them select a channel and tele-vote with regard to operator-controlled issues. It puts users in a receiving role.
Media Industry Mobile Services	Mobile TV develops as result of converging industries. But it has its origins in TV content and TV program structure, both often related to traditional media brands.

## 5. Mobile TV: The 3Italia Offerings

3Italia's Mobile TV offerings present the first nationwide ones in Europe and the first DVB-H ones in the world; only South Korea's DMB-based offerings were available nationwide before 3Italia went to market.

**3Italia.** 3Italia is the third largest mobile network operator and the Italian 3G market leader. 3Italia is largely owned by Hutchison Whampoa Group (95.4%), a Hong Kong based company. After being awarded a 3G license in 2000, 3Italila was first renamed Hutchison 3G (H3G) Italia in 2001. In 2002, 3Italia as a brand then replaced H3G before actually initiating 3G offerings in the Italian market. In 2004, 3Italia launched the first Mobile TV offerings via its 3G network. In 2005, it recognized the technological development of DVB-H as an opportunity for its Mobile TV offerings. Hence, it built the necessary DVB-H network infrastructure for €160 million and obtained licenses with the acquisition of Canale 7. 3Italia integrated DVB-H with its 3G infrastructure.

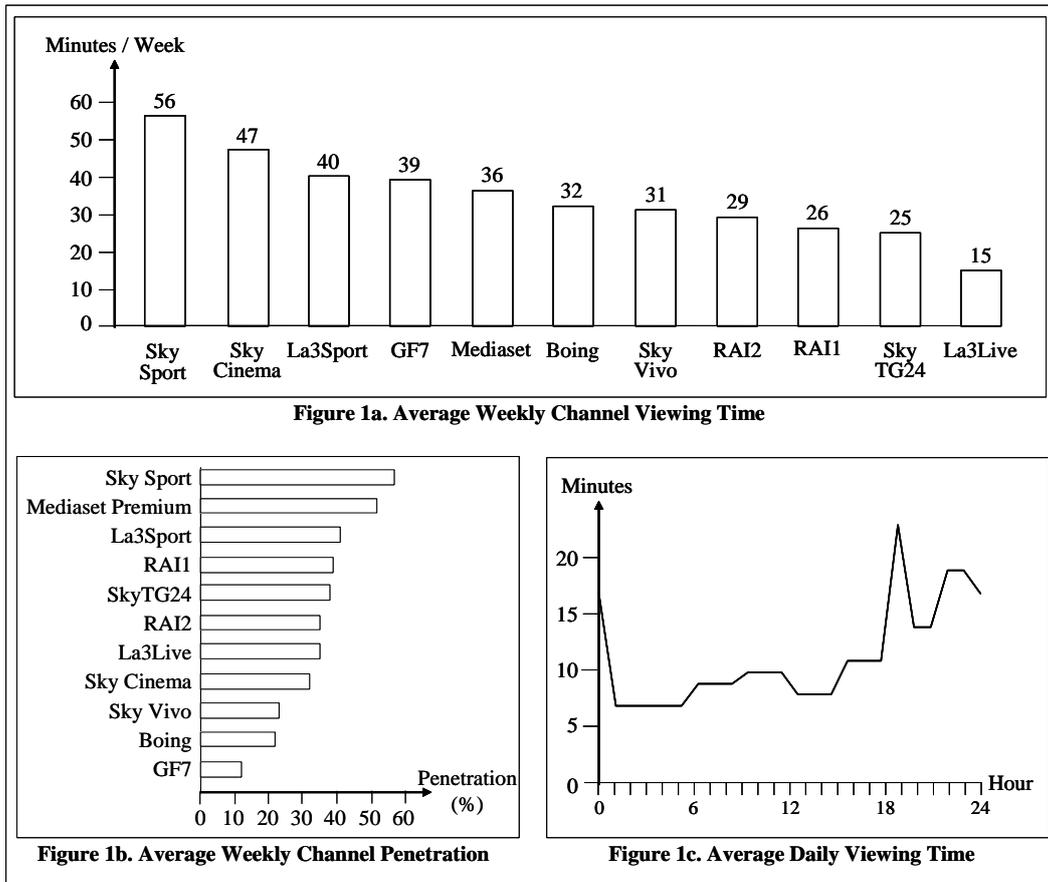
In 2006, with its 7.1 million 3G users, it controlled 44% of the Italian 3G mobile market. 3Italia positions itself as 'Mobile Media Company', providing its users with video, games, music, and TV on top of voice and data service. It follows a strategy of convergence, combining voice, data, and media services all provided through a single mobile handset [e.g., 16].

**3Italia's Mobile TV Offerings.** After starting its Mobile TV offerings in June 2006, 3Italia gathered its first 100,000 users by August 2006 and reached 400,000 by March 2007. At that time, it controlled more than 30% of the Italian DVB-H Mobile TV market [16].

3Italia's basic Mobile TV package includes news, entertainment, and sports. The content is provided through two 3Italia channels, La3 Live and La3 Sport, two public channels, RAI1 and RAI2, Mediaset, and four Sky Italia channels, Sky Sport, Sky Vivo, Sky Cinema, and Sky TG24. Four premium Mobile TV packages additionally offer cartoon channels, soccer channels, a reality channel, and adult entertainment channels. Mobile TV packages are available with tariff plans reaching from daily arrangements to 24-month contracts at monthly rates of about €29 for a common package. A common package includes the basic Mobile TV package, one gigabyte monthly data traffic, a mobile community account, and 60 minutes of free voice services per day. Additional premium Mobile TV packages can be purchased at prices starting at €3. To use 3Italia's Mobile TV offerings, users need DVB-H capable handsets. Users can select from various handsets that support real-time tele-voting and provide a 320x240 pixel resolution on a 2.2 inch screen.

**Use of 3Italia's Mobile TV Offerings.** 3Italia has a heterogeneous DVB-H user base. In 2007, about 75% of 3Italia DVB-H users were men aged between 25 and 44 years. Users mainly reside in the northern and central regions of Italy and are living in large cities. They clearly differentiate from other population groups in terms of TV use [11; 15; own interviews].

Users watch Mobile TV when away from home. Almost 60% of users watch Mobile TV predominantly outdoors and 28% watch Mobile TV generally in- and outdoors. Most users watch Mobile TV in their professional environment (workplace 38%; university and school 4%), on transits (while walking around 35%; while traveling 28%; while using transportation means 14%), and during social activities (being at a friend's house 8%; at a bar or daily 7%; at a restaurant



**Figure 1. Mobile TV use by 3Italia users surveyed Sep. '06 – Apr. '07**  
 [Source: 15; 16; own calculations]

6%; at a pub or discotheque 3%). They also watch Mobile TV when waiting in public places [11; 15; own interviews].

Most 3Italia Mobile TV users are highly satisfied with the available Mobile TV channels (82%-93%) and the available handsets (90%). 3Italia reports an ARPU of €60 for Mobile TV users compared to an ARPU of €100 for 3Italia non-Mobile TV users [15; own calculations].

3Italia Mobile TV users show a distinct preference for time-sensitive content. Both viewing times and weekly penetration data support user preferences for sport content (see Figures 1a and 1b). Users prefer watching live sport events over receiving only results – even if live. Although news content, similarly time sensitive, is not among the top channels in terms of viewing time, news channels and news-oriented public TV are among the top channels in terms of channel penetration. The discrepancy may be explained with the different time requirements of sport and news content. A sport event, such as a 90-minute soccer

match, requires more viewing time than a 15-minute news broadcast.

Earlier assumptions regarding Mobile TV [e.g., 46] imply that long shots are hard to watch on small screens and lengthy programs are hard to follow with only short mobile attention spans. However, it appears that – across channels and content genres – users do not require content to be specifically adapted for Mobile TV. Users accept traditional content on mobile handsets. Thus users allow TV content producers and distributors licensing readily available content with little additional cost and pursuing penetration pricing strategies. Further users are generally familiar with channel names, content types, and schedules; hence there is hardly any need to specifically promote programs broadcasted on Mobile TV.

3Italia Mobile TV users watch an average of thirteen minutes of Mobile TV per hour; they especially switch on Mobile TV just before dinner and in the evening hours (see Figure 1c). Overall, they watch Mobile TV close to eight and a half hours per

week. To put the number into perspective, total weekly media consumption has increased from 50 to about 60 hours between 1980 and 2000 and is expected to reach 90 hours by 2020 [27; 31].

## 6. Mobile TV Use in the Light of Technology Induced Paradoxes

This section investigates the use of Mobile TV in light of the eight technology induced paradoxes of mobile services identified by Jarvenpaa et al. [25]. It draws on the case of 3Italia and technical DVB-H characteristics.

- **Empowerment / Enslavement.** Similar to other mobile services, Mobile TV *empowers* users by providing them with more timely information and by entertaining them at times previously not common for TV entertainment [34]. Especially given the information content, it allows users better decision making. Without Mobile TV, appointments and activities away from home usually determine the end of TV consumption. At the same time Mobile TV *enslaves* users even when away from home. Especially the complementarity of stationary and Mobile TV, supported by the provision of identical programs, tempts users to finish a specific program on the mobile handset when leaving the house. 3Italia users frequently watch Mobile TV during the day and during professional activities. Hence the TV program structure increasingly influences people's work and private activities.
- **Independence / Dependence.** Mobile TV increases users' independence as it resolves some spatial constraints. It neither requires users to be at home nor indoors for watching TV [28]. Use locations and total viewing time of 3Italia's Mobile TV offerings present evidence for the newly gained spatial independence. Further, Mobile TV increases *independence* from the physical object, the TV set, which has limited portability. With the remaining linear program structure and hardly any on-demand capabilities, as in 3Italia's Mobile TV offerings, Mobile TV does not increase temporal independence. Most 3Italia Mobile TV offerings are identical to the TV programs on regular TV sets at home. Hence, Mobile TV does not appear to increase user *dependence* at the current time. Only 3Italia's content which is exclusively produced for Mobile TV may create some user dependence.
- **Fulfilling Needs / Creating Needs.** Mobile TV is not perceived as a problem solving nor as a

productivity-enhancing tool. It primarily targets the *fulfillment of needs for mass information and entertainment*. Given the infrastructure constraints of broadcast distribution, Mobile TV allows only for limited interactivity. Thereby it rules out program distribution upon requests by single users. Hence, users of 3Italia's Mobile TV offerings have hardly any influence on the content offered. The only exceptions would be program decisions taken via tele-voting, but in the case of 3 Italia they are not (yet) part of the service portfolio. Once Mobile TV will be taken for granted, it could be assumed to *create a 'need'* for more channels and higher display resolutions. However, this should be reflected in user dissatisfaction which is not an issue for 3Italia's Mobile TV users.

- **Competence / Incompetence.** Mobile TV offerings are information (and entertainment) mobile services, not application mobile services. They provide users with more information and entertainment, but barely with additional *competencies*. This is typical for offerings originating in the creative- or media industries. Further, infrastructure characteristics basically exclude that Mobile TV enhances competencies (possibly beyond media literacy). 3Italia's Mobile TV packages do not include programs that focus on competency building such as language training. In addition, Mobile TV barely involves complexities concerning the user interface; 3Italia does not offer new content genres or formats that could potentially lead to an impression of *incompetence*. However, Mobile TV may distract users from other simultaneously conducted activities; and, due to limited user multi-tasking inability, it may cause some coordination incompetence.
- **Planning / Improvisation.** Mobile TV offerings, due to their nature as information mobile services, do not involve additional *planning* capabilities. The technical characteristics of DVB-H broadcasting do not allow for application mobile services that are conditional to performing planning tasks. Similarly, Mobile TV is not an active user *improvisation* tool in the sense described by Ciborra [9].
- **Engagement / Disengagement.** Mobile TV provides users with information that allows them to *engage* in social discourses. At the same time, 3Italia users, with their passive TV reception in locations and during activities previously

associated with social discourses, potentially *disengage* from their environment. Especially the use of 3Italia's Mobile TV offerings in bars, restaurants, or even discotheques supports the argument of disengagement. Mobile TV can be compared to the use of mobile devices for work purposes where Soerensen and Pica [49] state that police officers who use mobile devices may be distracted from their opponents in situations that typically require physical engagement.

- **Privacy / Public.** Different from personalized services, one-to-many Mobile TV offerings do not touch many sensitive *privacy* issues in the sense of spreading personal information to the public. However, few privacy issues remain. Mobile TV offerings threaten the privacy of adult entertainment users, whose private media interests may become observable and traceable. However, adult entertainment use may – due to limited handset screen size – remain unrecognizable by others and hence not cause privacy issues. Interestingly, Mobile TV users even turn to their mobile devices at home in order to assure private viewing [39]. Besides affecting the privacy of users, Mobile TV, when used in *public*, can potentially disturb others. Watching 3Italia's offerings in bars, restaurants, busses, and trains has some, potentially negative, impact on others.
- **Illusion / Disillusion.** Mobile TV promises users the *illusion* of ubiquitous availability. Especially for broadcasted TV content, undisturbed, continuous signal reception is conditional to a positive user experience. As technology and network infrastructure are reliable, however, Mobile TV does not leave its users *disillusioned*. Combined satellite and terrestrial signal transmissions cover white spots known from other transmission technologies. Time-slicing technology flattens short signal interference. Mobile TV user satisfaction in the 3Italia case supports the reliability of ubiquitous service availability and refutes the argument of disillusion.

The analysis of existing research along with our own interviews suggests that only two (of the eight) technology induced paradoxes may play a role with regard to Mobile TV. We offer recommendations to tackle the risks of conflicting effects of Mobile TV use.

- The *empowerment / enslavement paradox* applies and influences Mobile TV users. The continuous availability of information and content empowers

users. In order to benefit from the empowering effect without suffering from the opposing enslaving effect, Mobile TV users need to develop protection schemes. Through self-discipline and limits to scheduled viewing times, they can benefit from the information availability and the entertainment qualities. Thus, Mobile TV users can avoid having their Mobile TV always switched on and thus becoming enslaved to it.

- Also, the *engagement / disengagement paradox* applies and has an impact on Mobile TV users. They need to withstand the continuous temptation of engagement in Mobile TV to prevent counterproductive disengagement. Some specific Mobile TV use such as watching the latest sports results could be strongly engaging with limited time-consuming, disengaging counter-effects. However, even just short Mobile TV use in critical situations such as driving a car in heavy traffic could have a strong negative impact resulting from disengagement. In situations with potentially dangerous disengaging effects, Mobile TV use may require regulatory bodies to take action. In many European countries, Mobile TV use while driving a car is already penalized under the overall ban of telephone use. Where that is not yet the case, regulatory bodies should establish similar rules soon.

As technology paradoxes potentially cause stress and anxiety [22], they may lead to conflicting effects, possibly even limiting technology adoption [43]. Similarly, technology induced paradoxes could trigger conflicting effects and hinder the adoption and diffusion of mobile services.

However, in the context of Mobile TV offerings, only two of the eight technology induced paradoxes appear to be relevant among early users. The technology seems to be free of incongruent effects, which suggests a possibly uninhibited and smooth adoption and diffusion of Mobile TV.

Beyond the scope of this paper, it remains to be seen whether and which mass media-induced paradoxes are also relevant to Mobile TV and how they impact user behavior and ultimately adoption.

## 7. Summary and Outlook

Due to the convergence of telecommunications infrastructures, computer technology, and media content services, Mobile TV offerings have recently emerged and are an increasingly important sector of the fast growing mobile services. In addition to mobile-exclusive content, they provide users with some of the same TV channels available on the

traditional TV sets at home. Overall Mobile TV users increase their total media usage through Mobile TV; they prefer time sensitive content, and they do not require specific handset-optimized content for their Mobile TV experience.

The analysis of technology induced paradoxes shows that – in the context of Mobile TV – only two of the eight, empowerment / enslavement and engagement / disengagement, may play a role. That finding suggests that the convergence of familiar technologies may result in comparatively congruent effects and a rather unhindered Mobile TV adoption and diffusion. Attention by users and regulators to a few rather basic recommendations regarding the risks of enslavement and disengagement should even further mitigate paradoxical effects of Mobile TV.

Future research may want to investigate which additional paradoxes originating in the mass media become relevant in the context of Mobile TV and how they impact adoption. It may also want to analyze in more detail whether and to what extent convergence of telecommunications infrastructures, computer technology, and media content services also leads to a convergence of traditionally distinct user behavior in mass and personalized communication.

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