Forecasting the Usage of Ambient Media in TV Broadcasting in the year 2016

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Abstract. Technologies in TV broadcasting are rapidly evolving, as also digital media technologies do. Within the scope of this paper, we discuss the application of ambient media technologies in the domain of broadcasting. Ambient media are media that are embedded throughout the natural environment of the consumer and follow the trend towards a ubiquitous society. The trend towards converging media environments across devices as TV sets, PCs, smart mobile phones, intelligent gadgets, and tablets is unstoppable. Internet, broadcasting networks, and service ecosystems become more and more a single service space, rather than having strict boundaries between each medium. The work discusses the current state of utilizing ambient media, and attempts to envision the potential application scenarios of ambient media in the year 2016 in the wider field of TV broadcasting. The key issue for successfully deploying novel services in the area of TV is the creation of service eco-systems emphasizing consumer experience, social interaction, and interactivity. Our study regards the change of consumers' life-styles and points broadcasters to possibilities how to gradually build up a new broadcasting ecosystem on various levels. To develop the vision of how to apply ambient media in the world of broadcasting, we applied various methods: consumer surveys, technology forecasting, expert interviews, and a thorough literature review. We outline a basic roadmap for the potentials of ambient media in broadcasting in the year 2016.

Keywords: Ambient media, broadcasting, system integration, smart media, consumer experience, TV, service eco-systems

1   Introduction

The convergence between TV and ambient media services – where the natural environment becomes the medium for transmitting messages, information, and knowledge between the broadcaster and the audience – implies a re-thinking of the traditional way of broadcasting. One major change that is foreseen is the smart adaptation of the media to the consumers' media consumption environment across a wide range of devices of the smart home, such as TV sets, PCs, smart phones, intelligent gadgets, tables, smart materials, garments, or even room lightening. The notion of content

becomes a notion of a plethora of audio-visual, haptic, or any other human perceptible 'entities' as voice, video, text, haptic feedback, or other human sensory inputs. The transmission channel itself becomes an agglomeration of various distribution channels rather than remaining the currently existing typical broadcasting networks. The audience does not perceive the TV stream as single medium – the consumed media is a service eco-system actively reacting on implicit or explicit consumer interactions [1].

These trends are solely some general trends TV broadcasting is currently facing. Ambient media are an additional current trend that has impact on broadcasting services. Within the scope of this publication we are discussing future trends of broadcasting and the impact of ambient media on broadcasting environment. We provide a forecast for ambient media and their impact in broadcasting for the year 2016.

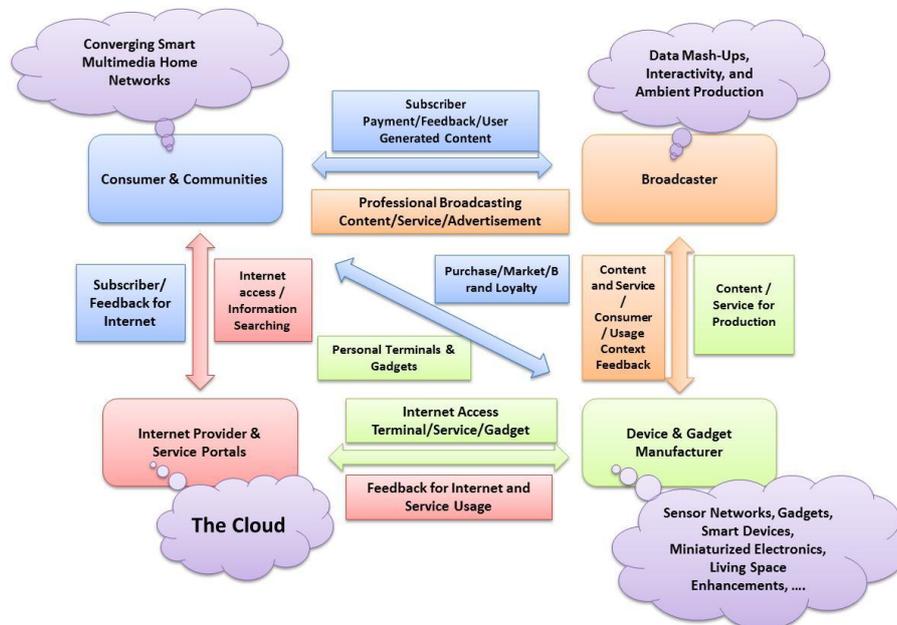## 1.1 Importance of Ambient Media in Broadcasting

Figure 1. The relationship of Consumer and Broadcasting in Ambient Media

Figure 1 illustrates the different stakeholders and the relationship between them in a typical broadcasting environment as well as the potential application areas for ambient media. In a typical broadcasting setting TV broadcasters provide content, value added services, and tag these with advertisements. The consumer can interact with the content or utilize payment schemes to get access to additional services. Depending on the actual settings, advanced payment modalities as e.g. for VoD services are possible. However, more and more emerging Internet service providers emerge on the market (e.g. Google TV) and take their share in the value-chain. This includes device

manufacturer, telecoms, new startups, or search engines. These changes are illustrated in the figure above very well.

1.2   Methods for this Study

The study performed within the scope of the industrial NELME project has been performed based on expert interviews, technology forecasting, expert survey, and a thorough literature research. The starting point of the study was based on several literature sources as e.g. [2, 3, 4, 5, 6, 7, 8, 11]. A modified version of Design Thinking [9, 10] was applied to develop a more visionary viewpoint towards broadcasting in the year 2016 in specific group works. Expert interviews, and technology forecasting was based on external experts from Finnish media and information technology industries, such as e.g. VTT, YLE, Metropolia, Sofia Digital, Hitmedia, and Jutel. The results have been published in a report [1].
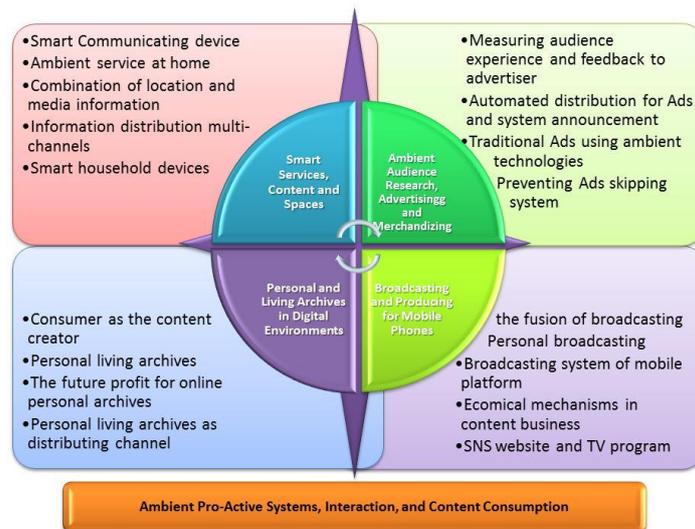
2   Today's Usage of Ambient Media in Broadcasting

Figure 2. Potentials of Ambient Media in Broadcasting

2.1   Categorization of Ambient Media Application Scenarios

As ambient media are a rather large field that contains many various fields of research, the various application scenarios of ambient media in broadcasting have been categorized into the following five lines of investigation [1]:

- smart services, smart contents and smart spaces;

- broadcasting and producing for mobile phones;
- ambient audience research, advertising, and merchandizing;
- personal and living archives in digital environment; and
- ambient pro-active systems, interaction, and content consumption.

The categories compiled several tendencies and directions for the potential use of ambient media in broadcasting environments and are illustrated in Figure 2.

2.2 Today's Perspective of Applying Ambient Media in Broadcasting

Figure 3 depicts an S-Curve model of the current status of ambient media in broadcasting. It illustrates the hypes and maturity of technologies for the year 2012. It nicely presents typical concepts in broadcasting as well as the potentials of ambient media in the upcoming years. Internet of things, mobile tagging, personal living archives, advertisement monitoring, x-screen concepts, digital signage, and social networks are clearly increasing and 'hype' today. However, from today's viewpoint, their technical maturity is still developing towards mass availability. But they are still not on the peak of maturity, nor wide-spread between consumers from a broadcasters' perspective. Mobile broadcasting platforms and electronic advertisements show increasing growth rates as per today, which is in contrast to other technologies as e.g. multimedia navigators and program guides which already exist on consumer markets and are mature technologies. They will be enriched by new advanced personalization features in the very near future, as underlying technologies still require additional research and development.
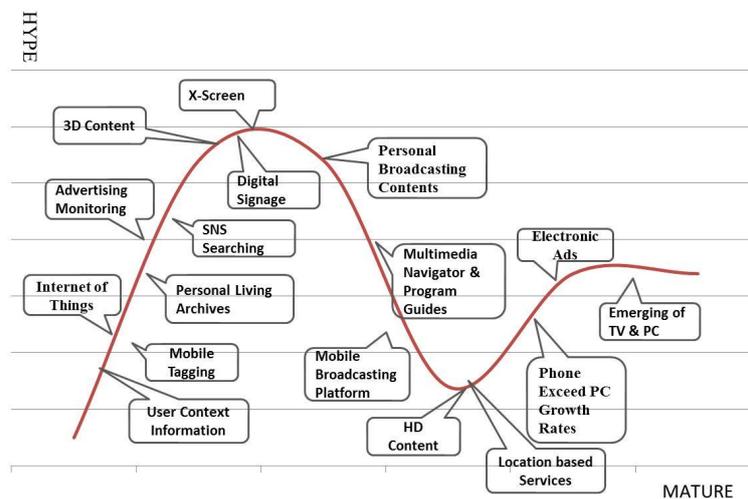

Figure 3. Today's View on the Technology Development of Ambient Media from a Broadcasters' Perspective
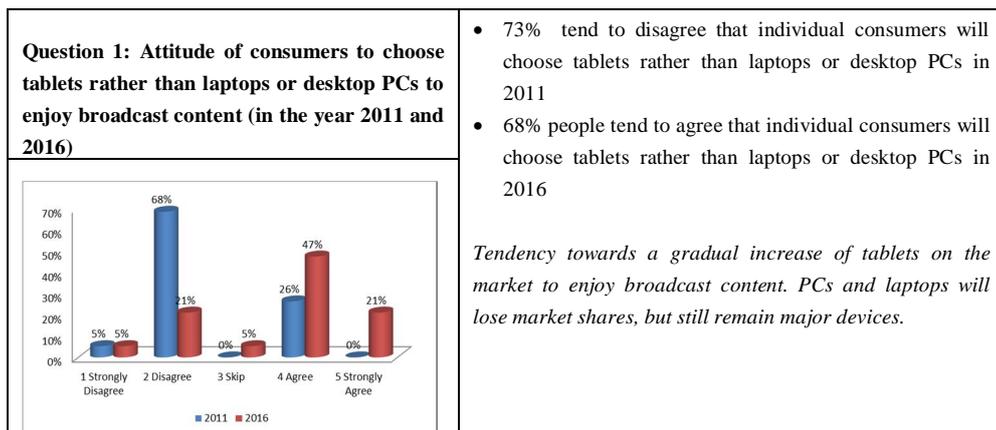
3   Expert Survey

3.1   Expert Survey Background

In order to acquire more external opinions for potential tendencies of ambient media, a small-scale web-survey has been conducted. The goal of the survey was to solely pin-point to current tendencies, trends, and show current consumer demands. The survey can't be seen as conclusive study, due to the rather small number of respondents. Despite this fact, the survey brought quite a few new insights and potential possible developments of converging typical ambient media services with broadcasting services, as it has been targeted to experts in the field.

The survey was sent to 93 people, with experience in the field of broadcasting. 32 people responded to the survey. Thus, the response rate was approx. 35 %. The survey consisted of 45 questions, where 10 questions related to the background of participants, and 35 questions covered various topics and aspects of ambient media. Most of the participants aged 28-35 years (41.1%); 94.76% hold a MSc. or higher degree; and most had an academic background (34.4%). Around 25% of participants had experience in broadcasting; 45% have had more than 5 years of experience in research; and 50% where professionals, manager, directors, or presidents in media industries. Note, that a large amount of respondents (63%) were working in R&D departments or research organizations.

3.2   Exemplary Survey Questions

As already mentioned, the goal of the survey was to find out tendencies and directions, rather than obtain fully-conclusive answers. For a more conclusive survey, a larger participation rate would have been required. Nevertheless, the survey gives much insight into the potential direction of applying ambient media in the field of broadcasting. Table 1 shows three exemplary survey questions, and discusses the results.

Question 1: Attitude of consumers to choose tablets rather than laptops or desktop PCs to enjoy broadcast content (in the year 2011 and 2016)	• 73% tend to disagree that individual consumers will choose tablets rather than laptops or desktop PCs in 2011 • 68% people tend to agree that individual consumers will choose tablets rather than laptops or desktop PCs in 2016 *Tendency towards a gradual increase of tablets on the market to enjoy broadcast content. PCs and laptops will lose market shares, but still remain major devices.*

Question 2: Broadcasters and advertisers should recommend TV contents based on consumer preferences (in the year 2011 and 2016) 	• 59% tend to disagree that broadcasters and advertisers should recommend TV contents based on consumers' preferences in 2011 • In 2016, 53% tend to agree that more and more person-alized recommendations and content will reach the indi-vidual consumer *Tendency towards more personalized and individualized content offerings leading to more value-added consumer services and personalized advertising*
Question 3: Attitude whether new players have the chance to enter the media industry market (in the year 2011 and 2016) 	• 67% tend to have the opinion that new players can enter the market in 2011 • 60% tend to believe that new players have the chance to enter the market in 2016 *Despite high entry barriers in broadcasting, the media industry market remains opened for new players on a stable basis*

Table 1. Three Exemplary Questions from the Expert Survey

3.3 Discussion of Expert Survey Results in the Large Context

The expert survey was part of a wider study to predict the development of ambient media in broadcasting until the year 2020, therefore the conducted survey can only be presented within the larger context of the study. The full study was based on methods such as expert interviews, technology forecasting, and brainstorming sessions. Within the scope of this section a few of the key-results of the expert survey in the context of the larger study are presented:

• mobile platform technologies will grasp more market from traditional broadcasting and PC;
• operation systems, middleware, and communication technology will become main concern;
• multi-touch applications, new screens, multiple displays, and new interactive de-vices are used to enhance consumer experience;
• HD content will rise, although consumers have almost the equal preference for SD content genres;

- personalized content gains popularity, and location based content will become key-element in broadcasting;
- consumers accept mobile broadcasting services, and value added applications supporting broadcast content on mobile phones and/or tablets;
- advertisers start to use new media technology to launch new ways of advertisements;
- personal living archives and consumer contributed content are important issues for broadcasters;
- efficient usage and business exploitation of broadcast archives is one major concern for broadcasters;
- broadcast station have more and more the possibility to exploit service ecosystems, or build their own new broadcast service centered ecosystems;
- new players from outside traditional broadcasting will challenge the traditional way of broadcasting.

4   Ambient Media in Broadcasting in the Year 2016

Figure 4 presents the S-curve model for the usage of ambient media in broadcasting in the year 2016. Location based services, HD content, 3D content, personalized advertisements, x-screen concepts, advanced advertisement monitoring, broadcasting ecosystems, and Internet streaming services are predicted to be mature services and technologies. Personal living archives have passed their top of hype, and are on the way to be a mature technology; new market players outside the broadcast value-chain will be new threats for broadcasters; mobile device sales will have exceeded PC sales; and the Internet of Things will mature gradually. In research and development new display technologies, program formats, and new possibilities to make use of user-context information will be in focus. In the further sub-sections further key-trends are discussed.
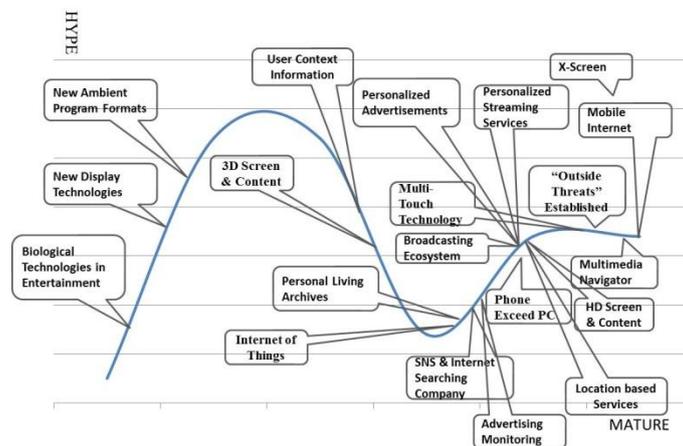

Figure 4. Technology Trends in 2016 from the Perspective of Utilizing Ambient Media in Broadcasting

4.1 Predicted Key Technology Changes

The study resulted into the following key technology changes and predictions for the application of ambient media in broadcasting:

- the main wave of mobile Internet will have been setup and established;
- the market of tablet PCs and mobile phones keeps rapidly increasing;
- sales of smart phones further increase, and the growth ratio exceeds laptops by far;
- mobile tagging, and micropayments are gaining popularity;
- IPTV increases popularity in mature markets, and shows high growth in emerging markets;
- 3D screens will gradually populate the living room environments;
- TV middleware and operating systems become another competitive market, similar to current mobile phone systems;
- multi-touch technologies enhance the consumer experience and input devices;
- display technologies for TV will change and new types will emerge on the markets constantly;
- multi-screen environments will extend the consumer experience and interaction capabilities;
- near field communication, and short range communication are one additional communication channel;
- technologies for smart integrated home environments, for exchanging content between devices and services are major part of the home environment;
- next generation IPv6 services will be in large-scale use to overcome IPv4 restrictions;
- networks for smart communication and service integration are shaping;
- sensors recognizing the consumer environment are mashed-up within services;
- increased application of sensor networks, data mash-ups, and context information.

4.2 Predicted Changes related to Content

The study resulted into the following major changes in terms of content development, consumption, and distribution:

- Increased consumption and production rate of broadcasting content produced by individuals;
- HD content will be a major content encoding format;
- 3D content especially produced for 3D screens will be on a trial, but still not mainstream;
- personal living archives allow consumers to save their personal content online and utilize content across consumers and broadcast services;
- radio-podcasts and personalized streaming services are gaining popularity;
- the integration of consumer data (e.g. usage data, location data) are integrated into service provisioning;
- data-mash-ups from sensors, and invocation of contextual information in content presentation, distribution, and consumption;

- consumer location based information as standard data source for content;
- wide spread application of broadcasting services on mobile platforms;
- convergence of home multimedia systems as inevitable part for content distribution platforms.

4.3   Service Changes and Developments

The study resulted into the following major changes in terms of service development, consumption, and distribution:

- convergence of social network sites searching and normal Internet searching;
- homogenous competition between social network search, and Internet search companies;
- increased advertising preference for the mobile user, and shift of the advertisement budgets to mobile services;
- increased personalized advertisements and consumer data mining;
- increased use of electronic media and more efficient methods to monitor consumer reactions on advertisements (e.g. emotions, reach, behaviour);
- 3rd parties provide TV content, either consumers themselves by utilizing 'out-of-the-home' recording facilities or new professional or semi-professional market players;
- emergence of new forms of electronic programme guides, in form of multimedia navigators capable of accessing also Internet based services to guide the consumer;
- prioritized real-time web-content, news discovery, and emergency information across distribution channel overriding other content;
- direct feedback to broadcasters via consumer monitoring, mining, and social media interactivity beyond the current models;
- public data centres are established for commercial and private use, eventually following initiatives to provide governmental data in a public domain way.

4.4   Business Structure Changes and Developments

The study resulted into the following major changes in terms of business structure and value-chain:

- Internet providers, telecom operators, and independent content brokers or distributors are more and more a threat to traditional broadcasters;
- broadcasters need to re-invent themselves to provide an eco-system of content and services to cope with these changes;
- increasing amount of new non-traditional broadcasting houses will emerge as new market players, which leads to more competition and additional challenges for traditional broadcasters;
- the model of apple online stores is a potential candidate for broadcast content distribution.

5 Conclusion

This short work has briefly viewed the potential trends of ambient media in broadcasting of the year 2016. It provides some prospects, but the real developments are still unknown and many surprises might be on the way. It is very exciting to have more time to verify these predictions, to wait them become true, or to continue refining within our study. Some of the signals already are becoming main trend - even today. But many new technologies are on the brink…

Acknowledgements

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