# Content for Mobile Television: issues for a new mass medium within today's ICT environment.

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## 1. INTRODUCTION: Mobile Television, another convergence exponent…

Mobile and television technologies are probably among the most prominent industries of the converging Information and Communication Technology (ICT) environment today (Ahonen & O'Reilly, 2007, p. 75-93). Mobiles already converged with camera, radio, mp3, personal digital assistants (PDA) and gaming technologies, and the digitalization also brought the realm of TV on new territories with the advent of IPTV (Internet Protocol Television) and digital television. Today, many providers believe that television itself is headed for convergence with mobile technology and services.

Mobile manufacturers and service providers have had to cope with saturating markets recently. Because many countries in Asia and Europe have reached a mobile subscription rate close to (or even over) 100% penetration (Netsize, 2007, p. 10), mobile operators are entering a new phase in which not only the number of new subscribers is low, but also the average revenue per user (ARPU) is declining (Andersson, 2005, p. 3). Therefore, operators need to find new sources of revenue. Many operators[1] are betting on broadcasting mobile TV becoming their newest "cashcow" and providing opportunity to create a new kind of 'mobile multimedia'. This evolution would enable the operators to increase the ARPU by opening up the market potential of media industries (Södergard, 2003, p.15; van den Dam, 2006, p.1; Urban, 2007, p. 48).

Traditional television business models on the other hand, are challenged by a fragmentization of public and proliferation of new video and TV broadcasting technologies. For the television industry, mobile television would mean a new distribution channel for their content (Urban, 2007, p.48) and the possibility to reach new audiences (Södergard, 2003, p.3) as well as to reach the traditional evening peak time audience at other times of the day (Digitag, 2005, p.10).

Clearly, the converging of mobile services and television could be considered the 'logical next step'. Illustrative of the prodivers' belief in mobile television as the new convergent medium exponent is the recent proliferation of trials and commercial rollouts. Already in 2004, one of the first commercial trials took place in Berlin. From 2005 onwards, several [or do you mean most?!? How many exactly?] European countries followed this example. Some of these trials included

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[1] e.g. Vodafone, Telefonica, Orange, Bouyges, SFR, …

user and market research[2], but most trials were merely focused on testing of transmission technology[3]. Outside Europe, technology-oriented mobile television trials also occurred, again testing transmission protocols. In Belgium, a pilot-project was started in 2006[4]: 'Maximizing DVB-H Usage in Flanders' (MADUF).

Despite the common-sense necessity of more user-centric research and development, the user is still too much overlooked in today's mobile television trials. Because content was 'king', or at least one of the most important determinants for the success or failure of many other new media technologies, such as HDTV, SACD, CD-I, WAP, … (Bouwman et al, 1994, p.31; Wallace, 199, p.25) content will undoubtedly also be a decisive determinant of success for mobile television. However, research into what is compelling mobile content, or at least which kind of content will be needed for a successful introduction of mobile television, is lacking in most trials to date. In other words, the current wave of trials is not user-centric enough. In the context of the preparation of the Flemish mobile TV trial MADUF, we aimed for a valuable basis for more user- and content-centric approach by incorporating a meta-analysis of trial results and the results from an expert panel and user survey.

### 2. Mobile television

As the exponent of the convergence of two of the most widespread technologies, few will have difficulties to catch the meaning of the 'mobile television'-concept. Television is literally going mobile: coming loose from a fixed place, consumable anytime, anywhere on a mobile device (Södergard, 2003, p.15), thus allowing to truly personalize the viewing experience (van den Dam, 2006, p.2). Surely, mobile television already existed as a rather marginal technology, based on analogue terrestrial transmission. Technological innovations now offer a digital image quality and the possibility of reception on a commodity device that people always tend to carry with them: their mobile phone. These two benefits allow to consider mobile television a new and innovative technology, whereas the analogue mobile television should be seen as an early predecessor.

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[2] Finland: Finnish mobile tv pilot group, 2005; Holland: Konijnenberg, 2006; Spain: Mestre, 2006; France: Médiamétrie, 2006; UK: Mason, 2006;…

[3] e.g. Rai Turin trial, Italy: Morello, 2006; France, TDF-trial: Pauchon, 2006;…

[4] This project is carried out under the wings of IBBT and includes some of the most important media and telecommunications companies in Flanders (e.g. Telenet, Belgacom, VRT, Siemens, …). The data in this paper are the result of research that we conducted in this project. The MADUF-project studies the possibilities of mobile television using the DVB-H technology and runs from January 2006 till March 2008.

Essentially, there are three ways in which live streams and on-demand programs can be delivered to mobile handsets. First of all, via the mobile network itself (e.g. UMTS), secondly by satellite (e.g. DBS) and thirdly by terrestrial digital TV (e.g. DVB-H[5], DMB,...). Due to issues with bandwidth and high costs (Feldmann, 2005, p.65-68; Carey, 2006, p.123) the former option has in many cases died a silent death, at least in terms of live streaming. DBS-reception of television is a technology used for moving vehicles such as ships, trains, airplanes and cars, buty is not suited for reception on a small mobile device (cf. Eom et al., 2007; Hules et al., 2005; Lee et al., 2003; Price, 2003; Wang & Winters, 2004). Within the mobile terrestrial digital TV offer, various competing technologies (DVB-H, T-DMB, MediaFlo,...) have emerged and are contending for commercial deployment[6]. The introduction of commercial broadcast services, in Italy for example, seems to be the precursors for a broader development in this field (Strohmeier, 2006, p.4). Research, conducted by Informa (2005), predicts that DVB-H will be the leading technology for mobile television. Most European trials made use of the DVB-H technology, and this is also the chosen transmission technology for the Flemish MADUF-trial.

Before elaborating on mobile (broadcast) television, it seems appropriate to situate 'mobile television'. Some authors (Carey, 2006; Feldmann, 2005 & Goggin, 2006) consider mobile television as one of the many mobile services. Vesa (2005, p. 6) provides a useful distinction between the various typologies of mobile services, each with their own basis for categorization, and uses them to come to a typology of mobile services consisting of three broad categories of services: conversation, content services and data access. The first conversational category is divided once more into mobile voice (e.g. voice calls, push-to-talk) and into person-to-person messaging (i.e., non-voice conversation services such as sms, mms, e-mail, chat and instant messaging). The second category of mobile content services includes SMS- and MMS-based content services, browser-based content services, and downloadable applications. The third category is called mobile data access, and refers to various kinds of transfer methods available for using the mobile services described in the two previous categories (e.g. GSM data, GPRS, CDMA, EDGE, UMTS…) (ibid., pp. 7-8). As this typology does not mention any sort of mobile TV, we can place it both in the second category (i.e. mobile TV as a content service) as in the third category, mobile data access. In the latter case we refer to the technological aspects of mobile broadcast TV (e.g. technologies such as DVB-H, DBMS, MediaFLO…).

Other authors consider mobile television as 'television going mobile'. From this perspective, mobile television becomes more than just a mobile service: it is regarded as a new and distinct mass medium. Wood (2006) distinguishes five gen-

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[5] DVB-H is the mobile extension of the DVB-T transmission protocol.

[6] For more technical information regarding these different technologies, we can recommend the following papers: Sieber & Weck (2004), Kornfeld & Reimers (2005), Scheide (2005), Faria (2005) and Pekowsky & Maalej (2005).

eral reasons why one consumes media: identity-building, share an experience with others, diversion, information and multi-tasking. He states that each of these 'reasons' should be fulfilled in order to be considered a successful mass medium. Orgad (2005) mentions the following six benefits for mobile TV: 1) flexibility, independence and a sense of security and 'being part of', 2) enhanced personal and intimate viewing experience, 3) seeking time and location-sensitive information, 4) filling empty time, 5) do-it-yourself: creating personal content and 6) mobile intimacy, networking, fandom and boosting love life. In this view, it can be argued to consider mobile TV a new mass medium with its own content and usage modalities. Ahonen & O'Reilly (2007, pp. 80-86) explicitly state that mobile television should be seen as the seventh mass medium, with abilities beyond the six other mass media[7].

### 3. Importance of Content

A first requirement for a successful technology is a well functioning technology. This explains the focus on technological performance in technology development processes and a majority of the mobile TV trials, and the lack of user-centric research and content offering. As is the case with most disruptive technologies, the first consideration for mobile broadcast TV has to be technological. Indeed, a new technology is doomed to fail, when it cannot deliver a stable and user-friendly (i.e. easy to learn and easy to use) product. For mobile TV, this translates well in many of the trials for which the sole purpose was to test the feasibility of the chosen technology and to assess whether 'Mobile TV could be done' (Carlsson & Walden, 2007). The content shown on the available channels was in most cases not subject to research of any kind, but simply providing some existing linear TV channels.

However the success of a new technology such as mobile TV is dependent on more factors than the technological aspect alone. Nolan and Keen (2005) distinguish some other impacting factors such as the competition between rival standards, the absence of regulatory frameworks and particularly in Europe the absence of a clear-cut spectrum allocation. Even when these factors are taken into account, we still confine ourselves to the critical success factors on a macro level of supplier related factors.

Hence, it is of the utmost importance for new technologies to also take into consideration the user centred factors on a micro level. Failures of recent technologies such as WAP and CD-I and the 'battle of standards' for VCR (VHS versus Betamax) or the newest DVD-generation (HD-DVD *vs.* BluRay), learn that the availability of desired content possibly has become one of the most crucial factors that determine the success of a new technology (Wallace, 1999). The adage

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[7] The six other mass media, according to Ahonen & O'Reilly: print, recordings, cinema, radio, TV and Internet.

'content is King' thus still prevails, especially in an essentially top-down medium as television.

The content issue thus can be considered a major one to tackle in order to ensure a user-centric product offering for mobile television, but this question is only at stake when the typical 'chicken and the egg'-problem is resolved (Bouwman & Christoffersen, 1992, p. 169; Bouwman, Van Dijk, Van den Hooff, & Van De Wijgaert, 2002, pp. 102-103). In the beginning, at the introduction, a lot of innovations face the problem of availability of suited and attractive content. Content producers are not willing to invest in often expensive new content (e.g. HDTV) when a large enough consumer base is not certain yet. The consumer on the other hand hesitates to adopt the new technology when he or she is unsure whether there will be enough satisfying content available. If these two processes co-exist, this results in media-suppliers not willing to take any risks because of the slow uptake of the new technology, while the absence of attractive content provides the consumer with a good reason not to adopt the new technology.

In this article we will try to offer the reader a counterweight for the technology-centric perspective on mobile television (trials), and we shall concentrate on the different kind of content types and strategies that suppliers can offer if they want to reach an audience as large as possible.

## 4. Content going mobile

Andersson (2005, p. 9) distinguishes three main drivers to explain why media and content industries are eyeing the mobile channel.

First of all there is the drive to go digital and, more generally, the world becoming connected. This striving can be seen from two perspectives: not only from the view of the supply side (a 'push' view) but also from the view of the demanding consumer (pull). The latter can be ascribed to the desire of contemporary consumers to receive 'any content, always, anywhere, and anyhow'. This global trend towards digitalization has necessitated all kind of content producers to adapt their business models and to broaden their offerings. However, while Andersson confines this idea solely to the internet, we need to acknowledge the bigger picture. The challenge is to meet the customer needs for getting media content not only via the Internet, as Andersson contends, but also via other and newer channels such as mobile media.

This has resulted in a converging ICT environment where one given service is offered by various technologies (De Marez & Paulussen, 2006, p. 235). This digitalization has resulted in a shift from the traditional layer model of ICT to a so-called vertical intertwined layer model (Felder & Liu, 1999, p.111; Van Dijk, 1999, p.9). The traditional layer model describes the relationship between (1) the physical infrastructure, (2) the services that transport the signals via the physical infrastructure from sender to receiver, (3) the services end-users consume and (4) the end user (Bouwman et al., 2002, p. 54). Whereas, in a traditional layer model every service had its corresponding infrastructure and transport service, thus

clearly resulting in a vertical integration, digitalization has resulted in an ecosystem where one no longer can distinguish a direct link between 'medium' and 'type of information'. With this in mind it is only logical that content providers try to make their audiovisual content available on as many platforms as possible and thus guarantee a wide audience. Traditional TV already migrated to DTV and IPTV, which freed the viewing experience from the 'time'-constraint. With the advent of mobile TV, watching TV is now getting dissociated from 'place' too and the striving for convergence seems almost achieved.

The second driver of mobile content according to Andersson (2005, p.10) is the need for interactivity. Kronlund (2006) distinguishes three reasons why interactivity is such an important feature of mobile TV for the different media players, including the regular consumer. First of all, interactivity is an appropriate stimulator of mobile TV for the average consumer (cfr. also Orgad, 2006). The appeal of interactivity lies in the additional services that can be accessed, such as shopping via mobile TV or playing along with a program. Because the mobile phone itself is a communication device, a feedback channel is already at hand (Steinbock, 2005). Mobile programs could be adapted to make use of these communication possibilities. By giving the consumer the possibility to participate actively, a longer usage duration can be attained. Thus, secondly, for operators, interactivity means additional traffic and revenues, and improved positioning with the TV industry and content providers (Johansen, 2006). Thirdly, for content suppliers and aggregators, interactivity can enhance the so-called stickiness of their program formats, which in turn is favourable for their advertising revenues.

Initially, interactivity can be introduced relatively simply: voting by means of a simple sms. Later on, fully interactive programme formats can be worked out, which in turn can generate additional revenue. These extra earnings can prove vital for traditional telecom operators who risk losing their market share due to dwindling voice revenues because their customers are watching TV on their mobile instead of calling or texting. The main challenge will be the development of mobile content formats that make use of this interactivity in a way, attractive to the end-user.

The third driver distinguished by Anderson (2005, p.10) is the need for personalization and marketing. Evolving on the personalizing trend, with the use of personal ringtones and wallpapers as the most obvious result, mobile TV fits in the trend towards demarcating a personal territory within the public sphere (cfr. also Orgad, 2006).

As different ad expressions form a significant part of a general content offer, advertising cannot be neglected when analyzing mobile content. It is expected that advertising will be an important revenue source, alongside subscriptions, and as a means to make content cheaper for the end-user. Mobile TV offers clear benefits to advertisers as customers can even be reached when they are on the move. However, to stick to the scope of this paper, we shall not go into further detail on the subject of advertising.

### 5. Three different content paths

In the remainder of this paper, we shall draw up a typology of mobile TV content, which will be further elaborated on the level of content types and program formats, based on literature and our empirical research.

Generally speaking we distinguish three possibilities to offer consumers mobile TV. First, regular television images (i.e. linear programming) can be shown by means of a mobile device. Second, the viewer can be offered TV content, tailor-made for his/her mobile. The latter once more can be divided into two categories. When the content is derived from existing TV programmes, we speak of repurposed content. When new entirely new content is developed for mobile viewing, we are speaking of mobile-specific content.

### *5.1 Simulcasting linear TV*

The easiest and therefore also most inexpensive way of providing content for mobile TV is transmitting a regular linear TV feed. This technique also is called re-transmission, simulcasting, or migrated content (Ok, 2005; Orgad, 2006). It suffices to reformat the feeds of existing TV channels and to compress them. These channels are transferred as a whole to the mobile medium, without altering the content. In this definition, the differences between regular TV and mobile TV is limited to two aspects.

Firstly and rather obviously, customers can see TV on the go, instead of actively 'going to' the information (Groebel, 2006). This place-shifting of familiar TV-content is attractive to the end-user, as he or she already 'knows' the content. As was the case in the Finnish mobile TV trial, viewers seem primarily attracted by well-known brands and programs (Finnish Mobile TV Pilot Group, 2005).

Secondly, there is the difference in screen size (Orgad, 2006). This brings us to the biggest disadvantage of linear transmission: the fact that the programs are made for a large screen. The viewing comfort on a small portable screen is much lower.

The fact that end-users watch linear programs on a less comfortable screen, is what van den Dam (2005) calls the 'must see'-function for mobile television: die-hard fans of a particular TV show want to watch 'their' show at any cost, even if this means a lower quality.

Hence, it is doubtful that a mere simulcast will be a good strategy. This would only allow some kind of place-shifting of the regular TV-experience, only in absence of a regular TV-set. Mobile television remains nothing more than a substitute for the regular TV viewing experience.

However, according to research firm A.T. Kearney, watching linear TV on phones is exactly what users want to do. A.T. Kearney polled consumers on three continents. Upon being presented with content options ranging from unique video composed specifically for handsets to repurposed content to basic TV streaming, consumers overwhelmingly reached for the familiar, choosing the brands and programming they see on their TV (Fitchard, 2005). Andrew Cole, head of A.T. Kearney's telecom and media practice, expressed: "The mass media content that you and I love is what people want to see on their phones. They essentially want to see their cable TV channels on their handsets. They want the familiar."

When place-shifting of familiar (linear) content is the only benefit of mobile TV, it can merely be considered another mobile service (cf. supra). However, this reaction can be perfectly explained by referring to the seminal Marshall McLuhan (1964). He already proposed in the '60's his thesis: "The content of a new medium is an old medium". Back then, he already realized that when a new medium is introduced, it will always be used in the same way as an older, already known medium. At first, the new possibilities of a medium will not be recognized or acknowledged. Metaphorically speaking, we are heading for the future looking backwards (de Boer & Brennecke, 1995, p. 92). For example, when TV was first introduced, television was thought of and used as radio with pictures or as an outlet for movies. Other interpretations of the concept of television (i.e., medium specific programs), were not developed until later on. McLuhan (1964) used another cogent metaphor: the horseless carriage syndrome. The new medium is considered in terms of the old medium, just as the car was seen as a carriage, but without a horse. In the case of mobile TV, this means that if mobile TV will develop into a new mass medium, content exploiting the full possibilities of the new medium will follow. Simulcasting linear television only cannot suffice.

### 5.2 Repurposed TV

In the case of repurposed mobile TV, the existing content is recycled for the mobile medium with minimal content adaptation. The repurposing in our definition thus is limited to formal and technical factors only. In other words, repurposed programmes have basically the same content as their regular TV counterparts but are split up into smaller segments, or are cropped to better suit the smaller screens of mobile devices. For the latter, software exists to distinguish foreground and background. The part of the screen identified as 'background', is reduced in pixels to save bandwidth. The image is also reduced in size by zooming in on the areas identified as 'foreground' (Yoshida, 2006). A good example is a newscast being split up in its different items, in which the image zooms in on the head of the reporter.

Because mobile TV still is in a nascent stage, many mobile TV suppliers are inclined to follow this path. The biggest advantage of repurposing existing content is that it is better suited for mobile viewing. Nolan & Keen (2005, p. 68) even state that the need for repurposing of broadcast television is one of the main conclusion from early trials and studies. Repurposing existing TV-content thus combines the best of two worlds: it recycles well-known brands with proven quality, and it adds this to a better viewing experience due to the formal content adaptations (e.g., cropping the screen size, etc.).

These adaptations, although only formal, will imply certain costs, but remain nonetheless a lot cheaper than developing original mobile specific content: "Made-for-mobile video content can cost several hundred thousand U.S. dollars per series (…). Repurposing content –editing down existing shows to fit the mobile screen – is significantly cheaper. A lot of companies use interns to do the editing, and costs are about USD50 per minute at the low end and USD500 per minute at the highest." (Coffman & Schulze, 2006).

It is striking that some authors (Ahonen, 2006; Mittermayer, 2006; Orgad, 2006) consider the repurposing of existing content as an intermediate phase, in anticipation of the moment that enough mobile programming will be made. Again, we can refer to the ideas of McLuhan, regarding new media and their initially limited content offer. However, in this matter, another aspect prevails. As the population of mobile TV viewers is still rather limited, it is too early to bet on one specific type of content, because it is still unknown which type will attract the most viewers. The content suppliers prefer to play it safe and rely on content that is derived from existing brands and concepts. Only when there is more clarity about the potential market for the technology and the desired content, can programs be adjusted to these markets. However, waiting to see which way the wind blows can prove risky. Content producers wait to distribute mobile formats until they are certain about the future market potential, but in the meantime potential customers postpone the purchase of a mobile device as long as they are not sure about the offer.

### 5.3 Mobile specific content

Contrary to the two former categories, the third category of content accommodates to all requirements of the new medium, albeit formally and technically as well as content-wise. Advocates of mobile specific content state that this content type is a necessary final step in the evolution of mobile television. The smaller screen, shorter usage duration, noisier usage environment,… should eventually lead to a new visual grammar, expressed in mobile specific content (Orgad, 2006).

Besides the obvious disadvantage of high production costs which are inherent with brand new content, the lack of existing brands can prove another hindrance to a broad content offer (*cf.* the already mentioned challenge of which comes first content or customers). Another possible limiting factor is that a lot of content suppliers show an anticipatory behaviour when it comes to new content for mobile devices due to the still remaining lack of clarity in business models. After all, it is important to know who is entitled to the revenue streams. Currently, it seems that only mobile service operators are making money out of mobile TV. Traditionally these groups are not very keen on redistributing their revenues to other parties such as content providers. It is doubtful that this attitude will remain justifiable. Once the trials are finalised and are turned in full-fledged commercial deployments, a fair description of the different roles and matching revenue streams will be necessary (Hart & Milanesi, 2006). However, early mobile TV services have already shown that content specifically designed, tailored, or easily repurposed for the mobile TV space is particularly attractive to consumers (ibid., p. 68). They mention short-form programmes such as rolling news, 30-minute documentaries/programmes, and 'Mobisodes'[8]. They further argue that especially content which can serve a cyclical 'snacking' behaviour, should be created. They think that throughout the day, nomadic users will every now and then dip in and out of the service.

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[8] Mobile spin-offs from known linear tv-series (e.g. 24, Lost, …)

We will dedicate some attention to one type of mobile specific content: user-generated content (UGC). Holt (2006) distinguishes three kinds of user-generated content: laissez-faire, gatekeeper and community content. The first is the basic form of UGC where everything that passes the legal guidelines is shared with everybody. In the second type of UGC a gatekeeper is the intermediating factor between the content creator and viewer and exerts some editorial management. He will act as a sort of moderator and the more intense and thorough he will operate, the better the quality of the program (Portu, 2006). According to Holt (2006) the two first types of UGC are granted only a short life. The content of this kind of user generated content will not go beyond what he calls "girls lifting their sweaters and boys lighting their farts". It's doubtful that the public will be enthralled with this kind of content for a longer period. Then a brighter future might be reserved for a third type of user generated content, namely community UGC. This kind of content requires some more engagement from the user, automatically resulting in a more compelling content offer. A nice example of community UGC would be SeeMeTV. This initiative of the British mobile operator Three is conceived as a 'customer-content channel'. Users upload their own videos to a mobile portal, where other users can watch these videos for a small amount of money (Goggin, 2006). Uploaders get paid for each video other users watch.

## 6. Case study: Flanders

As we asserted, content is an important factor for mobile TV. This applies for the estimation of the adoption potential of mobile TV as well as the tackling of the first mover issue the content suppliers are dealing with, which was mentioned earlier. Therefore, this paper repeats an empirical research on these content-related issues that has been conducted in the context of the Flemish mobile TV trial. For this purpose, we conducted empirical research. Our main research questions can be summarized as follows:

- what are the strengths and weaknesses of general (linear) content types for mobile TV?
- which opportunities and threats can be identified for repurposed and mobile specific content?
- How do these strengths, weaknesses, opportunities and threats compare to the identified three main drivers for mobile TV-content: place-shifting, interactivity and personalization?

To answer these questions, we followed a threefold research methodology, involving the following three steps:

1) A meta-analysis of **user-studies**, conducted within various **mobile television trials**.

2) **Expert panel survey**: initial contacts with experts in the field learned that in the current early stadium of the product life cycle, a lot of information that is not yet available in official reports can be obtained from personal conversations.

To this end, a panel of mobile television experts[9] was composed. About half of the experts were surveyed face-to-face[10], the remainder was questioned by an online panel survey. The questionnaire was identical in both cases. Eventually, 35 international experts agreed to take part in the survey.

Firstly, the experts were asked to compose a top and bottom five of most and least promising content types for mobile television. They were also asked to elaborate upon the strengths and weaknesses of the content types at hand.
Finally, the experts were asked about the opportunities and threats of the different content types when used as repurposed or mobile-specific content.

3) The findings from the previous two research steps provided us with the necessary input to construct a **user survey**. During one month, a representative sample of 405 Flemish people was surveyed. The respondents were asked about the content types they would like to see on mobile television. They also had to give a score to a set of twelve specific content formats.

By these means, we were able to compare and analyse information and results gathered from previous trials, an expert panel and a user survey.

## 7. Results

### *7.1 General content types*

Trial results (Finnish Mobile TV Pilot Group, 2005; Mason, 2006; Mestre, 2007 & Médiamétrie, 2006) point out that news, soap[11] and sports are clearly winners in every country. This what we could call **content triumvirate** appears to have a universal appeal among mobile television viewers, satisfying the information (news) as well as the entertainment (soaps) need and benefiting from the 'anytime, anywhere' live aspect (sports). Music was very popular in the UK and in France, but scored much less in Finland and Spain. This content type is closely associated with younger viewers, and has a less universal appeal than the 'triumvirate'. Also, adult content for mobile TV is predicted a bright future (Holt, 2007), but lack of this content type in the trials (except for The Netherlands, cf. Konijnenberg, 2007) leaves no evidence to support this claim.

Within our expert survey, all participants were given a list of sixteen content types. They were asked to rank the five most promising (MP) content types for mobile television. Subsequently, they were asked to compose the five least prom-

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[9] The expert panel consisted of two types of experts: persons that worked for a company or organisation that participated directly in a mobile TV-trial (trial experts) and a number of experts that were not involved directly in a mobile tv-trial, but had proven their expertise by recent publications on mobile tv (non-trial experts).
[10] Some of them were visited, while others were met at conferences (e.g. IBC 2006, Amsterdam and Mobile Entertainment Market 2006, London).
[11] We use the term 'soaps' to indicate soaps and series.

ising (LP) content types[12]. The highest ranked content type was granted five points, the second four and so on. The results can be found in the table below.

| MP genres | Score | LP genres | Score |
|---|---|---|---|
| 1. News | 120 | 1. Movies | 77 |
| 2. Sports | 85 | 2. Documentary | 59 |
| 3. Music | 57 | 3. Discussion | 44 |
| 4. Soap | 41 | 4. Lifestyle | 30 |
| 5. Adult | 36 | 5. Children's programs | 26 |
| 6. Cartoons | 24 | 6. Gaming channels | 24 |
| 7. Radio | 20 | 7. UGC | 21 |
| 8. Other entertainment | 18 | 8. Radio | 17 |
| 9. Reality | 13 | 9. Reality | 15 |
| 9. Lifestyle | 13 | 10. Music | 14 |
| 11. Gaming channels | 10 | 11. Soaps | 13 |
| 11. Children's programs | 10 | 12. Cartoons | 12 |
| 13. Documentary | 6 | 13. Other entertainment | 10 |
| 13. Movies | 6 | 14. Sports | 7 |
| 15. Discussion | 4 | 15. News | 2 |
| 16. UGC | 3 | 16. Adult | 1 |

*Table 1: Most and least promising content according to the expert panel.*

Experts clearly regard **news** as the most promising content type for mobile television and consider a mobile specific or at least repurposed format as the best way to serve the information needs of the consumer and benefit from the mobile medium. A looped format was often suggested (cf. also Orgad, 2006; Carlsson & Walden, 2007, pp.7-8). Experts see the appeal of **sports**, second MP content type, in the 'live' aspect that can be experienced 'anytime, anywhere'. Most sports would benefit from repurposing because of the smaller screen. Experts motivate the high score of **soaps** by their loyal community of fans. Linear transmission could already fulfil quite some needs as it allows fans to watch their favourite soap 'anytime, anywhere'. However, repurposed content can create added value for the fans by establishing a synergy between mobile and regular television, for example by broadcasting summaries or extra content on mobile television, or by allowing user interaction.

According to the experts, the hegemony of the content triumvirate will be challenged by **music**. Music videos come in a short format that is suited for mobile

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[12] By asking the experts to make a top five of least promising content types, we forced them to also consider the weaknesses of the content types, a necessary exercise in order to come to a strengths-weaknesses-opportunities-threats (SWOT)-analysis.

consumption. They are very popular among youngsters, so linear transmission could work. This content type also lends itself perfectly to allow some kind of interactivity (voting, user discussion, …), as already demonstrated in the Berlin-trial (cf. infra, Sattler, 2006). Personalization could be achieved through offering of artist-related ringtones, wallpapers and other mobile phone utilities.

Experts consider **adult content** as a promising niche that might play an important role in the adoption-process, as this content type benefits the most from the personal nature of the mobile TV-medium. When some user-interactivity would be added, Orgad's usage reason 'boosting love life' (2006) could become reality.

Programs that require too much attention or that are too long (films, documentaries and discussion programs), are clearly considered as unsuited for mobile television. Experts regard lifestyle-programs as unpromising because of their laid-back 'couch potato'-character. User Generated Content (UGC) seems to be a content type that confuses experts. It gets the lowest ranking as MP-content, but comes in only 7th as LP-content. However, quite some authors predict a bright future for UGC in a mobile television context (cfr. Holt, 2006; Ahonen & O'Reilly, 2007, p.85; Orgad, 2006).

Experts are also polarised in the case of radio, with a 7th place as MP-content and an 8th place as LP-content[13]. Some experts indicate a lot of potential for radio in the DVB-H technology, even as a possible substitute for FM. However, other experts think that radio has nothing to do with mobile 'television'.

In the user survey, a broader range of program categories was used. The results of the most wanted content types can be found in the table below.

| MP genres | Score | MP genres | Score |
|---|---|---|---|
| 1. News | 6101 | 14. Live events | 774 |
| 2. Series | 1922 | 15. Lifestyle programs | 758 |
| 3. Music | 1864 | 16. Sports background | 614 |
| 4. Film | 1861 | 17. Reality shows | 464 |
| 5. Soaps | 1520 | 18. Daily life shows | 442 |
| 6. Sports | 1516 | 19. Children's programs | 362 |
| 7. News background | 1409 | 20. Visual radio | 300 |
| 8. Quiz | 1276 | 21. UGC | 281 |
| 9. Documentary | 1182 | 22. Show programs | 266 |
| 10. Comedy | 1165 | 23. Erotic programs | 84 |
| 11. Talkshows | 1116 | 24. Porn | 82 |
| 12. Live sports | 1040 | 25. Sex-talk shows | 72 |
| 13. Cartoon | 949 | | |

*Table 2: Most promising content according to the user survey participants.*

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[13] Radio was only available in 5 of the 11 trials from which data was used in this study.

At first sight, the most eye-catching difference is the appearance of film in the top five. While experts think this is the least promising genre for mobile television, potential users indicate they are definitely interested in watching movies on mobile television. This confirms the finding in some of the user-trials (Lloyd et al, 2006; Mason, 2006; Rauch & Geissler, 2005; Sattler, 2006; Kim, 2006) that users could watch mobile television in longer sessions than initially expected.

Parallel to the opinion of the experts, music ranks also high among the surveyed users. Music can thus definitely be seen as a serious contender for the content triumvirate. It is also remarkable that sports news ranks only sixth. The low score for adult content, occupying the last three places, seems unrealistic. As some experts stated during the open interviews, respondents tend to underreport their preference for this content type. Adult should definitely be regarded as a promising content type; only other methods of estimating the potential of this content type should be looked for (like logging of the watched content in user trials, cf. Konijnenberg, 2007).

### 7.2 Repurposed and mobile specific content

A meta-analysis of the trials and additional information provided by the trial-experts revealed that hardly any repurposed or mobile specific content was tested during these trials. In Finland, two UGC-channels[14] were tested. These turned out to be a failure, both in absence of submitted content and viewers. The Dutch trial included a glamour-channel[15] with gossip and paparazzi-items in a looped format (Konijnenberg, 2007). The channel was slightly more successful, but the few additions and refreshments to the program-loop caused rapidly declining viewer-rates. The trials in Oxford and Paris included two commercial channels specialized in mobile specific content such as short films and comedy clips[16]. The Berlin-trial included an interactive music channel[17].

In order to get a better view of possible repurposed and mobile specific content, 'wild ideas' revealed by the expert survey were used to compose a list of twelve (new or already existing) repurposed or mobile specific program formats. We shortly introduce these twelve formats.

1. Visual newsflash: when a specific news item is broadcast on TV (breaking news), a signal is given to the user so he or she can immediately watch the images (push news-service).
2. Traffic TV: a channel devoted to traffic problems, with (live-)images and information on traffic jams and other traffic-related subjects.

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[14] Indicatv and Snaditv
[15] HollywoodTV
[16] ShortsTV and SFR TV
[17] VIVA+ Get the Clip

3.   Visual radio: a radio station that provides additional visual information such as traffic updates, music-related information, live images from the studio, competitions,…

4.   Event TV: a TV-channel devoted to a specific event (e.g. a music festival, a large exhibition, …) with highlights, interviews with artists, information on the program, live images from the different stages,…

5.   Mobile specific film: short films that are tailor-made for mobile television.

6.   Sports highlights: the user is kept up-to-date from sporting events (e.g. a football game) by updates with game highlights.

7.   Summaries: summaries of soaps and series that can be watched when one has missed an episode or when one wants to refresh his or her memory before watching a new episode.

8.   Get close to…: a program that shows a day in the life of a music band with footage from a professional film crew and from the band itself. The viewer can interact with the band members by sending images or voting with the mobile device.

9.   Mobisodes: short programs that are based on well-known series (e.g. 24, Lost) and that feature new story-lines, additional characters, …

10.   Free channel overview: a free channel where famous faces give an overview of what is broadcast on the other channels.

11.   Soccer addicts: a program consisting of user-generated content, presented and commented by a host.

12.   Extra imagery: extra content from well-known television shows (e.g. Big Brother, Temptation Island) that has not been broadcast before. This can include interviews with candidates, bloopers, …

Interest for these formats was measured on a five point-interest scale[18] in the user-survey. The results are shown in the table below, ranked from high to low.

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[18] 1: not interested, 2: hardly interested, 3: neutral, 4: interested, 5: very interested.

| Interest in repurposed and mobile specific programs | |
|---|---|
| Visual newsflash | 3,80 |
| Traffic TV | 3,27 |
| Visual radio | 3,08 |
| Event TV | 3,01 |
| Mobile specific film | 2,98 |
| Sport highlights | 2,76 |
| Summaries | 2,66 |
| Get close to… | 2,30 |
| Mobisodes | 2,27 |
| Free channel overview | 2,25 |
| Soccer addicts | 2,14 |
| Extra imagery | 2,09 |

*Table 3: Repurposed and mobile specific types according to users.*

It is striking that only four items out of twelve show a mean score higher than the neutral value 3,00. This means that the overall interest for repurposed and mobile specific programs is quite low among the surveyed population. Clearly, the visual newsflash is most popular, followed by traffic TV. Visual radio and event TV score hardly higher than the neutral 3,00. Mobile specific film is the first 'entertainment'-format in the list, already scoring below the neutral score. Program formats associated with well known 'brands' like summaries, mobisodes and extra imagery show remarkably low scores. The UGC-format 'Soccer addicts' is also quite strongly rejected by the surveyed public, as is the case with the mixed reality/UGC-show 'Get close to…'.

These results show that the (possible) end-user sees the most possibilities for mobile TV as an informative medium, allowing the mobile TV user to get breaking news and traffic updates anytime, anywhere. In fact, both functions are quite closely associated with the concept of 'visual radio', as breaking news and traffic updates are now mainly delivered through the radio. In other words, the survey-participants show the most interest in mobile TV as a 'visual radio' that offers up-to-date information anytime, anywhere with the addition of imagery.

There is significantly less support for the idea of mobile TV as an addition to linear television. This could indicate that the (Flemish) end-user sees mobile TV rather as radio with added images than as TV going mobile. However, more research on this subject is necessary.

## 8. Discussion

When analyzing the most wanted and watched content types for mobile TV, the content triumvirate news, sports and soap, seemed very popular in trials, amongst experts and within our user survey. These three content types are able to satisfy the information/update need (news and sports) as well as the entertainment need (soaps and sports). Music and adult content were identified as the two main contenders to this triumvirate. Music seems to be able to allow mobile TV to be used as a background medium, while adult content benefits the most of the fact that mobile TV can be considered a truly personal medium.

Experts regard long, attention demanding and linear narrative content as less suited for mobile television, with movies as the most striking example. Nonetheless, our user study revealed that there exists quite some interest for even longer content such as movies. The prominent role that some authors (Holt, 2006; Ahonen & O'Reilly, 2007, p.85; Orgad, 2006) assign to UGC, is clearly not top-of-mind with the end-user nor with the surveyed mobile TV-experts. Even when UGC was proposed as easily comprehensible formats ('Soccer addicts' and 'Get close to') with links to popular regular content genres (sports and music), the survey-participants remained largely uninterested. The failed experiment during the Finnish trial (cf. supra) also points in the same direction.

Based on our user-survey, repurposed or mobile specific content with information-value seems to have the most chance of success. The low scores of the program formats associated to linear TV programs increase the notion that mobile TV is considered rather as a radio with images than as a television going mobile.

When taking into account all information from our research, including the SWOT-exercises that were made by the experts, we can distinguish some general tendencies, applying for mobile content in general. These can be summarized in a SWOT-table. The 'strengths' and 'weaknesses' deal with existing, linear content brought on a mobile screen, whereas the 'opportunities' and 'threats' indicate the possibilities for repurposed and mobile specific content.

| GENERAL SWOT | |
|---|---|
| **Strengths** | **Weaknesses** |
| Mobile TV is an easy concept | Not suited for small screen |
| Live anytime, anywhere | Long programs |
| Non-linear structure/clips | Demanding too much attention |
| Short programs/items | Begin-Middle-End (narration) |
| Auditive dominant programs | No specific benefits |
| **Opportunities** | **Threats** |
| Short programs/items for time-killing | High production costs |
| Highlights/update function | Willingness to pay |
| Background medium/visual radio | Communication device |

| Personal device | Battery power |
|---|---|
| Extra material (behind the scenes) | Competition other media |
| Interactivity/cross-media applications | |

*Table 4: SWOT-analysis content for mobile TV.*

One of the most obvious strengths is the fact that **mobile TV is an easy innovation concept** to understand, as most are familiar with TV as well as mobile technology, and one can access the familiar, linear content on a mobile device. The main benefit for the viewer lies in the fact that he or she can access the known linear content offering **live anytime, anywhere**. One of the most recurring arguments is that this content should best be short: **short programs** or **item-based** programs from the linear offering should be best suited for mobile viewing. The same goes for programs that have a **non-linear structure**, for example music **clips**. The latter example also incorporates another strength for content on mobile TV: **auditive dominant programs**.

The most heard weakness for linear content on mobile TV is the fact that it is **not suited for a small screen**. Especially **long programs**, **programs demanding too much attention** and programs with a clear **Begin-Middle-End**-structure are supposed to be uncomfortable to watch on a small, portable screen.
Last but not least, when only linear programs are transmitted, there are **no specific benefits** for the end-user besides place-shifting of known TV content.

The main opportunities can be split up according to the usage goals that can be fulfilled. **Short programs and items**, possibly in a looped format, seem best suited for **time-killing**. When looking to offer the consumer known **brands, extra material** can be broadcast. The previously mentioned **visual newsflash** format and other informative formats can serve as an **update function**. The **visual radio**-concept seems best suited to allow mobile TV to be used as a **background medium**.

Possibly one of the most characteristic opportunities of mobile TV is the fact that it is considered a very **personal device**. Adult content, adapted to the screen size, can be assumed to be the content type that benefits the most from this personality. Another widely acclaimed opportunity is the possible **interactivity** due to the fact that the receiving device is a mobile phone, which also paves the way for **cross-media applications**. This last opportunity could lead to the most innovative formats, but besides some voting applications, hardly any content has been developed or tested in this context.

The main threat to repurposed and mobile specific content are the **high production costs** (cf. supra). This is largely connected to the fact that it still remains an open question whether the consumers will show a substantial **willingness to pay** to make up for the high costs.

Furthermore, the opportunity of interactivity could also be a threat to mobile TV. The mobile phone is still primarily a **communication device**, and too much interference from mobile TV with the normal communication functions should be avoided. This especially applies to the problem of **battery power**. When mobile TV consumes all energy, the device can not be used for its initial pupose: calling and texting.

The last identified threat is the **competition** with **other media**. Mobile TV will have to offer some clear advantages when compared to other available media, otherwise end-users will see no reason to adopt the new technology.

## 9. Conclusion

Literature regarding mobile TV revealed two main stances towards this new technology. Some considered it mere as another mobile service, where others saw mobile TV as a possible new medium. We elaborated on this distinction by looking at the content-side of mobile TV, which resulted in a threefold typology of possible content paths: linear retransmission, repurposed content and mobile specific content.

When mobile TV would stick to merely offering the content already available on the consumer's regular TV-set, the only benefit for the end-user would be the place-shifting of regular TV-content, and this with a substantial loss of viewing comfort. If this would be the case for mobile TV, it could indeed be seen as merely another mobile service. However, a content offering including repurposed and mobile specific content would enable mobile TV to carve out its own place as a new and distinct medium.

What this content offering should look like, is still subject to a lot of discussion. In the current study, we performed a meta-analysis on user trials, surveyed an expert panel in the field of mobile television and performed a representative user study. However, the results at hand should not be seen as decisive, but rather as an explorative starting point for more user-centric research, which is in our opinion 'key' for successful ICT-innovations.

Experts as well as users tend to agree that linear content should be a necessary part of the content offering. Overall, the content triumvirate news, sports and soap seem indispensable. Music and adult seem to have enough strengths for mobile viewing. In the case of repurposed and mobile specific content, the user study revealed that mobile TV is rather seen as an extension of radio than as 'TV going mobile'. Users tend to prefer informative content formats that have more in common with radio over content formats that are based on linear TV programs.

However, a lot of issues remain unsolved. It remains unclear how repurposing needs to be done and how one can make appealing mobile specific content. Thorough scientific research with a user-centric approach seems to be the path to follow. Despite the limitations of our own research, we tried to pave the way for this kind of research by providing a theoretically built framework for a (mobile) con-

tent typology. This should enable further investigation on the subject of mobile television and its content.

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