Digital TV platforms of public organisations

Business models, bottlenecks and public policy

Colophon

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Synopsis:

This paper presents the results of a pilot study in which business models have been analysed, in order to sketch market developments and innovation topics, and to identify bottlenecks. The study concerns digital TV platforms in the Netherlands and the UK, that are provided by *public* (broadcasting) organisations. The bottlenecks have been discussed with interviewees. One of the questions was how public policy (partly) creates or removes the perceived bottlenecks. The results of the study are compared with the results of a study on digital TV platforms by *private* organisations.

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Abstract

Business model analysis is used in different contexts, for different purposes. This paper will use business model analysis in the context of policy analysis and impact assessment. This opportunity has been created by progress in business model studies (integrated frameworks), as well as policy challenges in the field of ICT. This paper presents the results of a pilot study in which business models have been analysed, in order to sketch market developments and innovation topics, and to identify bottlenecks. The study concerns digital TV platforms in the Netherlands and the UK, that are provided by public (broadcasting) organisations. The focus is on digital TV via the internet. The results of the study are compared with the results of a study on digital TV platforms by private organisations. This concerns the design of business models (how are public business models different from private business models?), the perceived bottlenecks and the remarks and suggestions related to public policy.

The bottlenecks have been summarised in Table 4 in Chapter five (Conclusion). In the case studies, the bottlenecks were linked to elements of the business model. A bottleneck has an influence on the design of the business model, for example the pricing model, standards, and the level of vertical integration. For nearly all bottlenecks, it was possible to address the role of public policy.

Several bottlenecks concern the public service remit of public broadcasters. Under what conditions does more user involvement, such as user generated content, fit the standards of quality, good taste and independence of public broadcasters? Are public-private partnerships an effective strategy to exploit digital archives, launch thematic digital channels and provide TV via Internet, and are there any tensions with the public service remit? What are the restrictions related to competition policy? These questions have to be addressed by public broadcasters and the policy makers to which they are accountable.

The increased number of platforms improves the bargaining power of rights owners and content producers, which can frustrate and delay negotiations to launch services. In specific cases, there may be a need to reconsider policy. One example is the role of public broadcasters as providers of content. The recommendation is to stimulate public broadcasting organisations to pursue a strategy that is platform and technology neutral.

Another bottleneck – for public as well as private organisations – is the (high) uncertainty on user demand for interactive services, and user responses to new types of advertising, sponsoring and paid content. The policy recommendation is to support user studies, commercial pilots and living labs to acquire information on user behaviour related to interactive digital TV services, and different types of advertising.

Other bottlenecks and policy recommendations are related to standardisation and interoperability (e.g. for DRM), clearance of copyrights, visibility of public content on the Internet, the financial constraints of regional (public) broadcasting organisations and community based initiatives, and micropayments.

Preface

The B@HOME project is part of the Freeband Communication programme, which aims at the generation of public knowledge in advanced telecommunication (technology and applications). Freeband is based on the vision of 4G networks and services. It specifically aims at establishing, maintaining and reinforcing the Dutch knowledge position at the international forefront of scientific and technological developments, addressing the most urgent needs for research and novel applications in the present unfolding of new technology. Freeband comprises more than 25 organisations, including all-important technology providers and many representative end-user organisations. The Dutch Ministry of Economic Affairs is co-funding this programme as part of the BSIK plan. This specific B@Home paper is also funded via the strategic knowledge programme of the Dutch Ministry of Economic Affairs (Directorate General Energy and Telecoms) and TNO Information and Communication Technology.

The vision for Freeband for 2010 is to consider communication and information transfer from the perspective of the user, not the provider. The communication infrastructure will become transparent and abundant in all its layers. Freeband addresses the knowledge chain in communication in the direction of the new ubiquitous communication paradigm. Based on this vision key research questions take place in three main themes:

- **Society, Users and Applications:** what are the new possibilities in different sectors for ubiquitous communication and ambient intelligence, what do they presuppose as knowledge and how can they be realised?
- **Networking, Service Provisioning and Generic User Interaction:** the telecommunication infrastructure viewed from the user's perspective.
- **Enabling Technologies:** no new services emerge without adequate technology; conversely, it is the technology that drives the new paradigms!

B@Home's scope is future broadband services for the residential user, with a focus on the entertainment domain. The objectives of the project are to develop new business models as well as architectures capable of plug-and-play service delivery to the end-user.

The knowledge and experience gained in the project will be used to implement a demonstrator to show some of the future advanced services. In B@Home, Lucent Technologies, Philips Research, LogicaCMG, the Technical University of Eindhoven, Erasmus University of Rotterdam and TNO work together to achieve these results. The project started on July 1st, 2004 and has a duration of four years. After two years, the first demonstrator will be presented.

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Annex 1: Summary of business models

1 Introduction

1.1 Digital TV platforms of public (broadcasting) organisations

This paper will explore how public organisations design their business model for digital TV (DTV) platforms, and which bottlenecks are perceived. Ten case studies have been conducted: six in the Netherlands; four in the UK. It will be described how bottlenecks influence the design of the business model ('the decisions that are being made') and whether public policy has a role in creating or solving the bottlenecks. For instance, bottlenecks in micropayments will influence the pricing model; bottlenecks in digital rights management can influence the content offering; the remit of public organisations can be a bottleneck for partnerships, revenue models and revenue sharing. For the design of business models, and for the list of bottlenecks, a brief comparison will be made between public and private organisations that operate digital TV platforms. For instance, do public and/or private organisations opt for open standards and maximum interoperability? A previous study focused on *private* organisations that operate a digital TV platform.

Before we elaborate on the research question and the research approach, we introduce the uptake of digital TV and the importance of so called digital TV platforms. Subsequently, we mention the role of digital TV platforms that are operated by *public* organisations such as public broadcasting organisations.

The uptake of digital TV is increasing rapidly in Europe. There are many variations between European countries. The UK ranks first. In the UK, three out of four households watch digital TV.[1] In addition to the digital TV platforms that paved the way (satellite and cable), new platforms have been introduced. Digital terrestrial TV (DTT, also referred to as DVB-T), Internet Protocol TV via Digital Subscriber Line (IPTV via DSL), and TV via the internet increase the number of platforms and the variety of services. For instance, the number of digital terrestrial subscribers in the Netherlands has increased from 150.000 in Q3 2005 to 245.000 in Q3 2006. November 2006, the Netherlands has switched of analogue terrestrial broadcasting of TV signals. Examples of IPTV via DSL platforms are MaligneTV/France Telecom and Free (France), and Tele2/Versatel (Netherlands). New services via IPTV and DSL include premium channels, video on demand and interactive Electronic Programming Guides (EPGs). The label 'TV via internet' covers a variety of websites with TV and audio-visual services such as streaming and on-demand, for a general audience and for niches, with professional productions and user generated content. This cluster of services is provided by organisations with different backgrounds. Providers include public and private broadcasting organisations, publishers of magazines and newspapers, players such as YouTube, Microsoft, Yahoo and national or specialised entrants.

[1] Ofcom (2006).

Digital TV platforms (and their operators) are an important element in the digital TV value chain. In many cases, a digital TV platform 'mediates' between on the one hand a variety of content and service providers, and on the other hand a variety of consumers.[2] One of the key elements of digital TV service platforms is customer relationship. This includes a strong consumer brand and it may include conditional access, billing, registration of users ('eyeballs') and advertising deals related to the platform. Other key elements of the digital TV platform are content packaging (e.g. premium TV packages and Video on Demand (VOD) archives) and navigation (e.g. portals and EPGs). These features of digital TV service platforms can be of relevance for services other than digital TV. Examples are services such as radio/audio, news (text or multimedia), discussion fora, messaging and electronic commerce (such as online shops).

Digital TV platforms are provided by private as well as public organisations. This paper will address DTV platforms that are provided by *public* organisations. Many national, regional and local public broadcasting organisations have launched DTV platforms on the internet ('TV websites and portals'). In several countries, the national public broadcasting organisation is one of the partners in the consortium that operates the digital terrestrial platform (DVB-T platforms such as Freeview in the UK). In the Netherlands as well as the UK, DTV platforms that are operated by public organisations have gained a strong position. In the Netherlands, several digital TV websites of national public broadcasting organisations score well. Combined, these websites scored a top ten ranking in 2006.[3] In the UK, the BBC websites score a fifth place, and the number of Freeview subscribers is growing strongly.[4] This paper includes eight case studies of DTV platforms operated by public broadcasting organisations. There are two cases on DTV platforms by other types of public organisations. One platform (Vlinder.TV) emerged from a local community; another platform was set up by a non profit organisation (Fabchannel).

1.2 Business model analysis as a tool for policy analysis

In our previous papers we have addressed why and how business model analysis can be an effective tool for policy analysis.[5] This policy research option has been created by progress in business model frameworks.[6] Integrated business model frameworks have been developed, in which financial, organisational, technical and product/service elements are integrated. Business models are more than costs and revenues. Furthermore, an integrated business model framework allows for an analysis of a service that is provided by a value network of organisations. The analysis may be focused on one

[2] On the role of Digital TV platforms, see Poel & Tee (2006) See also Poel (2003) and Limonard and Tee (2007).

[3] The websites of the Dutch national public broadcasting organisations (combined) are in the top 10 of most visited websites. See for example the media concentration monitor of the Dutch media regulator (www.cvdm.nl). Another popular website / DTV platform is the website of commercial broadcasting organisations RTL. This is one of the cases in our previous study (Poel & Tee, 2006).

[4] All BBC websites combined scored a 5th place in a 2006 ranking by ComScore. The BBC scores higher than BskyB and YouTube. See ComScore, 22 November 2006, "ComScore reveals U.K. Top Sites and Web Traffic Trends for October". On Freeview figures, see Ofcom (2006a).

[5] Poel & Tee (2005, 2006).

[6] See Chapter 2 of this report for more background information on the business model framework that was developed by TNO, Telematics Institute and the Technical University Delft. See also the Freeband research projects B4U and FRUX (www.freeband.nl).

organisation ('the spider') but it is never restricted to one organisation. Topics include revenue sharing, investment sharing, the level of vertical integration, modularity, interoperability and user involvement.

Because business model analysis allows researchers to explore a set of important business decisions, it allows researchers to present conclusions on *market dynamics*. For example, who are the main providers of a specific service, what are the market developments related to topics such as the functionalities of services, vertical integration, consolidation and collaboration, pricing and costs? This type of analysis covers more topics than an analysis that is based on research frameworks such as market structures or strategy case studies of leading firms.

Furthermore, an analysis of business models may allow researchers to present conclusions on *innovation dynamics*. For example, which type of new services and features are being piloted and launched, by which type of value networks, to allow which types of user involvement? Especially in ICT services, it can be difficult to make a demarcation between the innovation process and market developments. As we migrate from the deployment to the implementation phase of ICT, of great importance are (services) innovations that take place 'in the market.'[7] This can be difficult to grasp with a research framework such as systems of innovation (national, regional, sectoral). National and regional boundaries can be irrelevant. Sectoral boundaries can be troublesome because of convergence within the ICT sector (media, telecom, IT) and because new services may require interaction between the ICT sector and other sectors (e.g. financial services, cultural industry, transport, health, education).

If business model analysis is an effective tool to analyse market and innovation dynamics, it can become an effective tool to analyse the impact of public policy on market and innovation dynamics. However, this holistic perspective creates a challenge to design a research approach that is feasible. Many policy instruments will have an impact on several elements of business models, and hence on market and innovation dynamics. Policy uncertainty may delay investments, access regulation may influence vertical integration, R&D programmes may influence standards and the design of services, etc. In a previous paper, five research approaches have been identified. All five research approaches are expected to be effective in explorative policy analysis. The analysis is not intended to assess one policy instrument, but seeks to understand how the existing policy mix has an influence on market and innovation dynamics for specific services or markets. Two out of five research approaches can also be effective in policy analysis on specific instruments (such as R&D programmes and regulation) or specific impact indicators (such as modularity and vertical integration). This has been explained in Poel & Tee (2005).

In a second paper, a pilot study has been presented (Poel & Tee, 2006). The pilot study was a so called 'bottleneck analysis' for digital TV platforms that are provided by private firms. In this explorative policy analysis, bottlenecks were identified by firms, and were linked to the business model, and the role of policy instruments in creating or removing the bottlenecks. In doing so, organisations presented a sketch of their business dynamics, bottlenecks, and the role of public policy.

[7] On the deployment and implementation phase of ICT, see Perez (2002).

Bottlenecks were defined as barriers and impediments that are mainly *outside* the scope of the organisation that provides a specific service. Bottlenecks are not about pure internal issues and small external problems.[8] It proved to be an advantage to start the discussion with the business models and bottlenecks of firms (and use business language) rather than to start with scientific frameworks and pre-defined categories of policy domains and policy instruments. In preparation of the interviews, we explored the policies that may be relevant.[9]

Based on experiences during the pilot study, this study will again address business models, bottlenecks and policy for digital TV platforms. However, the case selection has been restricted to digital TV platforms that are provided by public organisations. This allows us to comment on differences between private and public platforms. Similar business models, similar bottlenecks? To opt for public cases is also instrumental to pilot whether the research approach is effective to assess how public organisations collaborate with private and public partners, how the design of the business model takes on board general policy statements (such as maximum interoperability, open standards, non-discrimination, open innovation, user involvement), how general policy and regulation (applicable to all organisations) has an impact on public organisations, and how the remit of public organisations may hinder innovation. The decision to focus on cases in the Netherlands and UK is based on the differences between both countries (in digital TV progress and in the policy mix), the leading role of the UK in digital TV penetration (within Europe), and practical considerations (language and contacts).

1.3 Outline of the paper

The six steps that were taken in the analysis are summarised in Table 1 (next page).

[8] Bottlenecks can be related to temporary and persistent *impossibilities* (e.g. technical, legal, financial), substantial and crucial *uncertainties* (e.g. on markets, users and policy) and *persistent strategic and operational problems* (e.g. organisational integration, quality of service, access to key resources and third party facilities) (Poel & Tee, 2005, 2006).

[9] To know the policy context allows for a nuanced discussion of 'policy complaints' and suggestions by interviewees. For instance, we read the European Trend Chart on Innovation: country pages and EU scoreboard (policy monitor for the European Commission (EC), Benchmarking national and regional policies in support of the competitiveness of the ICT sector in the EC (study for the EC), 11th Report on the Implementation of the Telecommunications Regulatory Package (market, policy and regulation monitor by the European Commission (2005)). and websites and policy documents by national ministries responsible for ICT, media and innovation (mainly the ministries of economic affairs and cultural affairs). If this analysis is done well structured and documented, for the business models for a specific service or market, it can be labelled a *policy scan*. This is one of the five research approach that link business models and policy analysis (Poel & Tee, 2005).

1	Objective of the study, scope (services, markets, innovations, policy domains), case study selection
2	Analyse design of business models: value proposition, value network, functional architecture, financial model
3	Aggregate business model analysis (cases) to the level of market developments
4	Position and explore perceived bottlenecks in business model framework
5	Assess the role of public policy (in place) in creating or resolving the bottlenecks
6	Formulate policy recommendations

Table 1: Main structure of the analysis: six steps

The first step has been addressed in this chapter. Chapter two will introduce the business model framework that was used for this study. In presenting the framework, a set op hypotheses will be given on how public organisations can be expected to design a business model (e.g. open standards). The results of the second step (analysis of business models) will be summarised in chapter three (four UK cases) and chapter four (six Dutch cases). A highly structured overview of the ten business models is presented in Annex 1. The analysis of business models is based on desk research, and was validated by the interviewees. The third step is based on an analysis of the differences and similarities across ten cases. Is there consensus that business models for (public) digital TV platforms can only use proprietary, de facto standards, advertising based revenue models, little user involvement, digital TV (websites) as a complement rather than a substitute for analogue TV? The results of the third step will be presented in chapter five (conclusions). The fourth step is to identify, explore and position the bottlenecks within the business model framework. What and where are the bottlenecks? This is based on interviews. The same set of interviews provided the material for the fifth step. We asked: how does policy partly creates or removes these bottlenecks? The results are presented in chapters three and four. The sixth step - policy recommendations – is based on the interviews as well as reflection by the researchers. Results are presented in chapters three and four (linked to cases) and in chapter five (across cases).

It should be stressed that the results of the study are based on interviews with representatives of ten public organisations that provide a digital TV platform. To increase the knowledge base on which the conclusions are based, the input of interviewees is confronted with the results of recent digital TV studies by TNO, European Commission, OECD and others. To some extent, this allows us to confront the perspective of (public) platform operators with the perspective of consumers, content providers and other stakeholders. However, the conclusions based on a (pilot) study with ten interviews should be interpreted cautiously.

2 Business model analysis: framework and hypotheses

2.1 Introduction

This chapter gives a summary of the business model framework that is used in the B@Home research project (Figure 1). The framework consists of four clusters of design variables. The framework builds on work from TNO and research partners[10], and is more elaborately described in Ballon (2006).

It is not very common to use a business model approach to analyse services that are provided by *public* organisations. This deliverable builds on an earlier study where we used the same approach to study digital television platforms that are provided by *private* organisations. Because it is likely that the public nature of organisations impacts on their business model, we formulate a number of hypotheses on how 'public' business models will differ from 'private' business models. The hypotheses are noted in the relevant design variables elaborated on below.

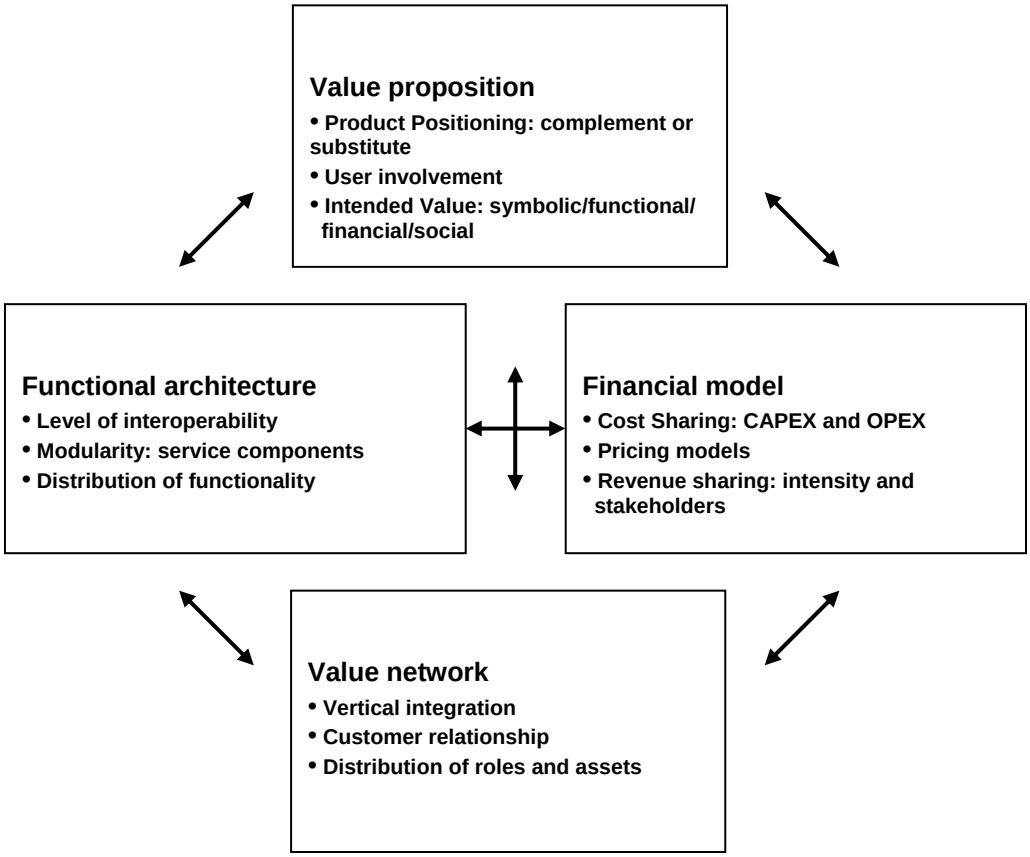

Figure 1: Integrated business model framework for ICT services

[10] See Ballon et al. (2005); Faber et al. (2003); Haaker et al. (2004); De Munck et al. (2003).

2.2 Value Proposition

- Product positioning

This criterion refers to whether the product is positioned as a complement to existing products or services, or is meant to be a substitute. Complementary products/services require different strategies as substitute products. For instance, to launch complementary products requires decisions on how to link the new product to existing products (commercially and technically). Examples are interoperability and exclusivity.

Furthermore, we distinguish between direct competitors and substitutes. A direct competitor is a product that competes on the same or very similar quality dimensions to other products, e.g. Apple's iPod and Microsoft's Zune. A substitute refers to a product that can offer similar functionality but does not belong to the same product class. For example, mobile phones that have music capabilities vs. dedicated mp3 players like the afore mentioned iPod and Zune.

- User involvement

It is increasingly recognised that end-users can play a significant role in the value adding process. Examples include peer-to-peer services, SMS-based services, and an increasing number of web-based services that rely on user input to create value, sometimes referred to as Web 2.0. Examples include Wikipedia, Google's page-rank, Ebay's user feedback system, Amazon's user reviews system, and reviews on hotel booking websites. In the case of digital television we distinguish between user roles such as zapping, time shifting, browsing, rating and tagging, sharing, changing, and generating content.

- Intended value

Different types of values that be linked to products/services. In some cases one value type can be specifically referred to as differentiating (crucial). More often, a combination of values is relevant. We differentiate between symbolic value (which gives the user an element of prestige or other type of symbolic value); functional value (which improves an existing function or introduces a new type of functionality in a given activity); financial value (a cost reduction compared to existing services or higher quality for a similar price); and social value (occurs when the user is able to maintain or enhance its social network).

Private organisations that provide DTV platforms typically target mass markets, or niche markets when these are expected to be profitable. **Hypothesis one** is that public organisations target mass audiences, as well as a wide range of niche audiences, that includes niches that are not necessarily profitable. This hypothesis is based on the public service remit of public broadcasting organisations, as well as a shared understanding that public organisations can not focus on the most attractive niches.[11]

2.3 Financial Model

- Cost sharing

Because broadband services often require significant investments. Cost sharing can be important. Examples of high cost roll outs include 3G networks and service platforms such as i-mode and T-Zones.

[11] On the public service remit of public broadcasting organisations – in the context of digital TV – see Leurdijk (2006).

Important variables include the size of the investment (and the risk), the number of parties involved, how long the write-off period is, and whether or not public actors are involved (e.g. Public Private Partnerships, PPP). We distinguish between the capital and operational expenditures (CAPEX and OPEX respectively), as well as the number of firms participating (one, two, or multiple).

The not-for-profit nature of public broadcasters and other public organisations can inhibit cost sharing agreements between public organisations and private organisations. For example, how to share the risks, investments, operational costs and revenues between a public and a private organisation? For public broadcasting organisations, the public service remit may even prevent activities and agreements can that can contribute to profits of private organisations. This is the case in the Netherlands. It seems to be less troublesome to have cost sharing agreements among several public organisations. For example, systems for digital processing, distribution and archiving may be shared. **Hypothesis two** is that public organisation that provide DTV platforms will not engage into cost sharing agreements with private organisations.

- Pricing Models

A range of pricing models exist. This includes selling at a “conventional” market price or at a subsided price, where revenues are gained from other sources (for example the iPod and the iTunes Music store, where most of the profit is gained from the first product). Bundling increases pricing options such as cross subsidisation. Companies can also use price differentiation and versioning, where prices are varied according to quality dimensions such as speed and timing. In the business model framework that is applied in this paper, a number of pricing models are distinguished. Examples are pay per use, subscription based, advertisement based and complementary products/services (see annex 1).

Public broadcasting organisations typically have a not-for-profit strategy, that is linked to the objective to serve as many market segments and niches as possible (‘the general public’). Financial sources are provided via government funding (e.g. in the Netherlands) or a license fee (e.g. in the UK). In many countries, advertising is a complementary source of revenues. These remarks are relevant for other types of public organisations as well, e.g. community based organisations and specialised public organisations (that focus on one niche). **Hypothesis three** is that public organisations that provide DTV platforms will provide services free of charge.

- Revenue sharing

When products are created/developed or provided together with partners, revenue sharing agreements might be used. These arrangements can be used either to distribute risks or to stimulate peripheral firms to take part in the development of the product. The type of revenue sharing might vary depending on whether the organisation is the initiator or follower, and whether there are bilateral or multilateral agreements. It needs to be decided how the revenues are measured (including revenues such as attention and reputation) and how the revenues are shared among the partners in the value network.

As mentioned above, it can be highly complex for public organisations to share the risks, investments, operational costs and revenues with private organisation. **Hypothesis four** is that public organisation that provide DTV platforms will not engage into revenue sharing agreements with private organisations.

2.4 Value Network

- Vertical integration

The level of vertical integration is a difficult strategic issue in the ICT sector. Note the content activities of telecom and cable operators, debates on fibre optic consortia, and Mobile Virtual Network Operators (MVNO). Integration can be exclusive or not. Exclusivity comes in two types: to only use one's own facilities, or to not allow others to use one's facilities. To address vertical integration, the business model framework includes a value chain. The value chain is customised for content related services and other ICT services. It distinguishes between content production, packaging, distribution, and navigation.

Bundling can be an important element of a vertical integration strategy. For example, a specific piece of content can be provided exclusively to users of a specific DTV platform (package). Furthermore, several DTV platforms are available via one specific distribution infrastructure. This type of vertical integration and bundling is less prominent for DTV via internet. In general, users with all sorts of internet access subscriptions, will have access to many online DTV platforms.

There are bundling strategies that are not linked to vertical integration. For example, TV programmes, channels and interactive services can bundled in one package. Also note that bundling can be stimulated via light instruments such as advertising and billing for one product, via discounts, and via strong instruments such as tying ('TV programme A can only be bought in a bundle with TV programme B').

In contrast to private organisations that provide DTV platforms, public organisations typically have a low degree of vertical integration. This will decrease possibilities and advantages of bundling. The exception is DTV platforms via digital terrestrial networks. Here, public broadcasting organisations can be part of the consortium that operates the network and the DTV service platform. This is the case in the UK, and has been the case in the Netherlands. Furthermore, public organisations may have less incentives to bundle products. This is related to the not-for-profit profile and the pricing models (see above). This is not to say that public organisations will refrain from bundling completely. Bundling can be used to advice users on other products that may be relevant for users, to increase consumer loyalty, and to stimulate users to stay within the domain of its DTV platform (e.g. website). This is relevant for the reach of public organisations and - is some cases - advertising revenues. **Hypothesis five** is that public organisation use fewer bundling strategies than private organisations.

- Customer relationship

Customer relationship looks at whether or not direct relations with end customers have been established, also referred to as customer ownership. In a typical value network for ICT services, one or two contributors will have customer ownership. Examples are UPC Digital, YouTube and the BBC. Depending on the nature of the service, a varying amount of information on the end user might be gathered. This information can be used to customise or otherwise improve the product to suit the end-user. A direct customer relationship is considered a strategic asset as it can also be leveraged to complementary products to the original product. We distinguish between a number of customer relationship and lock-in strategies that companies might employ. Examples are contractual agreements and loyalty schemes.

- Distribution of roles and assets

In the value chain (or value network) firms can contribute to the various value chain layers (roles) with a range of assets. To assess the roles and assets, an extended version of the value chain is used. Six layers/roles are considered: consumption, navigation, distribution, packaging, production, and creation. Examples of assets that firms can contribute to these layers include brands, content rights, customer knowledge, (potential) market presence, and distribution network.

2.5 Functional Architecture

- Level of interoperability

This mostly concerns technological standards. 'Open' can have a variety of meanings, including that it is not owned privately, that its source code is freely available, or that it is free of copyright. Proprietary standards have the same range of meanings, but the exact opposite. Proprietary standards are used in many areas such as digital TV (in most set-top boxes (STB) and conditional access systems (CAS)) and mobile service platforms (such as i-mode). This factor of the business model framework distinguishes between open and proprietary standards, and whether they are interoperable. Note that interoperability can be increased via de facto standards (open or proprietary) and via interfaces.

Public organisations, especially those that are linked to governments, can be expected to support open and interoperable standards. Many ICT policy documents have stressed the advantages of open and interoperable standards. See for example the European Union ICT task force report (2006) and the European Commission Communication (2004) on interoperability for DTV and the role of open MHP standards (Multimedia Home Platform). One of the policy strategies is to use public organisations to push open standards, rather than to mandate a standard. **Hypothesis six** is that public organisations that provide DTV platforms will adopt standards that are open (non-proprietary) and highly interoperable.

- Modularity: service components

Modularity refers to the design of systems and artefacts (such as devices) as a set of discrete modules that connect to each other via predetermined interfaces. Systems that have a higher degree of modularity can more easily adapt over time, and system owners usually have a higher number of suppliers it can choose from. This element of the business model framework considers the number of components that are used in the system (few or many), and whether they are custom made or standardised (off the shelf).

- Distribution of functionality

This refers to the location of intelligence. It might be distributed, which means the functionality is located in the terminals - such as the PC - and/or several de-central nodes of the network, such as a network of routers and local caching of websites. The intelligence can also reside in central elements of the network. One example is thin client computing with data, software and (extra) processing power located at one central location. In general, a distributed set-up will increase user control. This element of the business model considers whether the services use a streaming and/or download model; whether the control/timing is done centrally or de-centrally, and whether Digital Rights Management (DRM) and Quality of Service (QoS) features are present.

3 DTV cases in the UK

3.1 BBC Creative Archive

Introduction

In April 2005 the BBC launched the Creative Archive, which offers free access to selected BBC content for learning, pleasure and creativity. At the core of the Creative Archive project is the Creative Archive Licence, inspired by the Creative Commons movement. The Creative Archive Licence recognises and preserves copyright but creates the opportunity to engage in non-commercial sharing and integration of personal derived work. The Creative Archive Licence allows downloading to user's hard drive to copy and or share the work and create, copy and or share derivative works on any platform in any media. Commercial use is prohibited and users must share their own content on the same terms. Users must restrict distribution to the UK and treat content with respect.

Creative Archive users are able to:

- search for legally cleared TV and radio programmes, extracts and whole programmes
- preview and download non-broadcast quality versions (MPEG-1)
- modify and create their own versions
- share with others on a non commercial basis

October 2006, viewers have access to 500-600 video clips in total. From the beginning of the service in April 2005 until August 2006 there have been 100.000 regular users who have accessed half a million copies of the material. In the pilot phase (until October 2006) the audiovisual material has been limited to factual content, in the future the BBC wants to make archive material available across all BBC genres.

The BBC has created a Creative Licence Group that includes public and commercial partners. The Creative Archive Licence was launched by the BBC together with Channel4, the British Film Institute and the Open University. Since then Teachers' TV, The Museums, Libraries and Archives Channel and ITN News Archive have joined the Creative Archive Licence Group.

At the end of the pilot in October 2006, the service had to go through a public value test and a market assessment by Ofcom. During this period the service has been closed down. If approval to continue the service is received, the BBC intends to release a lot more material, up to 1000 hours of content every year. The outcome of the pubic value test and market assessment for the Creative Archive is expected in Spring 2007 and might give clearer guidelines on what the BBC is allowed to do.

The Creative Archive business model is summarized schematically in Annex 1. Notable business model issues include its high emphasis on user involvement; a decision to support both proprietary and open standards; and geographic restrictions due to the funding structure of the BBC.

Bottlenecks

1) Resistance from private firms that fear unfair competition

Private firms **f**ear that free access to the BBC's audiovisual archives and the availability of high quality

audiovisual material might hamper their possibilities to commercially exploit their archive material. With its Creative Archive offer - like with all other new, digital services - the BBC has to strike the right balance between offering access to its content on digital platforms on the one hand and staying within the limits of its public remit on the other hand. The BBC's remit includes innovation and developing digital services. Moreover, opening up its archives fits with the government's policy of stimulating free access to the nation's cultural heritage. At the same time new, digital services are subject to stricter regulations and procedures than the general open television channels BBC1 and BBC2. The BBC Trust has to subject all BBC's new services to a public value test and a market assessment by Ofcom, to determine their value for end users and the extent to which the new services distort competition in a free market. This means that the BBC can not freely and without restrictions open up all content in its archives to the audience, if there are market players that could exploit similar content on a commercial basis. A specific concern is that the BBC can build on the archives and staff for 'old media' to develop free and high quality new media services.

The BBC believes that the pilot phase has proven that there is little or no piracy and that instead the service has made archive material better known among the audience. According to the BBC it has even stimulated the demand for audiovisual archive material. Private competitors and partners will benefit. It is expected that in due course a mass market for audiovisual material will develop, in which people are prepared to pay small amounts of money for upgrading their productions based on Creative Archive material to high quality video content.

The resistance from private firms and the restrictions related to market distortion have affected the value network of the service. The BBC has offered the creative archive licence to other public bodies but also to commercial ones. The BBC seeks to avoid exclusivity. The value network is relatively open. This is due mainly to the Creative Commons approach that was chosen. The functional architecture is less open. The BBC uses a mix of highly interoperable content formats and proprietary standards for content browsing. Commercial companies (e.g. ITN News Archive) have been able to participate and have come to acknowledge that making available audiovisual archive content has widened market possibilities and opens up new business opportunities (not only b-to-b, but mass market), because more people get familiar with the use of audiovisual material. For ITN News Archive it functions as a shop window. Moreover the Creative Archive could also support businesses, as educational publishers can, for example, use Creative Archive content to prototype new educational material.

As mentioned above, public policy is relevant for this bottleneck. The system of checks and balances appears to be debated yet valuable. The BBC can innovate and pioneer, within the framework of the public service remit, the public service test and Ofcom's market assessment test.

2) Adoption: differences between population/market segments

The main bottleneck for further growth of the service is the speed in which people get familiar with the use of audiovisual and sound material and the level of media literacy and media skills. Young people are very keen on the use of archive material and digital services and might be frustrated that the BBC is not moving faster in this field, older people might take up these kind of services at a slower pace or might not be interested at all.

For the business model, this uneven interest limits the possibilities for the BBC to invest in the service, as its investments in the service should be in line with the reach of the service among licence payers. The

BBC's remit is to provide information, education and entertainment to *all* licence payers and it therefore can not legitimate to invest 'too much' money in services that still only have limited audience appeal. The BBC's value proposition for its Creative Archive will therefore also need to take into account user friendliness and disclose and present the content in an accessible, easy to understand and attractive way. This can be relevant for business models decisions related to user involvement, modularity and de-central location of applications (thick clients). The BBC tries to avoid: too much, too soon.

Public policy is relevant. The tensions related to catering for different population/market segments are stronger for public organisations than for private organisations. The public service remit does allow for innovations that are targeted at specific segments. To allow the BBC and other public broadcasting organisations to more actively target early adopters, and to 'educate' other segments, is part of a policy decision on how to use the public broadcasting organisation as a catalyst for innovation. If this role is stressed, competition concerns will increase.

3) BBC's public remit and User Generated Content can be contradictory

The BBC recognises that viewers are moving from 'just' viewers to co-creators of content. The relationship between the BBC and user generated content is a complicated one though, because unrestricted publication of content by users might conflict with the BBC's reputation for quality and editorial independency. For instance: material on Google Video is not moderated, it is hard to find what you are looking for, and often of low quality. The BBC Creative Archive therefore does not allow users to publish the productions made of it's archive material directly on the BBC's website. It will however provide some options for showcasing the results of what people have produced with its archive material through competitions in which the best submissions were made available on BBC's websites.

In the business model framework, the level of user involvement is considered an important element. The public remit of the BBC appears to 'pre-define' that the BBC is not leading in User Generated Content (UGC). This decision is linked to the intended value of the Creative Archive and similar services. A small level of user involvement decreases the options to create social and symbolic value, and to increase the customer relationship. The latter is highly relevant for internet services since service providers such as the BBC have to 'share' the customer with a variety of firms. Examples are portal websites, internet service providers (ISPs), advertisers and software providers (e.g. RealMedia).

The influence of public policy on this bottleneck is via the public service remit rather than via other policies and regulation. Of great importance is clarification of the remit and its quality considerations, in the context of platforms and services that include User Generated Content.

4) Copyright owners hesitate to collaborate in Creative Commons approach

The BBC has started the BBC Creative Archive with content of which they own the copyrights, especially news and other non fiction material. With non factual material, produced by independent producers, but even if produced by the BBC itself, this is a more complicated issue as some of the underlying right holders of archive material, are still hesitant to join deals with the BBC for making material available through the Creative Archive Licence. Particularly right holders in non factual programmes such as actors, musicians and writers, make the assumption that the service would undermine the potential commercial value of their past work. The BBC needs to severe the support of all these right holders and their organisations. Therefore, a second pilot is envisaged for making available fiction content, in which the BBC will cooperate with right holders representing – among others - writers, musicians and actors. The copyright issue is

difficult. First because it is very time consuming to clear all copyrights for exploitation beyond the purpose for which a programme was initially produced or commissioned (usually for being broadcast on the general BBC channels). Second because broadcasters can not always acquire copyright material - on terms that they find acceptable - for secondary exploitation on digital platforms. Copyrights are an asset that (some) independent producers and underlying right holders are also keen to possess and exploit. This limits broadcasters in opening up their archives more extensively.

The business model for the Creative Archive service is influenced by the hesitant position that is taken by many copyright owners. Access to less content may imply less intended value of the service, and less possibilities to develop substitutes for traditional services. On the financial side, copyright owners push for revenue sharing and for an important role in the value network. The variety of DTV platforms has improved their bargaining position. Independent producers and artists are getting less dependent on broadcasters for distribution of their work because the internet and other digital platforms increasingly offer them alternative outlets for their productions, be it through the packages and services network and portal owners or through their own websites. One of the counter-strategies by broadcasters could be to increase the level of vertical integration: to produce more content in-house.

New government policy concerning copyrights will affect the position of different stakeholders in the value web, among which the BBC and other broadcasters. Copyright legislation in Britain is currently under review. One of the triggers for the review – by the Gower committee – is the rise of digital platforms.

3.2 FourDocs

Introduction

Four Docs (http://www.channel4.com/fourdocs/) is a broadband internet channel designed by Channel 4 for people to showcase their documentaries. Users, be they professionals or amateurs, can upload and download 4 minutes long documentaries. The website started in 2005.

Channel 4 is a private broadcaster funded by advertisement. Channel 4 has a public service remit to provide innovative, high quality programmes made by independent producers, in return for free use of spectrum. FourDocs fits with Channel 4's public service remit. From the late eighties to the late nineties in the twentieth century Channel 4 was known for commissioning high quality documentaries. With increasing competition in a multi channel world and fragmenting audiences, Channel 4 redefined what it meant by factual programming, and shifted the focus on its main channel to more popular documentary output in the genre of reality TV series, such as Wife Swap. The website became an alternative channel for the distribution of innovative documentary content.

To maintain quality standards and to assure that legal requirements are fulfilled, all uploaded documentaries are moderated. As a result, the video quality on FourDocs is much higher than the content found on other UGC sites like Google Video, MySpace or YouTube. All contributors are required to make their work available under a Creative Commons licence. People that have uploaded a documentary to FourDocs receive comments from the FourDocs' professional editorial team as well as from other users. All these comments are published on the website. October 2006, 200 films have been published.

The FourDocs initiative was well reviewed and won several prizes such as the IVCA Awards (two times) and the Learning on Screen Awards, including the Grand Prix and the Revolution Award for best website from a media owner. It was also nominated for the Webby award. FourDocs receives on average 14 films per week, out of which one or two each month are not eligible for publication, mostly because the copyrights are not properly cleared.

Contributors are both amateurs and professionals. The website is used by teachers, professors and students in universities, film schools and media courses to stimulate students to showcase their work, receive criticism from reviewers, and see if they meet professional standards. The website also contains documentaries from abroad (Mexico, US, African countries, Lebanon).

The FourDocs business model is summarised I Annex 1. Business model design choices worth highlighting include the emphasis on User Generated Content (UGC) that is moderated and of more consistent quality than other UGC initiatives. Also, the choice of format complements the regular TV offering, but also returns to the genre originally associated with Channel 4.

Bottlenecks

1) Bandwidth limitations

Bandwidth is still the main bottleneck for this service since it restricts the number of potential users and especially the number of contributors. Even though many people now have access to broadband internet connections, the capacity is a-symmetrically distributed between uploading and downloading capacity. Uploading a four minute film might still take six hours or more, depending on the quality of the image. This has put off people from uploading their films. The website is now being upgraded to deal with this problem. The bandwidth problem will gradually diminish, because prices for bandwidth are still dropping.

To some extent, this bottleneck is mitigated by the decision to launch very short documentaries. However, bandwidth limitations still limit the variety of users and contributors and (therefore) the intended value (less social value) and product positioning (no substitute for documentaries 'on the telly').

Public policy that is relevant includes competition policy (e.g. access regulation in broadband markets) and R&D programmes with a focus on network technologies, content compression and distribution formats.

2) Increasing usage leads to higher costs

A second bottleneck is that the increasing popularity of FourDocs leads to extra costs: extra costs for server capacity and extra costs for the editorial team that has to view and check all films before they are published on the website. It is estimated that a 50% growth in popularity will lead to about 15% extra costs. For a non-commercial project this can become a serious problem.

This bottleneck is linked to the financial model. The required investments are substantial. It has become important to forecast growth and to select systems that are 'scalable'. To tackle this problem, revenues are important. The service is free for end users and has until now been free of advertisements. Channel 4 questions whether advertising on FourDocs will conflict with the character of a documentary website. Advertising might not be well received by its users that are highly critical of commercial influence on

‘artistic’ or documentary production. A niche audience and little possibilities for extra income, limit the potential of growth for this service.

Public policy was not mentioned in relation to this bottleneck.

3) Visibility on the internet

A third problem is the marketing of FourDocs. How are people going to find the website amidst the overwhelming amount of content available on the web? This requires a new and difficult add on to Channel 4’s marketing strategy. Channel 4’s has created partnerships with Google Video, YouTube, MySpace and Apple (podcasts). FourDocs documentaries are published on prominent pages of these websites, at Google Video for instance in their Google Picks section. This can increase traffic to Channel 4’s website by a factor 10. It is a deal with no money involved, but one from which both partners benefit. Google Video, YouTube and MySpace benefit from enabling their visitors to have quick access to high quality content. FourDocs creates an extra tool to make the FourDocs service known to a large audience, in the UK and elsewhere.

To increase visibility, the business model includes a rich value network with firms that recommend the FourDocs service. The role of other firms is small. They assist in promotion and navigation. So far, this is not linked to the financial model.

Public policy was not mentioned in relation to this bottleneck, although it was mentioned that public and quasi public organisations should not be hindered in finding ways to increase visibility on the internet.

3.3 Freeview

Introduction

Freeview is the main service on the Digital Terrestrial TV platform in the UK.[12] Shareholders are the BBC, BSkyB, National Grid Wireless, ITV and Channel 4. The consortium operates under the name of DTV services Ltd, and its main aim is to market Freeview. The technical implementation of Freeview was carried out by BBC Technology (now Siemens Business Services) before the launch in October 2002.

Users require a set-top box or a integrated digital television set (iDTV) equipped with the appropriate digital tuner to receive Freeview. The prices of the STB start at 30 British Pounds (~ 45 euros). Boxes can be purchased at electronics shops, supermarkets, and department stores. There is no subscription fee for Freeview.

Year end 2006, Freeview comprises 41 channels, the majority of which are classified as “entertainment.” This includes the main BBC channels. Other categories are Children’s, News, Music, and Lifestyle. Freeview users also have access to over 20 digital radio channels. In order to raise awareness of digital recording, Freeview has introduced a brand called “Freeview Playback” to promote digital TV recorders.

Freeview has enjoyed high user uptakes. It is available to 73% of UK households, and at the end of 2006 had a take-up of around 9 million households (36%), for which Freeview is the *main* method of receiving TV on the primary set. The actual number of Freeview set-top boxes and iDTV’s is higher (close to 15 million). The difference accounts for households using Freeview for a second or third television set, as well as a number of unused and ‘old’ STBs.

The Freeview business model is summarised schematically in Annex 1. In terms of business model design, the following elements are particularly notable. Costs, both operational and investments are shared by the Freeview consortium, composed of a mix of public and private organisations (BBC, BSkyB, National Grid Wireless (formerly Crown Castle), ITV and Channel 4). The value of the service itself is mostly a substitute for “traditional” TV viewing, as opposed to emerging services on the internet and other infrastructures that are experimenting with more active user roles. However, some basic forms of interactivity, such as time shifting and program information are available.

Bottlenecks

Bottleneck 1: Limits to vertical integration and coordination of decisions

The first bottleneck concerns the way the value network for Freeview is organised, compared to the market structure in digital TV markets. Freeview has opted for a value network in which the set-top box (and its software and middleware) can be developed and sold by a variety of firms. The competitors of Freeview, e.g. BskyB and cable operators, have a tight grip on the selection and implementation of technologies, and

[12] A pay TV DTT service, Top Up TV, also operates and has circa 200,000 subscribers.

on commercial offers that link the service to the set-top box. Furthermore, Freeview is a consortium rather than one vertically integrated firm. Again, this can be troublesome for influencing technology, innovation and commercial offerings. Improvements or modifications of services are decided via coordination between all relevant stakeholders. The challenges triggered by this set up poses challenges in terms of coordination of activities, decisions and the pace of innovation.

This bottleneck is tied specifically to the business model factors vertical integration and distribution of roles in the value network. Freeview is set up in such a way that the stakeholders involved are only responsible for their layer in the value chain.

This bottleneck is partly a result of the policy framework. Whereas a private organisation can offer a DTV platform service by itself, this would be problematic for the BBC (one of the initiators of Freeview), due to its public service remit and restrictions on commercial activities. On the other hand, policy makers have allowed or even stimulated a public-private consortium. This has resulted in an attractive and free service, which is highly successful in the market.

Bottleneck 2: How to communicate one unified message and brand?

The second bottleneck is linked to the first bottleneck. Again, it relates to the set-up of the consortium and the number of stakeholders involved in the value network. The multiplicity of actors can create problems in the way Freeview is being communicated to potential end-users. For example, manufacturers or retailers might promote different aspects of Freeview compared to broadcasters or other stakeholders. Public and private broadcasters may have different positions as well. For instance, Freeview is free, which minimises the potential for private broadcasters for subscription based TV packages and pay-TV services. Different messages have the potential to confuse the end-user. This is less of an issue for services that are delivered via one single company, or a consortium that is controlled by one organisation.

This bottleneck is related to the value proposition. Freeview can be both a complement or substitute to other DTV platforms, depending on household situation. Some stakeholders may have an incentive to stress Freeview as being a complement for cable, satellite and DSL. Product positioning is linked to the intended value. The BBC and others may stress the financial value (it's free) whereas others may stress the functional value (it's easy and can be used nomadic). Private broadcasters may be tempted to push for pay-TV services in addition to the free package. This will further complicate the message and brand.

There were no policy options mentioned that could tackle this bottleneck. The bottleneck was considered an implication of the Freeview value network (a consortium).

Bottleneck 3: Bandwidth limitations of the DTT network

A third bottleneck is a technical issue, related to the possibilities of DTT networks (Digital Terrestrial TV). The bandwidth currently allocated to the DTT network does not allow High Definition (HD) broadcasts.

This bottleneck can be considered a consequence of the overall functional architecture. DTT infrastructures, as well as other infrastructures, all have their pros and cons. It is not a design choice that can easily be reconsidered once taken, as deciding on the type of infrastructure (DTT via DVB standards)

is typically a one-off decision. Alternative platform operators, especially cable platforms, have less concerns about these issues since the available bandwidth is typically much higher. For satellite platforms, bandwidth is less of a problem (but interactivity is a concern).

Policy does play a role. Currently, communications regulator Ofcom is deciding on new (additional) spectrum allocations. If the necessary spectrum is not allocated to Freeview, HD broadcasts will not be available. In all cases, the amount of spectrum and bandwidth will remain relatively small compared to cable platforms and IPTV via DSL platforms.

3.4 S4C broadband portal

Introduction

S4C is the regional public service broadcaster (PSB) in Wales. The channel is bilingual (Welsh and English); most English language programming is rebroadcast from Channel 4. It also has a digital channel (S4C digital) that broadcasts Welsh content only. This focus of the case study is on the S4C broadband portal, a sub-site of the main website. The broadband portal offers a large number of shows in near TV quality.[13] The broadband site was launched February 2006. To accompany a rebranding of S4C, a new version of the broadband site will be launched early 2007. Some of the content is only accessible to IP addresses in the Wales region, others for the UK only, or worldwide. This depends on copyrights.

Programme genres available on the broadband site are leisure (including food shows and youth shows), music, events, factual (including current affairs and documentaries), entertainment, drama, planned plant (nature and wildlife), sport, and rural. For popular shows, an archive of recent episodes is available.

The S4C business model is summarised in Annex 1. Notable business model design choices are in the functional architecture and value network. For the functional architecture there is the issue of what type of standard to choose, in terms of interoperability and choosing an open or proprietary standard. Similar to other public DTV services providers, proprietary, de facto standards are used for content streaming. In general, open standards are preferred by public organisations. However, since a widely supported open standard is not present for video delivery, a more pragmatic choice has been made. In the value network, customer ownership is a notable variable. Unlike many regional broadcasters in the Netherlands, language is an important distinguisher for Welsh content. Because S4C is the only broadcaster that offers Welsh language shows, it can to a certain extent be considered an exclusive supplier. This intensifies customer relationship and increases the intended value of the service (symbolic, social and functional).

Bottlenecks

1) Time involved in clearance of copyrights

A major bottleneck involves the amount of time it takes to clear the different types of content rights. Depending on the type of content, this can range from the program itself to individual elements within the program, such as particular audio, visuals, performances, etc. In order to clear the rights, a wide variety of

[13] http://www.s4c.co.uk/bandllydan/e_index.shtml.

organisations has to be dealt with, something that can be very time consuming. Different rights also have particular “windows” as to how they can be used (e.g. in terms of number of times it can be broadcast, for how many years, on what platforms etc).

In the business model, this bottleneck is linked to S4C’s low degree of vertical integration. S4C does not produce content itself or owns the copyright over these productions. This structural role in the value network/chain is taken care of by several independent production companies.

A role for public policy could be to stimulate more streamlining in the process of copyrights clearance, either on a national or European level. One of the options is a ‘one stop shop’ for different types of content.

2) High costs to acquire content

A second bottleneck concerns the high costs to acquire popular content, particularly rights for popular sports events. For example, the rights for major sporting events (like the national football and rugby leagues) have become very popular, and the costs to acquire the rights have increased accordingly. For a relatively small organisation like S4C, it becomes difficult to compete with bigger companies, some of which operate in multiple countries, and can use their economies of scale to their advantage.

Similar to the previous bottleneck, this bottleneck is related to S4C’s low degree of vertical integration. Much of the content is acquired rather than produced in-house.

Public policy was mentioned briefly. The financial means of S4C are partly determined by public policy, as part of the public service remit.

3) Adapting work practices to broadband

With the move towards tape-less recording, the organisation, systems and workflows are being adapted. S4C’s staff has to adapt as well. This concerns the skills to master new technologies and tools, but also new roles in the organisation. Examples of tools for broadband delivery include decoding to a particular file format, bit rate, audio streams, subtitles, applying DRM if applicable etc. To increase the benefits of tape-less recording (towards file based production) systems are being developed to use one piece of content for several platforms (TV, radio, internet, teletext, mobile). In many cases, there are not yet standardised or proven solutions for file based production. On the organisation side, S4C and other broadcasters are exploring new workflows and organisational structures.

New work practices are linked to the functional architecture of the business model. File based production requires standards and interfaces for the production stage, and to exploit the content via several platforms. This requires changes in the financial model, for example cost levels and how costs are spread across programmes and platforms. Changes in the functional architecture may be a trigger to reconsider decisions on the value network. More interoperability and modularity can allow for outsourcing of activities.

Public policy was not mentioned in the context of this bottleneck.

4) Allocating resources for the broadband platform

The fourth bottleneck concerns the difficulties of allocating (enough) resources to the S4C broadband site. In addition to personnel costs, there are technical costs involved. A selection of technical costs has been

mentioned above. Other examples are servers and bandwidth. Because S4C is not planning to use banners or other forms of advertisement on its website or content, additional resources are required to carry the costs necessary for expanding and maintaining the current website.

In the business model framework, this bottleneck is linked to the financial model. Most relevant are required investments (level, period, cost sharing). Wales is a small region, and public funding is accorded proportionally. Like other regional broadcasters, it can be challenging to allocate resources to broadband activities, which are considered peripheral/complementary.

To address this bottleneck, the public policy framework in the UK could be more explicit about the role of broadband and digital services for regional PSBs (core business?) and about the role of regional PSBs in promoting the switchover to digital TV via all platforms (a catalyst?). This should be taken into account when deciding on budgets for (regional) PSBs. One of the difficulties is that broadcasters evolve into 'file based and multi platform' organisations. However, it is still possible to allocate some of costs to specific platforms such as the broadband platform.

5) Limited broadband penetration

To be able to make use of the S4C broadband platform and to receive near TV quality, a high bandwidth broadband connection is needed. Broadband access in Wales is limited or not-present in rural areas. Also, anecdotal evidence suggests that the actual diffusion of broadband access is lower than the official numbers supplied by providers. This is partly due to in the figures on business and consumer subscriptions, and several connections per business clients. The limited coverage and adoption of broadband access reduces the potential audience of the S4C broadband site.

Limited broadband penetration, in addition to financial issues, have influenced the business model for S4C's broadband platform. It is a complement rather than a substitute for regular TV and radio broadcasting.

It was mentioned that public policy is implemented to increase broadband availability.

4 DTV cases in the Netherlands

4.1 Fabchannel

Introduction
Fabchannel provides on demand video streams of live shows from Paradiso and the Melkweg, two live venues in Amsterdam. Since its inception in 1999, Fabchannel has been operating as a non-profit organisation. The streams are all available for free. The organisation is currently in a transition phase towards commercialisation.

Year end 2006, Fabchannel has a catalogue of over 500 shows. Many of the shows have been indexed per song, which makes it easier for the user to navigate through the show. Fabchannel participates in national research projects to further enhance the Fabplayer, the application that delivers the content. A new feature could be to provide detailed metadata and allow end-users to 'micro-tag' particular content, e.g. a certain guitar solo. Alternative promotional outlets in the social networking area such as MySpace, Hyves are used, and a selection of individual songs is available as streams on websites such as YouTube.

Fabchannel has received funding from a variety of organisations including Paradiso, The Netherlands Ministry of Education, Culture, and Science, the Amsterdam municipality, and the National Action Plan Digital Highway. Fabchannel has been recognised as a leading content provider. The organisation has won national and European prizes, and has won a Webby ('the internet Oscar').

After its initial period as non-profit organisation, Fabchannel is now exploring the commercial possibilities of the website. In the past, Fabchannel has been approached by cable and other digital platforms to make its content available through those platforms. It has always declined. Fabchannel is currently in negotiation with a variety of companies, including platform operator, and venues across Europe where it can use its expertise in digital concert distribution.

The Fabchannel business model is summarised in Annex 1. Notable elements of the Fabchannel business model concern user involvement, modularity, and investment structure. At the moment, user involvement is focussed on browsing and navigation. At the same time, some of the techniques Fabchannel is considering (such as 'micro tagging') require advanced technical know how. The expertise of Fabchannel is also reflected in the components that are developed in-house. Fabchannel uses the knowledge that is build via participation in national research projects with universities and commercial companies. In terms of Financial Model, capital expenditures are carried by funding organisations, Paradiso and Fabchannel itself. However, when the organisation changes to a for-profit organisation, the funding structure change.

Bottlenecks
Fabchannel is in a transition phase. Bottlenecks are different depending on the phase of the organisation. We refer to the first phase of Fabchannel, when it operated as a non-profit organization, and the second/commercial phase.

<u>Phase 1: How to earn sustainable revenues in a new and uncertain market?</u>
The market for music streams and downloads during the first phase of Fabchannel's operation was

underdeveloped. It would probably not have been possible for Fabchannel to sustain itself without the various subsidies it has been able to acquire. Examples of issues Fabchannel had to deal with include technological questions such as the development of the website, recording of content (concerts), streaming formats, servers and Quality of Service in general. Strategic concerns include dealing with content rights.

This bottleneck is at the intersection of the financial model (cost sharing) and the value proposition (intended value). By itself, Fabchannel would not have been able to bear the investments and operational costs, and to develop a high quality service that creates functional value and social value.

Public policy allowed Fabchannel to tackle this bottleneck. With the financial help of the funding organisations, and the expertise in research projects, Fabchannel was able to learn and expand its operations gradually. The service has been developed up to a point where it can be commercialised.

Phase 1 and 2: Lack of interoperability between DRM solutions

Performers and other content owners typically require service providers to use some kind of Digital Rights Management solution (DRM) in order to prevent piracy. A number of non-interoperable DRM standards exists. The standards are tied to particular hardware devices, software providers, music vendor platforms and content catalogues (e.g. the major record companies). Because it is costly to apply multiple DRM standards to Fabchannel's content, Fabchannel will have to make a choice. In phase one, Fabchannel relied on non protected content and the willingness of artists. No DRM was used. To select a DRM solution is an important decision in the evolution towards the second/commercial phase. Ideally, interoperability between DRM solutions (standards) would be in place. In the current situation a choice for a particular DRM solution implies exclusion from specific user groups (e.g. users of specific hardware and software).

This bottleneck mainly concerns the functional architecture of the business model. The level of interoperability – in the market – is low. As mentioned above, lack of interoperability can have implications for user groups that can be targeted. This concerns the value proposition. Lack of interoperability will make it more difficult to position the service as a substitute, and to increase social value (e.g. communities).

Policy makers could stimulate or mandate that DRM solutions are interoperable.

Phase 2: High costs of micro-payments

A content platform such as Fabchannel can benefit from micro-payments. Micro-payments will bring down the financial threshold for potential customers, compared to credit card payments and other solutions. Furthermore, micro-payments facilitate sales of individual tracks rather than entire shows. However, transaction costs for micropayments can be very high. For example, a fixed starting rate of a transaction might be € 0.50 to € 1.00. This bottleneck will make profit-generation very difficult in a market where the typical cost of single download is between € 1 and € 2. Transaction costs of credit cards can be lower, but many credit card companies insist on a minimum level of transactions and revenues. Providers of micro-payments are reluctant to renegotiate or partner.

This bottleneck is linked to the financial model of the service. The pricing model is influenced by the costs of micro-payments. It will have an impact on the value proposition, especially the types of services being offered and the intended value. Entire shows or individual songs, free or paid, paid by users or advertisers, with a rich catalogue or from artists that perceive internet stream as an instrument to increase their fan-

base? If providers of micro-payments are more involved in the business model (rather than as a supplier) there may be possibilities to discuss sharing of costs and revenues.

Although it was mentioned that public policy should not prescribe particular pricing models and price levels, it could be explored whether this can be done to stimulate technologies and platforms for micro-payments.

Phase 2: Clearance of content rights for several countries
Legislation regarding copyrights and the procedures for clearing content rights differ greatly per country. This makes it difficult for Fabchannel to expend into markets outside of the Netherlands. Economies of scale would be easier to reach if Fabchannel could internationalise. Fabchannel is aware that harmonisation at the European level is being dealt with. The high number of actors and the different interests involved in the process make this is a long term process.

This bottleneck is linked to the low level of vertical integration. Fabchannel is dependent on the performers, composers, their management and record labels. For Fabchannel, access to content is crucial. Furthermore, economies of scale are crucial. The copyright regime has an impact on costs and revenues.

Policy makers should continue the process towards harmonisation (or coordination) of copyright and the procedures to clear content rights. In the meantime, it could be useful if policy makers provide information and guidelines on the main points and differences between copyright regimes in other countries. For example, what are the differences compared to the Dutch copyright regime?

4.2 L1 Web TV

Introduction

L1 is the regional public service broadcaster (PSB) for the Limburg province. L1 is the brand name. L1 operates with the broadcasting license of Stichting Omroep Limburg (Limburg Broadcasting Foundation).

One of the main differences between L1 and other regional PSBs is that L1 is a public-private partnership. Shareholders include two private organisations: cable operator Essent and the Media Groep Limburg. L1 is in operation since 1997. It originates from two broadcasters that were operating in Limburg: the regional PSB Omroep Limburg, and the commercial broadcaster TV8. Due to scarcity on the analogue cable network, both broadcasters had to share a channel. Omroep Limburg operated throughout the day (from 7.15 AM to 7.15 PM). TV 8 had the evening slot from (from 7.15 PM to 7.15 AM). At the same time, the Dutch media regulator (Commisariaat voor de Media) required that there should be a clear break between the two broadcasts. This was to be implemented via a half-hour ‘black screen’.

Because of this obligation, and because both stations were broadcasting quite similar programs, it was decided to partner. Due to the Dutch Media Law, the two broadcasters could not merge into one organisation. Public and private/commercial broadcasters cannot form a single organisation. The program schedule and the strategy for content production and acquisition are determined by the Stichting Omroep

Limburg (the public organisation that owns the broadcasting license). The private organisation 'L1 Omroepbedrijven' is responsible for the production, creation, and broadcasting of the programmes.[14]

The main website of L1 has a focus on text information, mostly on local news. The separate Web TV website (DTV platform) has been created to provide a variety of on demand and streaming TV services. It includes web radio, teletext and text services. Topics are news, sport, current events, history, arts and culture, local events, Limburg and its relation to Europe, programs about films and entertainment, public transport in the area, youth oriented programs, and also a show dedicated to home videos from Limburg.

In 2005, L1 was awarded the prize for media company of the year. The jury at the national broadcasters conference stressed L1's innovative cross-media approach, its efficient production process, and the fact that L1 is an example of a successful public-private partnership.

The L1 business model is summarised in Annex 1. A selection of business model design choices can be highlighted. This concerns the functional architecture, value proposition and value network. One of the elements of the functional architecture is the distribution of functionality (location of intelligence, content, influence, etc.). L1 provides downloads. Users can archive shows. Other (regional) broadcasters focus on streaming. With respect to the value proposition, it can be mentioned that user involvement is relatively high. Users can contribute actively by submitting home made content. However, L1 does not 'forward' all contributions to the website. Rather, L1 aggregates a selection of contributions into an on demand program. With respect to the value network, it was mentioned that L1 produces content. L1 is vertically integrated, albeit some activities are with the 'public half of L1' and other activities are with the 'private half of L1.'

Bottlenecks

1) Funding of internet services

For regional public broadcasters, it is difficult to provide an internet offering that matches the quality of radio and TV broadcasting. Technical and operational issues play a role, but financial issues are qualified as a bottleneck. L1 perceives the level of funding for internet activities as insufficient. This mainly concerns funding by government. It can be difficult to convince governments and senior managers to allocate (more) money to internet activities.

This bottleneck concerns the financial model (investments). It is relevant for product positioning. The financial means are insufficient to develop the L1 Web TV platform into a substitute for radio and TV broadcasting by L1 and its competitors.

As mentioned above, public policy is relevant. In the Netherlands, regional public broadcasters (and L1) used to be financed by the national government. For some years now, they are financed by regional and local governments. Regional public broadcasters only receive funding for TV and radio activities, with no specific budget for internet related activities. At the same time, policy makers stress that public (regional) broadcasters must exploit the internet as a third platform. This is inconsistent. Furthermore, it creates

[14] http://nl.wikipedia.org/wiki/L1.

tensions within the organisation. Departments that deal with internet activities have to collect budget from the TV and radio departments. Policy makers could eliminate the inconsistency (internet tasks without internet funding) without taking away the obligation to collaborate between TV, radio and internet departments.

2) High costs of archiving digital content

The Web TV platform could benefit greatly from re-using digital content. It is very costly to digitise the TV and radio archive, even in the case of L1 that only has six years of video footage and 40 years of radio material. Archiving requires tools, people and storage. Even though prices are decreasing, storage is still expensive. It is also costly to start archiving 'along the way' as part of standard workflow procedures of TV, radio and internet production. This would prevent that archiving progress would fall behind even further than six years of TV footage and 40 years of radio material. As mentioned above, the financing structure for regional broadcasters hampers initiatives outside the domain of 'business as usual' radio and television distribution. To create digital archives appears to fall outside the normal activities that are funded by governments. The problem is similar to the difficulties to allocate financial means to internet activities (the Web TV platform).

In the business model framework, this bottleneck concerns the financial model (investments). The high costs of archiving and the limited progress have an impacts on several decisions. Limited availability of digital content is a constraint on the number of services and the variety of content that can be made available on the website. Options to increase intended value and user involvement can not be explored. Examples are rich dossiers on selected themes (functional value) and to allow users to browse the entire archive (user involvement). This could be a source of additional revenues.

In the existing policy framework, different rules apply to national and regional public broadcasters, when it comes to eligibility for certain government sponsored programmes. For instance, the archival project of the Foundation for Images and Sounds (Stichting Beeld en Geluid) has a focus on the archives of national public broadcasters. There are other examples, for instance the government programme to stimulate cultural productions (Stimuleringsfonds Culturele Producties). Directly or indirectly, this type of government sponsored programmes has an impact on the financial means of regional broadcasters that want to digitise archives and seek to build services that are based on digital archives.

4.3 Omroep Brabant

Introduction

Omroep Brabant is the regional public broadcaster that operates in the Brabant region, a province in the south of the Netherlands. The Omroep Brabant TV channel has about 500 000 viewers per day The website has 450 000 page-views per month, from 330 000 unique visitors. The traditional Omroep Brabant platforms attract an older audience: the average radio listener is around 60 years old, and the average TV viewer 50 years of age. The website attracts the youngest audience, with an average age of around 40.

The website attracts about 100 000 streams (both audio and video) per month. In addition, circa 200 000 video streams are made available via its alliances with news aggregators - Zoom-In and ANP-Video - that make the streams available on news outlets from Chello, Nu.nl and De Telegraaf. Omroep Brabant has

revenue sharing agreements with those firms, and receives about 25% of the advertisement revenues.

The large majority of the TV and radio programmes (95%) is available online, up to a week after broadcast, or even longer in the case of programmes for which an archive has been created. The trend is to make programs available longer than the week after broadcast. This is possible for the majority of the content, as about 80% of the programs are produced in-house. For the remaining 20% of the programmes, Omroep Brabant tries to clear the content rights for its internet services.

The Omroep Brabant business model is summarised in Annex 1. We highlight two decisions: vertical integration and investments. Omroep Brabant has a large variety of activities that it has outsourced to partners. Internet hosting is done by Interconnect, a company based in Den Bosch (Brabant). The streaming activities are managed by incumbent telecom operator KPN. Finally, the website has been developed and upgraded by Integrace, a company that is located in the Son Science Park, close to Omroep Brabant. With respect to the website and the role of Integrace, Omroep Brabant is considering to perform parts of these activities in-house, in order to increase time-to-market. As was mentioned in the L1 case, regional PSBs do not receive separate funding for internet activities. Omroep Brabant deals with this in the following ways. It has a total annual budget of around 16 million euro. 12 million euro concerns subsidies, and 4 million euro are revenues from advertisements. Of that 4 million euro, about 40 000 - 50 000 euro come from internet based advertisements. The overall 'deal' is that the internet division receives about 700 000 euro out of the total budget of 16 million euro.

Bottlenecks

1) Funding of internet services

This bottleneck was mentioned in the L1 case as well. Both L1 and Omroep Brabant are regional broadcasters, although L1 is a public-private partnership and Omroep Brabant is a fully public organisation. Omroep Brabant perceived this bottleneck in similar ways and words than L1. See above the L1 case for details on the bottleneck, its relevance for the business model, and the role of public policy.

2) Expertise to make technological decisions

The expertise and resources to solve technological issues are perceived a bottleneck. These issues pertain - for example - to choices on compression quality, investments in server or hosting capacity, standards and scalability of systems. Omroep Brabant has to make a variety of technological decisions, with uncertainty on the technological options and implementation issues. The decisions must be prepared thoroughly with experts at Omroep Brabant and – sometimes – outside experts. The uncertainties that are involved in technology selection, and the careful process to make a decision, can delay the introduction of new services on the digital TV platform (the website). For example, how will Omroep Brabant facilitate User Generated Content? This type of decisions is important in media markets with a growing number of platforms (e.g. internet and mobile), more competition and fragmentation of audiences.

In the business model framework, this bottleneck is linked to the functional architecture of the DTV platform (interoperability, modularity, distribution of functionality). As mentioned above, this bottleneck has an impact on the services that are being introduced (the value proposition).

Public policy was not mentioned in the context of this bottleneck, although it was mentioned that all regional broadcasters have to tackle similar technology issues. Policy makers could facilitate exchange of experiences and expertise.

3) Organisational transformation

A bottleneck for the improvement of digital TV platforms - for many broadcasters - is the transition from a TV and radio broadcaster to a cross media organisation. Personnel needs to be retrained in order to deal effectively with productions that are also suitable for the internet. Previously, there was a strict division between TV/radio journalists, TV/radio producers and the people that deal with internet. Gradually, journalists and other experts on the production side are being trained to make productions that fit all media platforms, including internet. Some resistance is to be expected. Job descriptions and organisational structures are changing. A similar bottleneck was mentioned in the S4C case.

The bottleneck of organisational transformation is linked to the value network. For example, a transformation towards a cross media organisation can include changes in the level of vertical integration (e.g. outsourcing). The transformation needs to be facilitated by the functional architecture, and is likely require changes in the financial model (e.g. more investments and less operational costs).

Public policy was not mentioned in the context of this bottleneck

4) Lack of consistent metrics regarding internet usage

The 'Landelijke Verkoop Maatschappij' (ORN) is a single point of contact for advertisers that seek to advertise on (all) regional TV and radio channels. The ORN possesses demographic information on TV viewers and radio listeners. This is highly relevant information for advertisers. ORN does not have this type of information on the users of the websites of regional broadcasters. Only the general statistics are available: the total number of page-views and the unique visitors. This makes the (TV) websites of regional broadcasters less interesting for advertisers. For example, Omroep Brabant does generate revenues from its banner advertisements on the website but most advertisers are regional organisations. Consistent metrics on internet usage can bring on board national advertisers. To develop and gather consistent metrics, it is necessary that regional broadcasters and internet researchers decide on the approach and indicators. The data can then be bundled by the ORN. This may allow ORN to sell banners - for the websites of (all) regional broadcasters - with an indication on the types of users/eyeballs.

This bottleneck is linked to the financial model, most notably the pricing model. A lack of consistent metrics affects the organisation's capacity to attract advertisers, and to increase revenues.

Public policy was not mentioned in the context of this bottleneck.

4.4 Vara Comedy

Introduction

Vara, one of the Dutch public broadcasters, is in the process of reorganising its production process in order to become a cross media organisation. Comedy is one of the key genres of the VARA brand. Vara's

webportal Variatee has 15.000-18.000 unique visitors each day, compared to 85.000 for the whole VARA internet domain. Vara's Comedy offer is exploited on different platforms:

- Vara broadcasts live and recorded comedy registrations on the *open TV channel*.
- Vara recycles archive content on a *digital thematic comedy channel*, but also produces a few hours low cost, original content for this channel. Content includes recordings of cabaret competitions, made with low cost camera equipment. The digital comedy channel is distributed on digital cable platforms and IPTV platforms, as part of the public broadcasters fourth channel (Nederland 4).
- On a *comedy web portal* (http://variatee.vara.nl/) the Vara offers access to 3-5 minutes comedy clips. It offers hundreds of comedy clips and over 40 hours of shows of Dutch comedians. Clips are categorised by genre (absurd, musical, politically engaged, etc.) by subject (men, violence, holidays, sports, religion, etc.) and by comedian. The clips can be rated by viewers and viewers can suggest missing material. There is a weekly top 10 and a listing of most viewed clips.
- Other outlets include mobile phones and PDAs (daily distribution of one clip); Radio; Pod & Vodcasts; an online magazine (Greinz.nl), and events like cabaret competitions between/in schools.

The Vara Comedy business model is summarised in Annex 1. Notable business model design choices include the relatively low emphasis on user involvement for the majority of the services that are part of the Vara Comedy bundle (no User Generated Content); and the decision not to use Digital Right Management (DRM) for most of the services.

Bottlenecks

1 Scarcity of attention

In the digital world bandwidth and distribution capacity will no longer be scarce. There is however still scarcity of resources to produce high quality content and scarcity of audience attention (eyeballs). The challenge is to lure internet users into exploring the available content, but on a web portal one can only showcase part of the available material on the first page. Internet users on average are avid browsers and clickers, and only briefly watch or read material on the internet. The question is how to get visitors to explore the content and how to offer the content to different kinds of users.

To improve the reach of its web portal the Vara will be investing more in marketing: 70% of all visitors of Vara's comedy portal have found it through Google, and 30% already knows the site by name. Search engine optimization therefore is important to increase the number of visitors to the comedy portal. This technique is outsourced to specialist companies. Other marketing options include weblogs and viral marketing. It is difficult to decide upon the right marketing mix. There are many options, but their results are not always clear.

For the business model, it means that marketing costs will increase. To only increase marketing costs ('expenses') will not suffice. It is crucial to involve several well know partners in the value network for online services. The Vara Comedy platform needs to be mentioned at websites of other public organisations as well as a selection of private websites. Google has been mentioned above. When striking alliances, public broadcasting organisations such as Vara must remain within the framework of the public service remit. This limits the possibilities for partnering, revenue sharing and marketing expenses (see below). Once users get to know the Vara Comedy platform, Vara seeks to increase their loyalty. Again, this may require

additional costs. Extra features, user friendliness and exclusive content come at a price. Another tool is to maximise user involvement. As was mentioned above, users can rate and tag clips.

The relevance of public policy for this bottleneck is mainly in the public service remit. This will be addressed in the context of the second bottleneck that was mentioned by Vara Comedy.

2. Restrictions on Public-Private Partnerships

The Vara would like to further develop its comedy offer on digital platforms and would therefore like to cooperate with a variety of private organisations, such as mobile operators, comedy theatres and bars (Comedy Train, Toomler) and publishers (online and print magazines). Current media legislation restricts public broadcasters in how to cooperate with private organisations. Public broadcasters can not provide services that serve commercial interests of private organisations. Other private firms may complain about unfair competition. Boundaries between public and private values would be blurred.

With less restrictions, there would still be an ethical issue of how to maintain the public broadcasters' integrity and quality when cooperating with private/commercial partners. For instance; the Vara turned down Google's offer to distribute VARA's content on their Google Video portal, because Vara can not afford to have its content be used in an environment over which it has no control.

An additional problem for Public-Private Partnerships (PPPs) is that Vara is migrating into a cross-media organisation. Organisation structures related to content (e.g. comedy) will become more important than organisational structures based on platforms/channels (internet, radio, TV, mobile, teletext). This means that a PPP with a focus on comedy is likely to cut across all platforms. This will make it more difficult to get a grip on costs and revenues, and to prevent that a private partner will benefit (strongly) from the partnership.

This bottleneck is linked to business model decisions on the value network. Due to the public service remit of the Vara, partnerships with private organisations are problematic. They are not impossible, but are rather limited and have to adhere to certain criteria. The criteria are stipulated by media law and - to some extent - by competition law. Therefore, the ways in which the products can be offered and marketed are limited. This affects the value proposition. Vara's content can not easily be distributed on web portals that are either too commercial or over which the Vara has no control. Visibility of the Vara Comedy platform would probably remain too low for the platform to evolve into a substitute for traditional TV distribution.

Via the public service remit, public policy clearly has an impact on this bottleneck. The limitations related to PPPs are a 'normal' element of the public service remit. However, the context has changed. It may be necessary to clarify the public service remit for a digital context, in which public cross media organisations seek to serve users. The possibilities for PPPs, however small, must be clarified.

3 Copyright issues

Comedy, satire and humorous content are exploitable content. Producers want to be reattributed for the use of this type of content. Sorting out all contracts and the varying copyright provisions in them, as well as clearing those copyrights is time consuming. Many 'old' agreements are not clear about compensation of right holders in case the content is used for new media services. This is the main reason that not all Vara's content is available via the Vara Comedy platform. Recently, agreements on the exploitation of content on

internet, digital channels and mobile platforms have become a standard part of copyright contracts between broadcasters, producers and artists. But, still there are different forms and exceptions. Vara produces or co-produces 70-80% of its content and always claims exclusive *broadcasting* rights (TV and radio). It remains to be seen if this claim/strategy can be maintained for Vara's Comedy platform.

To avoid even more complexity, Vara uses 'simple streaming' rather than downloading options. Downloading would require sophisticated Digital Rights Management (DRM) solutions. This would increase costs. It may also make right holders more reluctant to clear content rights.

The copyright bottleneck is linked to business model decisions on the value network, most notably vertical integration. Copyright issues ('costs and complexity') may be an incentive to increase the share of in-house productions. An additional avenue may be to increase the share of User Generated Content. Here, quality guidelines for public organisations can be a bottleneck (see above the BBC Creative Archive case). The copyright bottleneck is linked to the financial model as well. Obtaining copyrights can become more expensive if copyrights or licenses include possibilities for cross media exploitation. Also note that public organisations may have less flexibility in pricing models. High end user prices would allow private organisations to pay more for the creation of content or to obtain content licenses. For public organisations, high prices will create tensions with the objectives to serve all segment of the public.

4. Traditional audience measurement methods no longer suffice

Broadcasters are used to measure their performance in audience shares and reach. With digital media it is more relevant and appropriate to look at the frequency of (unique) contacts through any of the platforms. Existing and new audience measurement methods will probably be complementary. Development of new methods is still in progress. For public broadcasters, this is highly relevant. The Vara is accountable to the Dutch public and Dutch government. The level of investments, operational costs and 'eyeballs' must be made explicit. How do the costs and benefits of genre compare to those of another genre? How do the costs and benefits of one platform (e.g. radio) compare to those of another platform (e.g. internet)? As mentioned above, the costs for internet services can be substantial for elements such as copyrights and marketing. Of course, measurement is highly relevant for advertising markets, in which (some) public broadcasters are active.

This bottleneck links the value proposition (especially intended value) and the financial model (especially investments and costs). Any debate on costs and benefits needs to be based on relevant figures.

Public policy was briefly mentioned. Development of audience measurement methods for online services, can be combined with user studies. To some extent, private firms are developing new measurement methods. Public organisations could be facilitated to participate in these developments.

4.5 Vlinder.TV

Introduction

Vlinder is a neighbourhood in the city of Eindhoven. In 2001, the Vlinder neighbourhood was the location of the first Fibre-to-the-Home (FTTH) initiative in Europe. The Vlinder.TV foundation has launched a WebTV platform that encourages people to share home made television content. Vlinder.TV uses a fibre-optic network to connect its servers and to disclose its content. All users of the internet have access to Vlinder.TV, via FTTH or any other type of broadband connection.

The FTTH network was initially run by the Scandinavian company Bredband Bolaget, but was cancelled after only two months of operation, as part of a cost-cutting operation. Subsequently, a cooperation was established between the Technical University Eindhoven, the Kenniswijk FTTH pilot programme (paid by national government and other stakeholders), and the municipal housing agency, to ensure that the network would be viable for future exploitation. The network is operated by two non-profit organisations: the “Netwerk Exploitatie Maatschappij Eindhoven BV” and the “Ons Net Eindhoven” cooperation.

Vlinder.TV emphasises its socio-cultural objectives, being a community based website. People are stimulated to participate in the community as moderator, photographer, camera operator, TV host, technical assistant etc. The Vlinder.TV foundation itself consists of three core members. It has a group of 10 to 15 volunteers that actively participate in the creation of programmes.

Educational objectives are among the social-cultural objectives of Vlinder.TV. The organisation collaborates with an institute for people with a mental disability. People are learned to record and edit programmes. It has trained other inhabitants of the Vlinder neighbourhood as well. The foundation and the team of volunteers is also a way of meeting people, including people with various ethnic backgrounds.

Vlinder TV has an annual output of about 30 programmes. In the spring and summer months there is a peak production, due to the festivals that are organised in those periods. As opposed to other websites that focus on User Generated Content, the majority of content is produced for Vlinder.TV, by a small group of active users that (often) use the equipment of Vlinder.TV. Many UGC platforms rely on content from a large group of anonymous users that upload videos that were shot with a mobile phone or budget camera.

The site also links to regional events, and hosts a discussion forum. The forum was initially used quite intensively but the participation rate has decreased over time. The decline in participation is also attributed to the fact that the website was hacked May 2003 and the site was unavailable for a number of weeks. Yearend 2006, the discussion forum is filled with spam.

The Vlinder.TV business model is summarised in Annex 1. Business model decisions than can be highlighted are the financial model (investments and revenues) and functional architecture (interoperability and standards). The project was initially financed by the fibre-optic pilot project Kenniswijk, the Dutch Ministry of Economic Affairs, government agency SenterNovem, and the Global Informatistics company. Vlinder.TV received a funding of 20 000 euro, including 4 000 euro of small individual donations by local companies and individuals. The main investments are in audio-visual equipment (e.g. cameras,

microphones, monitors) and IT equipment (e.g. servers and computers). Vlinder.TV has adopted the RealMedia standard to stream its content, which is not available as downloads. The main considerations were the quality and the financial conditions compared to alternatives provided by Microsoft (Windows Media) and Apple (Quicktime). A proprietary standard was chosen because no widely supported open standard for video streaming exists. Even though Vlinder.TV is a non-profit foundation, in order to generate necessary revenues it is considering advertisements on the website (but not in the programmes).

Bottlenecks

1) Finding necessary resources

The main bottleneck for Vlinder.TV was to find resources for the production of Vlinder.TV content, in particular finding suitable studio space. Initially, production took place in one of the homes of the volunteers. This turned out to be a sub-optimal solution. People worked on programmes in a private household (with an informal setting) as opposed to a typical studio with well managed time slots. Financial considerations made it impossible to rent a commercial studio. To tackle this issue, Vlinder.TV found a suitable studio location via a partnership with the Groendomein Wasven foundation. Through the partnership, Vlinder.TV can use one of the rooms in a historical building in the Eindhoven area. The room is large enough for editing, mixing, recording etc. In addition, the new studio/room will act as a class room for courses and training.

This bottleneck is linked to the financial model, most notably the level of required investments and the possibilities for cost sharing. Even though the Vlinder.TV foundation managed to obtain funding, this mainly concerned one-time funding for capital expenditures. To cover operational expenditures such as the costs for studio space, additional sources and solutions were required. Since the TV creation and production process has changed fundamentally with the advent of digital recording, studio space can be much smaller than in the past. Still, an appropriate place with the necessary hardware and network connections needs to be present.

Public policy was mentioned briefly. To support and launch digital TV platforms, community based or otherwise, policy makers should address the start-up costs and operational costs.

2) Finding relevant expertise for TV creation

For a community based initiative like Vlinder TV, that relies on volunteers, an important bottleneck is to find the appropriate expertise for TV creation and production. Often, people with relevant skills lack the time or willingness to participate. With the help of training and experience, a mix of volunteers with various skills has been found. However, like other small scale community based operations, there always is the risk that key people lack the time to stay involved. So to maintain expertise can be a bottleneck as well.

This bottleneck is linked to business model decisions on value proposition (intended value) and value network factor (vertical integration and distribution of roles). For community based websites like Vlinder TV, the social value of the service is very important. Vlinder.TV is dependent on the local community, and relies on the strength of social ties in the community. For users and contributors, to participate must provide a social value. Furthermore, contributors can improve their skills while producing TV content. The active roles of users and contributors is linked to vertical integration. The core team of Vlinder.TV does not

provide all content. They need a wider group of volunteers. To provide content is structural role in the value network. It is crucial to provide the right tools and incentives to volunteers and other contributors.

Public policy was not mentioned in the context of this bottleneck.

4.6 VPRO 3voor12

Introduction

3voor12 is a service platform that is created by Dutch public broadcaster VPRO. 3voor12 is available via internet, and is a platform for a variety of audio-visual and textual content. Examples are on demand streams of live shows, TV and radio programmes and new music records. The focus is on alternative music (non-mainstream) with genres such as punk rock, metal, hip-hop/R&B and dance. The website is the main platform, although 3voor12 has also been introduced on cable, IPTV/DSL, and mobile platforms. For example, 3voor12 has developed a portal and two TV channels and seven radio channels, that are now part of pay-TV packages of many Dutch cable operators.

The most important audio-visual elements of the 3voor12 website are the TV and radio channels, the on de demand streams of concerts, music albums, songs and DJ sets. All content is available for free. The current website offers various kinds of interactive functionality, such as rating and tagging. The VPRO is considering to allow users to upload content themselves (User Generated Content). It is not yet decided whether this will be done on the website itself, or whether users will be allowed to do this via a dedicated website, or via 3voor12 ‘zones’ of UGC platforms such as YouTube.

As mentioned above, 3voor12 is available on cable and IPTV via DSL platforms. Currently, only the live streams are available, not the on-demand content. The cooperation between 3voor12 and other platform operators (in particular cable operator UPC), started as a project between two key people at the respective companies. Currently, negotiations between VPRO’s 3voor12 and the platform operators (cable and IPTV) are being done at the level of the VPRO management.

The 3voor12 business model is summarised in Annex 1. Notable decisions concern the value proposition (user involvement) and the functional architecture (interoperability and standards, and modularity). The 3voor12 website emphasises user involvement. Examples of these include the ability to tag and rate, as well as produce content via regional 3voor12 sites. Like other public DTV platforms, 3voor12 has opted for proprietary, de facto standards for content formatting and distribution. Because a widely supported open standard is not present in the area of video delivery, a choice has been made for proprietary standards (such as Windows Media). With respect to modularity it is notable that the VPRO has the technical expertise to develop many of the components in house, with some components based on open source.

Bottlenecks

1 Time involved in clearance of copyrights

In contrast to TV and radio broadcasting, there is no central organisation that can act as a ‘clearinghouse’ for use of content on internet platforms such as 3voor12. Instead, the VPRO has to deal with all individual rights holders (usually record companies).

Similar to other cases in this study, this bottleneck is related to 3voor12 low degree of vertical integration. 3voor12 relies on content provided by other organisations and by artists and users. The current process to clear copyrights can increase costs, delay the availability of new content, and harm the quality of the overall service platform.

Policy makers should explore how to increase efficiency of copyright related processes. Clearance of copyrights for internet use is one of the main problems. Policy options include a process in which (online) broadcasters deal with central rights agencies, perhaps with veto rights for record companies or other rights holders. The process should include clearer guidelines or rules regarding rights usage on the internet. Stakeholders should be involved in setting up the process, rules and guidelines.

2 Standardisation and interoperability

3voor12 is available on digital cable and IPTV/DSL platforms. However, due to differences between the service platforms of these partners, the VPRO has to adjust its offerings to the standards of each platform. For example, there are differences in bit-rate or compression. The VPRO would prefer to only have to digitise their material once rather than having to adjust it for each platform. Besides lack of standardisation on the distribution side, there are differences regarding reception by end users. This mainly concerns the standards, interoperability and functionality of set-top boxes. As of now, only one cable provider (UPC) offers interactivity, though this is also expected on the KPN Mine service (IPTV via DSL). Another provider of IPTV via DSL, Tele2/Veratel, will provide a menu somewhat similar to the 3voor12 website. Since the platform operators use different (middleware) standards, the menu created for Tele2 cannot be reused for the other, and has to be adapted.

The lack of standardisation and interoperability is linked to the functional architecture of the business model. In the business model framework, the level of interoperability is identified as a separate and relevant topic. The (low) level of interoperability can have an impact on the financial model (more costs), the value proposition (a larger community increases social value) and the value network (flexibility in choosing and changing partners, and in outsourcing and vertical integration).

It was acknowledged that policy makers have interoperability on their radar as a potential bottleneck for a variety of ICT and media services. One of the policy options is to be more intrusive and to require interoperability in the context of media content, platforms and services.

3 Coordination across the value chain

Platform operators such as cable operators and TV websites (such as 3voor12) are gatekeepers in the sense that they decide which channels and content will (not) be offered to consumers. Because 3voor12 is one of the early movers in the Netherlands, it has thus far had no problems to be made part of the platform operators' TV packages. However, in the future there is no guarantee that this will automatically be the case. The 3voor12 website will become more important, but to increase its audience and to create synergies, 3voor12 must be present on other platforms as well. Here, the VPRO controls less elements of the value chain. Other firms are the gatekeeper. This requires coordination across the value chain with uncertain outcomes. The VPRO is dependent on platform operators that consider whether or not 3voor12 will fit their platform and specific content packages. Furthermore, platform operators decide *how* the content will be made available. In most cases, the 3voor12 TV channels are part of a premium cable package. For a public broadcasting organisation, this can create tensions. Another topic for coordination across the value chain is customer ownership and data on user behaviour. The VPRO does not

automatically receive data on viewing habits, since this information is only available to cable operators and other platform operators. For instance, interactive set-top boxes allow UPC to monitor user behaviour. This information is highly relevant for other players in the value chain.

The coordination bottleneck is linked to the value network (vertical integration and distribution of roles and assets). If various organisations are responsible for different parts of the value network, the influence of organisations that do not have a direct customer relationship, will decrease. Examples have been mentioned above. The financial model and the value proposition can be influenced as well. If 3voor12 is part of a premium TV package, this influences the intended value (more symbolic value; yet less financial value for consumers?) and revenue sharing (50-50?).

One of the policy options is to apply the must-carry regime to digital thematic channels of public broadcasters. This could secure that 3voor12 and other digital public channels are in the 'basic' digital packages, rather than spread across all sorts of premium packages, or not being distributed at all.

4 Few platforms support interactive services

Similar to the previous bottleneck, this bottleneck is relevant for the provision of the 3voor12 platform via cable operators, IPTV and other platform operators. 3voor12 wants to increase the number of interactive services and features, and wants to provide these services via as many platforms as possible. In the Dutch market, UPC is among the few platform operators that support interactive services. For example, the UPC systems and set-top boxes support a sophisticated Electronic Programming Guide (EPG) as well as interactive services such as the 3voor12 quiz. For the majority of cable subscribers, 3voor12 is nothing more (or less) than a set of thematic TV and radio channels. On the 3voor12 website, more interactive services and features are available. 3voor12's on demand services are highly popular on the website, yet not available on cable platforms. This is partly due to scarcity of cable capacity and the costs and benefits of on demand services (by 3voor12 and others) compared to other services that require capacity. As a result, 3voor12 is a sit-back (passive) platform via cable and a lean-forward (active) platform via internet. Important advantages of 3voor12 via cable are the quality of the streams and the consumption via TV sets instead of PCs.

This bottleneck is linked to the functional architecture of digital TV platforms. 3voor12 can hardly influence decisions of (other) platform operators on interactivity and the distribution of functionality (e.g. to allow downloading and on demand services). As was mentioned above, coordination across the value chain can be difficult. The costs and benefits of interactive services are different for firms that have different roles in the value network, different financial models, and a different value proposition (e.g. complement or substitute, financial value ('budget') or functional value).

It was mentioned that public policy could stimulate that platform operators install set-top boxes (and middleware) that support interactive services. This is related to policy initiatives to increase standardisation and – especially – interoperability (see the second bottleneck). A large installed base of interoperable digital platforms will maximise 3voor12's opportunities to provide interactive services.

5 Conclusion

5.1 Introduction

Chapters three and four have addressed bottlenecks that are perceived by public organisations that provide digital TV platforms. To explore the bottlenecks and their impact, the bottlenecks were linked to the business model. Whenever appropriate, the role of public policy was mentioned. In the fifth and final chapter we integrate the results and we will elaborate on the role of public policy. The next section sketches the trends in business models, that emerged from the business model analysis. Subsequently, we reflect on the hypotheses in chapter two, to address the differences between digital TV platforms that are provided by public and private organisations. To conclude, we will propose a set of policy recommendations, based on the interview results and the analysis. As mentioned in chapter one, the focus is on the perspective of DTV platform operators.

5.2 Business models trends and market developments

Table 2 on the next page summarises the business models trends that emerged from the analysis of ten digital TV platforms that are operated by public organisations. A highly structured analysis of the business models is presented in Annex 1. The business model for each of the ten digital TV platforms is ‘scored’ on 12 elements. Table 2 includes the business model trends that emerged in a previous study, with a focus on private/commercial digital TV platforms. This is meant to provide some extra context rather than to allow for a strict comparison. The studies on ‘public and private platforms’ are different with respect to the types of platforms, the countries that are covered, and the market and policy conditions. For example, the study on digital TV platforms of public organisations includes nine cases of internet TV platforms (compared to one internet case in the previous study).

Business model trends: public cases	Business model trends: private cases
• *Internet TV and radio are positioned mainly as a complement* to traditional TV and radio broadcasting. There is a clear focus on content services. • *Functional and social value* are far more important than financial and symbolic value. • *Customer ownership is not being pursued by lock in strategies*, although for specific types of content, public organisations are the sole supplier. • *Vertical integration of DTV service platform, services and content production*, with content being provided by other organisations as well. Little involvement in networks/infrastructures, with the exception of digital terrestrial networks. • *Adoption of de facto, proprietary standards* due to a lack of successful open standards. • *Interactive services and experiments with high user involvement*, due to the focus on internet platforms. Few services that are based on User Generated Content. • *Clear and stable financial models*, that rely on public funding and advertising, with no usage fees and little cost sharing and revenue sharing. • *Tensions in the value network*, with respect to the costs and conditions for content acquisition and copyrights.	• *Triple play and other bundling and lock in strategies*, leading to competition between bundles rather than competition between single services. • *Vertical integration of network, DTV service platform, services and content*, to align investment incentives, increase Quality of Service, and allow for differentiation strategies. • *Little standardisation and some interoperability*, partly due to the importance of time to market, vertical integration strategies and the high quality of proprietary solutions. • *Difficulties in differentiation strategies*, with popular content being available on all DTV platforms, some differences in network capabilities, some exclusive content deals, unique interactive services and provisions for user generated content, with the main DTV platforms targeting large audiences, and TV via internet well positioned for niche markets. • *Changes in the role of firms* within the DTV value network, with content providers becoming less dependent on one or two key DTV platform operators, and exploring a central rather than a contributing role (especially with internet TV), with less clear implications for advertisers. • *Tensions in collaboration and competition* between content and service providers that provide content via the internet (e.g. commercial broadcasters, Google, Microsoft and Apple), and network operators and DTV platform operators that invest substantially in networks and DTV platforms.

Table 2: Business model trends for digital TV platforms

The business model trends of public and private organisations provide an indication of market developments. The differences and similarities between publicly and privately controlled platforms add to the overview of market developments. For example, vertical integration will remain a widely used strategy, even when technology and convergence allow for a so called horizontal market structure. There are tensions in the value network. From the perspective of platform operators (of which many also produce content), the bargaining power of content producers has increased with the rise of new and competing platforms. In TV markets, internet platforms appear to be a complement for traditional analogue TV and radio broadcasting. Other platforms, such as digital cable and digital terrestrial, are a substitute for traditional broadcasting.

Business model trends provide information on innovation dynamics. Innovation topics include user involvement (such as User Generated Content) and interoperability across platforms. The cases that were presented in Chapter three and four, touched upon innovations such as interactive services (such as those that build on digital archives), high quality niche services (such as music concerts), TV via mobile platforms (e.g. music and comedy), Creative Commons approaches, and transformation of organisations and work practices (process innovation).

The cases and the business model trends allow for a reflection on the hypotheses on how public organisations will design the business model for digital TV platforms (see Chapter two). Table 3 provides a summary. The phrase 'preliminary conclusion' is used to stress the explorative approach in this study. The hypotheses were intended to single out interesting questions *before* a variety of cases was done.

Hypothesis	Preliminary conclusion
1. Public organisations target mass audiences, as well as a wide range of niche audiences, that includes niches that are not necessarily profitable.	Correct, there are many examples of thematic channels, regional content and other services that target all sorts of niches. Mass audiences are targeted as well. The BBC tries to avoid that a large share of investments is invested to services and platforms (e.g. internet) that are not yet used by many British consumers.
2. Public organisations that provide DTV platforms will not engage into cost sharing agreements with private organisations	Correct, public organisation are very reluctant to enter into public-private partnerships and other ways to share costs with private organisations. One of the exceptions is the consortium for digital terrestrial TV (in this study: Freeview).
3. Public organisations that provide DTV platforms will provide services free of charge.	Correct, with the exception of digital platforms and channels that are included in the pay-TV packages of cable operators and other private platform operators. Furthermore, some public organisations are exploring paid services (e.g. micro-payments) for premium services based on digital archives and other assets.
4. Public organisations that provide DTV platforms will not engage into revenue sharing agreements with private organisations.	Correct, with the exception of digital platforms and channels that are included in the pay-TV packages of cable operators and other private platform operators.
5. Public organisations use fewer bundling strategies than private organisations.	Correct, there are platforms with a variety of services, and there are synergies and links between internet and other platforms, but consumers are not forced or tricked into bundles.
6. Public organisations that provide DTV platforms will adopt standards that are open (non-proprietary) and highly interoperable.	No, partly due to a lack of successful open standards, public organisations opt for proprietary yet de-facto standards such as RealMedia and Windows Media. In some cases, public organisations develop their own tools and standards. More in general, public organisations struggle with interoperability.

Table 3: The business models of public organisations that provide digital TV platforms

5.3 Bottlenecks and the role of policy

Table 4 presents the bottlenecks that have been identified in the study. The bottlenecks are presented in random order. Similar types of bottlenecks are mentioned one after the other. For example, several bottlenecks are related to the public service remit of public broadcasters, and several bottlenecks are related to copyrights. Again, the bottlenecks that emerged in a previous study provide some extra context.

Bottlenecks: public cases	Bottlenecks: private cases
• How to earn sustainable (advertising) revenues in a new and uncertain market, with fragmentation of audiences? • Adoption: differences between population/market segments. Public broadcasting organisations must invest in and reach all segments (proportionally). • Lack of consistent metrics regarding Internet usage, e.g. use of websites by different population/market segments. • The public service remit, that requires quality and independence, can conflict with user generated content. • The public service remit contains restrictions and uncertainties on public-private partnerships. • Opposition from private firms that fear unfair competition from public organisations that launch Internet and other digital platforms. • Funding of public broadcasters and (internal) allocation of budgets do not allow for high quality and innovative Internet TV. • Copyright owners hesitate to collaborate in services that apply a Creative Commons approach. • High costs to acquire content, which is highly problematic for regional broadcasters. • Time involved in clearance of copyrights, due to the variety of right holders and the lack of coordinating organisations related to the use of content on the Internet (in several countries). • High costs of archiving digital content, e.g. costs for tools, people and storage. • Availability and penetration of broadband. • Capacity of digital terrestrial networks. • Visibility of digital TV platforms on the Internet, e.g. via new gatekeepers such as Google. • Standardisation and interoperability, in the context of DRM solutions, set-top boxes, and platforms that support interactive services. • Few platforms support interactive services, which limits the possibilities of service providers (and Internet TV platform operators) that seek to use several platforms. • Expertise to make technological decisions, e.g. small organisations that have to choose between different standards. • Difficulties in coordination across the value chain/network with several organisations, e.g. decisions on brand, intended value for users, investments, interactivity (e.g. Freeview). • Transformation of organisations and changes in work practices to allow for cross media production, including Internet platforms. • High costs of micro-payments. • For community based platforms, it can be difficult to commit people with expertise.	• Uncertainty on user behaviour with respect to old and new types of advertising, sponsoring and paid content. • High uncertainty on consumer demand for interactive services, mainly the level and type of interactivity and willingness to pay. For DTV platforms via Internet this appears less of a bottleneck. • Uncertainty on revenue sharing and the underlying changes in “power structures” and value networks, is perceived a market/commercial issue. Does the bargaining position of content producers improve? • Quality of Service is an important operational concern, especially for DTV platforms via digital terrestrial, DSL/IP and Internet. Quality of the network, platform, content, services and “across the value chain” is important. • Standardisation and interoperability, mainly for DTV platforms via cable, satellite and terrestrial (set-top boxes) and via Internet (DRM). • Digital Rights Management is perceived a bottleneck by providers of TV via Internet. There are doubts on the quality of DRM solutions and enforcement of copyright laws. • The high level of required investments is perceived a bottleneck for operators of DTV platforms via cable, terrestrial, satellite and DSL/IP (not for Internet platforms).

Table 4: Bottlenecks for digital TV platforms

The number of bottlenecks perceived by public organisations is relatively large compared to the perception of private organisations that provide digital TV platforms. To a large extent, this difference can be explained by the public status (e.g. bottlenecks linked to the public service remit), the small scale of some public organisations (e.g. the resources of regional broadcasters and community based initiatives) and the focus on internet platforms rather than platforms such as cable, satellite and IPTV via DSL (e.g. bottlenecks such as micro-payments, visibility and coordination across the value chain).

There are similarities as well. Bottlenecks that are relevant to public and private organisations are uncertainty on user behaviour, changes in value networks ('roles, assets and bargaining power'), DRM solutions, standardisation and interoperability, and investments in networks and technologies. The interviewees that represent public organisations elaborated on content and copyright issues. Several bottlenecks were mentioned. For many public (broadcasting) organisations, content production and content acquisition are core business. In the study on privately owned platforms, content issues were perceived as part of the uncertainty on revenue sharing and changes in value networks.

The interviewees discussed whether and how existing policy instruments (partly) create the bottlenecks, and how changes in policy could (partly) solve the bottlenecks. It was acknowledged that for a number of bottlenecks, policy is of little relevance. This is one of the features of the research approach. It need not start with a focus on a set of policies or the assumption that policy is a key factor. Starting points are the business model, bottlenecks and language of organisations. Some input is more relevant for an understanding of market developments and innovation topics, than for immediate policy recipes. For example, the increased number of platforms improves the bargaining power of rights owners and content producers, which can frustrate and delay negotiations to launch services. In specific cases, there may be a need to reconsider policy. One example is the role of public broadcasters as providers of content. The recommendation is to stimulate public broadcasting organisations to pursue a strategy that is platform and technology neutral. This includes non discriminatory deals on content (e.g. channels), copyrights, distribution and operational arrangements.

Bottlenecks that were mentioned by many public and private organisations are the (high) uncertainty on user demand for interactive services, and user responses to new types of advertising, sponsoring and paid content. It was mentioned that there can be large differences between market/population segments (e.g. young and old). This is a problem for private organisations, but also for public organisations. Public broadcasters must provide services for all segments. Investments in TV via Internet must stay in tune with the uptake by large parts of the population. Uncertainty on user behaviour influences (and delays) business model decisions on investments, functional architecture, user involvement and the selection of partners. It was mentioned that policy could contribute to reduce uncertainty. The recommendation is to support user studies, commercial pilots and living labs to acquire information on user behaviour related to interactive digital TV services, and different types of advertising.

The bottlenecks related to standardisation and interoperability were perceived highly relevant for business model decisions on the functional architecture. The main topics were DRM solutions and the middleware in settop-boxes. It was stressed that a lack of open standards and a lack of de facto proprietary standards make interoperability difficult and expensive. This has a negative impact on the number of content and service providers on a digital TV platform and hence on the value proposition. Interoperability is addressed

in R&D programmes such as the EU Framework Programmes. The recommendation is to focus more on how content and services can be provided via *several* standards and platforms. Especially for interactive services and peer-to-peer services, interoperability and interconnection can boost overall market growth.

Several bottlenecks concern the public service remit of public broadcasters. Under what conditions does more user involvement, such as user generated content, fit the standards of quality, good taste and independence of public broadcasters? Are public-private partnerships an effective strategy to exploit digital archives, launch thematic digital channels and provide TV via Internet, and are there any tensions with the public service remit? What are the restrictions related to competition policy? These questions have to be addressed by public broadcasters and the policy makers to which they are accountable.

The bottleneck on clearance of copyrights influences the variety of content, and delays the launch of new services. It can also create financial uncertainty. The rights and claims of right holders, related to use of content in digital and international settings, can be unclear or underestimated. Copyright organisations are working on more efficient procedures for the digital context. Because of the wider economic and societal impact, policy makers could analyse how the process can be speeded up.

The bottleneck “visibility of digital TV platforms on the Internet” can be positioned in a wider discussion on digital media markets, media concentration and new gatekeepers. The availability of digital content has increased, especially on the Internet. From the perspective of consumers, visibility or ‘findability’ is one of the dimensions of access. Gatekeepers such as search engines, portals and online service platforms can increase or decrease the visibility of public content. In some cases, gatekeepers are vertically integrated and produce content. This will influence the incentives to include and prioritise public content. With internet TV still being a complement rather than a substitute, policy makers have some time to assess the policy options to increase the visibility of public content on the Internet. Similar discussions are being held in the context of Electronic Programming Guides for digital broadcasting platforms (Ofcom, 2006b).

Several bottlenecks are linked to the small scale and the financial constraints of regional (public) broadcasting organisations and community based initiatives. A policy response need not (only) concern funding. Interviewees mentioned the importance of certainty about expectations and funding, collaboration between national, regional and local policy makers (rather than tensions) and the importance of collaboration between small organisations (facilitated by policy makers). Similar suggestions were made in a recent study on the future of regional broadcasting organisations in the Netherlands (Rutten, 2006).

A number of policy remarks concern well known policy debates. This would be less so in studies that focus on emerging and expected services (closer to innovation). There are examples in which the results of the business model approach contribute to existing debates. For example, the demand for Internet based micro-payment solutions by Internet TV providers can increase the priority for this topic. Micro-payments via SMS can be an alternative. In the study on digital TV platforms by private operators, it was mentioned that the Dutch mobile operators and Dutch government agreed on a maximum tariff for SMS messages. This should protect minors from high phone bills, but the side-effect is that SMS payments are less suited for TV via Internet.

The findings are partly complementary and partly contradictory to the findings of existing studies on digital TV platforms. The findings can feed into policy debates on topics such as interoperability across platforms, Digital Rights Management, platform competition and public broadcasting in a digital context.

To reflect on the research approach, we mention that it is common - in policy analysis and impact assessment - to combine two or three methods. Because the research approach is an explorative and qualitative case study approach, complementary methods include well targeted surveys and statistical analysis. The research approach could also be used to analyse specific policy issues (e.g. competition) and to explore the policy mix for ICT innovation. For instance, competition regulators can use the approach to analyse the digital platforms and business models for online music, eHealth and eLearning. Policy makers and research consortia can use the approach to address business models, bottlenecks and the policy mix for emerging ICT services such as in-car platforms, 3D TV and services that build on RFID and location data. This could be part of R&D projects in the EU's 7th Framework Programme.

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Annex 1: Summary of business models

Business model overview BBC Creative Archive (1/2)

Value Proposition

VP1: User involvement

Zapping	
Time shifting	
Browsing/Scheduling	X
Rate/tag	X
Share/ Broadcast	X
Edit/ Change	X
Generate content	X

VP2: Intended value

Financial	
Functional	The BBC Creative Archive makes the archive and derivative material available for re-use and mixing. It offers end-users access to high quality video footage, in particular educators, students, video amateurs
Social	
Symbolic	

VP3: Positioning

Direct competitor	
Substitute	
Complement	To BBC TV channels and websites

Value Network

VN1: Vertical integration

Producing	BBC
Packaging	BBC
Distributing	
Navigating	BBC

VN2: Customer ownership

Lock in strategy	Low	Med	High
Contract. agreements	X		
Complem.investments	X		
Proprietary Standards	X		
Exclusive supplier		X	
Loyalty services	X		

VN3: Distribution of roles/assets

Assets* **Value chain**	Brand	Content rights	Customer knowledge	Distrib network
Consumption				
Navigation	BBC			
Distribution				ISP
Packaging	BBC			
Production	BBC			
Creation		Creator (on Creative Archive License basis)		

Business model overview BBC Creative Archive (2/2)

Functional Architecture

FA1: Level of interoperability

	Open	Proprietary
Interoperable	MPEG1, MP3, JPEG	Quicktime, Windows Media
Non-interoperable		

FA2: Modularity: service components

	Custom made	Standardized
Single or few component (integrated		
Many components	Creative archive license, CMS	

FA3: Distribution of functionality

	Stream	Download	DRM	QoS
Central	X	X	Limited	X
De-central				

Financial model

FM1: Cost Sharing

	CAPEX	OPEX
One firm	BBC	BBC
Two firms		
Investment pooling		

FM2: Pricing models

Pay per use	Subscr	Adv	No direct revs	Compl products	Resell cust info	Other
			X			

FM3: Revenue sharing

Rev Sharing	Licensing	Buying
	X	

Business model overview FourDocs (1/2)

Value Proposition

VP1: User involvement

Zapping	
Time shifting	
Browsing/Scheduling	X
Rate/tag	X
Share/ Broadcast	X
Edit/ Change	X
Generate content	X

VP2: Intended value

Financial	
Functional	Repository of short documentaries for users; Platform for content creators; site provides information on how to create documentary
Social	Users can rate and tag; Forum for discussion on films and related issues
Symbolic	

VP3: Positioning

Direct competitor	
Substitute	
Complement	To Channel 4 TV channels and its documentary offer

Value Network

VN1: Vertical integration

Producing	
Packaging	X
Distributing	
Navigating	X

VN2: Customer ownership

VN2: Customer ownership Lock in strategy	Low	Med	High
Contract. agreements	X		
Complem.investments	X		
Proprietary Standards	X		
Exclusive supplier		X	
Loyalty services	X		

VN3: Distribution of roles/assets

Assets* **Value chain**	Brand	Content rights	Customer knowledge	Distrib network
Consumption				
Navigation	Channel4			
Distribution				ISP
Packaging	Channel4			
Production				
Creation		End-user		

Business model overview FourDocs (2/2)

Functional Architecture

FA1: Level of interoperability

	Open	Proprietary
Interoperable		Apple QuickTime and Windows Media
Non-interoperable		

FA2: Modularity: service components

	Custom made	Standardized
Single or few component (integrated	FourDocs platform created by Magic Lantern productions	
Many components		

FA3: Distribution of functionality

	Stream	Download	DRM	QoS
Central	X		X	X
De-central				

Financial model

FM1: Cost Sharing

	CAPEX	OPEX
One firm		Channel 4
Two firms	Channel 4, Documentary makers	
Investment pooling		

FM2: Pricing models

Pay per use	Subscr	Adv	No direct revs	Compl products	Resell cust info	Other
			X			

FM3: Revenue sharing

Rev Sharing	Licensing	Buying

Business model overview Freeview (1/2)

Value Proposition

VP1: User involvement

Zapping	X
Time shifting	X, with 3rd party PVR or Freeview Playback box
Browsing/Scheduling	
Rate/tag	
Share/ Broadcast	
Edit/ Change	
Generate content	

VP2: Intended value

Financial	Only one-off purchase of STB, no subscription fee
Functional	More channels and better quality than analogue terrestrial, as well as (limited) interactivity
Social	
Symbolic	

VP3: Positioning

Direct competitor	
Substitute	For FTV satellite or basic cable/IPTV packages
Complement	To 2nd or 3rd television set in one household next to other TV services

Value Network

VN1: Vertical integration

Producing	
Packaging	Bundle of TV channels
Distributing	
Navigating	

VN2: Customer ownership

Lock in strategy	Low	Med	High
Contract. agreements	X		
Complem.investments		X	
Proprietary Standards	X		
Exclusive supplier			X
Loyalty services	X		

VN3: Distribution of roles/assets

Assets* / **Value chain**	Brand	Content rights	Customer knowledge	Distrib network
Consumption	Freeview			
Navigation	STB/iDTV supplier or Freeview			
Distribution				Freeview
Packaging	Manufacturers			
Production		Broadcaster		
Creation		Broadcaster		

Business model overview Freeview (2/2)

Functional Architecture

FA1: Level of interoperability

	Open	Proprietary
Interoperable	MPEG-2 (AV signal), MHEG-5 v1.05/v1.06 for interactive services	
Non-interoperable		

FA2: Modularity: service components

	Custom made	Standardized
Single or few component (integrated	Developed by Siemens Business Services Media (formerly BBC Technology)	
Many components		

FA3: Distribution of functionality

	Stream	Download	DRM	QoS
Central	X			X
De-central				

Financial model

FM1: Cost Sharing

	CAPEX	OPEX
One firm		
Two firms		
Investment pooling	BBC, BSkyB, National Grid Wireless (formerly Crown Castle), ITV and Channel 4	BBC, BSkyB, National Grid Wireless (formerly Crown Castle), ITV and Channel 4

FM2: Pricing models

Pay per use	Subscr	Adv	No direct revs	Compl products	Resell cust info	Other
			DTV Services Ltd is a not-for-profit company			

FM3: Revenue sharing

Rev Sharing	Licensing	Buying

Business model overview S4C (1/2)

Value Proposition

VP1: User involvement

Zapping	
Time shifting	
Browsing/Scheduling	X
Rate/tag	
Share/ Broadcast	
Edit/ Change	
Generate content	

VP2: Intended value

Financial	
Functional	Ability to watch or review S4C content
Social	
Symbolic	

VP3: Positioning

Direct competitor	
Substitute	
Complement	To existing TV channel

Value Network

VN1: Vertical integration

Producing	
Packaging	Made available via S4C broadband portal
Distributing	
Navigating	Made available via S4C broadband portal

VN2: Customer ownership

VN2: Customer ownership Lock in strategy	Low	Med	High
Contract. agreements	X		
Complem.investments	X		
Proprietary Standards	X		
Exclusive supplier		X	
Loyalty services	X		

VN3: Distribution of roles/assets

Assets* **Value chain**	Brand	Content rights	Customer knowledge	Distrib network
Consumption			S4C	
Navigation	S4C			
Distribution				ISP
Packaging	S4C			
Production	S4C	Rights holders (e.g. production companies)		
Creation				

Business model overview S4C (2/2)

Functional Architecture

FA1: Level of interoperability

	Open	Proprietary
Interoperable		Windows Media RealMedia (archive)
Non-interoperable		

FA2: Modularity: service components

	Custom made	Standardized
Single or few component (integrated	X, developed in house	
Many components		

FA3: Distribution of functionality

	Stream	Download	DRM	QoS
Central	X			
De-central				

Financial model

FM1: Cost Sharing

	CAPEX	OPEX
One firm		
Two firms		
Investment pooling	UK Department for Culture, Media and Sport (DCMS)	S4C

FM2: Pricing models

Pay per use	Subscr	Adv	No direct revs	Compl products	Resell cust info	Other
			content available for free			

FM3: Revenue sharing

Rev Sharing	Licensing	Buying
	X	X

Business model overview Fabchannel (1/2)

Value Proposition

VP1: User involvement

Zapping	
Time shifting	
Browsing/Scheduling	Via Fabplayer
Rate/tag	
Share/ Broadcast	
Edit/ Change	
Generate content	

VP2: Intended value

Financial	
Functional	High
Social	Brand increasingly more important
Symbolic	

VP3: Positioning

Direct competitor	
Substitute	Yes, e.g. 3voor12
Complement	To Paradiso live shows

Value Network

VN1: Vertical integration

Producing	At Paradiso and elsewhere
Packaging	Fabchannel portal
Distributing	
Navigating	Fabplayer

VN2: Customer ownership

Lock in strategy	Low	Med	High
Contract. agreements	X		
Complem.investments	X		
Proprietary Standards	X		
Exclusive supplier			X
Loyalty services	X		

VN3: Distribution of roles/assets

Assets* **Value chain**	Brand	Content rights	Customer knowledge	Distrib network
Consumption	Fabch		Fabch	
Navigation	Fabch			
Distribution				ISP
Packaging	Fabch			
Production		Fabch, content owners		
Creation				

Business model overview Fabchannel (2/2)

Functional Architecture

FA1: Level of interoperability

	Open	Proprietary
Interoperable		Flash (Previously Windows Media)
Non-interoperable		

FA2: Modularity: service components

	Custom made	Standardized
Single or few component (integrated	Fabplayer created in cooperation with research partners. Inhouse created PHP workflow management system	
Many components		

FA3: Distribution of functionality

	Stream	Download	DRM	QoS
Central	X		X (streams protected	
De-central				

Financial model

FM1: Cost Sharing

	CAPEX	OPEX
One firm		
Two firms		
Investment pooling	Fabchannel/ Paradiso Funding orgs	Fabchannel/ Paradiso Funding orgs

FM2: Pricing models

Pay per use	Subscr	Adv	No direct revs	Compl products	Resell cust info	Other
In future	In future		Currently, all of the content is available for free			

FM3: Revenue sharing

Rev Sharing	Licensing	Buying
		Shows are sold to rights holders (e.g. DVD)

Business model overview L1 (1/2)

Value Proposition

VP1: User involvement

Zapping	
Time shifting	
Browsing/Scheduling	Via L1 website
Rate/tag	
Share/ Broadcast	
Edit/ Change	
Generate content	Via program on L1 website

VP2: Intended value

Financial	
Functional	(sports)news in particular is in high demand
Social	
Symbolic	

VP3: Positioning

Direct competitor	To emerging TV services from other regional news provider
Substitute	
Complement	To existing TV channel

Value Network

VN1: Vertical integration

Producing	Own productions
Packaging	Via L1 website
Distributing	
Navigating	Via L1 WebTV site

VN2: Customer ownership

Lock in strategy	Low	Med	High
Contract. agreements	X		
Complem.investments	X		
Proprietary Standards	X		
Exclusive supplier		X	
Loyalty services	X		

VN3: Distribution of roles/assets

Assets* **Value chain**	Brand	Content rights	Customer knowledge	Distrib network
Consumption			L1	
Navigation	L1			
Distribution				ISP
Packaging	L1			
Production		L1		
Creation		L1		

Business model overview L1 (2/2)

Functional Architecture

FA1: Level of interoperability

	Open	Proprietary
Interoperable		Windows Media
Non-interoperable		

FA2: Modularity: service components

	Custom made	Standardized
Single or few component (integrated		X
Many components		

FA3: Distribution of functionality

	Stream	Download	DRM	QoS
Central	X	X		
De-central				

Financial model

FM1: Cost Sharing

	CAPEX	OPEX
One firm		
Two firms	Regional and national policy makers, L1	Regional and national policy makers, Omroepbedrijven L1
Investment pooling		

FM2: Pricing models

Pay per use	Subscr	Adv	No direct revs	Compl products	Resell cust info	Other
		X	X			

FM3: Revenue sharing

Rev Sharing	Licensing	Buying
	X	

Business model overview Omroep Brabant (1/2)

Value Proposition

VP1: User involvement

Zapping	
Time shifting	
Browsing/Scheduling	Streams of nearly all the programs available on the site
Rate/tag	(Possibly in future, by aligning with other parties)
Share/ Broadcast	
Edit/ Change	
Generate content	(Possibly in future, by aligning with other parties)

VP2: Intended value

Financial	
Functional	Users are able to stream or review missed broadcasts
Social	Interest in regional community news often reason to use the site
Symbolic	

VP3: Positioning

Direct competitor	To emerging TV services from other regional news provider
Substitute	
Complement	To existing TV channel

Value Network

VN1: Vertical integration

Producing	Majority of programs are own productions
Packaging	Content available on via Omroep Brabant site
Distributing	
Navigating	Content available on via Omroep Brabant site

VN2: Customer ownership

Lock in strategy	Low	Med	High
Contract. agreements	X		
Complem.investments	X		
Proprietary Standards	X		
Exclusive supplier		X	
Loyalty services	X		

VN3: Distribution of roles/assets

Assets* **Value chain**	Brand	Content rights	Customer knowledge	Distrib network
Consumption			Omroep Brabant	
Navigation	Omroep Brabant			
Distribution	Omroep Brabant			ISP
Packaging	Omroep Brabant			
Production		Omroep Brabant		
Creation		Omroep Brabant		

Business model overview Omroep Brabant (2/2)

Functional Architecture

FA1: Level of interoperability

	Open	Proprietary
Interoperable		Windows Media
Non-interoperable		

FA2: Modularity: service components

	Custom made	Standardized
Single or few component (integrated	Components are developed by the technical partners	
Many components		

FA3: Distribution of functionality

	Stream	Download	DRM	QoS
Central	X			
De-central				

Financial model

FM1: Cost Sharing

	CAPEX	OPEX
One firm		
Two firms	Regional and national policy makers, Omroep Brabant	Regional policy maker, Omroep Brabant
Investment pooling		

FM2: Pricing models

Pay per use	Subscr	Adv	No direct revs	Compl products	Resell cust info	Other
		On website	All content available for free			

FM3: Revenue sharing

Rev Sharing	Licensing	Buying
X, with news aggregators	X	X

Business model overview Vara Comedy[15] (1/2)

Value Proposition

VP1: User involvement

Zapping	
Time shifting	
Browsing/Scheduling	X
Rate/tag	X
Share/ Broadcast	
Edit/ Change	
Generate content	

VP2: Intended value

Financial	
Functional	Users can easily access comedy shows, clips etc
Social	
Symbolic	

VP3: Positioning

Direct competitor	
Substitute	
Complement	To TV channel

Value Network

VN1: Vertical integration

Producing	Vara
Packaging	Vara
Distributing	
Navigating	Vara

VN2: Customer ownership

Lock in strategy	Low	Med	High
Contract. agreements	X		
Complem.investments	X		
Proprietary Standards	X		
Exclusive supplier	X		
Loyalty services	X		

VN3: Distribution of roles/assets

Assets* **Value chain**	Brand	Content rights	Customer knowledge	Distrib network
Consumption	Vara			
Navigation	Vara			
Distribution				ISP
Packaging	Vara			
Production	Vara			
Creation		Vara		

[15] Being a genre on the TV channel/website, Vara Comedy is a bundle of services. We have categorised Vara Comedy according to the most prominent services in their bundle.

Business model overview Vara Comedy (2/2)

Functional Architecture

FA1: Level of interoperability

	Open	Proprietary
Interoperable		Windows Media, and (previously) RealMedia
Non-interoperable		

FA2: Modularity: service components

	Custom made	Standardized
Single or few component (integrated		
Many components	Large in-house developed database	

FA3: Distribution of functionality

	Stream	Download	DRM	QoS
Central	X			X
De-central				

Financial model

FM1: Cost Sharing

	CAPEX	OPEX
One firm	Vara	Vara
Two firms		
Investment pooling		

FM2: Pricing models

Pay per use	Subscr	Adv	No direct revs	Compl products	Resell cust info	Other
			X			

FM3: Revenue sharing

Rev Sharing	Licensing	Buying

Business model overview Vlinder.TV (1/2)

Value Proposition

VP1: User involvement

Zapping	
Time shifting	
Browsing/Scheduling	Via Vlinder.TV site
Rate/tag	
Share/ Broadcast	
Edit/ Change	
Generate content	

VP2: Intended value

Financial	
Functional	
Social	High, community oriented service
Symbolic	

VP3: Positioning

Direct competitor	
Substitute	
Complement	To regional broadcaster

Value Network

VN1: Vertical integration

Producing	All original content created by end-users
Packaging	Through Vlinder.TV website
Distributing	
Navigating	Through Vlinder.TV website

VN2: Customer ownership

Lock in strategy	Low	Med	High
Contract. agreements	X		
Complem.investments	X		
Proprietary Standards	X		
Exclusive supplier		X	
Loyalty services	X		

VN3: Distribution of roles/assets

Assets* **Value chain**	Brand	Content rights	Customer knowledge	Distrib network
Consumption		Vlinder.TV		
Navigation	Vlinder.TV			
Distribution	OnsNet			ISP
Packaging	Vlinder.TV			
Production	Vlinder.TV			
Creation				

Business model overview Vlinder TV (2/2)

Functional Architecture

FA1: Level of interoperability

	Open	Proprietary
Interoperable		RealMedia
Non-interoperable		

FA2: Modularity: service components

	Custom made	Standardized
Single or few component (integrated		Regular W3C standards
Many components		

FA3: Distribution of functionality

	Stream	Download	DRM	QoS
Central	X			
De-central				

Financial model

FM1: Cost Sharing

	CAPEX	OPEX
One firm		VlinderTV
Two firms		
Investment pooling	Kenniswijk, Minisitry of Economic Affairs, SenterNovem, Global Informatistics	

FM2: Pricing models

Pay per use	Subscr	Adv	No direct revs	Compl products	Resell cust info	Other
			Yes, not for profit foundation			

FM3: Revenue sharing

Rev Sharing	Licensing	Buying

Business model overview VPRO 3voor12 (1/2)

Value Proposition

VP1: User involvement

Zapping	Two sub-channels on DVB-C
Time shifting	
Browsing/Scheduling	Large content archive
Rate/tag	X, genres, titles
Share/ Broadcast	
Edit/ Change	
Generate content	

VP2: Intended value

Financial	
Functional	Stream missed broadcasts
Social	Music community
Symbolic	

VP3: Positioning

Direct competitor	
Substitute	Yes, e.g. Fabchannel
Complement	To existing VPRO content

Value Network

VN1: Vertical integration

Producing	Majority of programs are own productions
Packaging	Content available on demand via 3voo12 site
Distributing	
Navigating	Available via own website and cable/IPTV platforms

VN2: Customer ownership

Lock in strategy	Low	Med	High
Contract. agreements	X		
Complem.investments	X		
Proprietary Standards	X		
Exclusive supplier	X		
Loyalty services	X		

VN3: Distribution of roles/assets

Assets* **Value chain**	Brand	Content rights	Customer knowledge	Distrib network
Consumption	VPRO		VPRO	
Navigation	VPRO			
Distribution				KPN/ISP
Packaging	VPRO			
Production		VPRO content owners		
Creation				

Business model overview VPRO 3voor12 (2/2)

Functional Architecture

FA1: Level of interoperability

	Open	Proprietary
Interoperable		Windows Media and RealMedia
Non-interoperable		

FA2: Modularity: service components

	Custom made	Standardized
Single or few component (integrated	Components are developed mostly in-house	OS components developed in-house
Many components		

FA3: Distribution of functionality

	Stream	Download	DRM	QoS
Central	X			X, via cable and IPTV
De-central				

Financial model

FM1: Cost Sharing

	CAPEX	OPEX
One firm		
Two firms		
Investment pooling	PSB funding, Platform operators, VPRO	PSB funding, Platform operators, VPRO

FM2: Pricing models

Pay per use	Subscr	Adv	No direct revs	Compl products	Resell cust info	Other
			All of the content available for free			

FM3: Revenue sharing

Rev Sharing	Licensing	Buying
In case of co-productions with rights holders	In case of co-productions with rights holders	