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New Electronic Media (NELME)

2016 Foresight

VTT TECHNOLOGY 31

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2016 Foresight

Ville Ollikainen (ed.), Erkki Aalto, Jorma Kivelä, Timo Kuula, Marja Liinasuo, Ulf Lindqvist, Artur Lugmayr, Harri Maho, Leena Norros, Anu Seisto, Hao Zheng

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Abstract

The Nelme (New Electronic Media) project[1] will provide justifiable predictions of the most presumable and critical futures of electronic media, more specifically, electronic mass media, and, even more specifically, the future of the 'broadcast' as we know it today by the year 2020.

To accomplish this task, a research framework has been created to describe relationships and causalities between interdisciplinary trends and issues related to broadcasting and electronic media. This report covers intermediate results as a foresight to 2016.

For 2016, the foresight contains four scenarios that represent alternative futures. The scenarios are as follows:

#1: Linear Broadcasting
#2: Online Mass Media
#3: Specialized Audiences
#4: Non-linear Era.

They are organized on two axes: the horizontal axis describes broadband penetration and IP network performance in general ('Limited broadband' – 'World of broadband') while the vertical axis describes content availability ('Exclusive content rights' – 'Open digital market').

The foresight also contains the most probable vision, which, from a consumer perspective, is based on rapid penetration of broadband television and radio services, leading to hybrid viewing.

This intermediate report also contains a description of the production processes for 2016, a set of detected user groups and the next steps for the project.

Keywords electronic media, broadcasting, forecast, foresight, television, radio, IP, IPTV, network, user, survey, technology, production process, ambient media, business

[1] The two-year project Nelme was launched in October 2010 and has been funded by the Finnish Broadcasting Company Yle, Anvia Oyj, MTV Oy, Tieto Oyj, Genelec Oy, Jutel Oy, Sofia Digital Oy and Tekes – the Finnish Funding Agency for Technology and Innovation. The research partners in the project are VTT Technical Research Centre of Finland, Helsinki Metropolia University of Applied Sciences and Tampere University of Technology.

Preface

The business environment of electronic media is changing rapidly. Media enterprises are coping with challenges presented by society, technology and the changing use of the medium itself. There is substantial concern not only in the public and commercial media sectors but also among their partners and subcontractors. The Nelme (New Electronic Media) project will provide justifiable predictions on the most presumable and critical futures of electronic media, more specifically, electronic mass media, and, even more specifically, the future of the 'broadcast' as we know it today by the year 2020.

To accomplish this task, a research framework has been created to describe relationships and causalities between interdisciplinary trends and issues related to broadcasting and electronic media. The framework will serve not only as a framework for this project but also for studies and strategy planning to come.

The project will also address questions on how electronic media will be produced, the kinds of roles that will be found in content production and the kinds of processes that will dominate it. The aim of the project is to have an impact on the media industry, regulation authorities and policymakers with the project results and, eventually, to help the participants to develop their businesses and plan their R&D efficiently.

The method for predicting the future in the project is influenced by the Delphi method in which the expert group consists of people working on the work packages. The project forecasts the future step by step, first for the year 2013, then for the years 2016, 2018 and 2020. In Nelme, the Delphi method is processed four times, each time in two rounds: the initial and the final round. As a result, foresights and multiple scenarios are generated for the years 2013, 2016, 2018 and 2020.

This report was written between September 2011 and March 2012, and it covers the foresight to 2016.

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Terminology

B2B Business to Business

B2C Business to Consumer

CDN Content Delivery Network or Content Distribution Network, a system of computers containing copies of data placed at various nodes of a network. CDN can improve access to the data it caches by increasing access bandwidth and redundancy and reducing access latency.[3]

DRM Digital Rights Management, a term for access control technologies that are used by hardware manufacturers, publishers, copyright holders and individuals to limit the use of digital content and devices.[3]

DVB Digital Video Broadcasting. European standard collections for terrestrial (DVB-T, DVB-T2), Mobile (DVB-H), Cable (DVB-C, DVB-C2) and Satellite (DVB-S, DVB-S2) broadcasting and related technologies.

Ecosystem

A generic term with context-dependent interpretations. In this document, *ecosystem* refers to a device-oriented consortium that has control over, at least, content delivery and owns customer data.

EPG Electronic Program Guide

HbbTV Hybrid Broadcast Broadband TV, a definite collection of standards for combining broadcast and broadband services, including interactivity and content.

HD High Definition, a resolution higher than in traditional (standard) television, at least 1280 x 720.

Internet of Things

Uniquely identifiable and accessible objects connected via the Internet.

IPTV Internet Protocol Television, refers to IP-based television with a selection limited by the provider (walled garden). In practice, many IPTV implementations are actually hybrid solutions in which only part of the services are delivered over IP, the rest being delivered over broadcast.

IPv6 Internet Protocol version 6, a new version of the Internet Protocol (IP) that is designed to succeed the current Internet Protocol version 4 (IPv4). IPv6 was developed by the Internet Engineering Task Force (IETF) to deal with IPv4 address exhaustion using 128-bit addresses instead of the 32 bits used in IPv4.[3]

MHP Multimedia Home Platform, interactive platform for digital television. MHP did not become a success as such.

NFC Near Field Communication. Data exchange means for devices in close proximity.

NGN Next-Generation Network, a generic term for a packet-based network (such as an IPv6 network) that is able to make use of multiple broadband, Quality of Service-enabled transport technologies and in which service-related functions are independent of the underlying transport-related technologies.[2]

NLP Natural Language Processing, a field of computer science and linguistics concerned with the interactions between computers and human (natural) languages[3], for instance, speech-to-text conversion, question answering and machine translation.

nPVR Network Personal Video Recorder, also known as Remote Storage Digital Video Recorder (RS-DVR), is a network-based personal video recorder (PVR) stored at the provider's central location rather than at the consumer's private home.[3]

P2P Peer-to-Peer, a distributed application architecture that partitions tasks or workloads between peers. In P2P content-sharing systems, peers are both suppliers and consumers of content, in contrast to the traditional client-server model in which only servers supply (send) and clients consume (receive).[3]

Progressive download

Progressive download is a term used to describe the transfer of digital media files from a server to a client, typically using the HTTP protocol when initiated from a computer. The consumer may begin playback of the media before the download is complete.[3]

PVR Personal Video Recorder, a consumer device or application software that records video in a digital format to a mass storage device, such as a hard disk drive. PVR functionality is typically integrated into set-top boxes, but it is increasingly a function of a television set with external storage.[3]

SD Standard Definition, the resolution of traditional television; it depends on the local television standard, typically 720x576 (Europe) or 640x480 (North America and Japan).

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[2] ITU (2004). Definition of next generation network. Accessed in November 2011 at http://www.itu.int/ITU-T/studygroups/com13/ngn2004/working_definition.html.

[3] Wikipedia, http://en.wikipedia.org.

SNS Social Networking Site, such as Facebook, MySpace and Google+

QoS Quality of Service, often refers to the content quality management in IP networks.

UGC User Generated Content

UltraVioletA personal digital locker to store rights for content playout. It is an authentication and cloud-based licensing system that allows consumers of digital home entertainment to use streaming and downloaded content on multiple platforms and devices. UltraViolet adheres to a 'buy once, play anywhere' approach that allows users to store digital proof-of-purchases under one account to enable playback of content that is platform- and point-of-sale-agnostic.[3]

VCR Video Cassette Recorder, such as a VHS recorder

Visual radioVisual radio is a generic term for adding visuals to normal audio radio broadcasts. Visual Radio is also a trademark for a Nokia solution for interactive radio with FM radio over a data connection.[3]

Walled gardenWalled garden refers to a carrier's or service provider's control over applications, content and media on platforms (such as mobile devices) and restriction of convenient access to non-approved applications or content.[3]

1. Summary

Nelme created three different scenarios for 2013 that form the basis of this report. These scenarios were[4]:

1. **Non-linear TV**. In this scenario, broadband Internet gains ground at user premises, and television sets become connected to the Internet. A TV set may be connected to the Internet either directly or through an Internet-enabled media terminal such as a PS3 by Sony, Boxee by D-Link, Blu-ray player or an off-the-shelf laptop or other PC. Personal Video Recorders (PVR) have larger capacities, and network PVR services become popular. As a result, an increasing number of people will time-shift programmes and certain user groups will skip advertisements by fast forwarding the commercial breaks.

2. **Personal Viewing**. Tablets become a new and widespread platform for consuming audio-visual content. User-generated content gains ground on tablet platforms on which watching time-shifted television programmes is part of the overall Internet usage during leisure time. A noticeable percentage of users adopt this new model of media usage and television watching. Analogies between tablets in video and mp3 players in audio are obvious. Models of Internet advertising are applied, and traditional electronic media compete with traditional print media on the same platform. Long tail extra material and short format programmes gain additional importance.

3. **Slow HD**. In this scenario, the London Olympics will bring a substantial number of people into the HD era. However, only a few bother to connect the TV to the Internet, while the majority enjoys what is available live on air. The number of available channels over the air and from cable is increasing so significantly so there is no particular need for anything else. Digital set-top boxes are bought less frequently because television sets already contain digital receivers. Those who already own a PVR may keep on using it and possibly upgrade to an HD version, but the huge number of channels also makes programme selection cumbersome for recording. People use less money for home electronics and gadgets.

These three scenarios are not completely exclusive, as some consumer groups may follow one scenario and some another scenario.

In Nelme, the Futures Wheel is used to visualize the development of different scenarios. In the centre of a Futures Wheel there is a trend, event or issue. A set of first-order implications is collected around it: what are the immediate consequences, what is likely to happen? Figure 1 illustrates the Futures Wheel for 2013. For 2016, these first-order implications have been analysed correspondingly, resulting in second-order implications.

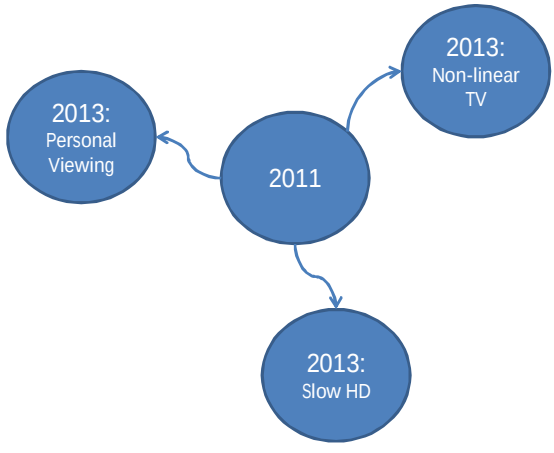

Figure 1. Futures Wheel of television for 2013.[4]

The remaining chapters in this foresight are as follows:

- Chapter 2: A brief description of work packages and methods
- Chapter 3: The most probable vision, what we expect from 2016
- Chapter 4: Four scenarios, depending on two major trends (broadband adoption and content availability), and a total of 14 sub-scenarios
- Chapter 5: Analysis of selected production processes and the future production paradigm
- Chapter 6: A note about production tools for 2016
- Chapter 7: A brief description of detected user groups
- Chapter 8: How this foresight was created
- Chapter 9: The next steps: how the study will continue.

[4] Ollikainen, V. (ed.) et al. (2011). New Electronic Media (NELME) – 2013 Interim Forecast, v. 1.02, a confidential document in the Nelme project. (Unpublished.)

2. Methods

This foresight to the year 2016 is mainly based on the three scenarios drawn up for 2013, described in the previous chapter. These scenarios were added with a list of topics that were seen as relevant for the future, presented as a list in the 2013 forecast. From this point on, each work package created foresights for 2016 independently. The Work Packages (with leader name/organization) are

WP1 – Technology Trends (Erkki Aalto/Metropolia)
WP2 – Production Processes and Workflows (Leena Norros/VTT)
WP3 – New User Driven Services (Anu Seisto/VTT)
WP4 – Ambient Media Experience (Artur Lugmayr/TUT)
WP5 – Business Models (Ulf Lindqvist/VTT)
WP6 – Project Co-ordination (Jouko Pesonen/YLE).

This document results from independent research, each WP having its own methodology. Consequently, there is a unique perspective related to each WP, reflecting the way the findings are presented:

- WP1 and WP5 used expert questionnaires complemented with interviews. The main purpose of these questionnaires was to evaluate the strength of different development trends.
- WP2 has a different agenda in the project: its work and output are based on the input from the other work packages. It is aimed at prototyping a new operational concept. WP2 is presented separately in this document.
- WP3 created seven stories describing potential media use situations in the near future. The stories were based on 2013 scenarios. Consumers' opinions and evaluations on the stories were then asked in a public web questionnaire launched in September. The questions were partly based on QUIS with some modifications, and both quantitative and qualitative data were collected with the questionnaire. The data were analysed, resulting in some generic outlines as well as a set of different user groups.
- WP4 uses Design Thinking as its methodology, with an expert questionnaire.

The forecasting process is described in more detail in Chapter 8.

3. Most Probable Vision: IP/DVB Hybrid Viewing

Electronic media technology will become a set of information technology applications.

For each business there will be competition to attain customer loyalty in order to expand the business volume. Telecom operators provide value-added services, including electronic media, and ecosystems gain weight through terminal sales and by offering content. Commercial broadcasters attempt to gain audiences for their pay TV services while public service broadcasters do their best to justify their existence. Producers and content licensors expand direct sales over IP.

There will eventually not be room for them all, and the anticipated winners will begin to attract other players, making success even more probable. Who will be the king of the castle just at the time when the market is rearranged? That is the big question.

IP is the key term for the most probable future for 2016: by 2016, 20–50% of households[5] will use TV services over IP, while tablets and smartphones with inherent connectivity and video and audio capabilities will also have become commonplace. Mobile devices with Internet connectivity pave the way for numerous IP audio services, including IP radio.

With these devices, linear and non-linear content can be accessed from a myriad of sources, including services provided by current broadcasters, practically everywhere. This is the trend in 2016 reflecting this change:

At the same time, the broadcast is still going strong due to the majority of people finding content most conveniently by being familiar with channel differentiation and programming schedules, just like today. However, IP will bring a hybrid component to the viewing experience: not all content will be transmitted over the air. IP brings freedom from schedules and, in some cases, freedom from places.

Thus, having *the opportunity* to use IP services does not, by any means, lead users to abandon broadcast reception. Hybrid reception is commonplace, supporting

[5] Currently, about 10% of Finnish households use IP-based TV services, with an annual growth rate of almost 300%. We expect the growth to continue, at least for a while. Penetration of home VCRs exceeded 50% in four years once it had penetrated 10%. From a user perspective, VCRs and IP-based TV services both provide freedom of time.

both non-linear IP and linear DVB watching. Broadcasting still has a substantial role in creating contemporary issues to talk about in other media. Electronic media still attract the biggest share of advertising revenue and distribution licences for the most interesting content, but, as the audience fragments, and due to competing distribution channels, they will lose their sharpest edge by 2016.

The relationship between broadcast and IP services is presented in Figure 2 below. Béhar and Colombani[6] have divided content into three classes: 'General content' for instant demand, 'on demand content' for mid tail use and 'online content' for long tail online content. Although the descriptions of the classes may not be the most relevant, the classification depicts the need for instant demand, which is best supported by broadcasts and other classes that benefit from IP.

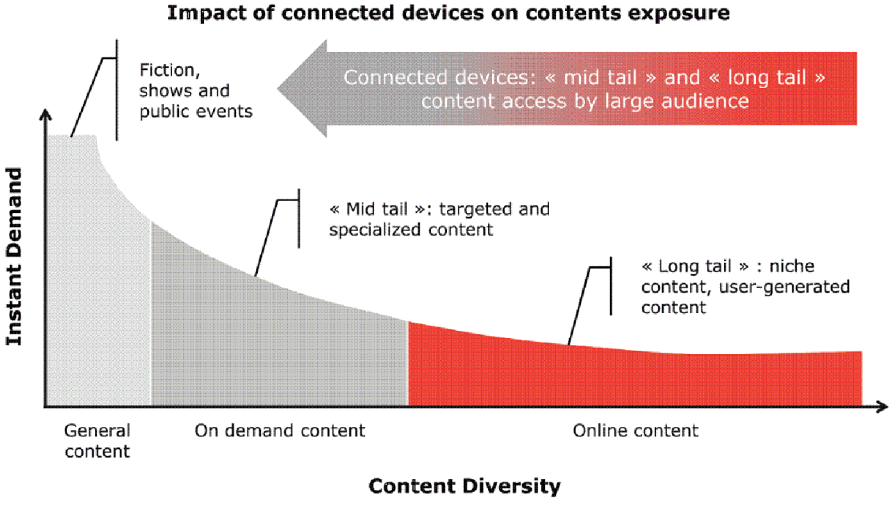

Figure 2. Impact of connected devices on content exposure[6]

Generally speaking, a relation to broadcasting also remains in households with IP-connected televisions and even in IPTV services offered by operators. For most people, linear broadcasting is dominant, perhaps accompanied by PVRs. However, the age group under 45, which is the most important one for advertisers, carefully selects what it watches and when. Thus, non-linear IP services pose a threat to current advertising models and broadcast-only pay TV. Expanding to IP delivery seems a must for pay TV operators, at least for programme catch-up, in order to avoid sliding downhill after consistently increasing market penetration in the past years.

[6] Béhar, P., Colombani, L. (2011). Connected devices and services: Reinventing content. Bain & Company and Forum d'Avignon. Accessed in December 2011 at http://www.bain.com/Images/Bain%20Avignon%202011_US%20HD.pdf.

There are several trends within the non-linear IP world:

- Open Internet with services over a shared IP infrastructure. The number of services is vast, but the quality of service cannot be guaranteed. A service provider can increase quality by using a content delivery network (CDN).
- Services in restricted environments using IP. These are characterized by high quality, while the selection is limited. Entertainment packages provided by telecom operators are an example of restricted services.
- Hybrid services: IP services combined with non-IP services, such as HbbTV (see below) and Radio DNS.

The most probable vision is that telecom operators bundle entertainment services with their broadband offerings. These services include, but are not limited to, movies on demand, network PVR and audio downloads. One motivation behind the bundle is to reduce customer churn in broadband networks. At the same time, several alliances, such as ecosystems built by Apple (iTunes, Apple TV), Sony (Bravia Internet Video), Samsung (Smart TV) and Google, provide content directly to the end-users, as do third-party content shops such as Amazon (LoveFilm), Netflix and Hulu after entering the European markets.

It is interesting to note that while ecosystems may challenge current broadcasters in providing premium content, operators are key players whenever technical quality is concerned. Anyone with appropriate content licences, in co-operation with a telecom operator, has potential to compete with traditional broadcasting.

By 2016, virtual communities (such as networks and communities within Facebook and Google+) have become important when making choices of what to see. The consumption of media content will be an increasingly social process in which individuals' social networks will have a significant effect. Mobile devices with social media services will be used actively while consuming other media.

TV sets with a larger screen and HD resolution have already become the mainstream in homes in 2011, and multi-channel audio devices will become the mainstream for high-end TV sets. 'Home theatre' does not necessarily mean a specific home theatre system, but a separated space with a TV set and possibly a computer. Separating the TV and computer from other living room activities will be a trend.

4. Scenarios

The following four scenarios represent alternative futures for 2016. The scenarios depict noticeable market penetrations by 2016 under certain conditions, not issues that are just beginning to emerge at the time. The conditions are presented below as two major axes.

Each scenario has sub-scenarios that are likely to coincide, taking into account that the real population is heterogeneous with different preferences and consumption habits. Each sub-scenario has a three-star ranking covering three different dimensions, considering, in particular, the current broadcasting industry:

- Probability is the overall probability, i.e. how likely the scenario is to affect the future
- Option indicates that the scenario contains prospects
- Threat describes the amount of negative impact of the scenario.

The scale is as follows:

☆☆☆ Non-existent
★☆☆ Not likely
★★☆ Likely
★★★ Almost certain.

It is important to notice that rankings for option and threat do not include any probability evaluation; they assume that the scenario will be realized to a considerable extent.

The four scenarios are:

#1: Linear Broadcasting
#2: Online Mass Media
#3: Specialized Audiences
#4: Non-linear Era.

These scenarios and their sub-scenarios are illustrated in a two-dimensional chart (Figure 3). The horizontal axis represents how well the information society has succeeded in providing broadband for everyone and how it has been adopted by citizens. The vertical axis describes the policy of content owners: whether the

content rights in general are available to multiple players or are sold exclusively to just a few in a region. Within each scenario, there are sub-scenarios in different locations on these axes.

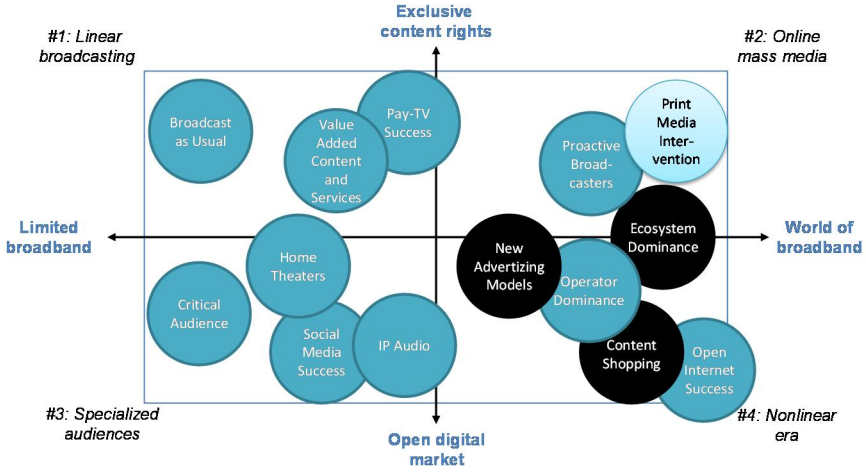

Figure 3. Chart for illustrating scenarios and sub-scenarios in two dimensions: the darker the background, the higher is the expected probability.

The axes are illustrated in Figure 4. The horizontal axis describes broadband success: availability, speed and penetration. It should be noted that availability is an issue enabling penetration, which is most important within our scope. On the right-hand side, people have widely adopted fast broadband connections and the IP infrastructure is capable of supplying the increased demand with uncompromised quality. On the left, people are generally happy with Internet surfing over mobile networks that become congested from time to time, as does the whole IP infrastructure, lacking even reasonable Quality of Service.

The vertical axis describes content availability. At the top of the chart, content licensing is a game for only a few players in a region: premium content is sold at a relatively high price and as a result of negotiation; other content is bundled with it *with exclusive rights*. As a result, the price of premium content only becomes modest for those who also have enough capacity to use the bundled content fully. This is leading to the existence of a few big players in content acquisition. Strict regulation and strong copyright institutions do not leave any room for novel ways to operate either.

At the bottom, content licensing has adjusted to meet the requirements of flexible demand, even for direct sales. As usual, copyright issues on the Internet are applied according to the country of origin. Consequently, content that could not legally be presented here may be legal in the country of origin. There are few countermeasures, while blocking of Internet content in the Western World can only

take place after strong political debate. If the country of origin is another Western country, for example, the USA, it would become practically impossible to block the traffic. In the face of competition to provide content, the stakeholders of strict regulation in one region may have to yield to more liberal, flexible and prosperous licensing policies elsewhere. Free content licensing, such as creative commons and distribution that is free for ideological and promotional content, is also at the bottom of the chart.

It should be noted that below the illustrated vertical axis, there is a possible world in which copyrights are not respected. However, while we do not consider this likely by 2016, Open Internet Success in the bottom right corner may begin to drop into that zone.

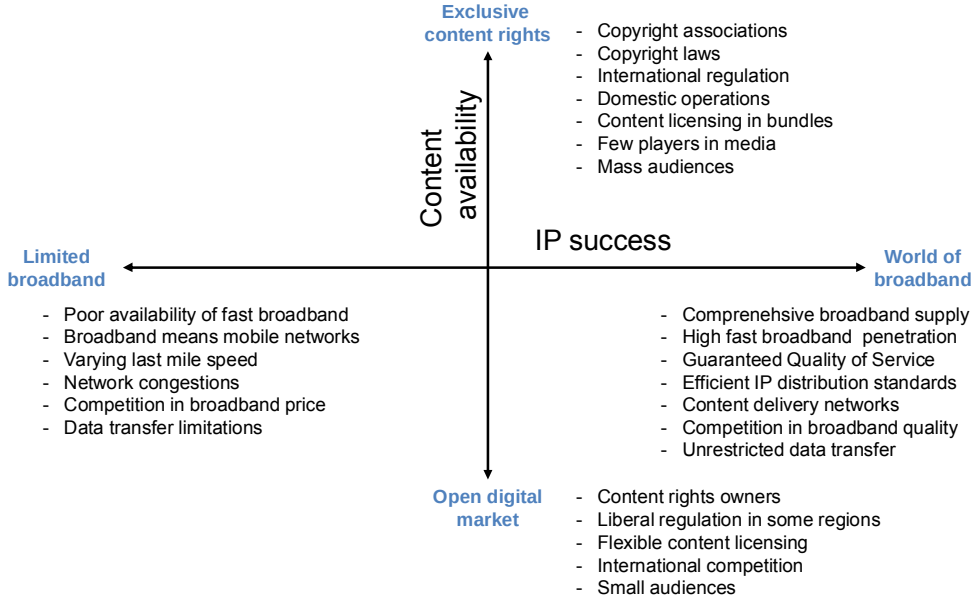

Figure 4. Typical characteristics of horizontal and vertical axes.

The axes also have two diagonals with certain properties (Figure 5): the diagonal from the top left to the bottom right may indicate success in the general economy, while the diagonal from the bottom left to the top right could be seen as a success for large media corporations in new markets.

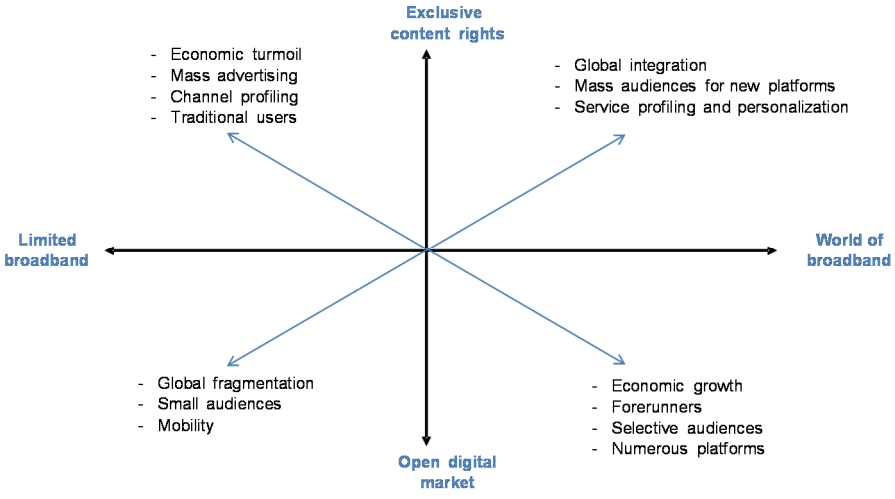

Figure 5. Typical properties of the diagonals on the chart.

The Futures Wheel illustration of the relations between the sub-scenarios and the 2013 scenarios is presented in Figure 6.

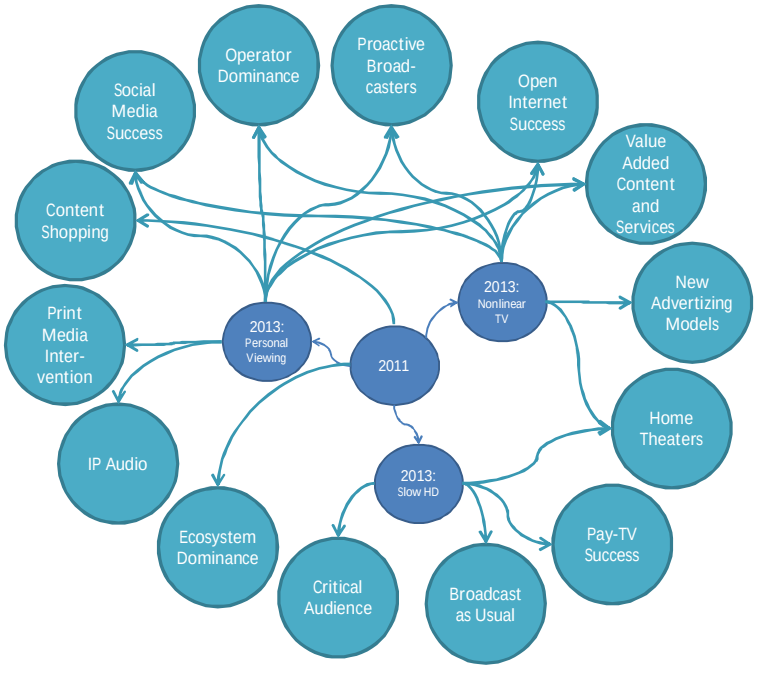

Figure 6. Futures Wheel for 2016. Scenarios related to all 2013 scenarios have arrows from 2011.

4.1 Scenario #1: Linear Broadcasting

The first scenario takes place in the world of exclusive content rights and limited broadband. Properties of this scenario are presented in Table 1.

Table 1. Properties of the first scenario, Linear Broadcasting.

Drivers	- more spare time
	- economic disorder
	  o less other spare time activities
	  o less money to buy competing media
	- lack of interest in information society
	- satisfaction with existing broadcasting service

Environment/market	- advertising in broadcast media - trust in mass communication and shared experiences - pay TV - regulation continues
Players	- broadcasters - advertising agencies - copyright associations - regulators
Solution	- broadcasters are initiators of public discussion - broadcasts are 'walled gardens' for value-added services - strong national content production
Enabling technologies	- DVB-x2 for spectral efficiency - FM - HbbTV for value-added services

This scenario assumes that the audience is not adopting non-linear viewing habits, not even in the younger age group. An increasing number of broadcast channels, including pay TV, fulfil all the needs for demographics that are important to commercial and public service broadcasters. The Olympic Games in 2012 and 2016 have promoted HD viewing, bringing access cards to almost every household, which in turn makes channel subscriptions easy. Once the audience pays for extra channels, it is less interested in acquiring non-linear services.

The broadcast media are the media that generate topics to talk about. Reality series keep on attracting audiences from all major demographics. Each broadcaster promotes between four and six premium programmes each season and these programmes gain so much attention that there is no reason to change the advertising models.

Content sales and regulation have remained the same. It was pointed out already in 2011 by, for instance, Apple founder Steve Jobs, that entering the television market is difficult[7], and it still is in 2016.

High Definition (HD) content will not be hyped, but it will gradually take over, paving the way for pay TV. Most of the content from broadcasters is still in standard definition (SD).

We assume that:

- HD will become a standard technology in TV sets.
- HD content from broadcasters will largely increase.
- Once they are familiar with HD content, users will prefer it over Standard Definition (SD).

After all, the popularity of HD content depends on consumer preferences: if there is public demand for HD, sticking to SD may lead a broadcaster, operator or ecosystem to lose an opportunity to remain or become a key player. In practice, all players who depend on the shared Internet face technical challenges delivering flawless HD content conveniently, giving an edge to broadcasters and operators.

4.1.1 Broadcast as Usual

Enabling scenario in 2013: - Slow HD	Probability: ★★☆ Option: ★★☆ Threat: ☆☆☆

Mobile broadband does the job of Internet surfing but does not provide Quality of Service for entertainment. In this scenario, estimations in 2011 for fixed broadband penetration have failed, partly due to high costs and partly due to core network congestion, which has led to general disappointment.

For the great majority, broadcast is the electronic media to follow. Broadcast schedules and channel differentiation still provide the most convenient way of selecting what to watch and hear. Broadcast TV has not been broken, so why fix it? Apple founder Steve Jobs stated already in 1998 that people watch TV to switch their brains off for half an hour or so.[8] At some point, IP-based services became disappointing through poor usability, lack of reliability and difficulties finding any meaningful content, thus not fulfilling the tacit goal shared by Steve Jobs. This disappointment does not yet make IP-based services too hip in 2016.

[7] Yarow, J. (2011). The Big, Honking Problems with the TV Market. According To Steve Jobs. Business Insider. Accessed in December 2011 at http://www.businessinsider.com/steve-jobs-apple-apple-television-2011-11?op=1.

[8] Rosoff, M. (2011). TV isn't broken, so why fix it? CNN Business Insider. Accessed in December 2011 at http://edition.cnn.com/2011/12/02/tech/gaming-gadgets/tv-does-not-need-fixing/index.html.

Broadcasters dominate content acquisition by buying exclusive regional rights for most popular programmes, sometimes in co-operation with international sister organizations. Bundled with these most popular programmes, exclusive rights for a large amount of second-class content are also acquired, leaving other players to provide just an insignificant and uninteresting drop.

Upgrading to HD gives such an experience that people enjoy broadcast movies, while television commercials also become more immersive.

The importance of broadcasts was emphasized by an economic downturn by 2016, during which people were cutting off unnecessary expenses, such as magazine, newspaper and pay TV subscriptions as well as the fastest broadband connections and Blu-ray rental.

Fast-forwarding commercials is a habit for only a fraction of the audience, compensated for by higher consumption[9], and already in 2011 some data indicated that more attention is actually paid to fast-forwarded commercials during the fast-forwarding[10].

4.1.2 Pay TV Success

Enabling scenario in 2013: - Slow HD	Probability: ★★☆ Option: ★★★ Threat: ★☆☆

Some studies in 2011 indicated that those who have gone for non-linear IP services also have a tendency to be pay TV subscribers[11], and only a tiny fraction has cancelled subscription because of IP. This may indicate that pay TV could receive a boost from consumption habits originally generated by non-linear viewing.

Due to the increased need to protect content, HD broadcasts require a conditional access card. Already having the card at home paves the way for easy pay TV subscriptions. From this point on, pay TV is the most convenient way to receive premium content into living rooms.

The broadcasters may use pay TV channels for pre-emptive competition by acquiring exclusive rights to all relevant content in order to prevent competitor success and put all the extra content on pay TV channels. Although it is a short-term loss, it may lead to success in the long term through

[9] The Nielsen Company (2010). DVR Use in the U.S. Accessed in November 2011 at http://blog.nielsen.com/nielsenwire/wp-content/uploads/2010/12/DVR-State-of-the-Media-Report.pdf.

[10] Wells, E. (2011). Blessing or Curse? How DVRs are Impacting Viewing Habits. TV Genius. Accessed in November 2011 at http://www.tvgenius.net/blog/2011/04/08/dvrs-impacting-viewing-habits.

[11] Frank, N. Magid Associates (2010). Magid Study Reveals Impact of Alternative Video Viewing Platforms on Traditional Television and Home Video Markets. Accessed in December 2011 at http://www.magid.com/node/148.

1) the acquisition of more customers and
2) having fewer competitors.

Eventually, this results in the broadcaster appearing in the epicentre of all related business.

Pay TV is not only for broadcasts: in cable networks it is bundled with broadband subscriptions, although the pay TV itself is linear broadcasting. In this respect, as a hybrid model, pay TV may contain non-linear services over IP, although it requires broadcasters to co-operate with operators.

4.1.3 Value-Added Content and Services

Enabling scenarios in 2013: - Slow HD - Personal Viewing	Probability: ★★☆ Option: ★★☆ Threat: ★☆☆

4.1.3.1 Value-added content and services

Value-added content and services use the public broadcasting network resources and other communications equipment to develop additional activities, often related to live broadcasted content. Non-live services may be related to database retrieval, data processing, electronic data interchange, electronic mail, electronic file transfer and other services. The services may be local or even hyperlocal.

Most consumers will appreciate choices for value-added contents and services, as the mobile phone is no longer a simple tool for talking and short messages and TV is not a passive linear TV for consumers in 2016. Value-added services have been accepted by the majority, and consumer demand will create new value-added services even used on state-of-the-art technologies such as natural language processing (NLP) over IP. One example of NLP from 2011 is the voice assistant Siri by Apple. The background to Siri lies in Artificial Intelligence, which is an inevitable trend for future devices[12].

Value-added services expand the income channel of broadcasters but will most probably need partnerships with third-party content providers. Co-operation between interdisciplinary businesses is essential, which is also the main concern of ambient media.

These services are offered via media and may contain both B2C and B2B services. Typical B2C services are extra material on demand, local and super local services, other videos on demand, profiled individual channels, targeted news

[12] Bhattacharyya, S., Sivanand, G. (2011). Mobile telephony network value added services, quest for capturing the value created most: Answers from the concept of value network. Synergy (0973-8819). Jul 2011, Vol. 9, Issue 2:1–18.

according to a selected profile, audio hit lists and other play lists, etc. e-Business could be a future service offered by media[12].

For commercial media companies the question of which form of additional service to invest in and how to keep existing services attractive is important. New service models in which good quality content is accessible at any time and in any place are essential to public service companies.

4.1.3.2 Interactive media

When the user or viewer of the media can operate the content (text, photos, visual art, sound, animation and video) of the multimedia or upload content independently at any time, it is called interactive media. Examples of interactive media are varied: interactive television, interactive advertising, algorithmic art, videogames, social media, ambient intelligence, virtual reality and augmented reality.

New user interface technologies, such as natural language, gestures and the use of device accelometers, set trends for interactive media. In this category, multi-touch technologies emphasize a user-interactive experience, especially on large screens.

Interactive media also cover public screens, such as information screens at airports, advertising screens in shopping centres and screens in commercial buildings. On public screens, multi-touch offers an advantage, as more than one person can access the screen simultaneously[13].

Interactive media, especially interactive advertising, can give consumers greater experiences than ever. Interactive media not only achieve exchange of information between businesses and consumers, but consumers may also become salesmen and advertisers. The most effective way of interactive advertising is viral marketing. Viral marketing uses images, text, links, Flash, audio and video clips to transfer information via email between consumers. A notable example of this is the Subservient Chicken, a campaign by Burger King to promote its new line of chicken sandwiches[14].

4.1.3.3 Hybrid Broadcast Broadband

Links to online content and services can be conveniently provided with broadcasts. Although this would also be possible with the Slow HD Scenario (#3) of 2013, it will only succeed if people in general shift towards non-linear viewing. A

[13] Ahsanullah, Mahmood, A.K.B., Sulaiman, S., Khan, M. (2011). Research design for evaluation of finger input properties on multi-touch screen. Information and Communication Technologies (ICICT), 2011. International Conference on, July 23, 2011:1–6, ISBN: 978-1-4577-1553-2.

[14] Schneller, A., Marshall, J. (2007). Social Media and the Burger King Brand, Trustees of Dartmouth College 2007. Digital Strategies Center: 603-646-0899.

double-edged sword in the hybrid broadcast broadband paradigm is that it requires IP connection: if a broadcaster encourages the audience to connect its TV equipment to the Internet, it promotes competing content from ecosystems and third-party content providers. These may be more attractive than value-added content and services of broadcasts.

For instance, HbbTV is a European collection of standards for hybrid broadcast broadband convergence summarized in the ETSI standard (Transport Stream 102 796).[15] In many respects, HbbTV follows the footsteps of MHP, although the online services are more advanced, including a browser and media player. Figure 7 illustrates all the functionalities related to processing A/V content.

We assume that providing value-added content via broadband transmission is an important part of future broadcasting. HbbTV provides a standardized solution for it but, at the same time, competes with ecosystem-specific solutions on the one hand and Internet multimedia applications on the other.

[15] European Telecommunications Standards Institute (2010) Technical specification, Hybrid Broadcast Broadband TV, ETSI TS 102 796. Accessed in November 2011 at http://www.etsi.org/deliver/etsi_ts/102700_102799/102796/01.01.01_60/ts_102796v010101p.pdf.

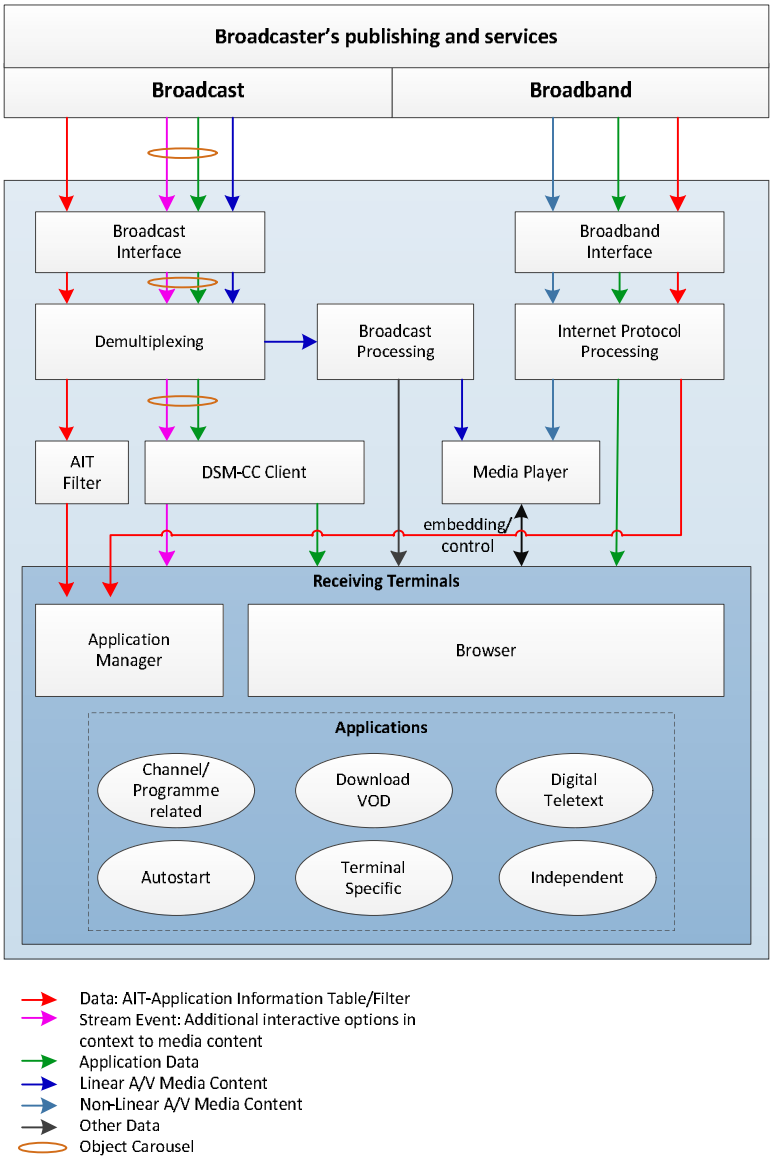

Figure 7. HbbTV integrating down-stream broadcasting and up-stream interaction in the same context or independently.

Hybrid broadcast broadband should perhaps not be the way a broadcaster should make its Internet presence, but it would be an appropriate way to promote it. It provides links to advertisers' websites as well as targeted advertising, which may

be difficult for an ecosystem to digest (i.e. Apple), giving the standardized HbbTV a fair chance.

Thus, hybrid broadcasts and the broadband approach exist as a platform for promoting the broadcaster's value-added services, content shops and targeted advertising.

4.2 Scenario #2: Online Mass Media

The second scenario takes place in the world of exclusive content rights and efficient broadband infrastructure. Properties of this scenario are presented in Table 2 below.

Table 2. Properties of the second scenario, Online Mass Media.

Drivers	- information society - decreasing spare time - Internet generation o willing to make own choices o language skills
Environment/market	- broadcast popularity - targeted advertising complementing broadcasts - strict copyright regulation
Players	- mass media industry - advertising agencies - local copyright associations - international content right owners - regulators
Solution	- broadcasters provide compelling online services - long tail content supply
Enabling technologies	- broadband Internet - catch-up services from broadcasters - semantic databases

In this scenario broadcasters have taken proactive countermeasures to defend their brand and business. At the same time, those print media corporations that already have broadcast-related operations step in to provide premium content over IP.

Taking into account that there are differences in content rights between geographical regions, though the Internet is global, some advantages can be achieved by partnerships across regional borders. For instance, if a regulation in territory A is more liberal than in region B, an Internet entertainment portal in region B may avoid local regulation by merely linking a service from region A to its portfolio instead of providing a similar service itself. In the long run, this benefits services located in region A, which will eventually put pressure on regulation changes in region B.

It should be noted that the non-linear future differs from the points of view of the public service broadcaster, commercial broadcaster and print media: whereas a

commercial broadcaster may find itself less efficient as advertising media or even as a content producer, in the short term, a public broadcaster may benefit by positioning itself as a channel agnostic content producer with cost-effective new distribution channels. For a public broadcaster, this may raise a question in the long term of a producer with public funding competing with privately owned enterprises. Similar discussions have been seen in several state-owned institutions across the world.

4.2.1 Proactive broadcasters

Enabling scenario in 2013: - Personal viewing - Non-linear TV	Probability: ★★☆ Option: ★★☆ Threat: ☆☆☆

In this sub-scenario, the broadcasters have succeeded in creating *a compelling public demand* for their online services. It is *an ultimate necessity for operators* and an advantage for ecosystems to include these services with flawless quality.

In this scenario, a non-linear service portfolio operated with a broadcaster fulfils all the requirements presented in other scenarios and more.

- Hybrid broadcast broadband standards for as wide terminal support as possible
- Uncompromised ease of use with personalized views on the service
- An efficient advertising platform
  - Mass advertising, complementing broadcast channels
  - Targeted advertising supported by detailed customer data
  - Advert swapping, no advert skipping
  - Immediate and accurate ratings for commercials
- Unparalleled entertainment
  - Catch-up for all programmes over at least 4 weeks; no need for PVRs
  - Long tail catch-up as a premium service
  - Movies on demand
  - Music download
  - Portal for third-party content brokers in another region whenever local regulation de facto prohibits certain services
  - New generation teletext for quick news updates
  - New online services in parallel with traditional broadcasting, e.g. large sports events
- Technical superiority
  - Tablet, personal viewing and multi-screen support
  - Support for mobile use
  - Home theatre support by Full HD and 5.1 audio
  - Progressive download with a customer-friendly digital locker
  - Micropayment

  - Geek corner for experimenting with the latest technology bells and whistles
  - APIs for user-generated value-added services
  - Enabling an Internet of Things
  - Rapid and active reaction through the use of semantic databases to issues relevant in social media
  - Profiling services for the consumers to offer personalized use of content
- Social media support
  - Updating social network site statuses automatically
  - Inviting friends to watch a programme simultaneously
  - Communicating with friends on a second screen while watching
  - Sharing photos, videos and music
  - Flee market for content
  - A chat site also accepted by a critical audience
  - Hyperlocal and community services over text, audio and/or video
- Value-added and interactive services including but not limited to
  - Gaming
  - Voice assistants
  - Gambling
  - Ordering pizza
- Information society basics.

By being a key player in the change, the broadcaster was the king of the castle just in time for the rearrangement of the market.

4.2.2 Print media intervention

Enabling scenario in 2013: - Personal viewing	Probability: ★☆☆ Option: ★★☆ Threat: ★☆☆

In this sub-scenario, traditional print media are in recession while digital printing and electronic media are gaining ground. Advances in electronic media have put pressure on newspapers, magazines and book publisher to seek new revenue from elsewhere. Some previous print advertisers have turned to online and social advertising while production and delivery (paper, ink, labour costs, transportation) have been rising to an unacceptable level. Meanwhile, smartphones and tablets with rich multimedia resources have become mainstream products, and printing media are responding to this change.

Thus, traditional differences between broadcasting and print media are largely vanishing: Broadcasters provide Internet services just like newspapers and magazines, while print media provide broadcast type and rich media content services for tablets and all connected devices, including stationary television sets. Journalistic resources of print media, together with capabilities to produce stories and rich

media content, a large customer base and strong financial backup make it possible to produce entertainment in-house, including video material. Large media houses with origins in print media have typically been involved in the broadcasting business for decades: finding appropriate content for online distribution and content licensing is also business as usual for print media. Online services make content acquisition for corporate broadcast channels more efficient by providing a channel to present their own productions with targeted advertising and less expensive content from content bundles. Thus, the origins of printed media do not limit the scope or format of the content.

The printing industry will not disappear, but those printing companies that are not suited to emerging technologies and marketing demands lack competitiveness. A research report by Gartner shows that readers generally do not consider print media and network media as alternatives. Users' experiences of reading short messages and electronic readers are completely different via a cell phone screen. Printing is the ideal medium for transmission of information, content and emotional experiences. Users have a deep-rooted affection for paper. The best consumer experience, unmatched by any other media, is the biggest advantage of print media.

4.3 Scenario #3: Specialized Audiences

The third scenario takes place in the world of open digital market and limited broadband, named as "Specialized Audiences". Properties of this scenario are presented in Table 3.

Table 3. Properties of the third scenario, Specialized Audiences.

Drivers	- more spare time
	- temporary economic turmoil and insecurity
	- young generation prefers social media over television
	- personal and professional content overflow
	  o large amount of content not suitable for general audience
	  o information and content overflow for the consumer
	- copyright issues and legislation
	- media, critical thinking and social movements
	  o slow living
	  o sustainable and ecological thinking

Environment/market	- emergence of social media - new players and industries open broadcast or broadcast-like services - surrounding household video and audio media - online IP audio/video - decrease in advertising due to financial turmoil - customization and personalization of media
Players	- social networking sites - web online portals - sites for user-generated content - existing broadcasters - 'over any distribution channel' telecom operators

Solution	- organizing tools for personalized and personal content - arrangements between social media and broadcasters - new service eco-systems o broadcast content, digital online services, social media and location-based services - content customization and personalization - aging population, people with specific needs, disaster broadcasts, young audiences

Enabling technologies	- smart algorithms and methods for content
	  o advanced content aggregation techniques
	  o personalized search and retrieval of content
	  o content search engines and smart EPGs
	- new content formats
	  o rapid and inexpensive methods for real time distribution of user-generated content from user to user
	  o emergence of personal and living archives
	  o advanced methods for organizing content
	- terminal development
	  o wireless and mobile technologies
	  o tablet computing
	  o smartphones
	  o ambient/ubiquitous devices
	  o smart consumer electronics
	- Internet audio
	  o multi-channel
	  o tagging for podcasting
	  o hybrid radio

In this scenario, the audience fragments into a few specific but recognizable groups. The move from mass media to specialized and even niche audiences has been a predominant trend since the invention of television. In accordance with age, personal preferences and personal needs, there are different requirements for content classification. Another trend is the growing proportion of virtual communities and social networking sites in people's lives. In terms of entertainment, social relationships and even official work, people are increasingly accustomed to using social networking sites to deal with daily activities and reducing the use of traditional media. Access methods are also more flexible and mobile, supported by technologies such as smartphones and tablets.

Internet content providers and advertisers are beginning to provide media (video and audio) and advertising services to these social network sites. The types and quantity of such services will also rise. As the virtual communities and social network sites become increasingly important, existing broadcasters have to build up equal competition and a coexistence relationship with them and seek to enter the social network field to share the market.

The rapid development of virtual communities and social network sites is also leading to the growth of user-generated content. As part of the personal and living archives in the digital environment, user-generated content will be a strong complement to professional content. All of these could be acceptable by consumers, but broadcasters still need to find their profits.

In this scenario, the audience is searching for more personalized household media services. With the great increase in the quantity and type of media content, the audience is beginning to seek higher quality of video and audio, and enjoy convenient services at home. Therefore, an increasing number of home theatre devices according to different personal circumstances will be created, which will be a trend. Attendant user restrictions and copyright issues will also increase.

In this scenario, the audience is also becoming more critical and demanding because of the explosive growth of media content and personalized services. The audience is under great virtual pressure. The people in the audience want to control their own choices but not intentionally or unintentionally under the control of the media and broadcasting company. The audience will become more critical and elusive.

4.3.1 Social Media Success

Enabling scenarios in 2013: all - Non-linear TV - Personal Viewing	Probability: ★★☆ Option: ★★☆ Threat: ★★☆

'Today, everything is about social media. Some industry gurus claim that if you do not participate in Facebook, YouTube, and Second Life, you are not part of cyberspace anymore.'[16] Businesswise, social media provide leverage for other operations. Social media users can be expected to follow other mainstream media, social networking sites being media in themselves, on the one hand, reducing the available time to follow broadcast content, on the other hand, complementing the social experience provided in broadcasts.

4.3.1.1 Virtual communities and social networking sites

Virtual communities are based on the users' own personal networks and social relationships on the net. Virtual community TV, such as Google TV and Facebook TV, is an emerging market.

According to the Cisco technology report (September 2011), social media channels such as Facebook and Twitter were already highly used by college students and young professionals worldwide on a daily basis in 2011. Employees have used social media tools to connect with co-workers and even their managers. Students have considered it more important to keep up on Facebook than to spend time with their friends in person.[17] Recommendations via social relation-

[16] Kaplan, A., Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media, Business Horizons (2010): 53, 59–68.

[17] Cisco connected world technology report (2011). Accessed in October 2011 at http://www.cisco.com/en/US/solutions/ns341/ns525/ns537/ns705/ns1120/CCWTR-Chapter1-Report.pdf.

ships are generally more convincing than TV advertisements: consequently, integration is the key to social and traditional media[16]. User behaviour is not changing and the popularity of virtual communities has an impact on video and audio content consumption.

A US study of the use of social networking sites already indicated in 2011 that social networking sites are also becoming popular in age groups other than just young people.[18] See Figure 8 below.

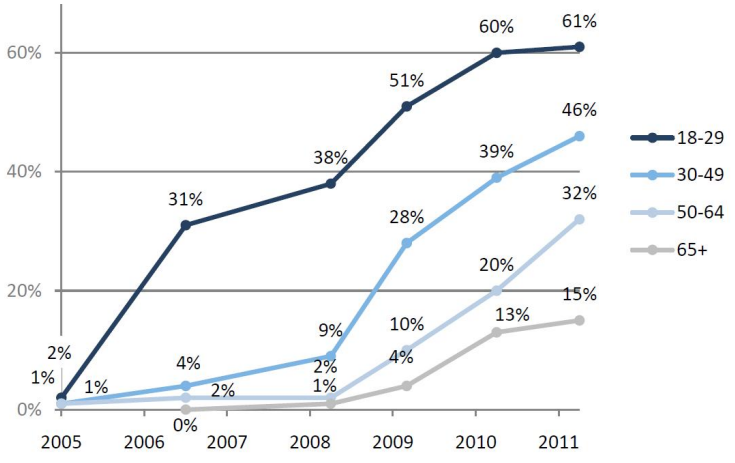

Figure 8. Social network use of adult Internet users on a typical day by age group (a US study).[18]

It is essential that virtual communities (such as Facebook and Google+) become important when making choices of what to see. Virtual communities become important in contexts of video and audio as well as in terms of recommendations. Media consumption in 2016 is an increasingly social process in which an individual's social networks have a significant effect. Real time social interaction over mobile devices (tablets, smartphones, etc.) while consuming content is a standard habit for a large number of people. According to a study by Google, already in 2011 72% of smartphone owners had said that they had used their devices while consuming other media.[19] Part of the population considers social media the winner, but a substantial proportion is still happy with the traditional lean-back mode in 2016.

[18] Madden, M., Zickuhr, K. (2011). 65% of online adults use social networking sites. Pew Internet. Accessed in November 2011 at http://www.pewinternet.org/~/media//Files/Reports/2011/PIP-SNS-Update-2011.pdf.

[19] Google (2011). The mobile movement: Understanding smartphone users (2011). Accessed in October 2011 at http://www.gstatic.com/ads/research/en/2011_TheMobileMovement.pdf.

Virtual communities can be considered content integrators that integrate content and services for consumers. Virtual communities may have content services themselves, demonstrated by the already evolved video- and audio-specific virtual communities ('Spotify TV'). The contents are partly from existing broadcasters (such as YLE) or Internet content providers (such as YouTube). The social media market has increased, but the traditional broadcasting industries have not vanished: they share the market.[20]

The development and increasing use of social media services have been a significant trend that has seen rapid changes. The popularity of individual social media services rises and falls quickly, as has already been seen globally in 2011 with, for example, MySpace, and locally in Finland with IRC-Gallery. An opposing example, Google+ gained over 40 million users within just a few months of its launch in June 2011.[21] By 2016, new virtual communities have evolved alongside the old ones. It is difficult to predict which the dominant services are in 2016, but some players (possibly including Facebook) become more fragmented and people use them more according to specified needs and interests related to, for example, work, news, entertainment, hobbies, family and friends.[4]

Privacy issues play an increasingly important role in the development and popularity of services.

4.3.1.2 User-generated content

User-generated content is an important trend. It is a trend but it is hard to profit from.

In this Social Media vision, user-generated content (UGC) is consumed alongside professional content, and it has become a more natural part of content production and consumption. When UGC is seen in its broadest sense, i.e. basically any material published on the Internet by non-media professionals (including, for example, Facebook status updates)[22], the majority of consumers creates content and share it. The audio-visual content, the creation and sharing of which requires more effort and skills (for example self-created video clips on YouTube), is still created by a smaller group of people, though this group is substantial.

It is not crucial for consumers to know whether the content is created by users or professionals, as the context of use, the terminal device and the user's needs

[20] Wallin, S., Leijon, V. (2006). Rethinking Network Management Solutions, IT Professional (2006), Volume: 8 Issue 6:19–23, ISSN: 1520-9202.

[21] Helsingin Sanomat (2011). Google+ vetää käyttäjiä. 14.10.2011. Accessed in October 2011 at http://www.hs.fi/talous/Google+vet%C3%A4%C3%A4+k%C3%A4ytt%C3%A4ji%C3%A4/a1305547196851.

[22] Interactive Advertising Bureau (2008). IAB Platform Status Report: User Generated Content, Social Media, and Advertising – An Overview. April 2008. Accessed in October 2011 at http://www.iab.net/media/file/2008_ugc_platform.pdf.

define which content is suitable at the time. Adequate technical quality (g*ood enough*) is also related to the context. The definition and meaning of user-generated content will develop, depending on the new ways of producing, sharing and using the contents. Content can be user-generated but professionally published, or vice versa.[4]

User-generated content is part of personal and living archives in the digital environment. The content can be static (such as pictures or photos) or dynamic (such as video clips or audio recordings). The services for storing the content are mostly free, and if the users hope to share these contents with others, it is also mostly free. Most of the user-generated contents are created because of hobbies and personal preferences and not in order to sell them. It is therefore very difficult for anyone, including broadcasters, to earn income. Some personal living archive websites (such as YouTube) may profit from this content.

In 2011, user-generated content is important in newspapers where a substantial share of contemporary photos come from individual readers. This trend is still valid in 2016. Video clips taken by users are also used, to some extent, by broadcasters. A wider use of UGC in electronic media would need completely new business models. The problem of commercializing UGC is obviously the main reason for the slow increase.

4.3.2 Home Theatres

Enabling scenarios in 2013: - Non-linear TV - Slow HD	Probability: ★★☆ Option: ★★☆ Threat: ★★☆

A substantial number of consumers either locate TV equipment in a separate room or space, away from a living room, or turn a living room temporarily into a home theatre. 'Home theatre' does not necessarily mean a specific home theatre system but a separated space with a TV set and possibly a computer. Organizing the media environment depends on the home size and personal media use habits.

According to a study[23] related to family life and media use, many people expressed that home should be a place where they can have *distinct places* for social interaction and for using electronic media and working. Living rooms are divided into two separate spaces: one room or space for entertaining guests, reading, spending time with the family and listening to music or radio programmes, the other room for a new kind of entertainment centre/workroom for using the computer (work-related duties or just surfing the net) and watching television. Leisure time consists of different 'projects' that make it more special and meaningful. Different places reserved for different functions give structure to people's leisure time and domestic life.

Furthermore, due to increasing numbers of devices and contents, media use often has domestic restrictions: adults regulate not only children's but also their own and each other's media use, especially when watching television and using the

Internet. Locating TV equipment and computers in specified places complies with these restrictions.[23]

With rapid technological development, TV sets with larger screen and HD resolution have become mainstream items. Due to consumer demand, most of the major TV stations offer HD channels and HD contents. Multi-channel audio has become the mainstream companion for high-end TV sets.

4.3.3 Emerge of Critical Audience

Enabling scenarios in 2013 - Slow HD	Probability: ★★☆ Option: ★★☆ Threat: ★★☆

The development of media is seen as contradictory and problematic, creating a critical audience. The constant online interactivity and ubiquitous services based on user profiles are creating a life that is too stressful and media-centric. The valuation of peacefulness without the constant media flow as a counter reaction is dominating. Thus, for example, face–to-face interaction, reading books and going to movies are seen as culturally significant activities.

A critical audience may well be enhanced by global economic turmoil.

The consumers have a need to be in control and decide personally what to do and not to do. Tailored media content services based on profiles do not fit into this thinking, since the consumers do not want the machines to make decisions, even though they are based on personal preferences. The basic fear is the 'Orwellian' society, in which people's choices are strongly controlled by the government, enterprises or other powerful organizations.

Ecological reasons and thinking are also significant factors. Using multiple services, communicating actively on line and buying new devices does not support ecological thinking. Furthermore, advertising is not favoured much, neither free-to-air nor tailored.

"I believe the culture of constant online presence is a passing phase with growing pressures of downshifting. (…) I make the choices myself and I don't want any media to make them for me. Why on earth should life be so easy – it sounds like the idea of some kind of dictatorship, which wants to make people stupid in order to control them more effectively. The fool doesn't resist. I am against this kind of thinking." (Comment from the WP3 questionnaire)

[23] Sarvas, R., Peteri, V., Kuula, T., Hanifi, R., Leinonen, A. (2007). Internal report: Media use at home. Creating opportunities for paper. Summary report. Espoo, Oy Keskuslaboratorio Ab. KCL Reports 2863.

4.3.4 IP Audio

Enabling scenario in 2013: - Personal Viewing	Probability: ★★☆ Option: ★★☆ Threat: ★☆☆

Mobile devices with inherent Internet connectivity pave the way for numerous IP audio services, including IP radio. The bandwidth requirement for IP audio is considerably less than the 1 Mbps that Finnish legislation has required from July 2010 onwards, leading to feasible mobile reception.

Part of the population has switched its listening habits to IP-based radio and other personalized audio media. Thus, audio recordings (e.g. streaming radios, Yle Areena) over IP are becoming increasingly important. Community radios will also begin to flourish, since distribution is no longer an economic issue, reaching fragmented audiences just like social media. Community radios provide local and hyperlocal services as well as services for geographically dispersed communities of interest.

- Broadcasted FM radio has an additional simulcast on Internet or digital TV. At some point, IP-based delivery is more popular than that of terrestrial and the end-users do not make a difference with regard to the delivery method.
- The Internet increasingly affects the total picture of audio delivery. New paradigms, such as radio DNS (hybrid radio), radio tag and radio EPG, have emerged.

Listening to audio recordings is part of the personal streaming media services. We expect a faster increase for recordings than for listening radio. The lowest threshold for beginning new IP audio services is the podcast.

The Internet is increasingly popular for contribution purposes, so user-generated content and produced real time content both use IP transfer. For professional purposes dedicated QoS IP routes are still used while multi-connection redundancy utilization has become commonplace technology. Contribution connectivity also includes low-quality video.

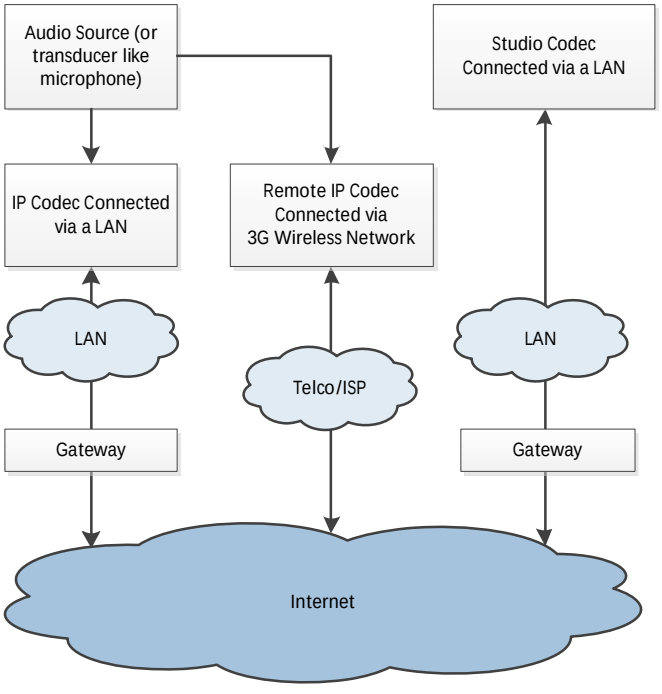

Figure 9. IP audio platform covering facilities from the prosumer's studio to the publishing business.

IP-based audio systems for production (Figure 9) are mature. Production is done in linear audio while delivery is AAC-based. Standardization for IP Studio environments goes on with all the major standards like PTP timing and RTP that already exist. Most of the production functionality can be run on standard IT resources in a virtualized environment. Dedicated hardware boxes are available for intake points and for user interfaces. User interfaces are also available on touchscreens and wireless pads. HTML 5 is widely used.

Loudspeakers are IP-based and may possess some processing power for equalization, delays, etc.

Studio-to-studio communication via IP takes place in a way that allows the whole network infrastructure and all the IP streams to be monitored for traffic congestion with specific tools.

The end-user experience does not change rapidly as, for instance, the majority of car radios in 2016 are from 2011 or before. RadioDNS will not become a separate feature like visual radio but will make emerging new features possible, such as tagging for podcasts or purchases, radio ripping and recording. This will most probably become more popular if the radio listening experience moves towards IP-based pad devices. These wireless pads may either attach to an Internet radio or

a home-network-based FM device with home network IP streaming. Home loudspeakers usually use IP addresses or wireless IP. This makes the wiring easy.

Hybrid TV and hybrid Radio schemes will most probably be separate in 2016 so standardization is under way to bring them together.

4.4 Scenario #4: Non-linear Era

The last scenario takes place in the world of open digital market and efficient broadband infrastructure. Properties of this scenario are presented in Table 4.

Table 4. Properties of the fourth scenario, Non-linear Era.

Drivers	- information society
	- decreasing spare time
	- Internet generation
	  o willing to make own choices
	  o language skills

Environment/market	- razor blade strategy for terminal sales
	- customer churn in telecom business
	- content and service bundling
	  o with devices
	  o with broadband Internet subscription

Players	- content right owners - content-licensing entities - telecom operators - device-oriented ecosystems - third-party content shops
Solution	- non-linear on-demand content - improved media content management

Enabling technologies	- broadband Internet
	- content delivery networks
	- ecosystem-dependent operating systems
	- proprietary solutions above network level
	- terminal development
	  o wireless and mobile technologies
	  o tablet computing
	  o smartphones
	- personal video recorders (PVR), network PVRs

In this scenario, broadcasters lose their leading role in the entertainment market to other players providing services over IP: 50% of households[24] have their entertainment services connected to the Internet, while tablets and smartphones with inherent connectivity and video and audio capabilities have also become commonplace.

Non-linear content can be accessed from a myriad of sources, including services provided by current broadcasters, practically everywhere. IP is reducing the importance of broadcasts significantly by 2016 simply by fragmenting the audience. Non-linear viewing habits were first adopted by an audience that also has commercial relevance and is willing to actively select what is on the screen.

The existence of widely available and modestly priced broadband is a key enabler of this scenario. The Internet has become a public right with modest cost.

In this scenario, broadcasters have relied on their obsoleting competencies for packaging content and creating issues of generic public interest and have not developed must-have services for a non-linear world in time. Promoting between four and six premium programmes per season and broadcasting live events still gains a tiny fraction of the viewing time while the rest of the time is under new and heavy competition from non-linear media. Some reality formats are facing competition from novel pay-and-peek IP entertainment.

Electronic programme guides are partly replaced by social recommendations. These recommendations are based on word of mouth (e.g. coffee table), social networking services (e.g. Facebook) or collaborative evaluations (e.g. IMDB).

It should be noted that the non-linear future differs from the public and commercial broadcaster perspectives: whereas a commercial broadcaster finds itself less efficient as advertising media or a content aggregator, a public broadcaster gains short-term benefits from positioning itself as a channel-agnostic content provider with cost-effective new distribution channels. For a public broadcaster, this will eventually raise a question of a producer with public funding competing with privately owned enterprises. A similar discussion has been seen in several state-owned institutions across the world. This discussion has emerged by 2016 but not on a major scale, since public service is still characterized by linear broadcasting.

There are several competing trends within the non-linear era:

- Open Internet with services over a shared IP infrastructure. The amount of services is vast, but quality of service cannot be guaranteed. Content providers increase quality by using a content delivery network (CDN).
- Services in restricted environments, using IP are characterized by high quality, while the selection is limited. A term “walled garden” is still valid.

[24] Currently, about 10% of households use IP-based TV services, with almost a 300% annual growth. We expect the growth to continue, at least for a while. Penetration of home VCRs exceeded 50% in four years once it had penetrated 10%. From a user perspective, VCRs and IP-based TV services both provide freedom of time.

Entertainment packages provided by telecom operators are an example of restricted services.

It should be noted that broadcaster oriented hybrid models can be found in the following scenario. As a further note, no IP data is transferred without an operator whatever the scenario is.

Telecom operators are bundling entertainment services to their broadband offerings. These services include, but are not limited to, movies on demand, network PVR and audio downloads. At the same time, several alliances, such as ecosystems built by Apple (iTunes), Sony (Bravia Internet Video), Samsung (Smart TV) and Google, provide content directly to end-users, as do third-party content shops such as Amazon, Netflix and Hulu after entering European markets.

End-users want to be in control. Time-shifting and PVRs also fulfil this requirement for those viewers who have not got into IP services. Although the watching time in general may not decrease, viewing traditional broadcasts becomes fragmented over an increasing number of channels, thus diminishing their prestige. The young audience, in particular, has a tendency to go for non-linear videos instead of broadcasts, which is unfortunate for commercial TV broadcasters, since the younger generation acts as a trendsetter, closely monitored by advertisers. All of these are catalysing new models for free-to-air advertising.

Variants on this scenario are described in the following chapters:

- Ecosystem Dominance depicts a future in which device-oriented consortia have sneaked into the entertainment market by combining device and content sales.
- Operator Dominance describes how operators have become key players through their large customer bases and unparalleled ability to guarantee Quality of Service.
- Open Internet Success promotes a future in which content is delivered over a shared Internet from third-party content shops directly to consumers.

4.4.1 Ecosystem Dominance

Enabling scenarios in 2013: all - Non-linear TV - Personal Viewing - Slow HD	Probability: ★★★ Option: ★☆☆ Threat: ★★☆

In this document, the term ecosystem refers to a device-oriented consortium, which, at least, has control over content delivery and owns customer data. Furthermore, it is beneficial for an ecosystem to have control over the entire distribution chain, since the perceived quality of ecosystem services depends on individual components in the chain. Currently, most active players in ecosystems are device manufacturers, not forgetting large IT corporations providing operating

systems, such as Google (Android OS) and Microsoft, and content shops, such as Amazon (Kindle).

IP is the keyword for ecosystems. Broadband content is delivered over the Internet to consumers using content delivery networks (CDN), which provide nearly flawless Quality of Service even if the content requires high bandwidth. End-user equipment may be part of the CDN either in, for instance, a peer-to-peer (P2P) delivery or as an intermediate content buffer.

In ecosystem dominance, the ecosystem owners manage the entire value chain of electronic media, providing both equipment and content to the consumers. Global players, such as Sony, Apple, Samsung, Google and Amazon, are active, while telecom operators have reached an equal position at national level. Ecosystems achieve high penetration through tablet and smartphone sales inherently connected to broadband Internet. Tablets, especially as lean-back devices, are suitable second TV screens and have become popular. At the same time, they earn customer loyalty, since different terminals at home are able to interact with each other. Ecosystem owners are not necessarily content providers but need content partners in their value network.

In 2016, global ecosystems are still partly handicapped by a language barrier, whereas national operators provide subtitles and translations with higher quality standards. Consumers may get discounted terminals as ecosystems earn profit from content and adverts. If the 2013 scenario of personal viewing is realized, the ecosystem owners will obviously achieve a dominant position.

With ecosystem dominance, current broadcasters are falling into a category of content providers, although they may see the ecosystems as their delivery channels. For audio and video content providers in general, ecosystems are the most attractive way of supporting global strategies. Win-win alliances may be created between ecosystems and current broadcasters, between broadcasters, between content providers and ecosystems, or between telecom operators and global ecosystems. User acceptance is critical from a usability and social point of view, which may still give some competitive edge to current broadcasters.

When alliances are considered, however, Figure 10 shows the turnovers of the most important Finnish players in the electronic media market in 2010–2011. Brand owners, like retailers, are considerably larger than media companies, operators and distributors. However, compared with global ecosystems, they are all almost negligible. Even on a domestic scale, telecom operators are significantly larger than broadcasters. Partnerships are potentially unequal and prone to buy-outs. In order to have more weight, the broadcasting industry may begin to co-operate more closely or join the forces on strategic levels.

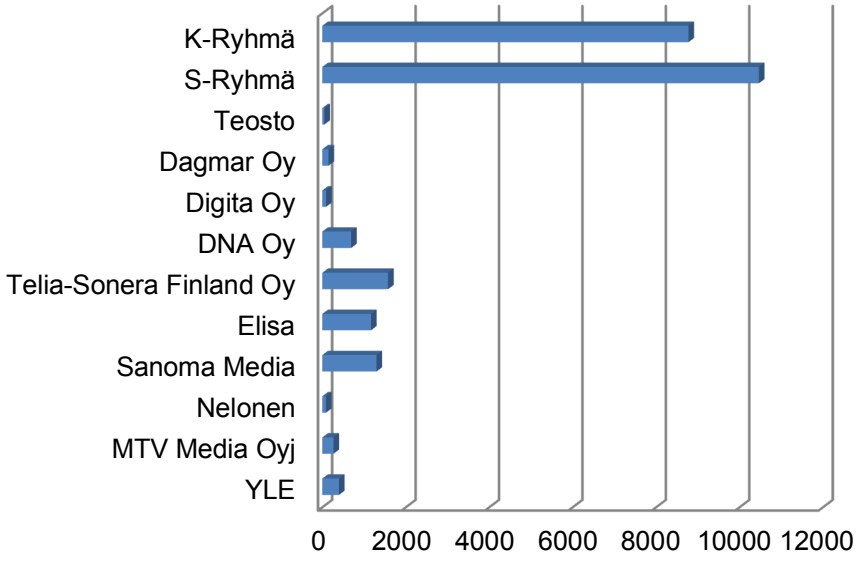

Figure 10. Players in the Finnish electronic media market.

It is also possible that without any mutual co-operation, the broadcasters may end up co-operating with one of the ecosystems each.

It should be noted that ecosystems also have a tendency to compete against standards. Whereas ecosystems have a tendency to operate as walled gardens (i.e. Apple iTunes), standards open up content selection from sources that are not under ecosystem control. Other than the standards related to the infrastructure, standards in general become less significant as, in ecosystem dominance, the solutions adapted by the ecosystems develop faster, and their standardized counterparts lag behind. The same content services may be available in different ecosystems at additional production costs.

Ecosystems may get their position even with a 'Slow HD' scenario, as smartphones and tablets are substantial for several ecosystems. One prerequisite for the ecosystem dominance is that the number of tablets and mobile terminals in use will be large enough by 2016. In Finland, this would require sales of at least 20,000 devices per month.

Sophisticated content delivery arrangements, sometimes referred to by the more generic term of cloud services, are typical of ecosystems. By 2016, this development in ecosystem dominance has led to a dramatic impact on the business model of electronic media, the ecosystems controlling the whole value chain. Some consumers may find it confusing why one terminal can access some content and another cannot.

4.4.2 Operator Dominance

Enabling scenarios in 2013: - Non-linear TV - Personal Viewing	Probability: ★★☆ Option: ★★☆ Threat: ★★☆

Ecosystems may also be created by telecom operators and mobile network operators (hereinafter 'operators' in this chapter). The operator-dominated ecosystem is last-mile oriented yet has alliances with content providers and possibly also terminal manufacturers. Also cable TV operators increasingly provide content over IP, bundled with broadband cable Internet access. In this respect there is no distinction between telecom and cable TV operators.

Operators have a crucial role in online services by 2016. Mobile devices, including tablets, have gained a role as a second screen for electronic media. Mobile devices also provide ubiquitous access to IP network services. At the same time, operators have billing contracts with customers, enabling premium services with minimal charging costs as well as accurately targeted advertising. It is significant, however, to see that most of the content has to be produced by some party other than an operator. In addition to entertainment and Internet services, operators are key players for ambient media with IPv6 enabling an Internet of Things paradigm.

ADSL, fibre-to-home, IPTV set-top boxes and 3G/4G enable broadcasting-related service concepts. Operators have a role in the distribution of almost all end-user services, as illustrated in Figure 11, while most radical concepts also have to be accepted by the operator.

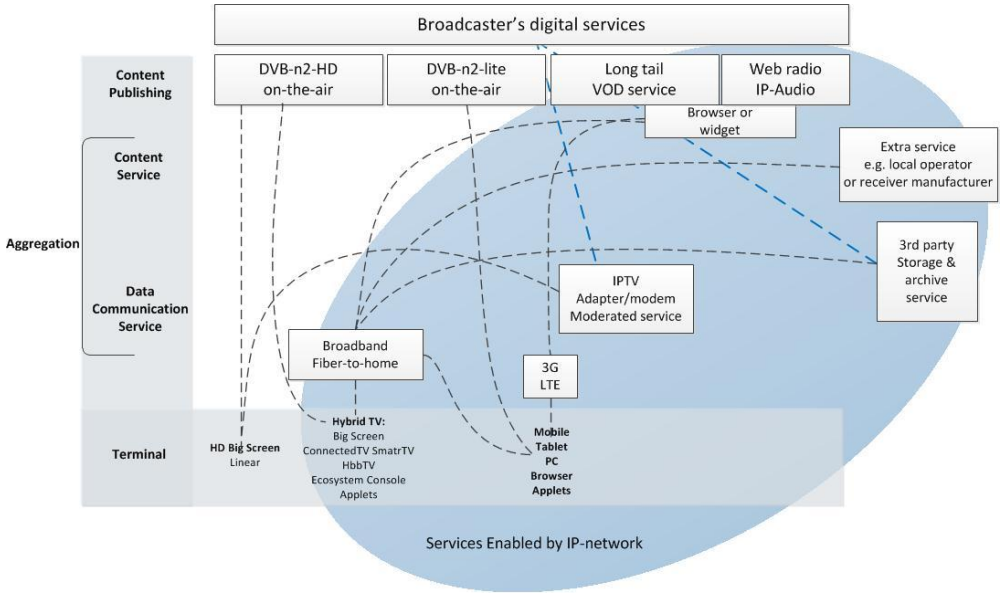

Figure 11. Distribution Services. The up-to-date services in the blue oval require a telecom operator to supply IP connection.

These services may include:

- connected TV content to the big screen via an open Internet connection
- HbbTV (Hybrid Broadcast Broadband) combining broadcast streams with IP services
- services accessed via an ecosystem terminal (e.g. Apple TV)
- content shops that are embedded in devices
- services accessed with downloadable applets or widgets
- moderated services by telecom operators (e.g. IPTV-walled gardens)
- long tail services by broadcasters.

Content is distributed over two methods: broadcasting and an IP network. IP delivery, in turn, may be streaming, file-based or a progressive download. A file-based download is the least critical for network quality requirements, since the download must be completed before viewing; thus it may also be the least convenient for the users. In operator dominance, the IP delivery gradually substitutes traditional broadcasting and gains the highest prestige.

In operator dominance, most operators offer and advertise entertainment packages by themselves, with interactive and personalized services and targeted ad-

vertising. Operators are the first ones to correspond to shorter and more fragmented media consumption, since the operators can also offer location-aware media delivery.

Without additional measures, the capacity of a nationwide core network in Finland is not enough if, in a presumed situation of prime time, tens of thousands receive standard definition TV over shared Internet. The measures would either be the use of multicast transmission or the use of a Content Delivery Network (CDN) that decentralizes video delivery, decreasing traffic in the core network. In either case, operators are the key players in arranging optimal access to different services.

The use of multicast transmission requires support from each network element in a core network, access network and home network. Currently, reliable multi-cast transmission can only be guaranteed in a single operator's network in which the operator can control all the devices in the network. Multicast delivery would solve many transmission bottlenecks, but it is technically a difficult issue to solve and requires co-operation between all the parties in the delivery chain – including the operators. If the operators positioned themselves in the entertainment business, multicast would not only produce additional costs but enable third-party competition from broadcasters and other real time content providers.

From the consumer perspective, the available content is one key reason to select a broadband operator.

Development has led to a dramatic impact on the business model of electronic media, introducing operators as service providers controlling the whole value chain.

4.4.3 Open Internet Success

Enabling scenarios in 2013: - Non-linear TV - Personal Viewing	Probability: ★★☆ Option: ★★☆ Threat: ★★☆

Open Internet success requires almost flawless broadband infrastructure and an open content market.

4.4.3.1 Emergence of a Next Generation Network

By 2016, networks have been integrated further. The Internet, mobile Internet, telecommunication network, broadcasting network, Internet of things and other sensor or communication networks will emerge and gradually form a universal network – the Next Generation Network (NGN). The next generation network will become the most important network. The current Internet, telecommunicating network, broadcasting network, mobile Internet and other sensor network are parts of the Next Generation Network. This leads to people being able to surf the Inter-

net using their living room TV, searching the Web with video links and using tablets to watch programmes[25].

Mobility and Quality of Service are two important factors of NGN. Peer-to-peer delivery has partly offloaded core network congestion. Due to regulation, shared Internet provides Quality of Service, has basic CDN functionalities on top of HTTP streaming standards, supports multicast and is cost-effective for broadcasters and other content providers.

4.4.3.2 Direct sales

With the help of a rapidly developed broadband infrastructure, content owners such as studios, production houses and sports associations have launched their independent services over IP. Led by horse racing, BBC iPlayer, HBO shop and Universal HD offerings and followed by football, ice hockey, baseball associations and independent producers, content rights owners sell their contents in quantities to mass audiences globally.

As a result, these players do not only gain revenues but also loyal customer bases for future expansion to related content, targeted advertising and value-added services, such as betting, merchandise and ticket sales. Other major beneficiaries no longer exist in the value chain.

Once they have broadband and connected devices, domestic customers find international offerings and quickly adopt the concepts. Digital lockers represent key technology in all downloaded content.

4.4.3.3 Smart Interaction Terminals

Service guides are an integral part of devices, acting as remote controls, especially tablets and smartphones. End-user equipment is easy to use and configure, especially with multi-touch and Near Field Communication (NFC) technologies. Some of the devices may use advanced interaction methods beyond multi-touch, such as voice control or visual search.

Three major players share the operating system market: Android OS has become popular as has iOS by Apple, although iOS is handicapped by a closed ecosystem. The third ecosystem is the Nokia-Microsoft ecosystem supported by the Windows OS (Windows phone OS and Windows 8). The competition on the tablet and smartphone markets has catalysed new innovations. Almost all PC makers produce tablets by 2016.

[25] Tatipamula, M., Grossetete, P., Esaki, H. (2004). IPv6 integration and coexistence strategies for next-generation networks. IEEE Communications Magazine January 2004, Vol. 42 Issue 1:88–96.

Near Field Communication (NFC) will become a mainstream standard for configuring mobile device systems, although it can also be used as a convenient payment and micro-payment medium.

4.4.3.4 Mobile Media

Mobile media generally refers to any media that can be watched or listened to in transit. Tablets and smartphones are platforms for consuming mobile media as well as for social interaction and content sharing. However, push-type services based on user profiling and context awareness have only gained success in small user groups in 2016: in general, a world that is too ubiquitous is seen as oppressive.

Other players, such as pay TV operators are likely to offer added-value services by providing content over mobile networks.

Mobile TV broadcasting has some interest in 2016, but the use of multiple screens (TV + mobile phones or tablets) has developed faster, and so have local and hyperlocal content in mobile media.

4.4.4 Content Shopping

Enabling scenarios in 2013: all - Non-linear TV - Personal Viewing - Slow HD	Probability: ★★★ Option: ★★☆ Threat: ★☆☆

Content shopping refers to buying content, services and applications from the Internet, either by progressive download or streaming. After downloading, the content can be used in different terminals, such as smartphones, tablets, PCs, television screens, multimedia navigators and other smart devices.

Most sophisticated DRM arrangements allow content to be used in multiple devices owned by the content buyer but they prevent further copying. The most prominent of these systems is UltraViolet™[26].

A closer look at UltraViolet ™ reveals that it is a digital locker in which to store personal content playout rights that support several DRM systems. It is a cloud-based rights management system for online digital content that allows consumers to download purchased content for multiple platforms and devices. UltraViolet only co-ordinates and manages the rights for each account not the content itself. The content may be obtained in any standardized multi-DRM container format. All major Hollywood studios (except Disney) support UltraViolet, as do companies like Sony, Panasonic, Nokia, BBC Worldwide, Netflix, LoveFilm, FilmFlex, Barnes & Noble and Tesco. Apple and Amazon have their own digital lockers but are ex-

[26] Digital Entertainment Content Ecosystem (DECE) LLC (2011). UltraViolet. Accessed in November 2011 at http://www.uvvu.com/.

pected to begin supporting UltraViolet due to a need for a universal content locker.[27] The UltraViolet launch has not been too successful, however, from a consumer perspective due to apparent usability problems[28], giving some edge to the competitor KeyChest by Disney and Apple, which stores not only rights but also content to a cloud.

There is no tablet, no smartphone and, increasingly no television set without a related content store. Due to the wide selection of available content, only a fraction of the offerings become popular.

4.4.4.1 Independent content brokers

A content broker is an economic organization or individual specializing in the exchange of content between producers and consumers. By definition, independent content brokers are not affiliated to a single producer, ecosystem or operator. Thus, they are efficient sales channels, also for independent content producers, with a variety of genres, whereas consumers appreciate subsequent wide selection. The young generation, in particular, is used to content shops, with a tendency to decide 'when and what' they want to consume. Amazon, Voddler, Netflix, Hulu and Spotify are examples of independent content brokers.

The number of independent content brokers is slowly increasing, but the rate of increase will slow down when the market saturates. Third-party content brokers have to guarantee almost flawless streaming or quick downloading, which inevitably requires the use of content delivery networks, increasing otherwise moderate costs.

Although these third-party content shops or brokers are not the original content producers, they have networks for acquiring content, a wide range of sales channels and a solid customer base. There are at least two ways to generate revenue, one is from the subscriber payment (Netflix) and the other is from advertising (Google)[29].

In the long run, there are only two choices for a company: continue to grow or wait to die out. There is no exception for third-party content shops or brokers. Even if Amazon and Spotify do not expand their business scope, they will face close challenges from other industries, such as the net and physical retail stores

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[27] Hunter, P. (2011). Ultraviolet launches in UK, but still has work to do in Europe. Accessed in December 2011 at http://broadcastengineering.com/news/ultraviolet-uk-europe.

[28] O'Neill, J. (2011). Hollywood sees Amazon as leverage for UltraViolet, but it's too late for this holiday season. Fierce Online Video. Accessed in December 2011 at http://www.fierceonlinevideo.com/story/hollywood-ees-amazon-leverage-ultraviolet-its-too-late-holiday-season/2011-12-14.

[29] Trefis Team (2011). Netflix Needs To Go Deep Into Personalized Streaming, Forbes, June 10, 2011. Accessed in October 2011 at http://www.forbes.com/sites/greatspeculations. 2011/06/10/netflix-needs-to-go-deep-into-personalized-streaming.

from Apple and Google[30]. We expect content-related activities from these well-established players by 2016.

4.4.4.2 Long tail content

Long tail content refers to content made available after being in mainstream delivery. Due to the Internet, the long tail effect has broken the classical 80–20 rule known as the Pareto principle: 80% profit is obtained from the 20% best-selling products, while the remaining 80% of the products do not have a significant profit value. However, the long tail effect makes some of the content that is not best-selling in the short term become best-selling in a longer sales cycle.

The long tail effect helps broadcasters to produce new income, especially with DRM. Broadcasters have had much exquisitely made content, which could generate long-term revenues.

The development of long tail content is closely related to net shops and movies on demand. Consumers are able to conveniently access long tail content from net shops or Internet databases and also use it over a long period of time, such as in movie on demand systems. Long tail content itself does not have any special technical meaning but is merely a description of the market effect. The term *long tail* also describes more independent and random consumer behaviour, especially of minority groups such as immigrants and hobbyists. Chris Anderson's book provides examples of the long tail effect: Amazon's book sales, Google's advertising, Netflix and Real.com, and Rhapsody online music services[31].

4.4.4.3 Movies on demand

Movies on demand is also a form of content shopping that has gained in popularity since 2013. Movies on demand are not exclusively for HD screens and multichannel audio but also for tablets and even smartphones.

Video rental and PVR are following the same decline as the CD personal audio recorder industry before, as almost all movies and broadcasted programmes are available on the net. It is a change in lifestyle boosted by science and technology advancements.

Even if 2013 was an era of slowly developing HD, movies on demand are going strong in 2016 for whoever has a TV set connected or owns a tablet.

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[30] Betts, R.A., Malhi, Y., Roberts, J.T. (2008). The future of the Amazon: new perspectives from climate, ecosystem and social sciences. Philosophical Transactions of The Royal Society, B (2008)363:1729-1735. DOI:10.1098/rstb.2008.0011.

[31] Anderson, C. (2006). The long tail: Why the future of business is selling less of more. New York: Hyperion. ISBN 9781401309664.

With wise decisions, convenient DRM and the long tail effect, the movies on demand industry is becoming stronger[32]. Covering the whole scenario, ecosystems and independent content brokers such as Voddler also contribute to this trend. Entertainment packages are gaining in popularity, obsoleting DVD and Blu-ray discs and boxes. Basically, movies on demand is an evolution from packetized media. As such, it will not substitute broadcasting but because of its ease of use it may compete with broadcasted movies.

4.4.5 New Advertising Models

Enabling scenario in 2013: - Non-linear TV	Probability: ★★★ Option: ★★★ Threat: ★★☆

In this whole scenario, people are increasingly opposing TV and radio schedules and save time by not watching commercials they are not interested in. Non-linear watching increases freedom of choice, while consumers gain more control over their spare time. However, many people in 2016 still find the traditional linear television convenient and familiar.

Free-to-air advertising is squeezed from several directions:

- Network PVRs with catch-up services. Telecom operators provide entertainment packages for their broadband customers. Between 11/2010 and 05/2011, within only half a year, the percentage of IPTV-enabled households doubled from 2% to 4%[33]. This pace is leading to 10% penetration in early 2011. In the 1980s, it took 6 years for VCRs to reach a 10% level, and then only 4 years to hit 50%. Although these figures are not fully comparable, the similarity to user needs is a good starting point for discussion.
- Direct content sales (Netflix, Hulu, movies-on-demand, part of IPTV entertainment packages). Content distributors like Hulu and NetFlix already grew rapidly in 2011[34]. By Q3/2011, Hulu had more than one million premium subscribers. NetFlix had 20 million at the end of 2010 and revenue of USD 2 billion.
- Ecosystems (Google, Apple, Amazon...), especially ecosystems with tablets. In the UK, 74% of iPad users have reported using catch-up TV in 2011.

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[32] Waterston, A. (2005). VOD and DVR in the home – A glimpse of the future, sky. Report, July 7, 2005. Accessed in October 2011 at http://www.horowitzassociates.com/white-papers/vod-and-dvr-in-the-home-a-glimpse-of-the-future.

[33] Viestintävirasto (2011). Markkinakatsaus 3/2011. Accessed in October 2011 at http://www.ficora.fi/attachments/62QK8WRmW/Markkinakatsaus_3_2011.pdf.

[34] Bergman, E. (2011). Hulu Plus available on WD VTTM Live streaming media player. Hulu Blog, Archive for October 2011. http://blog.hulu.com/2011/10/page/5.

- Independent content brokers (Amazon, TVkaista)
- Excessive use of home PVRs. Statistics from the UK indicate that time shifting is saturated at a level of 20%. This may be the 20% of the population that remains with broadcast.
- Traditionally, packetizing content and advertisements to television channels has been a core competence for broadcasters. In the on-demand era this competence has less relevance, whereas knowing individual customers, inherently weak in broadcasting, is an important lesson to be learned.

These trends are promoted, especially by the young generation, the trendsetters, closely monitored by advertisers. Although in this scenario, the amount of viewing time in general has not decreased, it has decreased for one of the most important demographics. This obvious threat to free-to-air advertising has become a reality in this scenario and is supported by statistics from the USA[35].

As a new advertising model, Hulu Ad Swap allows users to swap out of an advert they are watching to one they decide is more relevant. Hulu claims that this drives 93% higher unaided brand recall and 35% higher purchase intent.

On IP, targeted advertising can be added to the programme flow, either to the beginning of a programme or to the middle with, e.g. disabled fast-forwarding or Ad Swap. Targeted advertising emphasizes the importance of having

1) knowledge of the users
2) control over the delivery chain.

Together with a risk of losing consumer attention through diminishing and fragmented viewing, the assumed habit of advert skipping makes television advertising less attractive, causing advertisers to look for other media. As a countermeasure, product placement has existed for decades and has become stronger in this scenario. This has changed business models by 2016, causing the direction of the money to flow from the programme producers to the broadcasters.

The attention of consumers has become a valuable commodity because of its scarcity. In essence, it has become the currency of the online world.[36]

[35] Cisco (2011). Visual Networking Index: Forecast and Methodology, 2010-2015. Accessed in November 2011 at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360.pdf.

[36] Graham, R. (2010). Advertising in the attention economy. ClicZ Marketing News and Expert Advice. January, 2010. Accessed in November 2011 at http://www.clickz.com/clickz/column/1715025/advertising-attention-economy.

5. Perspectives on Electronic Media Production Processes

In the NELME project, the WP2 has focused on understanding the changes to be foreseen in the production processes in the near future of the electronic media. WP2 was set to analyse the present production and to identify seeds for future forms of production in the present reality. To do this, three small-scale case studies were accomplished that exemplified some advanced features of media production. The case studies were 'Voice Heräämö', 'MTV3 Uutiset' and 'Yle Uusi Päivä'. The aim of these case studies was further to understand the pressures on the work processes and personnel competencies in media production. WP2 also considered the work accomplished in the other NELME WPs that focused on producing scenarios for the future development of the electronic media. In the research-oriented work of WP2, different conceptual models were used to structure and interpret the observations concerning the present practices and the predictions of the experts in media technology and production (see details in NELME WP2: Production Processes and Workflows: Concept of Operations analysis for projecting New Electronic Media Production by Norros, L., Liinasuo, M. and WP2 partners).

As a result of WP2, a proposal was made for a service-oriented business approach to production, and the basic functions and structure of a non-linear multimedia production process. This approach and model will be piloted in the next phase of the project in order to concretize and test the basic concepts. In this chapter, the synthesis of the WP2 observations is provided and outlined for a new production paradigm that is sketched.

5.1 Results of the analysis of the development pressures of present production processes

The development pressures that the present electronic media production process faces emerged from the case studies accomplished by WP2 and the NELME 2013 roadmap. Observations of the other NELME WPs that were considered particularly relevant, from the point of view of the future organization of electronic media production processes, and literature findings were also considered. The conclusions are organized into five main points concerning the organization of the production process.

5.1.1 Business concept

In the future, the electronic media companies will develop in a business-driven manner. Production technology development follows the needs of the overall business concerns. The core of the business orientation is to serve the public in a flexible way and in diverse forms. The concept includes that interaction between the producers and consumers, i.e. users, is increasing, to the extent that the consumer may increasingly be considered a co-creator.

Understanding the users' needs and focusing on the user experience (UX) are a great challenge for the companies. This is because the user-centred and service-oriented way of doing business needs to penetrate the whole production organization and be adopted as part of the professional production culture and work practices. The smaller-scale electronic media companies may act as pioneers in developing this kind of broadcasting cultures for the domain, but the larger companies are those that actually turn the course of the broadcasting paradigm.

The business concept of the future includes companies clarifying their positions in the relationship between traditional broadcasting and Internet-based services. Today, the Internet appears to be the most developed publishing channel. This position finds support from the traditional media theory, according to which the strength of the Internet medium makes it capable of including in itself all the previous media. Yet, from this it does not follow that the previous media forms, which provide specific user experiences, would not play an important role in the multi- or cross-medially structured electronic media.

5.1.2 Production process

A clear conclusion of NELME experts and many other media specialists is that the strictly linear broadcasting production process needs to be expanded by a distributed and non-linear production process. The non-linearity of production is seen to increase the efficiency of production, but it also supports the needs of consumers who have developed practices of non-linear, on-demand consumption of media content. It is also agreed that such a fundamental change in the form of production will require big economical investments. Beyond this, organizational innovations and new ways of working are required.

The exploitation of the Internet takes place in all present functions of production, and new functions will emerge. A significant impact of the Internet is that it integrates the publishing channels and, via this, enables collaboration between different producers and interaction with consumers. Users can consume programmes on demand, independently of time and space. As a result of this two-way communication, new knowledge, understanding and meanings are created. According to media theorists, this development is a significant change from a broadcasting type of delivery of information, in which such a creative role of communication cannot be realized.

5.1.3 Production functions and technologies

It is a big challenge to reorganize the production processes in a non-linear way. The case studies accomplished in WP2 and the messages that were received from WP1 brought up signs, examples of attempts and technical possibilities to withdraw from the linear way of producing programmes. In 'The Voice Heräämö' case, the significant feature towards a new way of producing is the parallel use of TV, radio and Internet. Intensive interaction with the users could be created in content production by a small innovative, multi-skilled team via the Internet. In the 'MTV3 News' case, the signs of new ways of production became visible via the ongoing implementation of the Media Asset Management system (MAM) into the production of news. The implementation of the 'Mediadesk' as a shared operative tool for all the production personnel is also an important step towards non-linear production. The material collected in the 'MTV3 News' case demonstrates the pressing issue very well and attention was also drawn to it by WP1: that the storage and archive functions will gain great importance in managing the production process. In connection to this, the topic was also addressed while studying the MTV3 case. There is intensive on-going creative work in the industry to find possible ways of searching stored and archived information. There is a need for innovations in compression technologies, as there appears to be no limit to the need for archiving. Better retrieval from archives would also allow the public to enjoy existing media content according to their demands.

Different ways of intensifying and integrating the production process are needed with regard to planning, content production, aggregation and editing. These pressures were clearly identified in the third case, i.e. the 'YLE Uusi päivä'. Material will have to be worked on at a great pace and partly in a parallel way.

According to the WP1 experts, the role of content management is growing: programme data are stored and must be easy to find and retrieve. There are data in various phases of processing and the level of processing must be known by the personnel in order for them to edit the data as necessary. The rough division between the processing levels of the programme data is reflected in the storage location: the choice is between archiving (finished material) and content management (unfinished material).

One important means to manage content is to exploit proxy technology. The use of a proxy version of the material being processed would enable both parallel and distributed processing of the same material also in spatially distant places. The retrieval of created material needs to be intensified and realized by novel search technologies, as the tagging of metadata consumes too much time and effort.

'YLE Uusi päivä' also brought up a further trend in production that reinforces the development towards non-linear production. In this quite resource-intensive and large production process, YLE was able to implement Internet-based publishing and reception of the programme, and it enabled an actual co-creation process with regard to the programme content. The Internet part of the production and the

broadcasting facilitated each other, but there were clear signs that the Internet part would develop in its own direction.

Issues of automation were brought up in the case studies and by the WP1 technologists. Studio automation is one issue that is currently on the agenda, and automation of publishing and delivery are under intensive research and development.

5.1.4 Quality of output

The accomplished case studies did not deliberately bring up the quality demands on the electronic media outputs. There is a clear need for intense analysis of the complex issue of quality of service in multimedia production. This issue is related to the business-oriented need to better comprehend the User Experience and needs. A quality feature of the production process itself that requires more attention is security in electronic media production. Technical and human reliability of media production also need more consideration.

5.1.5 Work processes and personnel competencies

The measures to increase the efficiency of production through technological innovations will have to be balanced with attempts to ensure that the personnel maintain good journalistic competencies and practices. The number of personnel is not assumed to be decreasing even though the deployment of new technology enables more work to be done with less effort. Training of the personnel and the development of new work practices are needed. New types of teamwork between human personnel and technology will be designed. The growing importance of the Internet and the new roles it brings about in production also set new challenges for the personnel. All in all, the multimedia environment and the non-linear process will both provide challenges that cannot be met without considerable inputs to the development of journalistic work.

A creative and charismatic personality is highly valued in journalists. In connection with these electronic media, personnel are needed who can comprehend complex phenomena, make sense of confusing situations and be ready to act under a high information load.

5.2 Future production paradigm

In the analyses of WP2 it became clear that a linear model of production is an idealization of the real process, which is known to be full of interconnections between functions. Good output has been acknowledged to be a result of iterations in the process. It has become necessary to move back from this idealization and to redefine the production paradigm. The new paradigm is seen to include at least two aspects. First, it is based on a service-oriented business model and, second,

on a non-linear production process. In this chapter, we introduce the future production paradigm.

5.2.1 Service-oriented business model

The business model of future electronic media will be service oriented. This means that the purposes and needs of the society and people using media services are driving the media production. This business model also implies an intrinsic principle according to which the media business and production processes are structured. The basic idea is that the entire production system is considered to be composed of hierarchical layers of means-ends relationships. In other words, a certain lower level of a system, let us say technical components, may be considered as providing means that support an upper level function, a certain technical system , e.g. a data storage system, which again provides a technical service, e.g. an archive function.

The next level of the hierarchy, the technical service, e.g. the archive, can be seen as a means to deliver a service that is important for media business that orients towards effectively providing media content on demand. This business function forms the basis for an end-user service, e.g. last week's programme contents, which has been identified to satisfy a vast number of end-users who do not watch TV regularly but want to keep in touch with current contents and popular discussion topics.

In a service-oriented business model, the monitoring of the quality of the overall functioning of the system is not only accomplished by technical measures that describe the functioning of the means but also with monitoring indicators that reveal whether an end that is aimed for, i.e. a certain service, has been successful.

The challenge for the electronic media and broadcasting companies is to conceptualize the different levels of the sociotechnical business system they are managing and to organize the processes of the system to deliver the services in which the end-user is interested. The ITIL community, and the ITIL Service catalogue in particular, provides support to these efforts by the broadcasting companies. The telecom operators are also currently transforming their business models into service-oriented ones.

In the forthcoming work on the NELME pilot, a demonstration will be provided of service-oriented business thinking in the organization of the media production process.

5.2.2 Linear production process

Drawing on ideas presented by Oittinen[37], we propose that the media production process consist of four main functions that are structured in a networked manner. Figure 12 depicts the generic functional model of the production process. As Figure 12 indicates, the basic form of the model is clearly non-linear. There are three production functions, i.e. planning and processing; publishing, delivery and use, and archiving and access, which are ordered in a continuous chain with two-way interactions with the core function of the content management.

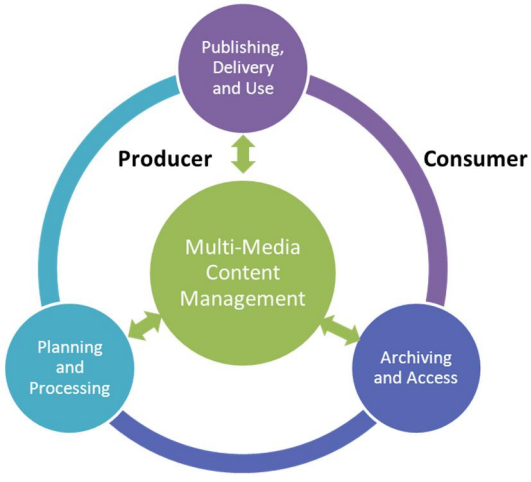

Figure 12. The new functional model of future production (modified from the original version by Oittinen[37])

Drawing on Oittinen's ideas, we have considered what the intrinsic quality features may be that the future production process should express. To the original three characteristics, i.e. *multimediality*, *topicality* and *visuality* that a future media production process should maintain according to Oittinen, we added a fourth characteristic, i.e. *emotionality*. Interpreting Oittinen, these characteristics emerge from the internal and external pressures that media production is experiencing today:

The multimedia character is the most evident feature of future electronic media. The media production uses different publishing channels (radio, TV, Internet, mobile) and exploits different forms of perceptual modalities including hearing, vision, touch and a diversity of interface technologies (connection to ambient intelligence). With *topicality* we draw attention to the identification and creation of relevant and interesting topics for the huge information flow. *Visuality* should be taken

[37] Oittinen, P. (2011). Media content access, production process and tools. Power point presentation downloaded 25.5.2011 from www.nextmedia.fi.

to denote the requirement that the form of presentation of the content is *illustrative*, i.e. uses different means for facilitating the comprehension of complex and abundant material. Finally, *emotionality* draws attention to the fact that electronic media have an important function of creating emotionally laden experiences by the users, e.g., via shared online participation in joint events. There may be numerous qualities of User Experience (UX) depending on the targeted content and the user groups.

The proposed electronic media production process model draws attention to the fact that the production process is not only owned by the producers but also by the consumers (see Figure 12). As the model makes explicit, these two partners interact in every function of the process, most with those functions in the outer production circle and in a mediated way with the core function of content management. Using the model in Figure 4 as a means, it is possible to characterize the interaction between the producer and the consumer in a systematic way; see details in [38].

5.3 The future production paradigm and the NELME scenarios

The analyses accomplished within WP2 focused on understanding the future aims and constraints of electronic media production. The starting point was the present forms of organizing broadcasting production. The experts participated in the analysis, and the observation they made when visiting the broadcasting companies was that TV broadcasting, as a form of mass media, will most probably have an important role in the future communication society. The new production paradigm that was sketched for the electronic media production process has two major attributes. It is service-oriented and non-linear. These two characteristics emerge from the insight into the increasing role of the Internet and the new forms of communication it enables, i.e. social media. The challenge for the broadcasting companies is to find new ways of operating that creatively exploit the possibilities of the Internet. In their analyses and discussions, however, the experts also stressed the inherent strengths of the broadcasting medium, i.e. it enables shared focus and joint public experiences among millions of people at the same time. Being present at joint repeated or singular events creates unity and continuity that people also seek. This applies at the same time as the fact that people express needs for mobility and freedom of externally set time constraints in the consumption of media content.

In connection with and as a response to the above-described complex demands of the public, the production processes need to be non-linear and more

[38] Norros, L., Liinasuo, M. & WP2 partners (2011). Production Processes and Workflows. Concept of Operations analysis for projecting New Electronic Media Production. NELME WP2 Report, VTT.

flexible. There are of course also pressing economic reasons to develop non-linear forms of production.

When considering the 14 sub-scenarios introduced above, it becomes evident that practically any of them, when they become reality, would require production processes according to the new production paradigm. Many of the issues included in the scenarios were discussed as reasons, drivers or outcomes of changes in the production processes. From the production process point of view, the issue is not whether the operators, social media or Internet would be dominant but rather that the restructuring of the electronic media production will have to enable integration of the interests of different actors and to facilitate interoperability of diverse technologies. The scenarios labelled ‘Value-added content’, ‘HbbTV’ and ‘IP Audio’ are examples that emphasize the integrative tendencies in the industry. Professionalism in media content creation, and production and delivery were highlighted in the WP2 studies in which professionalism would include new ways of working and collaboration while interacting with the consumers in a variety of forms.

6. Some Notes Concerning Production Tools

Whatever the scenario, flexibility is the keyword for any production-related issue in the world of increasingly diversified and rapidly evolving terminal platforms and distribution alternatives.

In production, especially recording and capturing, prosumer tools also become tools for professionals. Compared with prosumers, the professionals will have a toolbox that is more advanced in ergonomics and agile in routines. Production equipment will communicate with the next phase of the publishing process over wireless technologies.

Due to decreasing equipment prices and… avoiding costly long-term investments in single purpose tools seems most reasonable.

In media management, both hardware and software seek cost-effectiveness by compromising costs and exponentially increasing needs for intermediate storage, long-term storage and archiving. Until 2016, meta-data-based asset management will still be in use, but semantic retrieval and searching will emerge in experimental systems.

Keeping our eyes open for media agnostic production and delivery infrastructures is preferable to ending up with monolithic single media arrangements:

In addition to managing video, audio, text and still images, we can expect unknown content-related data, ‘X’, to become part of the production process. This X may be related to, for example, media management, process management, value-added services and/or content processing. It may or may not be classified as metadata. In fact, by not knowing the exact meaning of ‘X’, we cannot assume that the selected single system vendor will eventually come out with the best solution.

Other circumstances such as the ‘open innovation’ paradigm, introduced by Prof Henry Chesbrough, attempt to solve similar problems. Introducing the open innovation paradigm to production infrastructure has the potential to lead to the most flexible environment in which to operate. For instance, if player A wanted to integrate visual radio into content production, he would have all of the interfaces open and be able to add the required functionality to the production platform, even though the platform itself would be provided by player B. Thus, both A and B

would have the benefit of open innovation. Furthermore, with open innovation, the consequences of single vendor lock-in are not fatal, as they often used to be.

As an acid test for a buyer: flexible data structures (not necessarily relational databases), database access, modularity over open interfaces supported by several players and proper documentation are the most important issues to evaluate.

A thought for a system provider: remember that most of the smartest people work for someone else. If there is a problem you cannot solve, invite other companies to innovate and let them provide solutions. Open up interfaces that they may need.

This note reflects on the modular service-oriented production process described in Chapter 5.

Content distribution and receiving environments will merge to include both linear and non-linear interactive access. For this, generic software and coding architectures like object-oriented programming (Java), multi-platform language (nXML) and hyper-text-mark-up-language (HTML5) will be major technologies. Managing different terminals, from mobiles to UltraHD screens, will become a challenge for production by 2016, not least from a storytelling point of view.

Generic software and coding architectures are the best bet even though ecosystem development may lead to non-standard solutions and proprietary arrangements. Maintaining in-house skills of basic technologies gives the best edge to evaluating third-party offerings. On the other hand, knowledge of the latest software tools has a tendency to become obsolete quickly after they have been learned – skills to be acquired by outsourcing?

7. Summary of Detected User Groups

Based on the analysis of the WP3 questionnaire (N=164), five different media user groups are suggested for future observation and study. A summary table for these groups is presented in Table 5.

Table 5. Detected user groups.

Group	Description	Related scenario
'MULTISCREEN USERS'	Use of multiple devices and social media simultaneously OK; slight emphasis on young people	*Success of social media; value-added content and services*
'WEALTHY'	Technologies that make life easier are good; high incomes	*All except critical audience*
'CONSERVATIVE'	Happy with the current situation; routine-like media use	*Home theatres*
'ECOLOGICAL'	Critical towards consumption; ecological thinking	*Critical audience*
'AWARE & CRITICAL'	Critical towards online culture and constant media flow	*Critical audience*

Note: The groups presented are not necessarily exclusive; some consumers may belong to more than one group. Placing people into very restricted categories in the changing media environment is not realistic.

8. Nelme Process for the 2016 Foresight

8.1 WP1 Technology Trends (Erkki Aalto / Metropolia)

The work package started to define research topics by enquiries. This was to discover the significance of variable topics to define a model for the Initial Round of the WP1 partners and specialists. The next peer-to-peer enquiry changed the evaluation of the 98 technological elements to measure it in five degrees of significance from less important as -2 to more important as +2. The scale was applied instead of the percentage to describe the change. The process took place from September to October 2011.

After feeding the research topics to the team of six work packages, the WP1 Technology Trends evaluated the principle scenarios of the NELME 2013 Forecast (Personal Viewing, Non-linear TV and Slow HD) reflecting the assembled data from enquiries.

In the team of work package leaders, the focus on Forecast 2016 was set by clustering the discovered topic and setting it to possible trends. These trends were evaluated by enquiring statements versus counter-statements (Table).

From this output, the NELME project set scenarios to be described. WP1 described Operator Dominance, Hybrid Broadcast Broadband TV (HbbTV) and IP Audio. The phase was processed in late October and November

After the workshop by the NELME steering board and work package leaders on November 11th 2011 the report Forecast 2016 was improved.

There were 12 set scenarios altogether, illustrated in two dimensions (NELME Forecast 2016, page 16). The scenario 'Proactive broadcasters' was evaluated in December.

The WP1 partners approved the current version of the 2016 Forecast at the meeting on December 12th.

All the contributions, research material processing and supplements by WP1 are described in the appendix report. The process is described in Figure 13 below.

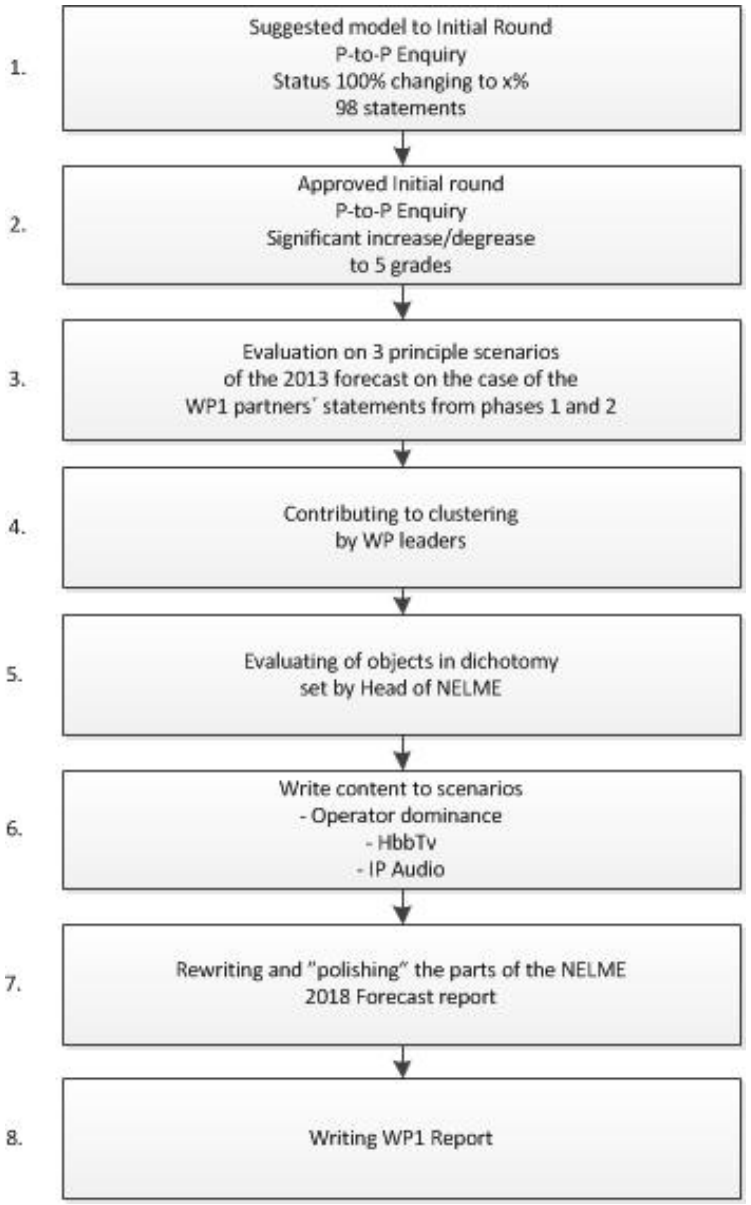

Figure 13. WP1 (Technology Trends) contribution to this report.

8.2 WP2 Production Processes (Leena Norros / VTT)

WP2 has focused on understanding the changes foreseen in the production processes in the near future of electronic media. Instead of predicting trends and providing inputs to the scenarios of future electronic media, which was the focus of the other NELME work packages, this one was set to analyse the present production and to identify seeds for future forms of production in the present reality. To do this, three small-scale case studies were accomplished that exemplified some advanced features of media production. The aim of these case studies was further to understand the pressures on the work processes and personnel competencies in the media production. WP2 also considered the work accomplished in the other NELME WPs in order to understand the predictions concerning the future of the electronic media domain.

In the research-oriented work of WP2, different conceptual models were used to structure and interpret the observations concerning the present practices and the predictions of the experts in media technology and production.

As a result of WP2, a proposal was made of a service-oriented business approach to production, and the basic functions and structure of a non-linear multimedia production process. This approach and model will be piloted in the next phase of the project in order to concretize and test the basic concepts.

8.3 WP3 New User-Driven Services (Anu Seisto / VTT)

WP3 created seven stories describing potential media use situations in the near future. The stories were based on the 2013 scenarios. Consumers' opinions and evaluations of the stories were then asked for in a public web questionnaire launched in September. The questions were partly based on QUIS with some modifications, and both quantitative and qualitative data were collected with the questionnaire. The data were analysed, resulting in some generic outlines as well as a set of different user groups.

Based on the analysis of the WP3 questionnaire (N = 164), five different media user groups are suggested for future observation and study.

8.4 WP4 Ambient Media (Artur Lugmayr / TUT)

WP3 created seven stories describing potential media use situations in the near future. The stories were based on the 2013 scenarios. Consumers were then asked for their opinions and evaluations of the stories in a public web questionnaire launched in September. The questions were partly based on QUIS with some modifications, and both quantitative and qualitative data were collected with the questionnaire. The data were analysed, resulting in some generic outlines as well as a set of different user groups.

8.5 WP5 Business Models (Ulf Lindqvist / VTT)

The analysis has been based partly on the results of the 2013 forecast. In addition, a questionnaire study was conducted among the experts of WP5, the WP leaders of the NELME project. The questionnaire covered the players, megatrends, driving forces, technology impact, trends and changes, potentials and threats for public service companies and commercial media companies.

The questionnaire was answered by 14 experts. The results were analysed statistically, calculating the mean values of the indexes, standard deviations, normalized mean values, variations and correlations between the experts. Two external gurus were also interviewed: Tauno Äijälä, Yle, and Seppo Sisatto, University of Tampere. Finally, the results were interpreted by the working group.

8.6 Compiling work package contributions

The topics for the 2016 studies originated from the 2013 report, with additional issues discovered when preparing the report or in work package discussions. Two work packages used internal questionnaires and interviews to evaluate the topics (Figure 14) while two others processed them in work package meetings.

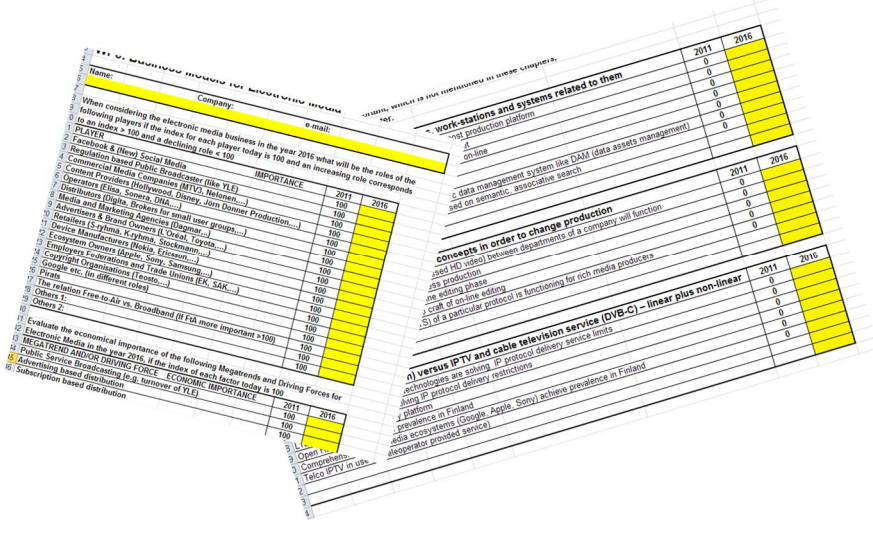

Figure 14. Collecting research items.

More than 20 topics were collected from the documentation produced by the work packages, complemented in a brainstorming session that resulted in a total of 98 topics. Each of these topics was converted into an argument and a respective counter argument. The probabilities of them happening by 2016 were evaluated by

work package leaders on a scale of ‘for sure’ – ‘likely’ – ‘not likely’ – ‘impossible’, with ‘impossible’ meaning that the counter argument was expected to take place. If a topic was evaluated as ‘for sure’ by any work package leader, it was used as a core for a sub-scenario. In contrast, an evaluation as ‘impossible’ even by a single work package leader prevented the topic from being processed further. For topics falling between these extremes, a consensus was required to take the topic further.

After this process, 15 selected sub-scenarios were clustered by the work package leaders as an evaluation of how likely it was for each pair of sub-scenarios to coincide in the future, on the same four-step scale. After clustering, the result was ten sub-scenarios. (Figure 15.)

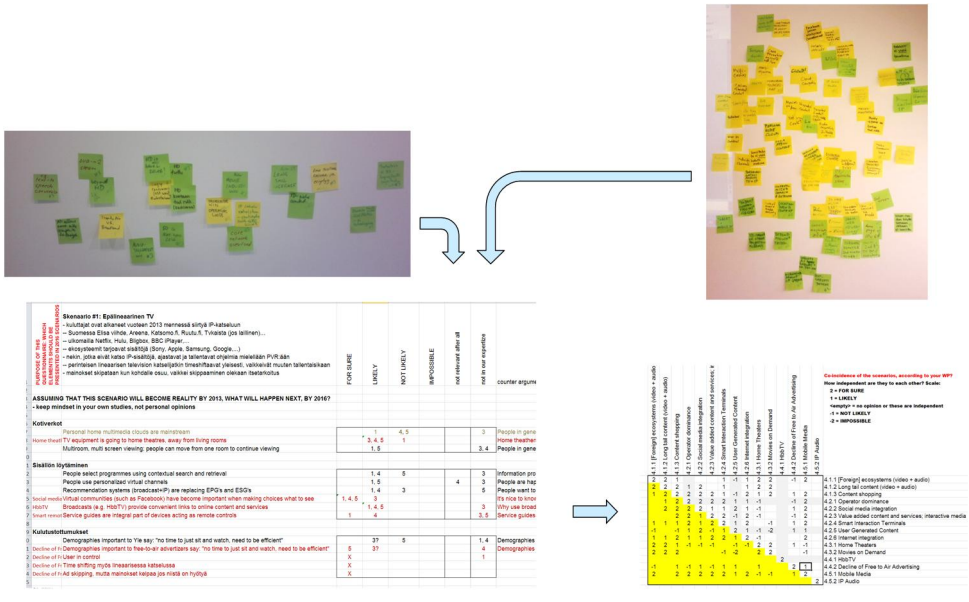

Figure 15. Combining the results (additional source: documents produced by work packages).

These ten sub-scenarios were then evaluated by work package leaders in three dimensions: ‘probability’, ‘option for current business’ and ‘threatens current business’ (Figure 16). This round provided the stars presented in this document.

1=For sure 2=Likely 3=Not likely 4=Impossible	Probability	Option for current business	Threatens current business			Probability	Option for current business	Threatens current business	
Broadcast as Usual (page 20)	1	2	3	HIGHEST		4	3	4	LOWEST
Pay-TV success (page 21)	2	1	3			2	1	3	
Value-Added Content and Services (page 22)	1	2	3			2	3	3	
Proactive Broadcasters (page 28)	2	2	2			3	2	4	
Print Media Intervention (page 30)	2	2	2			3	3	4	
Social Media Success (page 34)	1	2	1			2	3	3	
Home Theatres (page 37)	1	1	2			3	3	4	
Emerge of Critical Audience (page 38)	1	1	1			2	4	4	
IP Audio (page 39)	2	1	3			3	3	3	
Ecosystem Dominance (page 44)	1	1	1			1	3	3	
Operator Dominance (page 47)	2	2	2			2	3	4	
Open Internet Success (page 49)	2	1	1			2	3	3	
Content Shopping (page 51)	1	1	3			3	2	4	
New Advertising Models (page 55)	1	1	1			2	2	2	
Broadcast as Usual (page 20)	1.5	2	4	MEDIAN		2.3	2.5	3.7	AVERAGE
Pay-TV success (page 21)	2	1	3			2	1	3	
Value-Added Content and Services (page 22)	2	2	3			1.7	2.3	3	
Proactive Broadcasters (page 28)	2	2.5	4			2.3	2	3	
Print Media Intervention (page 30)	3	2	2.5			2.7	2.5	3	
Social Media Success (page 34)	2	2	2			1.5	2.3	2	
Home Theatres (page 37)	2.5	2.5	2			2.3	2	3	
Emerge of Critical Audience (page 38)	2	2	2.5			1.8	2.5	2.3	
IP Audio (page 39)	2	2	3			2.3	2	3	
Ecosystem Dominance (page 44)	1	3	2			1	2	2	
Operator Dominance (page 47)	2	2	2			2	2.7	2.7	
Open Internet Success (page 49)	2	2	2.5			2	2	2	
Content Shopping (page 51)	1	1	3			1.7	1.3	1.3	
New Advertising Models (page 55)	1	1	2			1.3	1.5	1.8	

Figure 16. Prioritizing the sub-scenarios.

In these evaluations, work package leaders had an opportunity to consult their teams, if necessary. In general, the work package leader had been the person most involved in the process and he/she thus had a justified say on these evaluations.

The sub-scenarios were presented to the steering group after which a discussion was launched to organize the sub-scenarios on two axes. During these discussions, four additional sub-scenarios emerged and were accepted by work package leader consensus.

As far as the axes were concerned, the horizontal axis (broadband penetration) was self-evident, while in the beginning the vertical axis was seen to have something to do with content, content rights or content-related regulation. After discussions between the work package leaders, who consulted the respected scenario specialist Toni Ahlqvist as well as substance experts from VTT, and, finally, after personal discussions with several steering group members and Dr Erja Ruohomäki from Yle, the vertical axis took its shape and the diagonals were created.

9. The Next Steps

Compared with 2013, the creation of foresights for 2016 indicated that forecasting becomes progressively more difficult as the time span increases. However, there are numerous weak signals and trends, some of which are applicable to further forecasting.

As the next steps, the project will use the scenarios for 2013 and 2016 as a filter for detected weak signals, as illustrated in Figure 17. These signals, which are relevant, pass the scenarios and, at first hand, are suspected of affecting consumer behaviour, which may in turn affect infrastructure development. This order is conceptual and has to be considered on a case-by-case basis. We will keep all our options open to add new scenarios for 2013 and 2016 if necessary.

Bearing in mind that new domestic high definition licences that replace the old ones will be granted in 2016, the licensing policy for both television programmes and transmission networks are still unclear, and foreign corporations have indicated interest in the market, the domestic playground may change radically in the years to come.

The final report will became available in Q4/2012.

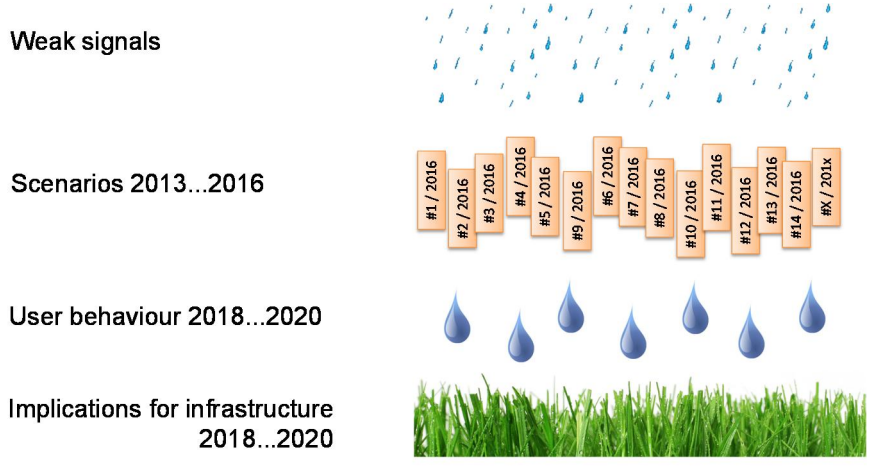

Figure 17. Concept of creating weak signals, foresight for 2018 and 2020.

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Appendix

Reports available on request

1. Nelme WP1 (Technology Trends) report for 2016 foresight: Research Material Processing, Supplements.
2. Nelme WP3 (New User Driven Services) report for 2016 foresight: User Groups for Further Observation and Study.
3. Nelme WP4 (Ambient Media Experience) report for 2016 foresight: Ambient Media Experience Foresight.
4. Nelme WP5 (Business Models) report for 2016 foresight: Foresight 2016.

Series title and number
VTT Technology 31

Title	**New Electronic Media (NELME)** **2016 Foresight**
Author(s)	Ville Ollikainen (ed.)
Abstract	The Nelme (New Electronic Media) project[39] will provide justifiable predictions of the most presumable and critical futures of electronic media, more specifically, electronic mass media, and, even more specifically, the future of the 'broadcast' as we know it today by the year 2020. To accomplish this task, a research framework has been created to describe relationships and causalities between interdisciplinary trends and issues related to broadcasting and electronic media. This report covers intermediate results as a foresight to 2016. For 2016, the foresight contains four scenarios that represent alternative futures. The scenarios are as follows: #1: Linear Broadcasting #2: Online Mass Media #3: Specialized Audiences #4: Non-linear Era. They are organized on two axes: the horizontal axis describes broadband penetration and IP network performance in general ('Limited broadband' – 'World of broadband') while the vertical axis describes content availability ('Exclusive content rights' – 'Open digital market'). The foresight also contains the most probable vision, which, from a consumer perspective, is based on rapid penetration of broadband television and radio services, leading to hybrid viewing. This intermediate report also contains a description of the production processes for 2016, a set of detected user groups and the next steps for the project.
ISBN, ISSN	ISBN 978-951-38-7846-7 (URL: http://www.vtt.fi/publications/index.jsp) ISSN 2242-122X (URL: http://www.vtt.fi/publications/index.jsp)
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Publisher	VTT Technical Research Centre of Finland P.O. Box 1000, FI-02044 VTT, Finland, Tel. 020 722 111

[39] The two-year project Nelme was launched in October 2010 and has been funded by the Finnish Broadcasting Company Yle, Anvia Oyj, MTV Oy, Tieto Oyj, Genelec Oy, Jutel Oy, Sofia Digital Oy and Tekes – the Finnish Funding Agency for Technology and Innovation. The research partners in the project are VTT Technical Research Centre of Finland, Helsinki Metropolia University of Applied Sciences and Tampere University of Technology.

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#2: Online Mass Media
#3: Specialized Audiences
#4: Non-linear Era.

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