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The research described in this report was prepared for the United Kingdom Office of Communications.
Preface

The European Commission has proposed an Audiovisual Media Services Directive (AVMS), which extends television broadcast regulation to Internet Protocol delivery. The proposal specifies two types of regulated content: linear streamed content delivered according to scheduled programming; and on-demand content delivered to specific user request (which it terms non-linear).

This research report was commissioned by the UK communications regulator, the Office of Communications (Ofcom). It examines the indirect impacts of the proposal’s regulatory definitions for new multimedia services in the UK and across Europe. The methodology assesses the impacts (largely by qualitative means) of the new proposed regulation via case studies of the value chain in three sectors: Internet Protocol Television, mobile multimedia and online games. It comprises the following.

1. Literature and data review – this includes ‘portraits’ (short scenarios) of alternative futures for the sectors under regulation.

2. Case studies of the value chain in each of the three sectors. The IPTV case study was conducted internally at RAND. The mobile multimedia case study was conducted by independent consultant Dr Colin Blackman, with key input by Simon Forge of SCF Associates Ltd. The games case study was conducted by Dr Jason Rutter of the University of Manchester, with some additional regulatory input on virtual worlds by Chris Marsden.

3. Impact assessment of the sectors based on hypothetical cases for regulatory and market development in the period to 2011, to draw evidence for the impact on investment, off shoring, and the broader information and communication technology and broadband markets.

This report is completed, and has been peer-reviewed, in accordance with RAND’s quality assurance standards (see: http://www.rand.org/standards/). The report is intended to receive a wide distribution among UK and international communications stakeholders with knowledge of the AVMS proposal and economic impact assessment.

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Executive Summary

The European Commission published proposals for a new Audiovisual Media Services Directive (AVMS) on 13 December 2005. RAND Europe input (RAND, 2006) in October 2005 to the European Commission’s Impact Assessment based on the Issues Papers of 11 July 2005 found empirical support for the liberalisation of the rules on traditional broadcasters. It cautioned that evidence for impacts on the developing sectors for non-linear delivery was lacking: "In the absence of empirical evidence in order to assess the cost–benefit, we do not consider that definitive answers are possible." The AVMS proposes to regulate two types of video providers: linear and non-linear. Linear providers will be regulated according to a revised broadcast regime, and will encompass both traditional broadcasters and providers of Internet Protocol TV (IPTV). This regime will apply whether the viewer watches the programme in real-time or records (using, for instance, a Personal Video Recorder; PVR) for later playback. Where the viewer actively requests the individual video file on demand, this is considered a non-linear use of video. This latter type of service would be regulated according to minimal standards, lighter than linear ‘broadcasting’ regulation, but still encompassing a wide range of prohibitions against particular types and durations of advertising, other commercial communications, different types of expression, and so on. The definitions do not exclude video blogs, interactive computer games or delivery of video over mobile telephone networks.

The AVMS as drafted does not yet ensure consistent application of a ‘light touch’ approach using self-regulation wherever possible to offers market actors greater flexibility in achieving the goals of the AVMS rather than traditional command-and-control regulation. The cost of complying with regulation has several components including: (1) opportunity costs arising from not creating content that is popular but not permitted by

regulation (and provided by other sources outside the EU); (2) the direct costs of policing content that is created; and (3) the risk of litigation. RAND 2006 stated that:

“Regulation can only be effective with flanking self-regulation and technological and other instruments to protect viewers.”

Further, the AVMS proposals as currently drafted do not offer firms, particularly the small and medium-sized enterprises (SMEs) who can be expected to play a major role in driving new media innovation, with sufficient regulatory certainty to encourage investment in European Union (EU) multimedia sectors. This is essential: the forerunner of the AVMS (the ‘Television without Frontiers’ Directive) affects only licensed broadcasters directly. The AVMS as proposed will affect a very broad range of stakeholders who formerly were unregulated or regulated by generic regulation such as the E-Commerce Directive. The impacts of the proposal should be assessed for these ‘indirectly affected’ (in actuality, newly-affected) parties.

This study analyses these potential effects in detail. The Executive Summary describes the conclusions in five phases:

1. analysis of the proposed Directive’s definitions as applied to multimedia content;
2. the Directive’s broader macroeconomic impact via broadband and information and communication technology (ICT), including the innovations which have been termed “Web2.0”;
3. the effect of the regulation on multimedia value chains;
4. the specific effects of regulation in three case studies: Internet Protocol TV (IPTV), online games and mobile multimedia; and
5. concluding comments on the impacts of regulation on development of the sector in terms of portraits of future broadband service development.

We caution that the sectors under examination have changed considerably from experimental innovation to deployment. Governments recognise a need to improve measurement of digital content, as lagging or incomplete statistical indicators mask the economic potential and implications of emerging industries and trends, affecting the agenda and priorities for government policymaking, if not the evolution of the sector itself.

This study does not attempt to describe material changes or improvements which could be made to the draft Directive to ameliorate the regulatory impacts identified, but the study

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5 RAND (2006), at p. vi.
6 The definition of SMEs: ‘Companies classified as small and medium-sized enterprises (SMEs) are officially defined by the EU [European Union] as having fewer than 250 employees. In addition, they can have an annual turnover of up to 50 million euros, or a balance sheet total of no more than 43 million euros… In reality, 99% of businesses in the European Union are SMEs’, see: http://ec.europa.eu/enterprise/entrepreneurship/docs/facts_en.pdf
does point to the need for greater regulatory certainty as to the scope of the regulation of new services and the need for clear commitment to ‘light touch’ regulatory techniques.

**AVMS and Definitions of Multimedia Content**

A first legal problem is the application of the AVMS to new multimedia services. The definition of “audiovisual media service” is based on the six elements in Article 1(a) of the proposed AVMS:

“A service as defined by Articles 49 and 50 of the Treaty [of the European Union], the principal purpose of which is the delivery of moving images with or without sound, in order to inform, entertain or educate, to the general public by electronic communications networks.”

Article 1(b) defines “media service provider” as those who hold editorial responsibility. Both scheduled linear programming and video-on-demand (VOD) services (non-linear content) are to be subject to a set of prohibitions or restrictions on offensive content (inappropriate for children, racist or xenophobic) and forbidden commercial content (including certain types of advertising and sponsorship).

The E-Commerce Directive9 and Annex to the 1998 Recommendation on the Protection of Minors and Human Dignity10 already apply to non-broadcast services. The AVMS supplants this suggested self-regulation by a co-regulatory or regulatory approach. The Commission states:

“This definition is intended to regulate as a function of the centre of gravity of the service sector concerned, not as a function of borderline cases. It is binding as to the result to be achieved but leaves to the national authorities the choice of form and methods.”

This latter point is critical: the definition does not specify exclusions or how ‘light touch’ regulation should be applied, so national implementation can vary significantly. In particular, the relative regulatory compliance cost burdens faced by linear and non-linear service providers can be expected to vary significantly.

**The Impact of Broadband and ICT on the Economy**

The macroeconomic impacts of the AVMS arise from its effect on the development of core elements of the ‘New Economy’ – especially broadband and the ‘creative content’ sectors12. The Organization for Economic Cooperation and Development (OECD) states:

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9 Directive 2000/31/EC, as implemented in national laws in 2002, already gives consumers clarity about where a company is regulated, and where to pursue any complaints.


“Broadband content applications and services are expected to encourage the uptake and effective use of ICT, to drive broadband development. Furthermore, digital content is expected to provide a new impetus for the digital economy, encouraging innovation, raising the level of skills, triggering dynamic developments and innovations in existing industries and creating new markets.”

Therefore, the digital content industries are viewed as particularly important for employment and international competitiveness. Figure 1 shows that employment in industries such as advertising and film shrank between 2001 and 2004, but employment in software for computer games and electronic publishing (elements in multimedia) grew by 5% over the same period.

Figure 1: Employment in Creative Industries in the UK 1995–2004
Source: Office for National Statistics

Figure 2 shows that the software sector also dominates creative economy exports.

Figure 2: UK Exports for Selected Creative Industries 1997–2003
Source: Office for National Statistics

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The European Information Technology Observatory (EITO) stated that:

“Entertainment and mobility in particular will account for most of the positive developments within the telecommunications market, further supported by new data and Internet services, mainly in the fixed area. Broadband access continues to boom in the EU.”

Beyond this direct contribution to competitiveness, broadband and ICTs are ‘enabling technologies’ that facilitate broad productivity gains. Broadband Internet use is necessary for many future ICT applications and services, and policymakers consider it important that current and future workers are ICT-literate, which increasingly means multimedia literate.

User-generated Content: Web2.0

A further element in broadband’s contribution to overall productivity is the potential development of innovation by end-users enabled by ICTs. The next generation of distributed applications and services on the Internet is crucial to development of the broadband economy, increasing the utility and power of networked computing, especially the Internet. This is described as Web2.0, and makes user-generated and distributed content central to consumers’ Internet experiences. In Europe, a notable national example is Estonia, which has significant expertise in Web2.0 and peer-to-peer (P2P) technologies, notably in producing the Voice over Internet Protocol (VoIP) software Skype and the P2P client Kazaa. Web2.0 is likely to facilitate significant innovation and consumer adoption in the years to 2011. In turn, user experience with digital games and multimedia suggests that they are likely to drive innovation and adoption of Web2.0 and P2P services and markets.

Value Chain Analysis

We now examine the sectors in more detail. There are limitations to the use of standard quantitative techniques in determining the costs and benefits of the AVMS in new multimedia sectors. We consider the medium-term, to 2011 where possible, but caution that the only certainty in such an analysis is that the quantitative assessment will be incorrect. Therefore, we rely largely on qualitative analysis. We examine the literature for evidence of the evolution of value chains, before turning to specific case studies and the value chain in each.

The value chain is a simple tool to evaluate systematically the full range of activities required to bring a product or service from conception through production to final consumer delivery. Porter’s classic 1985 analysis studies value creation at company level.

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14 EITO (2006) ‘Online Visual Media Content’, market data provided by the EITO Task Force in cooperation with IDC (Inbternational Data Corporation), Institut de l’Audiovisuel et des Télécommunications en Europe (IDATE) and Growth from Knowledge (GfK), at: http://www.egovmonitor.com/node/4796/print
15 In any nascent sector that is predicted to grow fast, the ‘median’ statistical prediction is most likely to be inaccurate: consumer adoption of technologies either develops faster or slower than expected, as we discuss in Chapter 2. For a quantitative assessment, see Indepen/Ovum/Fathom (2005) ‘Extension of the Television without Frontiers Directive: An Impact Assessment’, see: http://www.ofcom.org.uk/research/tv/twf/twfreport/
identifying and categorising the company’s activities, and studying the value added at each point. Support activities, which exert their effect on value creation via the primary activities, can also directly affect value creation. The normal value chain diagram connects different entities (generally firms) and the arrows between them indicate functions. These value chains can incorporate also the more complex interlinkages between the various actors (processes) within the value chain. For example, the design of a product not only influences the production process and marketing, but is influenced also by the constraints in these downstream areas. In addition, value chain analysis has been extended to analysis at an industry level, encompassing links between firms in a similar manner to links within the firm\textsuperscript{17}.

Scholars have argued that the emergence of new technologies will have – and has had – fundamental impacts on the value chain of affected industries\textsuperscript{18}. In particular, disruptive technologies\textsuperscript{19} have the potential to overturn an existing dominant technology or product, and in so doing, introduce new value-creating processes, reconfiguring the value chain. In some cases, the emergence of new technologies has led to the creation of a ‘value web’\textsuperscript{20}, where the traditional linear or hierarchical relationships between suppliers and producers have evolved to encompass more complex, network-like, relationship forms. Value web networks are footloose (can globally relocate easily) and responsive to consumer market, investment and regulatory conditions. This is not to say that bottlenecks and legal constraints do not constrain these new types of enterprise, but their responses are not as uniform, smooth or predictable (in relative terms) as in the traditionally linear, vertically-integrated or controlled environments which broadcast and telecoms regulators have analysed\textsuperscript{21}, and on which formal analysis has concentrated\textsuperscript{22}. Furthermore, the ruthless competition in these markets results in highly volatile and ‘snowballing’ investment decisions: for states seeking to attract such investment, there is more of a ‘winner-takes-all’

\begin{thebibliography}{99}
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pay-off from the entrepreneurial investment climate provided. There is a tendency in networked sectors to reactions swinging from excess inertia to volatility23.

Conventional simplified value chains do not reflect fully the ability of international or globalised investment, production and distribution to relocate away in response to changes in the regulatory and/or market environment. This study tests whether AVMS could have a measurable impact on particularly ‘footloose’ sectors of the overall value ‘mesh’. Previous studies show that the value chain in emerging multimedia services (as with Web2.0) is less hierarchical and less linear than traditional mass media markets24. The ‘fitness’ of one business model over another will be determined by its ability to adapt to technological, regulatory and other changes and to articulate and attract finance for suitable business cases.

Competing business models differ in the power of the operator within the value chain, and the feasibility of vertically-integrated ‘walled gardens’. This fluid relation between power and upstream and downstream integration is characteristic of multimedia value webs, where transaction costs are large enough to promote internalisation by integration rather than reallocation through market-based relationships. Network operators may expand up the value chain into content provision, and content providers may expand down the value chain into service provision and content aggregation. This has two implications. First, the internalisation of functions previously available in a competitive market may increase entry barriers and thus market power. Second, integration may change the amount of regulatory pressure brought to bear (this will be anticipated in integration decisions).

The single point of control assumed in most broadcasting and telecoms regulation has given way increasingly to clustering, hybridisation and agglomeration of skills within virtual organisations25, in ways that have not been reflected fully in regulatory impact analyses26.

Therefore, the AVMS Directive will be applied to an industry whose structure is both more complex and more dynamic than the traditional industries of broadcasting or telecoms, and one in which the effects of regulation may have significant impact on the eventual industry structure that emerges. In some cases, the natural response by the market to heavy regulatory burdens and/or increased regulatory risk may be to increase this rate of integration, and hence to make the market structure less competitive and open than would have been the case otherwise27.

Case Studies

This section lays out conclusions from the detailed case studies. Note that the concluding remarks differentiate ‘walled gardens’ from an open/interoperable access ‘commons’. It is also important to note the influence of the AVMS on the value chains for each case study and, in particular, the effect of content compliance costs on large content providers and SMEs, offshoring by providers and network operators’ pricing and regulatory compliance strategies.

IPTV

IPTV is at a mature stage of commercial deployment only in Hong Kong, and to a lesser extent, France and Italy. IPTV is a substitute for existing TV channels, and can be largely substituted by VOD services. It is delivered primarily as a ‘walled garden’ product bundled with broadband access and telephone calls at present, typically by major telecoms and cable operators. The sustainability of this business model in the medium term is not clear and turns in part on whether network operators are able (and permitted by regulation) to impose charges or other forms of control for such content in the face of ‘free-riding’ global P2P distribution of video content.

Regulatory risks: A light-touch regulatory regime based on industry self-regulation or co-regulation appears feasible in relation to these ‘walled garden’ offerings. Conversely, the risks of multinational offshoring and SME business failure appear quite high, particularly in more global sectors such as P2P-distributed VOD and niche content channels. The market is too immature to model peering costs and alternative distribution models with any certainty. We therefore recommend more intensive and focused research into the costs of local IPTV versus VOD and multicast distribution costs. If such costs differ substantially, it may be that the regulatory costs are very much secondary to the distribution costs in the operators’ choice of where to site their networks.

It is possible that this market will trend away from ‘walled garden’ linear services to open-access non-linear distribution for all but essential ‘live’ events. Such a development would much reduce the scope to apply practicable EU-level regulation, unless this was mirrored in the level of control applied in Third Countries. In the absence of detailed modelling, it is difficult to be certain whether the cost of regulatory compliance with the new AVMS Directive could itself be a contributory cause of the migration of economic activity towards this ‘open-access’ model, but clearly, the heavier and less practicable the EU regime, the more likely it is that distributors will favour alternate means to address consumers.

Open versus closed models: The distribution cost question may depend on the ability of IPTV ‘walled garden’ networks to retain customers in the face of possible ‘free-riding’

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28 A ‘walled garden’ is a type of IP content service offered without access to the wider Internet: most mobile telephone networks provided walled gardens to their subscribers.

29 By ‘commons’, we refer to an open space, with interoperable and publicly available standards, of which the World Wide Web is the archetype.
global P2P distribution of video. This has wider regulatory implications, particularly involving the development of 'gatekeepers' rather than open access models\textsuperscript{30}.

**Mobile Multimedia**

Mobile users inhabit a much more personal and pervasive environment than personal computer (PC) users\textsuperscript{31}. Compared to fixed line Internet access there are additional constraints on full openness. The mobile industry has developed hitherto on the basis that operators control the use of their networks and the devices which connect to them. For that reason, the initial content offerings of mobile providers have tended to be provided in a 'walled garden', in which the customer experience is 'guaranteed' by the operator and regulatory compliance can be imposed on third-party content providers through their contracts with the mobile operator.

*Regulatory risks:* As with 'walled garden' IPTV offerings, compliance with a light-touch regulatory regime appears feasible, and in fact would build on existing self-regulatory regimes in a number of Member States. Mobile operators are probably less vulnerable than fixed networks in relation to the 'free-riding' P2P problem because of the greater control that they already exert over the end-to-end delivery of traffic on their network. Nonetheless, care would need to be taken to ensure that the costs of compliance with a regulatory regime for content did not become so great in relation to 'open-access' distribution that mobile operators themselves would choose to evade the costs of the former by artificially restructuring their business activities (for instance, mobile companies requiring or facilitating the setting up of content services outside of the EU so as to avoid EU rules).

*Open versus closed models:* The obverse of the above analysis is that the Directive will tend to reinforce the tendency towards a high level of end-to-end control by network operators of mobile content services. If it were considered that a more open mobile environment was desirable and would spur creativity and generate more jobs, then part of the policy response could be to avoid new regulatory burdens.

**Online Games**

It has been argued that 'online games are the future of the interactive entertainment industry'\textsuperscript{32}. In this relatively young sector, a highly-skilled labour force gives Europe significant presence in the global market. Digital games development is more global than either IPTV or mobile content sectors. Developers increasingly use specialised labour around the world and around the clock. Global labour supply and the networked basis of the games themselves make offshoring elements of the industry relatively straightforward.

\textsuperscript{30} Continuing the analogy with commons and walled gardens, one can imagine that a walled garden can be protected and entry or exit charges imposed. By contrast a commons is open access, with no controls. The walled garden gatekeeper is likely to be the owner of the garden – the operator.

\textsuperscript{31} As a hypothesis chosen in Chapter 3, we did not consider that – in the medium term – mesh networks would achieve critical commercial mass such that they would affect the regulatory decisions to 2011. This may be inaccurate, but certainly to date such networks have been isolated.

By 2011, most games will involve access to online content, multiplay or community resources, irrespective of the platform. This will eliminate any demarcation between offline and online gaming, as data flow will become increasingly seamless.

**Regulatory risks:** Applying rules drawn directly from TV to games may not suit the profound differences in the way that the media are used. Implementation of the AVMS, where games are classified as linear or non-linear regulated video, would make online gaming subject to new regulation based on whether the user is connected to the network, not the context of the game or its content. Neither legislators nor users would be clear on the point at which gaming services become covered by the AVMS or why elements of play are regulated differently. The gaming currently considered appropriate for industry self-regulation and play by minors (when used on a stand-alone machine or wired network) would become subject to AVMS regulation when played online.

With high local development costs, compliance costs falling on EU developers may bar them from the global market. While large publishers could mitigate costs by integrating administration with existing quality management, developing and hobbyist SME developers would face disproportionately high impacts. However, precisely these small players constitute Europe’s comparative advantage in the global market.

**Innovation and Web2.0:** The regulation of online ‘persistent world’ games is still primarily through PCs. In Eastern Europe the PC – rather than the specialised games console – is the primary games platform. Any regulation that disproportionately affects online PC games will have asymmetric impact, especially on European states with lower average wage levels. The digital games industry is at the vanguard for exploiting the use of network technologies for user engagement, user creativity and community building and it may seem premature to legislate for the developing industry. Moreover, this impact of regulation on platform development and convergence is particularly tricky in terms of new games consoles driving innovations in graphics, storage, communications and computing power. The ‘media centre’ bundling of functions in these consoles creates a further challenge for ‘technology-neutral’ AVMS implementation.

**Overall Value Chain Conclusions**

The most footloose and immature elements of the value chain also combine high potential for disruptive growth and responsiveness to regulatory sunk costs and uncertainties. The resulting flight of capital or skills to other sectors or countries may be greatest in gaming, but also includes globally P2P distributed IPTV (as opposed to local) companies and some elements in the otherwise tightly vertically integrated and localised mobile value chain. We expect these businesses to have a high sensitivity to regulatory proposals. As business models develop, so does the possibility of quantifying and analysing their response to regulation in more detail and with more certainty. Regulation includes changes to current regulated pricing and classification of content, so the interplay between content regulation and content pricing is, in our view, an essential area for future research.

33 The interviewees in this project have indicated that Quality of Service on the Internet is a complex issue and that net neutrality needs greater analysis in order to ascertain the real investment
The potential of regulation to affect the value net appears most profound in the business model choice between a ‘walled garden’ and an open-interoperable content model (although we acknowledge that these are ideal types of business model). The latter tends towards Web2.0-type ‘public good’ value and innovation concentrated in end-users rather than network operators and associated clusters of developers. At least at the margin, the choices made now about the regulation of these sectors can have an impact on this business model choice. By and large, the greater the levels of regulation and problems of uncertainty, the more likely the market is to develop towards more closed and concentrated structures, for three reasons:

1. larger companies are able to bear the direct costs of regulation much more easily than SMEs;
2. larger companies have the resources and lobbying power to seek to influence regulation in a positive direction; and
3. larger firms in a concentrated market can offload compliance costs upstream onto content providers and developers, or downstream onto consumers.

The case study sectors’ development is interdependent. They are both cooperative and in competition with each other, being substitutes and complements in both demand (consumer substitution and churn) and supply (the degree to which content can be reformatted and/or made interoperable across platforms for IPTV, mobile and games).

The linear/non-linear distinction is vital in deciding on regulatory strategy. Non-linear enforcement is a critical issue. User-generated and user-hosted content create their own problems. There are tens of thousands of potential commercial video podcaster, but no regulatory body in the sector can register such a body of AVMS suppliers. The only feasible way to enforce the Directive is via the intermediary, content host or service provider as a proxy for the content editor. This may result in substantial changes to the type of common carriage regime that is currently in place, and described in Chapter 2.

For incumbent linear operators, the nominal burden of regulation will not change. Hence, incumbents and regulated actors have incentives to drive up regulatory costs in other parts of the value chain. Should they choose not to do so, they must hope to leverage their position in the emerging value chain in order to compete successfully with entrants from outside the industry.

New linear operators (e.g. new channel providers) will face relatively heavy regulatory burdens under all scenarios. They are likely to licence over to incumbents or otherwise consolidate. Therefore, regulation reinforces concentration. In fact, it is difficult to imagine new entry succeeding in any but niche channels, because sunk costs make entry uncompetitive in ‘established’ new media channels.

options that can drive content and network investment in Web2.0 and next-generation network futures.

34 These are not always non-linear. For linear niche content, the extreme cost of enforcement on users may create a ‘safe haven’ in the shadow of the regulation. Users and others below the regulatory radar could populate the linear market niche as suppliers, and as users of other users’ linear content, if the regulation inhibits the incumbents who currently dominate the linear sector.
For both old and new linear operators, the ‘referred liability’ which makes them police content is controlled via the fact that they commission content from providers (including advertisers) under contract. Therefore, linear actors can pass on regulatory risk via co-regulatory and self-regulatory arrangements enforced by contract. Where costs cannot be passed on except to end-consumers, linear offers may lose out to non-linear services.

**Impacts of Case Studies on the Broadband Market**

Having considered the effect of regulation in the three case studies and their potential interactions, we now attempt to aggregate from the sectoral to the broader content level, to gauge the impact of content regulation on the broadband network market and ICT in three areas: universal broadband penetration, faster broadband, and the effect of user-generated and distributed content.

**Universal broadband penetration**: Currently, approximately 40% of UK households do not subscribe to a fixed-line broadband service. It is necessary to separate the consumers who are likely to do so by 2011, those who have (or will) obtain mobile and other wireless connections, those who access the Internet only at work or school, and those who will not adopt. We can anticipate that a proportion will choose to adopt a lower speed and more filtered Internet via digital TV (with final UK regional analogue switch-off in 2012), or substitute mobile for fixed line networks. Further evidence and analysis is needed to assess the extent of any serious or sustained lag in broadband penetration or correlation between population density and broadband penetration. OECD figures for the end of 2005 indicate that several early-adopter European countries are now approaching universal broadband saturation (with the exception of rural areas, disabled users and a clear lag in penetration among over-55s).[^35]

**Faster broadband**: Most existing UK home Internet connections are already at broadband speed. The migration path to 2011 is to higher bandwidth (speed, capacity, reliability) services. The higher cost of fibre combined with consumer service demand uncertainties mean that it cannot be assumed that fibre will achieve a penetration rate approximating to current broadband penetration by 2011, but the rate of adoption of fibre and fibre-like (50Mb/s and upwards) connections is an essential element in the assessment of the AVMS. As Figure 3 shows, there may be a developing supply–demand ‘arms race’, as connection speed and application bandwidth continually drive each other higher (at least in urban high-density locations). This is obviously only one of several different potential outcomes.

[^35]: See generally, OECD (2006a) ‘Broadband Statistics December 2005’, 11 April, at [http://www.oecd.org/document/39/0,2340,en_2649_34223_36459431_1_1_1_1,00.html#Graph 2](http://www.oecd.org/document/39/0,2340,en_2649_34223_36459431_1_1_1_1,00.html#Graph 2)
Figure 3: Possible Development of the Supply–Demand Curves for Broadband

User-generated and distributed content: If networks and content providers cannot monetise their respective parts of the value chain, network effects can reverse into a ‘vicious circle’, in which neither content nor network can secure investment to provide service. Instead, the inflexion points at which investment in the lagging element is needed to prime the next phase of disruptive growth can become crisis points (described below in the ‘midband malaise’ or ‘user-controlled commons’ portraits). At this point, investments may be constrained and a ‘virtuous circle’ of investment replaced by a vicious circle of under-investment.

Qualitative Projections Based on Portraits

It is difficult to model changes in AVMS regulation against broadband Internet use with any certainty. Quantitative forecasts for the size of new multimedia markets are unreliable, as outcomes in an immature disruptive technology environment tend to fall at either extreme of the ranges anticipated. For the same reason, it is not possible to quantify accurately the broader economic impact of the AVMS. Instead, we offer preliminary qualitative ‘portraits’ of potential broadband development based on a previous scenario-based methodology. Figure 4 below illustrates the portraits via current projections of broadband penetration and European Internet advertising and access growth against the European venture capital available for communications investment. We note that both of the current projections would be significantly interdependent with the scenarios we portray for the future: the higher the scenario projection of investment, the higher the rate of

deployment of services and hence some further presumptive increase in the rates of broadband adoption and access/advertising growth.

The portraits are:

1. 'midband malaise' – where content owners and network operators cannot monetise content;
2. 'user-controlled commons' – where P2P distribution becomes highly popular and widespread, displacing streamed live content on the Internet and traditional business models37;
3. 'winner-takes-all' – one type of content wins the bulk of consumer revenues, taking advantage of the contagion and tipping effects of digital networked content;
4. 'win–win' – all content sectors grow their markets and create a virtuous circle of bandwidth upgrades and industry growth.

Figure 4 adds a fifth 'Web2.0' portrait whose potential success has many key dependencies, of which the most important are motivated and risk-taking innovators and the venture capital to support those risks. New innovation encouraged by venture capital – which we take as a quantifiable proxy for other investment sources – may be diverted by 'heavy touch' regulation of market entrants. Strong regulatory signals can invite (or alternatively, dissuade) such investment.

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37 We note that in this scenario, the prevalence of usage of non-commercial sites will lead to flattening growth for Internet advertising and access, unless there are new compelling applications for P2P sharing that include advertising and late adopter use. Otherwise, it may only be a commons for non-commercial early adopters.
Regulatory Conclusions

In a ‘walled garden’ world, vertical integration and/or networks of contractual relations can allow participants some competitive breathing space to find and implement suitable allocations of regulatory costs and compliance activities. Something similar could happen in self-regulation or co-regulation forums. Dominant and entrenched market actors in regulated ‘bottlenecks’ play games with regulators in order to increase the sunk costs of market entry for other actors, and pass through costs to consumers and innovators. Very high cost co-regulation and self-regulation can be as effective in curbing market entry as direct content regulation. Also, if vigorous regulation makes it difficult to recoup compliance costs or shift them towards those entities best placed to bear them, the consequence would be consolidation and concentration of market power. Either approach would help the European sectors touched by the AVMS to ‘survive’ the onset of regulation, but long-run efficiency requires either that competition hardens, or that ultimately, regulatory burdens must increase. The former approach (bargaining to reallocate compliance typical of a light-touch/co-regulation approach) seems likely to provide fewer long-term threats to competitive health. The cost, investor signalling and market reputational effects of a non-regulation regime can be very damaging, leading to ‘surprise’ court cases and broad national legal differences. It leads to wide divergences between market actors’ compliance and between ‘walled gardens’ and open access, causing consumer confusion (as well as choice for the particularly well-educated minority of consumers).

Therefore, based on the incomplete evidence thus far – for which reason we include the research topics below – we cautiously suggest that a form of Internet video self-regulation in which market actors and self-regulatory bodies maintain a constant dialogue with regulators and consumers is a preferable light-touch regime to those of government-funded regulation and non-regulation of selected European Internet content. A light-touch stable regime provides investors with a reasonable level of business certainty. Investors require some certainty that regulation will not cause unwelcome ‘surprises’ that distort their business case. Proposals that user-generated Web2.0 video and computer games be regulated under the AVMS can be included in such ‘surprises’.

In sum, these conclusions support a light-touch regulatory regime involving self-regulation and market-based, low-cost solutions.

Nine Areas for Further Research and Analysis

The conclusions we make are based on hypotheses designed to isolate the effects of content regulation within the many other parameters in the development of broadband services. The report details the various areas of development that invite further research, and we here highlight the most pertinent and relevant areas that we have identified, throughout

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38 The claim is that if regulation falls on the new content providers, who have no regulatory expertise or even function (except a lawyer as a generalist), then it will be more painful and create real economic hardship for some players. By contrast, if regulation is enforced in a flexible way that allows those best placed to comply to do so in the most cost-effective way, there will be less economic hardship and potentially more competition.
which there runs the ever-present research topic of the search for cost-effective pricing of content and of Digital Rights Management (DRM). These research areas can inform ongoing assessment of indirect impacts of the effects of content regulation on the Internet.

1. **Internet peering and distribution costs**: We recommend more intensive and focused research into the costs of local IPTV, VOD and multicast distribution. It can be postulated, for instance, that European ‘Long Tail’ sites need US ‘hits’ in order to prosper: further research into the use of these sites is needed to confirm this initial hypothesis. Further research on an ongoing basis is needed into user-generated content creation and self-regulation.

2. **Price discrimination and content regulation**: Regulation includes changes to current regulated pricing and classification of content, so the interplay between content regulation and content pricing is in our view an essential area for future research. ‘Net neutrality’ needs greater analysis in order to ascertain the investment options that can drive content and network investment in Web2.0 and next-generation network futures.

3. **Converging Quality of Service and next-generation networks**: On the Internet, ‘Quality of Service’ is a complex issue. Data, voice and other applications have different ‘legacy’ Quality of Service standards – at least implicitly in their technologies and consumer preference. In converged domains, the necessary evolution will affect entry and profitability. The economics of these interactions require further clarification, as the current empirical base reflects ‘impulse’ effects not market development.

4. **Venture capital flow analysis**: In order to explore the fluctuations in venture capital more accurately it would be necessary to research the individual funding agreements. This helps in real option analysis of the choices made by venture capital investors.

5. **Switching costs, regulation and innovation**: The impact of regulation on churn and the ‘turbulent’ impact of churn on market growth need to be considered. For instance, regulation may encourage price/feature competition or reduce firm survival. Churn – or even vigorous cost competition – may reduce the scope for product innovation on the supply side and innovative (user-generated) activity on the demand side.

6. **Drivers for broadband penetration**: Differences in broadband penetration and capacity utilization appear to be largely explicable by speed of deployment and pricing differences. This observation for early adopters in richer OECD countries may not adequately describe late adopter incentives, and may not hold for the

---

39 The legality of the attempts by network owners to charge multimedia content producers for carrying their content.

Eastern European EU Member States. Further research is necessary in this area, with stated preference as a potentially useful methodology.

7. **Stated preference analysis**: User demand for access and services is not driven wholly by current offerings, but reflects as well a ‘real option’ decision based on potential future goods, services and types of interaction (especially with regard to user-generated content). This has powerful implications both for uptake and utilisation. Because these options are framed by existing uses and service offerings, revealed preference data cannot shed light on underlying preferences or on the structure of the underlying decision (e.g. the extent to which content drives broadband adoption or vice versa). Discrete choice modelling with stated preference data would make the values ascribed to internet service provider (ISP) choice by users more robust and give deeper insight into the possible future evolution of the sector under different regulatory regimes.

8. **Quantitative assessment of harmonisation and enforcement**: We note that the medium-term effects of regulation are largely differentiated between Member States according to their enforcement decisions, and that these will have impacts on both investment and competition in the sectors. We caution that further research is needed to model these more fully in quantitative rather than qualitative terms, and to shed light on the possible future shape and consequences (e.g. regulatory cost, effectiveness and ‘flight’) of regulatory competition both within the EU and between the EU and other global regimes.

9. **Game theory and regulatory impact assessment**: Our analysis has highlighted the importance of different models for the discharge of regulatory liabilities (blind vs. sighted ISPs, as analysed in Appendix A) and for consumer interaction (open access vs. ‘walled gardens’). Since these partially align with the Internet versus next-generation network split and since they are already visible, it would be helpful to have a better understanding of this ‘competition of organisational forms’. Our analysis shows that the supposed ‘unanticipated consequences’ of regulation of Internet video can be estimated, and that regulators can become more aware of these consequences by using regulatory games to simulate real market behaviour.
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CHAPTER 1 Assessing Indirect Regulatory Impacts

1.1 Introduction: Assessing Indirect Impacts

This study for the Office of Communications (Ofcom), the UK’s independent communications regulator, assesses the indirect impacts of a proposed European video law. It focuses on the indirect impacts on new multimedia sectors in the UK market, a relatively early adopter of new technologies, with reference to the broader European market and other important international markets. These are impacts on the aggregate market and its actors rather than the regulators and existing regulated TV companies. In particular we assess three case studies, consisting of companies operating at the ‘outer margin’ of the proposed services to be covered, in Internet Protocol Television (IPTV), mobile multimedia and online gaming sectors. These are less directly affected and less established companies than broadcasters, and were less well-organised to consult on the original European Commission proposals – many will have been formed since the revision of the Directive was first proposed four years ago. Our focus is these new emerging sectors and the indirect impacts thereon.

The structure of the report is as follows. Chapter 1 explains the definitions in the Directive and the regulatory options for its enforcement. In Chapter 2, we lay out the effect of broadband video services on information and communication technologies (ICTs) and on productivity. Small and medium-sized enterprises (SMEs) are the most vulnerable actors in the value chain and those most important in aggregate for European competitiveness. We explain the recent phenomenon of SME and user-generated commercial video on the Internet as part of the Web2.0 innovation phenomenon. We also explain the current regulatory model used. In Chapter 3, we explain our analysis by case study, which employs ‘portraits’ to describe alternative futures for market development under various regulatory options. Chapters 4 to 6 consider the case studies in turn: IPTV services, mobile multimedia services, and online gaming. We explain the industry value chains, and how

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they are affected by regulation. We also explain the substantial overlap between the case studies: for instance, IPTV can be offered over the mobile platform, as can gaming. We use industry standard projections for quantitative illustration, but rely in the main on qualitative analysis. In Chapter 7, we explore in aggregate the lessons of the case studies for particular indirect impacts: on ICT and, more narrowly, broadband infrastructure market growth. In the concluding Chapter 8 we analyse the potential impacts, first on foreign investment and the possibilities that the globalised elements of these industries might choose whether to invest in Europe or overseas; and second, on SMEs and Web2.0 developments.

This introductory chapter is structured as follows: in section 1.2 we explain the main provisions of the Directive as they impact on the case studies; in section 1.3 we explain the regulatory implications of enforcement of the AVMS.

The fieldwork for this report was carried out during the period 10–24 June 2006 and is stated to be accurate as of 24 June 2006. Similarly, our definitional and regulatory analysis dates from 30 June 2006, at the end of the Austrian Presidency of the Council of Ministers and immediately prior to the Presidency of Finland. Finland intends to press ahead with creating favourable investment conditions for the multimedia market:

"Finland will continue to promote the content and creative industries as key resources for creating economic growth, employment and competitiveness in Europe. We will focus particularly on creating an enabling environment for the production and distribution of online content, i.e. film, music, literature and other audiovisual content… We will also discuss the Commission proposal to amend the Television without Frontiers Directive on audiovisual services, to bring it up to date with rapidly changing technology. Finland intends to forge actively ahead on this front in the Council."44

We note that this is the second RAND examination of new media sectors in connection with this Directive, with fieldwork conducted approximately nine months after RAND Europe provided input45 for the Impact Assessment based on the European Commission’s Issues Papers of 11 July 200546. RAND (2006) identified that the empirical evidence supported the case for the liberalisation of the rules on traditional broadcasters, while cautioning that measurement of the developing sectors for non-linear delivery needs expanding:

"In the absence of empirical evidence in order to assess the cost–benefit, we do not consider that definitive answers are possible."47

Governments recognise that there is a need to improve the way that digital content is measured as lagging statistical indicators mask the economic potential and implications of

44 Finland Cabinet Committee on European Union Affairs, 'Preliminary Agenda for Finland’s Presidency of the EU', 24 May 2006, mimeo, p. 4.
47 Horlings et al. (2006), supra at p. vii.
emerging industries and trends, affecting government policy setting. In the USA, the standard viewing measurement body has announced that in future it will measure TV and radio consumption online as well as via traditional means\textsuperscript{48}.

We caution that the sectors under examination have changed considerably in 2005–2006 from experimental innovation to deployment, and may be expected to change significantly in the initial phase of commercial deployment in succeeding years. In particular it is not clear that definitional advice regarding new types of services, for online video gaming, non-linear (i.e. on-demand) video files and mobile multimedia, has offered certainty to investors and entrepreneurs regarding the amount of video enhancement that constitutes a service to be regulated under the Directive, when implemented into national law in approximately 2010\textsuperscript{49}. It is this problem that this study examines.

1.2 What Does the Draft Law Propose?

The European Commission published proposals for the AVMS\textsuperscript{50} on 13 December 2005. The Television without Frontiers Directive\textsuperscript{51} (TVWF) is the main European Union (EU) legislative instrument about broadcasting. It dates from 1989 and has been revised once, in 1997. The TVWF places every TV broadcaster under the jurisdiction of one Member State, which is required to impose certain minimum standards on the broadcaster’s programming, and all the other Member States are required to ensure free reception of its TV broadcasts: the ‘Country of Origin Principle’.

The proposed amended AVMS encompasses all commercial media services offered over the Internet, mobile networks, telecoms networks, terrestrial, cable and satellite broadcasting networks, or over any other electronic network whose principal purpose is the provision of moving images to the general public. This could touch on the provision of multimedia services over all forms of video communications. These new amendments to the existing Directive will apply not only to television but also to other electronic services, if their ‘principal purpose’ is to provide moving pictures ‘to inform, entertain or educate’ the general public. ‘Television’ would include some Internet services streamed and on-demand over the Internet. Thus streamed ‘live’ TV over mobile will be regulated as TV programmes. Video-on-demand (VOD) ‘non-linear’ services would be subject to less regulation than traditional TV ‘linear’ services, but more controls than the general law.

The definition of “audiovisual media service” is built on six elements in Article 1(a) of the draft AVMS (Recitals 13 to 17). “Audiovisual media service” means:


\textsuperscript{49} Our understanding is that the Directive will not be returned from the European Parliament to the Council of Ministers until the German Presidency in the first half of 2007, and therefore will not be passed into law until at earliest the second half of 2007.


\textsuperscript{51} Directive 89/552/EC as amended in Directive 97/36/EC
a service as defined by Articles 49 and 50 of the Treaty of European Union
- the principal purpose of which is
- the delivery of moving images with or without sound,
- in order to inform, entertain or educate,
- to the general public
- by electronic communications networks\(^\text{52}\).

Article 1(b) defines “media service provider” as those who hold editorial responsibility.

Table 1 indicates the Commission’s interpretation of excluded services from the scope of the definition.

**Table 1: Exclusions from AVMS Definitions**

<table>
<thead>
<tr>
<th>Defining element</th>
<th>Exclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services as defined by Articles 49 and 50 of the Treaty</td>
<td>Non-economic activities, such as purely private websites, weblogs (blogs)</td>
</tr>
<tr>
<td>The principal purpose of which is</td>
<td>Services where audiovisual element is only ancillary (example: travel agency website, gambling websites)</td>
</tr>
<tr>
<td>Delivery of moving images with or without sound</td>
<td>Does not cover audio transmission or radio or electronic versions of newspapers</td>
</tr>
<tr>
<td>In order to inform, entertain or educate</td>
<td>Audiovisual content without editorial aspects – e.g. traffic webcams</td>
</tr>
<tr>
<td>To the general public</td>
<td>Private correspondence – e.g. emails</td>
</tr>
<tr>
<td>By electronic networks(^\text{53})</td>
<td>e.g. DVD rental, cinema</td>
</tr>
</tbody>
</table>

Article 1(c) defines a linear audiovisual media service as a service “where a media service provider decides upon the moment in time when a specific programme is transmitted and establishes the programme schedule”. This equates it with “television broadcasting” and “television broadcast”. Linear services include scheduled broadcasting via traditional TV, the Internet or mobile phones, which “pushes” content to viewers. It also includes all recorded and therefore delayed linear content, whether recorded on Personal Video Recorder (PVR) or other means.

Article 1(e) defines a non-linear service as an audiovisual media service where the user decides on the moment in time when a specific programme is transmitted on the basis of a choice of content selected by the media service provider. Non-linear services include on-demand films or news, which the viewer ‘pulls’ from a network.

\(^{52}\) Within the meaning of Article 2(a) of Directive 2002/21/EC.

\(^{53}\) This is a reference to the legal definition in Article 2(a) of Directive 2002/21/EC: “electronic communications network” means transmission systems and, where applicable, switching or routing equipment and other resources which permit the conveyance of signals by wire, radio, optical or other electromagnetic means, including satellite networks, fixed (circuit- and packet-switched, including the Internet) and mobile terrestrial networks, electricity cable systems, to the extent that they are used for the purpose of transmitting signals, networks used for radio and television broadcasting, and cable television networks, irrespective of the type of information conveyed.
TV broadcasting rules would apply to linear services, whereas non-linear would be subject to a basic set of minimum principles, e.g. to protect minors from inappropriate content, to prohibit certain types of advertising. Ultimately, the linear/non-linear (or push/pull) distinction depends upon who decides when a specific programme is transmitted and whether schedules exist. The differing degrees of regulation of content ‘pushed’ by suppliers or ‘pulled’ by users reflects differences in user choice and control and the likely impact on society. They also are intended to take account of the principle of proportionality: the costs of regulation should be proportional to the benefits of enforcement.

We note the opinions on definition of linear/non-linear expressed by the rapporteur for the European Parliament’s Culture and Education Committee, Ruth Heronymi, MEP, in the Working Paper of 6 June 2006, but prior to concrete amendments cannot consider video blogs, user-generated content such as YouTube (considered in Chapter 2) and interactive games to be excluded. In Chapters 4 to 6, we examine each multimedia sector as fully as possible, to attempt to discover (if necessary by examples) which element is subject to linear and/or non-linear regulation under the proposed Directive.

We employ the examples given by the European Commission’s February 2006 ‘non-paper’ on Scope. Table 2 is drawn from that source, itself based on the AVMS proposal, as well as the related impact assessment and the relevant press releases. It indicates the Commission’s view of the definitions’ intended application in practice. The Commission states:

“This definition is intended to regulate as a function of the centre of gravity of the service sector concerned, not as a function of borderline cases. It is binding as to the result to be achieved but leaves to the national authorities the choice of form and methods.”

This latter point is critical: as the definition does not lay down exclusions or how ‘light-touch’ regulation should be applied, the national implementation of the law can vary significantly. In particular, the difference between the costs of classification as a linear or non-linear service provider can be expected to vary significantly.

Non-linear content is to be regulated subject to minimum rules. Therefore it is not subject to the highly complex set of linear rules but to a set of prohibitions on offensive content and forbidden commercially-driven content (including advertising that is inappropriate for children, racist and xenophobic material, and certain types of sponsorship). This is not dissimilar to the rules in the E-Commerce Directive 2000/31/EC and the Annex to the

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57 Ibid.
58 The E-Commerce Directive as implemented in national laws in 2002 already gives consumers clarity about where a company is regulated, and where to pursue any complaints.
1998 Recommendation on the Protection of Minors and Human Dignity. For a variety of reasons, the 1998 Recommendation’s suggested self-regulation approach is supplanted here by a co-regulatory or regulatory approach. We address this issue in Chapter 2.

The AVMS as drafted does not yet offer certainty that a light-touch approach using self-regulation wherever possible can be applied consistently. By ‘light touch’ we refer to a governance regime that offers market actors greater flexibility in achieving in the goals of the Directive than traditional command-and-control regulation. RAND (2006) stated that:

“Regulation can only be effective with flanking self-regulation and technological and other instruments to protect viewers. Whereas specific regulation – contrasting to existing general legislation – allows public authorities to react more effectively (ex post), the monitoring and enforcement of such rules in the fast growing supply of non-linear audiovisual services will be very challenging and nearly impossible without active co-operation of the sector.”

Table 2: Linear and Non-linear Services/Platforms Including Internet Protocol (IP)

<table>
<thead>
<tr>
<th>Service/platform</th>
<th>Analogue terrestrial satellite TV</th>
<th>Digital terrestrial TV</th>
<th>Digital satellite</th>
<th>Digital cable</th>
<th>IPTV via Broadband</th>
<th>Mobile IP streaming</th>
<th>Digital mobile broadcasting</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV (linear service)</td>
<td>PSB**, free-to-air and some pay-TVs</td>
<td>PSB channels, free-to-air and some pay-TVs</td>
<td>PSB channels, free-to-air and pay-TVs</td>
<td>PSB channels, free-to-air and pay-TVs</td>
<td>IPTV: PSB channels, free-to-air and pay-TVs</td>
<td>PSB channels, free-to-air and pay-TVs</td>
<td>PSB channels, free-to-air and pay-TVs</td>
</tr>
<tr>
<td>Pay-per-view (linear service)</td>
<td>Sport events, films and other events</td>
<td>Sport events, films and other events</td>
<td>Sport events, films and other events</td>
<td>Sport events</td>
<td>Sport events</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOD (non-linear service)</td>
<td>Films, serials TV programmes and music (concerts, clips)</td>
<td>Films, serials TV programmes, sport events, music (concerts, clips, tracks), videogames</td>
<td>News, ‘mobisodes’, reality shows, music and sport clips</td>
<td>News, reality shows, music clips</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: European Audiovisual Observatory

We note that proposals to regulate video on the Internet are not confined to the EU. In the US Congress, the Chair of the Senate Committee on Commerce, Science and

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59 Recommendation 98/560/EC on the Development of the Competitiveness of the European Audiovisual and Information Services Industry by Promoting National Frameworks Aimed at Achieving a Comparable and Effective Level of Protection of Minors and Human Dignity


61 Ibid. at vi.

62 Public service broadcasters.
Transportation has introduced a ‘Cyber Safety for Kids’ Bill of 2006 proposing a similar measure, but it is unlikely to pass into law. It should be noted that the application of regulation to streamed content on mobile phones and the Internet was in 2004 rejected by the Australian government, but the subject of a renewed legislative proposal following the broadcast over mobile and Internet networks of uncensored content from ‘Big Brother’. The Australian prime minister John Howard in July 2006 made clear his view that, in this case, self-regulation had not worked:

“I don’t like heavy-handed regulation. The business community is always saying to me let us self regulate. Well here’s a great opportunity… to do a bit of self regulation and get this stupid programme off the air.”

We therefore caution against a view that the proposed AVMS is entirely unique in proposing to regulate Internet content, as other countries also have such legislative proposals. In this respect, much of our analysis of market impacts which follows is generic, and can be amended and applied to other jurisdictions.

1.3 **Regulation and the AVMS**

According to a recent Ofcom report, three different forms of regulation can be defined as follows:

- **Direct regulation** – where a statutory body is empowered by law to develop its own regulations which it maintains, monitors and enforces.

- **Co-regulation** – where a body with statutory regulatory authority delegates to the relevant industry responsibility for maintaining and applying a code of practice that the statutory regulator has approved. The statutory regulator is responsible for overseeing the effectiveness of co-regulation, and retains powers to intervene where necessary.

- **Self-regulation** – where a group of firms or individuals exert control over their own membership and behaviour. Membership is voluntary and participants draw up their own rules using tools such as codes of conduct to define good or bad practice as well as technological solutions and standards. Members take full responsibility for monitoring and compliance without reference to a statutory regulatory authority.

We use these working definitions.

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63 ‘S. 2426: A Bill to Facilitate the Protection of Minors Using the Internet from Material that Is Harmful to Minors, and for Other Purposes’, 15 March, at: http://thomas.loc.gov/cgi-bin/query/z?c109:s.2426:


Of course, the viewer/consumer choices and investment decisions of firms will be affected by the regulatory environment. It is important to note that we will not use a simplistic binary regulation/deregulation approach to impact assessment. The AVMS as proposed leaves substantial leeway to Member States to adopt different regulatory approaches, whether lighter touch or otherwise. The European Digital Media Alliance (EDiMA), the pan-European lobby for the digital media industry, has stated explicitly that it believes the AVMS proposal does not meet “the objectives that the European Commission has identified can [be] (or are already met) by alternative, more proportionate and effective means”\footnote{EDiMA (2006) EDiMA Contribution to the Debate on the Proposal for a Directive on Audiovisual Media Services, undated, document number ED-0602-001-LCC. Brussels: EDiMA.}.

We consider three types of regulatory regime.

1. *Heavy* regulation – a system imposing uniformly high costs. This is the current broadcast regime, although naturally these high sunk compliance costs for companies are not uniform across Member States. Broadcast contextual regulation can be considered as the highest cost case scenario extended across all platforms and requiring compliance function, with the possibility of strong regulatory response to breach. Note that studies of the Sarbannes-Oxley Act of 2002 in the USA show examples of such regulation imposing disproportionate compliance costs on SMEs\footnote{Supra, note 15.}.

2. *Light-touch regulation* – in which companies can take full advantage of the single European market from a liberalised and low-cost base. In many respects, this is an ideal scenario.

3. *No specific regulation* – but general civil and criminal law which can be applied to specific communications case studies.

The latter has been the situation for Internet content since its inception, despite a variety of new laws. The application of criminal law in specific European cases has resulted in unintended consequences and content provider losses: consider, for instance, the German conviction of former Compuserve general manager Felix Somm\footnote{Bender, G. (1998) ‘Bavaria v. Felix Somm: The Pornography Conviction of the Former CompuServe Manager’, at: http://www.digital-law.net/IJCLP/1_1998/ijclp_webdoc_14_1_1998.html}, or the *cause célèbre* French case of Yahoo! and its online Nazi memorabilia auctions\footnote{Reidenberg, J., ‘Technology and Internet Jurisdiction’ (2005) University of Pennsylvania Law Review 153, at: http://ssrn.com/abstract=691501}. There is not a ‘no regulation’ option without reference to national law. Indeed, criminal law prosecution is possible even in countries where there is the specific civil law remedy of regulation.

Clearly the proposed AVMS does regulate the Internet, for particular content types, but it is not unique in so doing. For instance, the areas of harmful and unsuitable communications, racism and xenophobia are addressed by a range of legal measures\footnote{For an international assessment of the UK, see Council of Europe: European Commission Against Racism and Intolerance CRI (2005) ‘Third Report on the United Kingdom, Adopted on 6 October 2005’, at: http://www.coe.int/T/Discrimination/CRIRAC/UK/ReptUKen.htm.}.

\begin{paracol}{1}

\end{paracol}
recent EU report\textsuperscript{72} expressly addresses the boundary between freedom of expression and racism and xenophobia and explains the complex legal situation with regard to international law\textsuperscript{73}. Internet video companies are not operating in a legal vacuum, but the possibility of criminal or other court enforcement of general law is at once a less common but more expensive alternative to regulation and self-regulation. Whereas the UK has established an effective co-regulatory solution to block UK-originated child pornography, other countries such as the USA rely on criminal prosecution\textsuperscript{74}.

In quantifying costs, a case such as Compuserve or more especially Yahoo! (which occupied six years in French and US courts) is far more expensive than direct regulatory control of content for the individual firm in the individual jurisdiction. For the aggregate market (all firms in all jurisdictions), it may be less expensive than direct regulation, especially on a global network such as the Internet, where the costs of extending national to global deployment of technological control measures may be of trivial additional cost. One company’s loss of a national court case obliging it to filter and censor content on its network or in its library may result in a precedent that leads to most multinational firms in the same sector being obliged to deploy the same controls, especially where the national market is highly strategic. For instance, China places enforcement obligations on service providers\textsuperscript{75}.

1.4 \textbf{Summary}

The AVMS as drafted contains significant definitional uncertainties, especially for new forms of interactive multimedia on non-traditional TV platforms. We explained the legal definitions and clarifications proposed by the Commission and Parliament in section 1.2. Section 1.3 considered three ideal types of regulation: direct government regulation; forms of co-regulation in which the government oversees industry’s self-regulatory schema; and self-regulation, in which industry (and consumer) introduce types of scheme without


government control. We noted that there are different shades of such regulation, placed on a continuum from ‘heavy’ to ‘light touch’, which normally (but not always) conforms to the flexibility and costs imposed by each form.

Chapter 2 considers the ICT industries’ contribution to productivity, the contribution of broadband infrastructure deployment to ICTs, and the development of new applications and services based on broadband platforms. It also examines the ability of market actors to regulate their actions in conformity with existing regulation, and the proposed AVMS.
CHAPTER 2  Examining the Economic Impact of Broadband Services

In the following chapter, we offer a brief overview of the larger economic landscape that the AVMS will influence – and which in turn will influence both regulatory enforcement and participant compliance. Section 2.1 introduces the particular sectors under examination and their broader economic input. Section 2.2 considers the effect of SMEs and ICTs on productivity, noting that video over broadband is a very small piece of a much larger trend towards the New Economy. Section 2.3 examines new applications and services built on broadband platforms, in particular Web2.0 type services, and the implications of wider choice of content. Section 2.4 frames the debate regarding content enforcement in terms of ‘Notice and Take Down’ regimes which currently regulate content on the Internet. To move to a more active enforcement regime may create incentives to move towards the ‘walled garden’ and away from open-access models for Internet access. Section 2.5 considers the influence of venture capital on the funding of innovative broadband applications and content services. Section 2.6 offers conclusions.

2.1  Measuring the Wider Economic Impact of Broadband and ICT

There is a particular problem in assessing the productivity of the ‘New Economy’ - those elements of the economy enabled by ICT. The OECD states:

“Most of the productivity growth differentials between the US and the EU since the mid-
1990s stem from the New Economy. In particular, the ICT-using services sector –
especially distribution and financial services – has dramatically contributed to boost
productivity growth in the US over those years, while its contribution in the EU has been
much more limited.”

Apparently, recent studies have solved the paradox that ‘computers are seen everywhere except in the productivity statistics’. This macro-level impact of ICT policy is of

‘Competition and Innovation: An Inverted-U Relationship’, Quarterly Journal of Economics
paramount importance to European competitiveness. The resolution of this paradox highlights two effects, which puts statistical evidence of economic impacts into perspective. First, the sustained productivity impact of new technologies (and access to new types of content) comes from their diffusion beyond the bounds of the ICT sectors. This diffusion is not continuous, and involves costs that may interrupt or partially reverse productivity growth. Second, enhanced productivity is often accompanied by falling prices, which mask true welfare gains. These take the form of increases in consumer surplus (better *and* cheaper goods and services) and producer surplus (e.g. reductions in fixed costs and increased use of ‘shared’ infrastructures).

ICT diffusion in the economy is driven by business and consumer use of ICTs, and increasingly this includes network applications and services. The OECD further states:

"Broadband content applications and services are expected to encourage the uptake and effective use of information and communication technologies (ICTs), to drive broadband development. Furthermore, digital content is expected to provide a new impetus for the digital economy, encouraging innovation, raising the level of skills, triggering dynamic developments and innovations in existing industries and creating new markets."

Therefore, digital content industries are viewed as important elements for international competitiveness. The OECD praises EU policy for supporting these industries.

### 2.1.1 UK Creative Industries’ Place in the Broader Economy

In view of the joint importance of content creation and communication services to the ‘diffusion’ aspect of New Economy productivity, we consider the ‘creative economy’ which generates the content that drives growth in this area and which forms a specific indirect focus of the AVMS. In what follows, we consider the ‘official’ definition of the creative industries used by the UK Office for National Statistics. In some senses this is too broad (covering content not specifically amenable to electronic distribution) yet too narrow (being based on industrial classification of enterprises, rather than specific jobs or the

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81 OECD (2006b), at p. 16: “EU-funded measures such as MediaPlus and the EU’s eContent programme support the production and use of European digital content and they promote linguistic and cultural diversity on networks. The eContentplus programme 2005–2008 of the EU tackle fragmentation of the European digital content market (including multilingualism of content) and improve the accessibility and usability of geographical content.”

Table 3: Numbers of UK Businesses in the Creative Industries\textsuperscript{83}

<table>
<thead>
<tr>
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<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising</td>
<td>10,600</td>
<td>10,400</td>
<td>10,300</td>
<td>10,000</td>
<td>10,000</td>
<td>10,100</td>
<td>10,100</td>
<td>9,800</td>
<td>9,800</td>
</tr>
<tr>
<td>Architecture</td>
<td>3,700</td>
<td>3,400</td>
<td>3,300</td>
<td>3,400</td>
<td>3,400</td>
<td>3,100</td>
<td>3,000</td>
<td>3,500</td>
<td>4,100</td>
</tr>
<tr>
<td>Art and Antiques</td>
<td>1,400</td>
<td>1,500</td>
<td>1,600</td>
<td>1,300</td>
<td>1,800</td>
<td>1,800</td>
<td>1,800</td>
<td>1,800</td>
<td>1,700</td>
</tr>
<tr>
<td>Designer Fashion</td>
<td>1,400</td>
<td>1,400</td>
<td>1,300</td>
<td>1,300</td>
<td>1,300</td>
<td>1,300</td>
<td>1,300</td>
<td>1,300</td>
<td>1,400</td>
</tr>
<tr>
<td>Video, film and photography</td>
<td>4,100</td>
<td>4,800</td>
<td>5,500</td>
<td>6,000</td>
<td>6,500</td>
<td>7,400</td>
<td>7,900</td>
<td>7,900</td>
<td>8,000</td>
</tr>
<tr>
<td>Music, Visual, performing arts</td>
<td>33,100</td>
<td>32,600</td>
<td>32,500</td>
<td>32,200</td>
<td>32,600</td>
<td>32,300</td>
<td>31,500</td>
<td>31,500</td>
<td>30,100</td>
</tr>
<tr>
<td>Publishing</td>
<td>7,200</td>
<td>7,000</td>
<td>6,600</td>
<td>6,600</td>
<td>7,200</td>
<td>3,600</td>
<td>6,700</td>
<td>6,700</td>
<td>8,000</td>
</tr>
<tr>
<td>Software, games, electronic publishing</td>
<td>48,100</td>
<td>49,500</td>
<td>52,600</td>
<td>55,700</td>
<td>56,700</td>
<td>56,100</td>
<td>55,800</td>
<td>53,700</td>
<td>49,100</td>
</tr>
<tr>
<td>Radio and TV</td>
<td>2,300</td>
<td>2,300</td>
<td>2,300</td>
<td>2,300</td>
<td>3,000</td>
<td>3,400</td>
<td>3,600</td>
<td>4,000</td>
<td>4,200</td>
</tr>
<tr>
<td>TOTAL</td>
<td>111,900</td>
<td>112,900</td>
<td>116,200</td>
<td>121,800</td>
<td>121,900</td>
<td>122,000</td>
<td>122,000</td>
<td>120,500</td>
<td>114,900</td>
</tr>
</tbody>
</table>

Source: Estimates based on Interdepartmental Business Register (IDBR), Office for National Statistics

markets reached), but provides the most feasible approach. The number of businesses in the creative industries in the UK are summarised in Table 3. Figure 5 below shows the high value-added of computer games jobs compared to those in traditional communications and media industries.

Figure 5: UK Sectoral Revenues Excluding VAT (\textpounds millions: blue) and Employment (red) 2004

Sources: Department of Trade and Industry; Office for National Statistics

New media creative industries are important to the UK economy but growth is highly dependent on the state of the economy, specifically on consumers’ disposable income.

\textsuperscript{83} The IDBR covers all UK businesses registered for Value Added Tax (VAT), Pay As You Earn (PAYE) and/or registered at Companies House.

\textsuperscript{84} Due to changes, data from 2003 are not entirely consistent with previous years.
Note the relatively high expenditure on video hardware compared with video subscription, TV licence, games software and advertising costs in Figure 6 below.

![Figure 6: UK Household Expenditure on Multimedia Equipment, Advertising, Services 2005 (Emillions)](image)

Sources: Office for National Statistics, Household Expenditure Survey Table A1; Internet Advertising Bureau; Ofcom

Figure 7 shows that while employment in industries such as advertising and traditional publishing shrank between 2001 and 2004, employment in software for computer games and electronic publishing grew by 5% over the same period. This appears to be the growth engine for the creative economy.

![Figure 7: Employment in Creative Industries in the UK 1995–2004](image)

Source: Office for National Statistics

The software, electronic publishing and associated industries are also far larger sources of creative economy exports than advertising, television and print publishing combined, reflecting the global nature of the industry’s outputs, as shown in Figure 8. The overall
The contribution of all the creative industries to UK exports could be significantly higher if figures for all sectors of the industry were known.

![Figure 8: UK Exports for Selected Creative Industries 1997–2003](source: Office for National Statistics)

The European Information Technology Observatory (EITO) produced an assessment of the contribution of telecoms value-added services to the overall ICT sector in its latest annual report. It stated that:

“Entertainment and mobility in particular will account for most of the positive developments within the telecommunications market, further supported by new data and Internet services, mainly in the fixed area. Broadband access continues to boom in the EU.”

The EITO 2006 edition contains a special study which analyses the digital broadband value-added services industry and markets in Europe – P2P networks and markets. These are important elements of the Web2.0 phenomenon that we describe in section 2.3.

We can conclude from this global overview that the multimedia sector is important for competitiveness, although we should note also that broadband and ICTs are ‘enabling technologies’ which permit broad productivity gains. Therefore, employment and export statistics for the sectors can tell only a part of the story. A further element is the development of innovation by SMEs and end-users enabled by ICTs, which is the focus of the following sections.

### 2.2 ICTs and Competitiveness Policy

Most of the activity covered by the AVMS involves ICT-using services (such as content delivery). Van Ark demonstrates that US adoption and diffusion of ICTs is the reason for

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85 Market data were provided by the EITO (2006), EITO Task Force in cooperation with IDC, IDATE and GfK, see: http://www.egovmonitor.com/node/4796/print
the rapid growth of the US economy and slowing growth in Europe. The real US advantage lies in the services sector. The reasons for late and limited adoption of ICTs in Europe are many and reflect risk-averse and ICT-averse attitudes, but the overall effect is clear to the European Commission:

"The differences in EU-US productivity patterns are fundamentally driven by the superiority of the US in terms of its capacity to produce and absorb new technologies." 

The figures also show differences in: factor (skills, capital) availability, mobility and quality; consumer demand; and ICT regulation and tax treatment.

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87 Ibid., at p. 17.

“Europe and its citizens should realise that their way of life is under threat but also that the way to prosperity through research and innovation is open if large scale action is taken now by their leaders before it is too late.”

Part of this change reflects the changing nature of foreign investment in research and development (R&D) for Europe, the USA and other locations, with net outflows from Europe growing in the past decade. DG Research states:

“Such a net outflow also reflects the relatively stronger attractiveness of the US research and innovation systems compared to those of the EU – and the ability of the US to sustain consumer demand despite economic cycles.

- It risks leading Europe into a worrying vicious circle as the loss of high value-added R&D activities and jobs undermines further its capacity to retain such activities.
- Furthermore, US outward R&D investment grew over recent years in all major regions of the globe, but growth has been fastest outside EU-15, particularly in emerging countries such as China, where US outward R&D investment increased by 25% per year since the mid-1990s (against 8% per year in EU-15).
- As a result, the EU-15 share in total US outward R&D investment has been declining since the late 1990s.”

The overall picture is of increasing dependence on global investment, and Europe has become the least attractive of the major investment locations for such R&D, lagging significantly behind the USA and East Asia. In response, the Directorates General for Enterprise and Industry and Information Society (INFSO) jointly established the ICT Taskforce in May 2006, charged with producing policy guidelines to advise the Commission. This Taskforce will not consider explicitly the AVMS or the ‘European Charter on FilmOnline’ initiatives, as explained at the initial preparatory meeting. The intended effect of European R&D policy is to reduce regulation, thus encouraging both domestic investment by European businesses and inward investment by foreign-owned high-technology businesses.

2.2.1 Regulatory Impacts on Small Businesses and Start-ups

To estimate the marginal or incremental impacts of regulation, a good starting point is an assessment of the unfolding response to existing regulations. While the specific impact of regulation is difficult to disentangle from that of other policies and changes in the market environment, the sensitivity of sector development to regulations in the area touched by

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90 Ibid., at p. 37.
91 This is part measurement artefact – formal R&D expenditure does not cover content development, translation or localisation. This concentration follows ‘comparative advantage’, especially if (for instance, in exchange for content access, as in gaming) Europe gets access to the fruits of more ‘orthodox’ R&D in other parts of the globalised economy. The essential question is whether European firms can defend their markets and/or compete effectively in world markets.
92 This is a European corporate–government initiative launched at the Cannes Film Festival 2006; see: http://ec.europa.eu/comm/avpolicy/docs/other_actions/film_online_en.pdf
the AVMS can be seen in existing analyses of regulatory implementation, commitment and forbearance and the impact (for good or ill) of regulatory uncertainty on market choices (whether firms decide to invest and create jobs in Europe or not). To put the AVMS in context, it is helpful to consider its ‘fit’ with overall EU innovation and SME policy. Dixon et al. state:

“it is important to consider whether such [small business affecting regulations] are meeting their objectives, whether they are well targeted and whether they have unintended consequences that interfere with intended aims… Information on the cost–benefit tradeoffs could help policymakers design more effective policy.”94

This is supported by independent research conducted by consultancy NERA in 200495. Commission Vice-President Günter Verhueneg, the Commissioner for Enterprise and Industry, has stated that:

“We know that over-regulation hits SMEs the hardest, and no less than a 25 per cent reduction in the costs of bureaucracy for entrepreneurs is what we believe is desirable, and possible, in Europe. True to our commitment to ‘thinking small first’, we are now screening all new EU laws for their friendliness to smaller companies, and we have already scrapped over 60 pending EU laws.”96

The Commission’s 2005 study on R&D illustrates the problem:

“Nearly a quarter of business R&D is performed by SMEs in the EU (22.4%), a figure substantially higher than in the US (14.1%) and Japan (7.0%). The higher concentration of R&D expenditure in small and medium-sized companies should not be a problem if this supports company expansion. Empirical evidence, however, shows that it is more difficult for European SMEs than for US SMEs to grow into large companies.”97

As discussed in the case studies, there are sound reasons to believe that SMEs may be particularly vulnerable to AVMS implementation, being potentially more exposed and less able to internalise compliance costs. Regulatory burdens and the reassurance offered by regulatory commitment or clarity affect firms of different sizes, ages and ‘innovative potential’ differently. However, it is necessary to avoid facile comparisons of US and EU SMEs – in particular, to assume that the market impacts of R&D spending by SMEs are the same. The relatively modest SME R&D impact in the EU in part reflects greater risk exposure. However, the advantages of SMEs in providing diversity to the market are not limited to formal innovation, but include localisation and customer responsiveness, the maintenance of competition and self-correcting or adaptive supply chains and value meshes. In particular, ‘virtual enterprises’ (with some EU and Member State support) have

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97 Directorate-General for Research (2005), supra at p. 11.
helped SMEs not only to survive but to compete successfully with larger integrated enterprises for even quite large contracts.\(^9\)

The AVMS proposal offers the carrot of ‘Country of Origin’ legal certainty to foreign investors and start-ups seeking to develop innovative video services, together with the stick of minimum content compliance requirements and the obligation on Member States to police (via regulation or co-regulation) commercial video content consumed and generated within Europe by their citizens. The effect is held to be beneficial to investment. It was clear from the June 2006 field interviews that SME and investor actors shared the view that the Country of Origin principle in the E-Commerce Directive supplied sufficient legal certainty for investment and operational purposes.\(^9\)\(^9\). It was further apparent that the new liability placed upon those responsible for video editorial content was a cause for significant concern.\(^10\) This liability was expected both to impose additional costs on vertically-integrated ‘walled garden’ operators – thus erecting substantial additional entry barriers – and to create liabilities where none previously existed for online video innovators.

This SME analysis is important in that it establishes both the vulnerability and importance of the sector in European competitiveness. We consider specific SME activities in the multimedia industries in section 2.3, which examines the growth of user-generated and distributed content.

2.3 **Possible Future Broadband Impacts on the Economy: Web2.0**

The next generation of distributed applications and services on the Internet is seen as crucial to the development of the broadband economy, with an increase in the utility and power of networked computing, especially the Internet, that is seen to be emerging. This is described as ‘Web2.0’ after Tim O’Reilly’s description of “an unprecedented period of user interface innovation, as web developers are finally able to build web applications as rich as local PC-based applications.”\(^10\)\(^1\) In particular, for consumers the Web2.0 phenomenon indicates that user-generated and distributed content may be central to their Internet experience.\(^12\) O’Reilly states:

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99 The method used was elite interviews, informed by a basic template of the definitions supplied by the European Commission and explained in Chapter 1. The small number of interviews undertaken supports the literature, but is not intended to provide a meaningful sample to extend the analysis beyond previously published material – for instance, RAND (2006).

100 Unsurprising, given the large scale of new media hostility to the AVMS proposals as revealed in various positions, including EDiMA (2006) supra.


“The potential of the web to deliver full scale applications didn’t hit the mainstream till Google introduced Gmail, quickly followed by Google Maps, web based applications with rich user interfaces and PC-equivalent interactivity.”

The collection of technologies used by Google was christened ‘Ajax’, in a seminal essay by Jesse James Garrett of web design firm Adaptive Path103.

The economic fundamentals driving Web2.0 are that broadband has become ubiquitous for many, resulting in increased Internet usage in everyday life; and the founders and executive management of companies that were established (and often failed) in the 1990s ‘Web 1.5’ era have now reached senior positions to pass on a lot of commercial and technical experience. Examples of rich Internet-based networking applications confirm the trend towards this user-led innovation104. They include: P2P sharing networks such as Kazaa and BitTorrent; Wikipedia, a user-generated encyclopedia; executive social networking sites such as LinkedIn and ASmallWorld; social networking sites such as MySpace and Bebo; photo-sharing sites such as Flickr; video networking sites such as YouTube.

As we will see in the IPTV case study (and even more so in the games case study), the user is enabled to ‘pull’ content and even adapt and mix content into a user’s own ‘mash-up’. A mash-up is a combination of existing media reworked into a new and innovative type105. An example might be remixing music tracks, or the integration of maps into classified directories that GoogleMaps performs. A part of this user-led innovation is a series of video- or audio-enhanced innovations that may be impacted by the AVMS as currently drafted. We offer some details in the following section.

2.3.1 Peer Production: Web2.0 for Video

The idea that users can generate their own content and improve the experience for others is part of the concept of user-generated innovation which is a focus of the research of von


104 The Wikipedia citation for Web2.0 warns against over-hyping the term, but offers useful guidance on the content of such applications and services: “It is generally accepted that a Web 2.0 website would exhibit some basic characteristics. These include: The site should not act as a walled garden – it should be easy to get data in and out of the system; Users usually own their data on the site and can modify it at their convenience; Mainly web-based – most successful Web 2.0 applications can be used almost entirely through a web browser: this is commonly referred to by the phrase ‘network as platform’; Data returns should be dynamic, not static, changing depending on variables associated with the user’s query (e.g. keywords, location); An architecture of participation that allows users to add value to the application as they use it; Some social networking aspects”; see http://en.wikipedia.org/wiki/Web_2

105 A term used in relation to the Internet only since 2004, its best description remains that on Wikipedia, itself an exemplar of user-generated content: http://en.wikipedia.org/wiki/Mashup_%28web_application_hybrid%29
Hippel and others\textsuperscript{106}. Sites such as YouTube, Google Video, MySpace and iFilm host user-generated content. Such content is being used increasingly in mainstream television and even film, and the addition of more personalised and occasionally outrageous video (including inevitably violent and explicit content)\textsuperscript{107} via this genre is part of its development. Examples of Web2.0-type multimedia applications are varied. Sites that host content generated by users include YouTube and MySpace, with other social networking sites able to upgrade to video-sharing, including Flickr (owned by Yahoo!), Bebo, Faceparty, music site Last.fm and Spacebook all having attracted substantial investment. MySpace is the most popular online social network site with over 90 million users, and was acquired in 2005 for $580 million by News Corporation\textsuperscript{108}. Public broadcasters are offering their content to users to remix. The BBC (British Broadcasting Corporation) has launched the ‘Creative Archive’ as a mechanism to allow its users to download, use and reuse original BBC content\textsuperscript{109}. Nielsen/Netratings reports that traffic increases over the past year are impressive\textsuperscript{110}.

The Pew Center has conducted research into US peer production of Internet content, finding that 35\% of all Internet users have posted content to the Internet\textsuperscript{111}. Further findings include the following:

- 42\% of broadband users have posted content;
- That group accounts for 73\% of home Internet users who were the source of online content;
- 26\% of Internet users have shared their artwork, photos, stories or videos;
- 8\% publish their own blog;
- 11\% of broadband users had blogs, compared to only 4\% of dial-up users.


\textsuperscript{111} Horrigan, J. (2006) ‘Home Broadband Adoption and Online Content Creation’, Pew Internet & American Life Project, at: http://www.pewInternet.org/pdfs/PIP_Broadband_trends2006.pdf. The Pew Internet & American Life Project report is based on the findings of two daily tracking surveys on US consumer use of the Internet and broadband connections. The first survey was conducted from 29 November to 31 December 31 2005 among 3,011 US adults, 1,931 of whom are Internet users. The margin of error for the overall sample was ± 2\%. For results-based Internet users, the margin of sampling error was claimed at ± 2\%. The second survey with the same error margins was conducted from 15 February to 6 April 2006 among 4,001 US adults, 2,882 of whom were Internet users.
Lower-income users were more likely to post content online than higher-income users, while whites lagged behind African-Americans and English-speaking Latinos (32%, 39% and 42% respectively); and

51% of 'under-30' home broadband users have posted content to the Internet, compared with 36% of home high-speed users older than 30.

We caution that this phenomenon is already generating a hype that may prove illusory. As Durman notes:

“In Silicon Valley and elsewhere in technology circles, there is a whiff of euphoria once more. With so much money chasing so many new companies with strange names and doing stranger things, Web2.0 is beginning to resemble the first dotcom boom.”

User-generated video is becoming a commercial Internet phenomenon, and is therefore an element which we explore in the case studies as well as at the end of the following section.

2.3.2 The ‘Long Tail’

Part of the Web2.0 user-generated and distributed experience is the sharing of resources such that all content can be archived and is ultimately transferable, to an extent now possible only for a professional archivist. The ‘Long Tail’ thesis holds that content can be selected by the user from a wider variety of choices than traditional media, and enables extremely niche audiences to self-select. Where inventory storage and distribution costs are insignificant, it becomes economically viable to sell relatively unpopular products; however, when storage and distribution costs are high, only the most popular products can be sold. A result is that instead of only ‘blockbuster’ content being viewed, with choice constrained by the advertising budgets of major TV networks or film studios, the ‘Long Tail’ of creative content can be selected. Hence P2P networks which began by trading large volumes of popular music tracks increasingly trade smaller volumes of niche music, some of which becomes popular through such trading. Popular bands are starting to emerge due largely to their presence on the Internet, without the need of initial filtering and marketing by a music company.

The possibility that content can be used long after its traditional media viewing in cinema, TV, video or digital video disc (DVD) rental and sale, has the potential to change the economics of the media industry and to allow the consumer much more opportunity to ‘pull’ non-linear content rather than the current broadcast tradition of ‘pushing’ content at a mass market of users. As with the early days of P2P, this system stabilises diversity, in the sense that ‘good’ content will build market share in the open-access world and (possibly)

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find targeted development and marketing support under licensing or contract to ‘major’ content producers.

In order for the ‘Long Tail’ to be effective, users need to have advanced search skills and tools to select effectively from the much wider range of choice available to them. Experience with P2P networks suggests that the initial experience of users focusing on well-known hits is supplanted relatively rapidly by more varied choice of content, and by adaptation and ‘mashing’ of content into new forms. More research is needed in this area, to explore the regulatory implications for interoperable and non-interoperable content choices, much as electronic programme guides in digital television were researched for the competitive implications of their search architectures. We return to this debate in section 8.3.

The combination of the ‘Long Tail’ with Web2.0 is found in user-generated and peer-distributed content, which in Internet video includes the recent phenomenon of YouTube, founded in February 2005.

Example: YouTube

“Over the past decade, large media and tech companies have tried to build mass-market services offering video over the Internet. Someone has finally succeeded big: a startup with 35 employees and an office over a pizza restaurant.

YouTube remains by far the most-visited video site on the Web. It attracted more than 20 million U.S. users in May, compared with 11.1 million for Microsoft’s MSN Video and around seven million for both MySpace’s video site and Google Video, according to research firm NetRatings Inc. YouTube says behavior indicates that users are most interested in viewing clips three minutes or shorter. Consumers view short videos more than 70 million times a day. Users post more than 60,000 videos daily, with a limit of 10 minutes for most clips.

YouTube serves up videos from its Web site directly or from other sites where people insert them, generally not requiring users to download any special software. To accomplish this technical feat, YouTube drew on open-source software and wrote its own code. The service can handle about 110 video formats and 64 audio formats used by digital photo and video cameras and cellphones.

YouTube’s rising popularity led to run-ins with others. In December, MySpace blocked users from playing YouTube videos on their MySpace pages. Consumer outcry followed and MySpace activated the YouTube feature again. A News Corp. executive later said MySpace was concerned that the YouTube videos contained porn, and only reactivated them once YouTube had given it assurances about porn filtering. (YouTube says it removes any pornography after users point it out.) Shortly after the incident, MySpace released its own video service to compete with YouTube.

YouTube says it removes clips when content owners request it, under a procedure outlined in the Digital Millennium Copyright Act of 1998. In some cases, copyright owners such as TV producers put the clips on its site themselves in order to generate buzz or to test ideas. The YouTube co-founders decline to provide many specific details of the ad system they expect to gradually begin rolling out next month. But they say they’re not fond of commercials that play before a user can watch a video, known in the industry as ‘prerolls’.

The possible impact on the European video content industry is sensitive to both regulation and the behaviour of existing (offshore) rights holders, content creators and ‘reputational incumbents’ in content markets. If these video rights holders can secure their rights through Digital Rights Management (DRM), they will enter agreements with commercial European distributors who in turn can ‘back off’ their content regulation liabilities, as the hits are already content-compliant. Although this study does not discuss DRM in depth, the extent or otherwise of interoperability – whether market or regulation-driven – is another important element in which the compliance burden might fall. A standard for DRM could incorporate forms of self-compliance by content providers who choose to adopt the standard. However, as part of the broader intellectual property rights strategy of individual companies, DRM decisions have been highly differentiated, with the strategies of Sony and Apple, for instance, attracting significant regulatory controversy. Further research in this area is clearly required.

In an open-access world, it is not possible to guarantee quality to users or promise DRM to rights holders. If owners cannot be assured of DRM, they will demand that distributors turn over the money that they collect directly to incumbent (offshore) rights holders. Denied access to a share of these rents, the European distributors, in turn, may seek protection in a diversified portfolio including more local (European) content. For their part, customers may value diversity, leading to a diversified market with a ‘Blockbuster’-like protected sector of large incumbents with limited and protected content, and a ‘Long Tail’ of diversified SMEs competing for niche viewership.

An interesting example of the ‘Long Tail’ effect of niche content finding new consumers is ‘podcasting’, which we examine in the following section.

### 2.3.3 Podcasting

Podcasting is a misnomer, an unfortunate confusion of a brand called the ‘iPod’ with a technology for downloading digital files for later playback. Podcasting is a video-based...

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117 The New Oxford American Dictionary declared ‘podcasting’ the 2005 ‘Word of the Year’, defining the term as “a digital recording of a radio broadcast or similar program, made available on the Internet for downloading to a personal audio player”. For our purposes, we see no reason to limit by definition its playback to a portable device (and in any case both laptop and mobile phone can support such formats). The use of automatic syndication via Atom and RSS feeds is also suggested in a narrower definition. See the Wikipedia definition, at: http://en.wikipedia.org/wiki/Podcast: “Podcasting is the method of distributing multimedia files, such as audio programs or music videos, over the Internet using either the RSS or Atom syndication formats, for playback on mobile devices and personal computers. The term podcast, like ‘radio’, can mean both the content and the method of delivery. The host or author of a podcast is often called a podcaster. Podcasters’ web sites may also offer direct download or streaming of their files; a podcast however is
distribution method, with no clear definition. The term was first coined in 2004. Podcasting originally referred to subscription to Internet-delivered sound programmes, but now increasingly applies to video clip-based programming. The technology can supply these clips to a PC or handheld device (in practice, the clip is generally saved to a handheld MP3 player attached via the Universal Serial Bus (USB) port to the PC). The major TV channels have made video podcasts available on pay-per-view or a free basis, along with many radio stations and non-traditional media companies, including individual companies and newspapers.

Podcasting using a syndication feed sends programmes automatically to the subscriber (as most podcasts are free, this subscriber is not a paying customer). In this respect it is a ‘push’ technology, like broadcasting. Its popularity lies in the ease of use and the subscriber’s selection of a programme as a serial. Distribution costs are minimal and the use of subscriber data to sell advertising is commonplace: unlike video downloads of individual files (especially where total download numbers are difficult to obtain, as on P2P networks), podcast subscriber numbers are known to the ‘podcaster’. There are no reliable estimates of podcast numbers in aggregate, but individual companies supply non-audited data only for individual events: the top ranked podcast at Podfeed had 31,000 subscribers on 5 July 2006. Feedburner reports “serving 57,279 podcasts including feeds with video reaching 3,433,013 aggregate subscribers (as of 28 June 2006)”. It is highly likely that there is a much higher proportion of video bloggers who do not commercialise their content. Video podcasting is less produced and consumed than audio podcasting. It is estimated that several billion MP3 files are shared on P2P networks per month, although the accuracy of these estimates must be questioned. However, it is clear that early-adopter users value peer-distributed content and are willing to accept that downloading is not instant.

2.4 Regulatory Implications of User-generated and Distributed Content

User-generated content is clearly a growing feature of broadband use, and the business models for sites such as Google and YouTube support the insertion of advertising into the more popular video blogs and presentations. Under the AVMS, these would make the content producer who chooses to accept advertising subject to the AVMS as a non-linear provider, even though the advertising is chosen by the site host. Under such circumstances,

distinguished by its ability to be downloaded automatically using software capable of reading RSS or Atom feeds.”

118“Yankee Group predicts that podcast ad insertion will be based on a cost-per-impression model, an ad-industry measurement for every 1,000 people who see or hear an ad”, see: http://news.baluart.net/article/38/finding-profits-in-podcasting/
119Continually updated data: http://www.podfeed.net/news.asp
121See: http://freevlog.org/tutorial/. Also, see: http://vlogdir.com/index.php?custom=yes&TID=popular, which lists some popular video podcasts: unsurprisingly, the early adopters’ most popular list includes many of an adult nature.
liability is uncertain, although a ‘Notice and Take Down’ (NTD) regime appears to be favoured by content hosts, at least for offensive and copyrighted materials. We elaborate on this in the next section.

We do note that the potential impact of higher costs for distribution where Internet packets are inspected and differentiated from the whole (in other words, video is charged for priority, the scenario opposed by the US ‘net neutrality’ lobby) is so closely associated with the implementation design for the AVMS that it must at least be considered, in section 2.4.2. The lowest entry barriers result where content providers can provide ‘blind’ service to end-users through an internet service provider (ISP) with no content charging or regulation. This may produce more end-user innovation\(^{122}\). The content and and/or service provider may be obliged by law, or permitted by business case, to offer a ‘walled garden’ and even to inspect each packet and charge for its distribution. It can then pass through regulatory compliance costs to content providers, or assert a ‘packet priority’ charge, which imposes a non-recoverable cost on the content innovator\(^{123}\). (AVMS and content distribution charges also will have an interdependence with the types of DRM and monetization strategies adopted by content providers.)

### 2.4.1 Alternatives to Content Regulation: Self-Regulation and NTD

It is clear from the description of the number of users and viewers of YouTube that, although it is a mass-media phenomenon, it would not be possible to regulate the posters of content directly. How then can content be regulated? On the Internet, the content host is subject typically to a NTD regulatory regime. This does not require \textit{ex ante} regulation, but does require content hosts to ‘take down’ users’ content which they have been informed (given ‘notice’) either breaches law or otherwise offends against their terms of use. There is thus a shift of liability. Instead of direct liability on the individual content provider, there is a reduced liability on the content host. The host enforces this liability by ensuring that users are only able to use the service under conditions or terms that explicitly permit the content host to take down material that is illegal, often extending this power to material that is offensive, of an unsuitably adult nature, and so on.

On YouTube, the editorial controller, if such exists, is the person who posts the content. When the content generates income for that person via advertising, with advertising to be included on YouTube in August 2006, the editorial controller – i.e. the user who posts content and receives a share of the advertising income – will become subject to the AVMS as currently drafted. For regulatory purposes, YouTube users post the content and the YouTube website reacts \textit{ex post} on receiving complaints regarding breaches of copyright or offensive content.

This is fundamentally different to traditional broadcast regulation, where the editorial controller (the broadcaster) is responsible for the content \textit{ex ante} – before it is offered to the public. Hence much ‘live’ television is actually time-delayed by five to 10 seconds, in


order that offensive content (typically sexually explicit language) can be removed. Advertising is self-regulated but synchronised with the television content to ensure that appropriate standards are matched between editorial and advertising.

The relaunch of large commercial video-sharing websites by Microsoft and Google in July 2006 creates a hybrid business model in which commercial and non-commercial video are shared on a single service, itself funded by advertising. YouTube has used this hybrid business model also, announcing an agreement to host content from the US broadcast network NBC. In such hybrids, broadcast content regulated alongside user-generated content (currently subject only to NTD-type regulation) creates an enforced coexistence of two models. This lends some credence to calls for more effective filtering of content by content hosts. In response to public concerns raised by the New York State Consumer Protection Board on 13 June 2006, video suppliers including Google have defended their NTD procedures. YouTube has claimed that it removes objected-to video within 15 minutes.

Websites such as YouTube are not the only video-enhanced community sharing phenomenon. It is well-known that online games are very popular in South Korea and growing in popularity elsewhere, with the avatars (personalities) and images increasingly served in 3D (three dimensions) and HD (high definition). These games have an ease of use that is based largely on the stored files on each computer rather than a stream of content. It is claimed that it is easy for games developers to create functionality in online games that ensures that the content is non-linear rather than linear – that is, that it only delivers content at each individual user request, storing this content on the user’s hard drive. Whether this technical distinction is sufficient to evade the linear definition altogether is not clear, but it does indicate the range of technological choice open to suppliers of video-enhanced games, rather than real-time broadcasts. It is apparent that the delivery of computer games’ interactive content is not as constrained by the linear/non-linear distinction as a live broadcast stream.

In Europe and North America, a new type of interactive experience has become increasingly popular, that of online ‘virtual worlds’. These are described in more detail in Chapter 6, but for present purposes, the self-regulatory approach of these ‘virtual worlds’ is worth consideration as an alternative to the ex ante broadcast/ex post Internet regulatory distinction. In an online game, it is possible for the administrator to respond to

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inappropriate behaviour by a member by the online equivalent of a community punishment.

**Second Life: Online Policing in a Virtual World**

Policies and Policing

Global Standards, Local Ratings: All areas of Second Life, including the www.secondlife.com website and the Second Life Forums, adhere to the same Community Standards. Locations within Second Life are noted as Safe or Unsafe and rated Mature (M) or non-Mature (PG), and behavior must conform to the local ratings. Any unrated area of Second Life or the Second Life website should be considered non-Mature (PG).

Warning, Suspension, Banishment: Second Life is a complex society, and it can take some time for new Residents to gain a full understanding of local customs and mores. Generally, violations of the Community Standards will first result in a Warning, followed by Suspension and eventual Banishment from Second Life. In-World Representatives, called Liaisons, may occasionally address disciplinary problems with a temporary removal from Second Life.

Global Attacks: Objects, scripts, or actions which broadly interfere with or disrupt the Second Life community, the Second Life servers or other systems related to Second Life will not be tolerated in any form… If you choose to use a script that substantially disrupts the operation of Second Life, disciplinary actions will result in a minimum two-week suspension, the possible loss of in-world inventory, and a review of your account for probable expulsion from Second Life.

Buyer Beware: Linden Lab does not exercise editorial control over the content of Second Life, and will make no specific efforts to review the textures, objects, sounds or other content created within Second Life. Additionally, Linden Lab does not certify or endorse the operation of in-world games, vending machines, or retail locations; refunds must be requested from the owners of these objects.

Reporting Abuse: Residents should report violations of the Community Standards using the Abuse Reporter tool located under the Help menu in the in-world toolbar. Every Abuse Report is individually investigated, and the identity of the reporter is kept strictly confidential. If you need immediate assistance, in-world Liaisons may be available to help. Look for Residents with the last name Linden.

The alternatives to direct enforcement therefore appear to be two-fold: to rely on a form of indirect liability against content hosts, and to rely on the media literacy and self-policing of online communities, whether YouTube or Second Life. However, the proposed AVMS is intended to move beyond this compromise in the E-Commerce Directive (2000/31/EC) in the case of commercial video content. Therefore, enforcement will require a more substantial policing of these content providers than simply an NTD regime.

We acknowledge that the enforcement of the AVMS by network providers and content hosts has not been considered fully in previous analysis, and caution that our approach here is subject to any further regulatory developments.

Enforcement can only be undertaken successfully by the content host. Therefore, it is necessary that more effective policing of content by this host is required for video content.

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128 Source: http://www.secondlife.com
Such policing would require that network providers can identify ‘foreign’ video files that are transported onto their networks. This requires a type of control to identify the type of content carried in each file as it enters the network. This type of control over incoming packets is a type of ‘walled garden’\textsuperscript{129}. Note that (with relative technical ease) users can encrypt their video content and thus evade the more basic types of policing carried out by the network provider\textsuperscript{130}.

Network providers might be expected to argue that such a new control strategy would require extensive and expensive upgrades to their systems. While this is partially true, there are other reasons why providers may have this capability already. First, a type of traffic inspection is required for government law enforcement and security purposes. Second, network providers already provide filters against the more obvious types of ‘spam’ – unsolicited commercial communications, as the law terms it. Third, network providers cooperate with national security agencies in tracing potential terrorist activities via their file transfers on the Internet. Fourth, it is possible for network providers to trace non-encrypted Voice over Internet Protocol (VoIP) communications and to block these packets. Fifth, in order to prevent users from over-stressing the network at times of peak usage, and in order to charge content owners for value-added high-volume services such as video files, network providers are increasingly adopting Quality of Service architectures for their networks. These new developments allow network providers to block video file transfer, or more appropriately to charge the users a carriage fee for sending such large files. This is the solution adopted by mobile operators and some network providers, and is generally termed a ‘walled garden’ to denote the isolation of content on the network from other content on the wider Internet. We consider this policy below.

2.4.2 Content Discrimination and Charging

If innovation is typically both user-distributed and user-driven, the implications are that innovation is encouraged by interoperability and open access: in general, ensuring that content can be shared freely between those users. This view is in some conflict with content and network owners’ need to be recompensed for their services and has led to an animated debate in the USA. In 1999, Lemley and Lessig argued against permitting cable companies to discriminate between Internet traffic\textsuperscript{131}. Their claim was that innovation at


the edge of the network is opposed by traditional media and network businesses, as it makes business cases based on controlling distribution bottlenecks redundant: where there is peer sharing, there is less opportunity for traditional bottlenecks and therefore control of revenues. However, the inverse also applies: without some means to secure revenues for the increased bandwidth necessary for Web2.0 type applications to flourish, do network operators have an incentive to upgrade? As Ed Whitacre of AT&T stated:

“The Internet can’t be free in that sense, because we and the cable companies have made an investment and for a Google or Yahoo! or Vonage or anybody to expect to use these pipes [for] free is nuts!”

Content charging relies on a type of Quality of Service for the Internet, enabling network providers to discriminate (in Lessig’s terms, to regulate) between packets. The standards body for 3G (third generation) mobile telephony, 3GPP, has been working since 2000 on a set of standards called IMS (IP Multimedia Subsystem). This is an operator-friendly environment intended to generate new revenue via deep-packet inspection. Fixed-line carriers and equipment vendors have created the 'IPsphere', a new set of standards for network intercession in IP application flows. Both sets of standards support the ability to filter and censor by file type on the Internet. This enables the carrier to discriminate, to decide which content to delay and which to permit to travel at normal speeds to the end-user. As Cisco standards expert John Waclawsky puts it:

“This is the emerging, consensus view: That IMS will let broadband industry vendors and operators put a control layer and a cash register over the Internet and creatively charge for it.”

The interoperability debate is broader than simply an Internet access debate, as it affects innovation in software – indeed, the origin of the argument lies with software industry disputes over interoperability, an argument captured by Lessig in his contribution to the Microsoft litigation. The debate has centred on the legislation in the US Senate and Congress permitting US network operators to discriminate between the Internet traffic that they carry. In Europe, the debate has developed more slowly, and the new proposed Electronic Communications package does not propose so-called ‘net neutrality’ provisions,
instead continuing to permit national regulators to make policy. The scope of the overall Electronic Communications package is not part of this project, as it would introduce too many regulatory variables. Neither is the issue of protection of intellectual property rights by DRM, which similarly has too broad a scope for a narrowly-defined project.

There are incentives for network providers to police the traffic by type, if not by content. This permits some enforcement potential for the AVMS, in that unencrypted video files can be monitored. It also permits network providers to charge independent content owners for carriage of their video files over the network. Therefore it enables the network providers, many of whom also operate their own proprietary video operations, to charge a different price to non-affiliated content owners than affiliated owners. This differential pricing could make the profitable operation of non-affiliated video providers more difficult. On that basis, the ‘walled garden’ might become the more successful business model. That model makes regulation much easier to enforce, but also prevents some of the interoperability and open access for users that is held to lead to much Web2.0 innovation. (We note that encryption and other technologies mean that no ‘walled garden’ would be entirely closed.) It is not the aim of this report to provide the ‘right’ answer in the complex trade-off between, on the one hand, regulated ‘walled garden’ networks and affiliated content providers, and on the other, open interoperable but only self-regulated Internet access. In the final chapters we do attempt a further analysis of the types of choice that network providers and users may employ.

2.5 Investment, Venture Capital and Web2.0

Although the Web2.0 model works successfully with P2P systems for media file-sharing, revenue streams for robust P2P that protects DRM are much smaller than sharing volumes. Typically, the payment method for the type of content service supplied is advertising. Advertising expenditure is increasing rapidly on the Internet, although as seen in Figure 10, there are very large differences between the major European economies, and advertising may prove to be a viable form of support for Internet video, even on P2P sites.

138 See European Commission (2006) ‘Staff Working Document’, 28 June, at: http://ec.europa.eu/comm/avpolicy/reg/tvwf/modernisation/consultation_2005/index_en.htm, at section 6.4, Net Neutrality: “In Europe the regulatory framework allows operators to offer different services to different customer groups, but does not allow those who are in a dominant position to discriminate between customers in similar circumstances. However, there is a risk that, in some situations, the quality of service could degrade to unacceptably low levels. It is therefore proposed to give National Regulatory Authorities (NRAs) the power to set minimum quality levels for network transmission services in an next-generation network environment based on technical standards identified at EU level. The existing provisions for NRAs to impose obligations on operators with significant market power, and the powers for NRAs to address access and interconnection issues could be used to prevent any blocking of information society services, or degradation in the quality of transmission of electronic communication services for third parties, and to impose appropriate interoperability requirements.”
Note that Internet advertising is a much larger market in the UK than in France or Germany, and it is predicted to continue to represent the majority of western European advertising. Therefore, regulation of advertising-supported Internet video content is likely to have a disproportionately severe impact on the UK market. This, combined with the greater dependence for start-ups in the UK market on independent venture capital, may make this the most sensitive market to regulation.
Figure 11 illustrates the growth potential of different regions over time, with the US market for Internet access and spending maturing rapidly, and the Asia-Pacific market the fastest growing. Europe is between these poles. A key question is the overall policy goal: the effect of regulation on competition and economic growth is at the centre of our analysis.

SMEs seeking to exploit new content business models on the Internet need access to capital. While there are a variety of sources, the most public and therefore identifiable is venture capital. There are better and more disaggregated statistics for investments in media available in the USA, but for European venture capital investment the analysis aggregates all ‘communications’ expenditure, which encompasses Wireless Fidelity (Wi-Fi), billing systems, VoIP and multimedia applications including Web2.0. In order to explore the fluctuations in venture capital more accurately it would be necessary to examine individual funding agreements, a task of too great a granularity for this project, but which we recommend as a research area worth deeper analysis.

Equally, the foreign direct investment flows into and out of European multimedia sectors would be a useful research project, to assess whether current and future regulation might affect the media company’s decision to enter or leave markets. In the absence of aggregate or granular data, we consider in Chapter 8 the basic case for investment. The case for foreign direct investment in media sectors has been considered previously specifically in regard to rules on foreign takeovers and media ownership, and this is a research topic that might be reopened usefully 139.

For our purposes in the absence of greater granularity, we use aggregate venture capital communications investment as our proxy for investment in the sector, while acknowledging the limitations of the approach. Given that Web2.0 applications include many different classifications of content, which nevertheless amount to software innovation of some type, it may be that narrower classification is not possible. To put this possibility in empirical perspective, it is useful to consider the size and nature of venture capital flows. These can be conceptually separated into sources of finance (especially venture capital and private equity), and support accompanying finance (including business angels and incubator programmes). Both sources and recipients are divided along national, sector, etc. lines that determine where the money is ultimately invested, returns are enjoyed and how support flows to or away from different parts of the value chain. In addition, venture capital should be considered as one of many funding sources including government funding, conventional equity and debt, banks, licensing and so on. Thus venture capital measures are highly sensitive indicators of expectations and the direction of change rather than direct measures of activity. Hence the lack of granularity to specific subsectors does not invalidate the conclusions.

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The 2005 annual survey of European venture capital demonstrated several interesting trends\textsuperscript{140}. First, buy-out investing was three times higher than venture capital funding, demonstrating an appetite among venture capitalists for mature rather than start-up businesses, as well as a tendency for consolidation to internalise costs and bundling effects\textsuperscript{141}. Second, funding was typically raised, managed and spent in different markets: UK managers invested as much in other markets as in the UK (€11.9 billion in each) – all other countries except Sweden received net inflows of venture capital. Third, venture capital investment in 2004–2005 just recovered to 2001–2002 levels\textsuperscript{142}. Government invests more in venture capital funds than private individuals, although the majority is invested by pension funds, insurance companies and banks. The majority of funds were raised in the UK or USA (€38 billion, or more than half of the total). In Figures 12 and 13, the data from Dow Jones VentureOne and Ernst & Young show that the ‘spike’ in 2000 was caused by the communications and information technology (IT) sectors, with the UK the primary recipient.

![Figure 12: Investments Made by European Venture Capital Funds 1999–2006](source: Dow Jones VentureOne and Ernst & Young [2006])


\textsuperscript{141} The literature on corporate control documents the cyclic nature of merger activity with phases of core competence and market power concentration alternating with diversification waves. In addition, volatile industries, especially those with strong network/interoperability or learning-by-doing effects, show periodic entry and shake-out phases that would explain changes in the associated investment flows.

\textsuperscript{142} Investment for 1999–2005 has been €10.9 billion, €19.7 billion, €12.2 billion, €9.8 billion, €8.4 billion, €10.3 billion and €12.7 billion respectively. The peak year (2000) was potentially a bubble-induced statistical outlier (source: Dow Jones Venture One and Ernst & Young, 2006 at http://venturecapital.dowjones.com/press/statistics.html).
In 2004, €4.9 billion was put into 1,026 investments in the European communications market, according to the European Venture Capital Association (EVCA). This compares with 1,192 investments totalling €4.92 billion in 2003 and 1,209 totalling €2.5 billion in 2002. ‘Communications’ comprises telecom hardware, carriers, Internet technology, TV and radio broadcasting, media houses and publishing. The EVCA does not publish a more detailed breakdown.

The return to 2000–2001 ‘bubble’ levels of venture capital investment has many key dependencies, of which the most important are motivated and risk-taking innovators and the capital to support those risks. Consumer-generated innovation can spill over into the business sector, and Google demonstrated these effects with its applications’ use in business websites.

Several caveats are necessary. First, levels of investment represent a balance of demand and supply – high levels of investment generally mean short-run excess returns on investment. These may result from bottlenecks in other investment sectors as much as from rosy opportunities in the ICT area. Moreover, the development and productivity growth impacts of ICT development are not smooth, but follow a punctuated path – therefore, fluctuations are not necessarily indicators of speculative bubbles. However, the sector has experienced herd behaviour and ‘irrational exuberance’ before, leading to a degree of scepticism among financial sources (especially conventional ones). Regulatory and policy leadership can be particularly helpful in ‘underwriting’ these risks. But one lesson from the previous bubble should be retained: the ‘halo effect’ of easy capital availability led to many firms that grew on the basis of capital gains rather than earnings or productivity growth and, in the process, to much stranded or lost investment. Clarity regarding those areas

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likely to achieve market success is key to avoiding this inefficiency in future.\footnote{Even weekly national newspapers are reporting on this risk, see Durman (2006) supra.} In this regard, an examination of the ‘hype cycle’ may be helpful. This is a concept that illustrates the waves of over-optimism, herding, cyclical over-investment and return to more sober levels of investment and growth, which tend to occur in networked information industries, as described in Figure 14. It has been applied by academic observers\footnote{See Best, D. (2006) ‘Web 2.0: Next Big Thing or Next Big Internet Bubble?’, mimeo, at http://page.mi.fu-berlin.de/~best/uni/WIS/Web2.pdf} as well as venture capitalists to describe the hype around Web2.0.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{hype-cycle}
\caption{The Hype Cycle in New Information Technology Deployment}
\footnote{See: http://www.gartner.com//it/docs/reports/asset_154296_2898.jsp}
\end{figure}

We accept that most of the European venture capital to support another ‘leap forward’, as in the late 1990s, is sourced from the UK and USA and managed from London. It is particularly susceptible to regulatory and other risks. There are strong indications that a new wave of investment is available, but that it will be invested only in video-based Web2.0 applications if the European regulatory climate is seen to be welcoming (obviously, global capital only invests where the profit potential outweighs regulatory and other risks). However, interviews with several categories of actors\footnote{The categories of stakeholders interviewed included: venture capitalists and financial analysts specialising in the sector; IPTV, games and mobile multimedia entrepreneurs; network operators; and broadcasters. Interviews were conducted in Helsinki, 9–11 June; Zurich, 15–18 June; Brussels, 19 June; Cambridge, UK, 20–21 June.} for the case studies have reinforced the strongly-expressed claims of New Economy stakeholders that the lack
of clarity in the AVMS proposals is perceived to offer significantly more entry barriers to investors than incentives.

Other sources of capital are largely sectorally driven. Web2.0 applications driven by sector-based investment will tend to avoid radical new business models. The risk is clear within mature industries: the cannibalisation of existing business model revenues by new services. A case in point is VoIP: the cost of making packet-switched Internet phone calls is far lower than that of a circuit-switched phone call. Incumbents are incentivised to prevent that switch to VoIP for as long as possible.

Venture capital could be invested in alternatives to video start-ups:

- other end-user applications – especially VoIP, but also billing systems or Wi-Fi, all of which would support Web2.0148;
- other high-technology sectors – for instance, biotechnology and nanotechnology;
- mature industry management buy-outs149;
- return of capital to investors in the absence of suitable investment opportunities (as in 2002–2003).

In general, European Commission communications regulatory policy is highly supportive of interoperability and open access, which is considered necessary for Web2.0 applications150. New innovation is encouraged by venture capital, and strong regulatory signals – including even outreach to, and dialogue with, such investors – are generally sent by governments welcoming such investment. A central part of the mission of the Directorate General for Enterprise and Innovation is to encourage venture capital formation in Member States.

However, we note that regulation can often put public policy reasons before investment. A recent high-technology case cited is the genetically-modified foods sector, in which European public policy prevented a liberalisation of rules to permit companies to invest in Europe with the same flexibility as in the USA. Similar charges were laid against the original Television without Frontiers Directive. Investment analysis requires a cost–benefit analysis of regulation. Indeed, where the investor believes that the individual company has a regulatory arbitrage advantage, it may see this regulatory strategy as part of the cost–benefit analysis for its investment151. As an example, a company that supplies VoIP is required to declare the regulatory climate as part of its risk assessment for public investors. Vonage’s initial public offering (IPO) on 23 May 2006 raised $531 million152. Vonage supplied the following information in its filing with the US Securities and Exchange Commission prior to the IPO:

“While we are not covered by legislation exempting us from liability for failures of our emergency calling services, traditional phone companies are covered. This liability could be

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149 This is the predominant form of venture capital investment, representing more than twice the value of early-stage investment.
150 See, for instance, the Open Source Observatory, at: http://ec.europa.eu/idabc/en/chapter/452
152 See: http://www.physorg.com/news67784622.html
significant. In addition, we have lost, and may in the future lose, existing and prospective customers because of the limitations inherent in our emergency calling services. Any of these factors could cause us to lose revenues, incur greater expenses or cause our reputation or financial results to suffer.”153

Therefore, we caution that a negative view of the AVMS as applied to new multimedia sectors may not have a wholly negative effect on investors154. Investment may continue to flow into the sector, but will only flow to those companies considered to have the ability to ‘play a good game’ with regulators.

2.6 Conclusions

In this chapter, we established that a causal link between productivity and ICTs is generally accepted as existing, and is seen by policymakers as a key differentiator for competitiveness, with US productivity gains in the 1990s driven by ICTs. We explained in section 2.1 the enabling effect that broadband has on ICTs more generally, and hence productivity. It is broadly accepted that broadband has beneficial effects on economic growth. We also saw in section 2.2 that policymakers, for instance the OECD, see broadband services as contributing further to the competitiveness role of ICTs. However, there is a remaining evidence gap in ascertaining the degree of productivity gain from broadband penetration in any economy, particularly where differing national levels of broadband penetration are largely for consumers and SMEs rather than business and government. SMEs and new market entrants were seen to have greater risk exposure to new regulation than larger and more mature market actors, and thus new regulation should be implemented with especial regard to SMEs and new market entrants.

We examined in section 2.3 the new forms of applications and services built on broadband platforms, in particular Web2.0 type services, and the implications in permitting wider choice of content. We explained in section 2.4 that the open-access debate is influenced heavily by perceptions of ‘walled gardens’. In our analysis, we made reference to the sources of innovation identified as emerging in the multimedia sectors, and the regulatory debate over content charging, which in part concerns how best to encourage innovation by reducing regulatory costs in creating Web2.0 and ‘Long Tail’-type services. In Chapter 7 we will consider in simplified terms the effect of the AVMS compared with content charging. These have important interdependencies with the AVMS, as its effect is to regulate commercial video on the Internet, which is seen as an integral part of Web2.0 and ‘Long Tail’ services.

In brief, user-generated commercial video poses substantial regulatory challenges:

- **Supply** – thousands of content providers (millions on YouTube, MySpace and Google Video) cannot be regulated as for linear providers, because the regulatory burden will be too great for government regulatory agencies;

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intermediaries – currently, hosting sites are not liable, given that they may insert advertising but do not control content beyond NTD\textsuperscript{155};

demand – video-sharing and virtual-world sites cope with abuse through user reporting and NTD – after which content is unavailable unless 18+ status is claimed.

‘Walled gardens’ in broadcasting and multimedia can choose to use the e-commerce NTD regime, or use self-regulatory measures that appear much more similar to those of the mobile industry, with high cost and significant investments in media literacy (as with the Association of Video on Demand\textsuperscript{156}. The mobile, online games and IPTV case studies are explored further in Chapters 4 to 6.

We now look at the approach of examining regulation via case studies, to assess business models and the implications of the AVMS for those business models. We constantly refer to the degrees of control exerted by the network providers and other distributors of Internet video content, in order to test the local ‘walled garden’ or global ‘open Internet’ nature of those models. This, in turn, will shed light on the likely effects of regulation.


\textsuperscript{156} See Filkin, E. (2005) presentation to the OECD, June, at https://www.oecd.org/dataoecd/14/47/34985339.pdf. The homepage has not been updated in 2006, and is found at: http://www.arvod.org.uk/
CHAPTER 3 Assessing Regulatory Impacts through Value Chain Analysis

3.1 Introduction to Value Chain Analysis for Regulatory Impact Assessment

There are limitations to the use of standard quantitative techniques in determining the costs and benefits of the AVMS in new multimedia sectors, as we previously indicated: “Assessing the impacts of the revision of the existing TVWF should be seen as the best possible attempt to project current empirical data and scientific understanding into an uncertain future.”\(^{157}\)

A key aspect is the implicit assumption that impacts can be measured by looking at those entities closest to the end-user and/or those most directly bound by regulation. In a world of complete and perfect markets this would be true: competition would ‘bid away’ any rents and would generate (implicit) prices for any additional constraints and distortions. But these sectors do not fit the standard model: firms obtain inputs and deliver outputs through a bewildering variety of make, buy and lease arrangements; vertically-integrated or horizontally-bundled firms coexist with specialised ones; and externalities (including the costs of regulatory compliance) are internalised or ‘traded’ through both formal arrangements (e.g. contracts and mergers) and informal ‘swaps’. For this reason, even the immediate impacts must be based on an appreciation of the variety and strength of linkages among market participants, and insight into where value is created, where costs are incurred and where profits are embedded.

This ‘value chain’ approach is particularly important in understanding dynamic responses. Conventional industrial organisation analysis concentrates on single markets or simple filere\(^{158}\) structures with clearly-delineated and distinct input and output markets. Not only

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\(^{158}\) ‘Filere’ is a technical term used to indicate local ‘clustering’ around a value chain which can take several forms. The simplest is a local replica of a linear value chain in which most stages of the production process are present and every firm can be put at a single level (from input to output). Other agglomerations include clusters of similar firms and star-like collections of different firms around a common service provider (e.g. games developers clustered around a server farm). If, for instance, as a result of regulation, the hub relocated, the spokes would drift away, too. They could still be connected electronically to each other and the market, but what would be lost is social
are the commercial relations among content creators and service/access providers more complex, but they are also highly responsive to market and regulatory conditions. Because these changes can undercut or magnify regulatory impacts, an analysis of these ‘value chains’ or ‘value meshes’ is essential. Finally, the value mesh approach is particularly suited to the particularities of these sectors: many communications service channels can be used to provide access to a given bit of electronic content, and any given channel can be used to provide access to a range (not always the same range) of content. Moreover, access channels and types of content differ in the extent to which they invite or support user-involvement. Without a value mesh approach, it would be difficult to visualise such phenomena as convergence, the competitive interaction of e.g. mobile-based and fixed line-based companies, or the merger/reconfiguration of firms across the content and transport domains.

We use a value chain analysis to address the impact assessment challenge identified in, for instance, the Indepen report for Ofcom159 in the medium-term (to 2011 where possible) – although the only prediction which can be made with certainty is that quantitative assessments will be incorrect. Therefore, we rely largely on qualitative analysis. RAND (2006) incorporated a simplified value chain analysis for each revision proposed in the Issues Papers. However, these value chains did not fully incorporate international investors or outsourced and footloose production and distribution. In this study we consider whether the Directive could measurably affect these particularly weightless sectors of the overall value mesh.

Previous studies by RAND160 and others161 show that emerging multimedia services (as with Web2.0) have less hierarchical and less linear value chains than traditional mass media markets. Increasingly, the single point of control assumed in most broadcasting and telecoms regulation has given way to clustering, hybridisation and agglomeration of skills within virtual organisations162. The implications for regulatory impact have been considered in theoretical and applied literature163 but not reflected fully in regulatory impact analyses164. We now examine the literature for evidence of the evolution of value chains, before turning to specific case studies and the value chain in each.

networking (and thus some informal self-regulation) and the impetus for complementary industries (venture capital, marketing, platform development) to gather there.

160 Horlings et al. (2005), supra.
162 See Botterman et al. (2005), supra.
163 RAND Europe projects (VSO, TERRA2000, Network Evolution) for the Directorate-General Information Society and Media (DG INFSO) during 2000–2003, considered the regulatory strategy impact, and other studies (i2010 and Lisbon evaluations) considered the impact on entrepreneurs.
Section 3.2 explains our methodological approach and case study selection. Section 3.3 examines the emerging value chain in ICTs and multimedia sectors. Section 3.4 explores the competitive impacts of various bottlenecks or ‘pinch points’ in the value chain, where dominant actors can exert market power and rearrange upstream sectors. Section 3.5 lays out possible portraits for the case studies and their boundaries.

3.2 **Methodology for Assessing Value Chains**

The methodology included preliminary desk research to integrate the overall cross-sector framework with analytical results needed to render supply, demand and regulatory developments or options and describe the mechanisms by which they influence outcome measures.

Each case study considers the structure of production and supply. Two countervailing trajectories can be observed:

1. ‘walled gardens’ – large vertically and/or horizontally integrated actors seek control of vital commercial (and often regulated) ‘pinch points’ or bottlenecks in the value chain. They are motivated by the need to reduce risk and transaction costs in leveraging existing assets into new business areas;

2. ‘open access’ – value meshes of virtual smart organisations emerge. They are essentially footloose but tend to form new media clusters in ‘suitable’ urban areas, (as discussed in section 8.1). The clusters comprise New Economy start-ups and associated businesses in particular locations (stereotypically Silicon Valley, California). They are footloose in the sense that they involve small numbers of generally highly-educated creative individuals densely interlinked with the global economy, and therefore are free to relocate to other locations with greater ease than traditional non-networked businesses and individuals. This weightlessness has a ‘putty-clay’ quality, however, in that once formed, such clusters tend to persist with only minor exchanges of individuals.

The case studies illustrate both trends with examples drawn from the UK and other European and international settings. They provide a vertical analysis of each sector. The research was conducted in June 2006 and was typically desk-based, with two types of supplementary interview as feasible and necessary:

- interviews by phone and in person with members of the client consortium;
- interviews by phone and in person with sectoral experts.

We examined three major new multimedia market sectors: IPTV; online multiplayer gaming; and mobile multimedia content. They display varying degrees of hybridisation, internationalisation and ‘substitutability’ – for each other and for conventional linear content channels. In part, for this reason, joint analysis – rather than a parallel examination in which all sectors (counter-intuitively) gain or lose together – can provide a better
account of consumer adoption and switching behaviour. This is reinforced by the dynamics of consumer learning, herding and ‘initiation’ into the range of possibilities offered. Initial adoption of an access channel tends to be based on a specific single application, an attractive pricing offer or a general ‘real option’ sense that the channel (e.g. broadband) is a necessary first step to meet an uncertain future demand. Thus the ‘mature’ customer base may arrive through different entry points, and market competition may lead to convergence (or splitting) of sectors. Although multimedia consumption is growing from a low base, and therefore all sectors may be expected to benefit from a generalised ‘halo effect’, there are important consumer choices between, for instance, investments in broadband gaming hardware and software compared to mobile devices and downloads.

3.2.1 Hypothesised Constants for Case Studies
To isolate the regulatory and consumer adoption changes that will drive these markets in the short to medium term (three to five years to 2009–2011), we fixed several hypotheses to eliminate unnecessary variables and logical inconsistency among the cases. These hypotheses are not the only ones possible, but they do have specific relevance. First, they represent consensus views from the literature – this does not make them true, but does make them ‘central expectations’ around which key players’ actions (e.g. to invest in or develop markets) are based. Second, as a set they are mutually consistent, which increases the robustness and possibility for comprehension of conclusions based (implicitly) on them. Third, they can serve as the starting point for a deeper discussion of impacts, since changes in one (e.g. an assumption that spectrum will be scarce) can be linked to changes in others (e.g. the implementation of the Electronic Communications package and the Spectrum Review will likely trigger specific changes in telecom regulation and the power of spectrum rights owners).

The hypotheses are as follows.

- Spectrum will not be scarce in 2011 – there will be viable technologies for mobile IPTV. UK analogue terrestrial television switch-off will proceed on schedule in 2008–2012.
- The revision of the Electronic Communications package and Spectrum Review will not change fundamentally the overall structure of telecoms regulation.
- Following the E-Commerce Directive, hosting will not be liable under Articles 12 to 14 for content, assuming ‘mere conduit’ status. This is very similar to ‘common carriage’ status in the USA.

165 While this report does not consider revealed preference modelling of demand for these services, there is a clear case for further empirical modelling supported by this analysis. ‘Revealed preference’ and ‘stated preference’ are methods which can be used to provide evidence to uncover the necessary counterfactual. Note that RAND Europe has worked jointly with Indepen on such modelling for the Radiocommunications Agency, and the more recently on National Lottery design.


167 See the proposed revisions published at 29 June 2006: http://europa.eu.int/information_society/policy/ecomm/tomorrow/roadmap/index_en.htm#communication
Other content regulatory measures will be unchanged, such as general rules affecting particularly interactive advertising in Directives drafted by European Commission Directorates General for Public Health (DG SANCO) and the Internal market (DG MARKT); the Recommendation on Protection of Minors and Human Dignity, the Safer Internet Action Plan, and associated Directives dealing with aspects of security, privacy and liability in electronic networks and commercial messages.

Current generations of 3G mobile telephony and games consoles will mature and next-generation consoles and networks will have no significant market impact\textsuperscript{168}.

Uniform deployment of DRM across all platforms will take place in the medium term\textsuperscript{169}.

We do evaluate hypotheses regarding:

- content discrimination and other interoperability debates\textsuperscript{170};
- mass market Internet access technology - with choice of DSL (Digital Subscriber Line), FTTx\textsuperscript{171} and 3G;
- promotion of sectors via new forms of distribution and content production (including digital TV, rural wireless broadband, and royalty-free copyright);
- current and emerging trends in competition regulation, including competitive effects (including complementary market spillovers) in merger analysis and, to a limited extent, the potential impact of content protection under intellectual property rights.

These assumptions enable us to consider the market specifically in relation to the AVMS rather than the entire range of regulatory and market uncertainties.

The following section summarises a literature review designed to inform the case study impact assessments.

\textsuperscript{168} That is not to state that WiMAX, Wi-Fi and other technologies will not be important, or that a new generation of XBox-type of devices might not emerge, but that they will not be mass-market items by 2011.

\textsuperscript{169} The uncertainty of adoption methods for DRM has been put aside as a research subject for another study. We acknowledge the market uncertainty associated with different DRM models, notably in the decision whether to permit network operator revenue shares based on its bottleneck control, or to adopt a peer distribution method for content with no revenue share for the network operator.

\textsuperscript{170} The so-called ‘net neutrality’ debate.

\textsuperscript{171} FTTx refers to various forms of ‘deep fibre’ deployment: to the building, to the curb, to the household.
3.3 Value Chain Analysis

The concept of value chains was enunciated first by Porter\textsuperscript{172}. The value chain is a simple tool to evaluate systematically the full range of activities required to bring a product or service from conception through production to final consumer delivery. Porter’s classic analysis studies value creation\textsuperscript{173} at company level, identifying and categorising the company’s activities, and studying the value added at each point. Support activities, which exert their effect on value creation via the primary activities, also can directly affect value creation. This concept focuses on commercial value to the firm(s) involved. It is worth noting that creation and convergence of new sectors and business models may entail the monetisation of other aspects of value, including deepened human capital, intellectual property rights, or aspects of the value to society as a whole.

The normal value chain diagram connects different entities (generally firms) and the arrows between them indicate functions. An alternative is the ‘process map’ perspective where the nodes are functions (production, distribution, etc.) and the arrows are the responsible parties (firms). In a stable environment these are identical, but where value chains compete or collide, it is useful to consider both aspects. Also of relevance in the current context is the fact that the usual value chain pays more attention to flows from supply to demand (i.e. toward the consumer) and does not consider carefully the reverse flows (of money, feedback and, increasingly, content, etc.). These reverse flows can be important in the industries considered.

In addition, these value chains can incorporate the more complex interlinkages between the various actors (processes) within the value chain. For example, the design of a product not only influences the production process and marketing, but is also influenced by the constraints in these downstream areas. Further, value chain analysis has been extended to analysis at an industry level, encompassing links between firms in a similar manner to links within the firm\textsuperscript{174}.

Scholars have argued that the emergence of new technologies will have (and has had) fundamental impacts on the value chain of affected industries\textsuperscript{175}. In particular, disruptive


\textsuperscript{173} Porter (op cit.) defines value as "the amount buyers are willing to pay for what a firm provides them". In simple terms, in order to make a profit, firms must add value so that their revenues (the value of their outputs to consumers) are higher than their costs (the value of their inputs). Porter’s concept of value is very market-bound, however; two other aspects of value creation are the value to the firm itself (e.g. in creating human capital, intellectual property rights, etc.), and the value to society (stakeholders as a group) of the firm or sector’s activity.


technologies have the potential to overturn an existing dominant technology or product, and in so doing, introduce new value-creating processes and reconfigure the value chain. The emergence of new technologies has in some cases led to the creation of a ‘value web’, where the traditional linear or hierarchical relationships between suppliers and producers have evolved to encompass more complex, network-like, relationship forms. Furthermore, there has been disintermediation and re-intermediation in the value chain, as the chain has been broken down successively into its individual elements, and then rebundled into a reconfigured value chain. These developments are illustrated more fully in the case studies descriptions of value webs. We briefly explore the value webs in games and mobile multimedia to illustrate the case, returning to the topic in the specific case study chapters.

3.3.1 Mobile Games and Value Chain Theory

Mobile multimedia content can encompass many forms, including music, videos and games, but the majority of the value web literature studies mobile gaming. For this reason there are not only a number of overlaps with other case studies, but also a number of important differences. MacInnes et al. argue that the mobile and traditional games industry structures differ substantially, with game publishers and retailers (on the Internet, more commonly aggregators) replaced in the value chain by mobile service providers (MSPs). In its formulation, the mobile gaming value chain consists of mobile device development, game development and mobile service provision; mobile service provision is broken down further into game platform provision, game co-enabling, wireless network provision, content and application aggregation, promotion, measuring and billing.

The usefulness of this essentially linear value chain analysed by MacInnes et al. is limited by its inability to encompass the important and complex interrelationships between different areas of the value chain; for example, two-way interactions between mobile device developers and game developers. In contrast, the European Commission-funded project mGain explicitly acknowledges the ‘webbed’ nature of the relationships between different actors and processes in the mobile multimedia content value chain. This is particularly useful when we consider P2P content, with its complex interactions between many users, as opposed to the traditional ‘client–server’ relationship. This prospective complexity is shown by the complex Figure 15 below. This shows only the primary interaction channels between the various industry sectors. In order to simplify analysis, mGain uses a case study framework to investigate the provision of two mobile games and, in so doing, extracts one particular value chain from the value mesh below (note product flows from left to right).

178 Wirtz (2001), supra.
180 MacInnes et al. (2002), supra.
181 mGain (2003), supra.
Figure 15: Mobile Entertainment Value Web
Source: mGain (2003, Figure1)

However, even the extracted value 'chains' show elements of the prospective complexity of the value mesh above, and the inter-relationships are such that the value chains could more accurately be described as value webs, even in the case of the provision of mobile games. An illustrative example in mGain\textsuperscript{182} is *Who Wants To Be A Millionaire?* (hereafter *Millionaire*) (a quiz-based game). Celador is the content provider, and runs the game through aggregators such as Vodafone Live! using applications providers on that platform. It may also contract with a mobile virtual network operator, such as Virgin Mobile. Note that Vodafone Live! is an aggregator owned by a network operator, which may also control its own network equipment, portal and devices. Therefore the value chain that appears complex at first sight actually may consist of the content provider delivering content via application developers direct to an aggregator-network operator portal. Nevertheless, these various functions are capable of being unbundled and provided by different companies as well as being integrated into one company. In general, the content should flow left to right and the revenues from customer back to aggregator and provider, and there are complex revenue-sharing arrangements in the distribution chain. Intermediaries who are paid for discrete services, rather than revenue sharing, will simply receive payment for providing devices or network equipment, for instance.

The value chain remains fairly linear, although one company both writes the relevant software and supplies platform and maintenance, while a device manufacturer acts as an

\textsuperscript{182} mGain (2003), supra.
aggregator\(^{183}\) in the intermediate step in the value chain. A simple description of this value chain, with examples of companies involved at the time of research, is provided in Figure 16.

![Figure 16: Value Chain for the Millionaire Mobile Game](image)

**Figure 16: Value Chain for the Millionaire Mobile Game**

Source: mGain (2003, Figure 3).

The distribution of costs incurred is not discussed, although there is some suggestion that operators retain a large revenue share whilst incurring little cost\(^{184}\). When evaluating the relative bargaining power in the value web, it is important that these elements are not overlooked, and the competitive outcome is the topic we explore in the next section.

### 3.4 Value Mesh Networks and Competitive Markets

Value mesh networks are footloose and responsive to consumer market, investment and regulatory conditions. This is not to say that bottlenecks and legal constraints do not constrain these new types of enterprise, but their responses are not as uniform, smooth or predictable (in relative terms) as in the traditionally linear, vertically-integrated or controlled environments which broadcast and telecoms regulators have analysed\(^{185}\) and on

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\(^{183}\) Collecting many different mobile services from service and content providers, and presenting them to the consumer as a unified offering.

\(^{184}\) mGain (2003), supra. Sparse information is given for the revenue-sharing model of Millionaire, but a fuller description of adult content site Private Stars is available. The operator retains around 30 to 40% of the revenue; the SMS gateway provider retains around 10%; and 60% of revenues are shared between Private Media Group and its wireless applications company, although the latter operates on a fixed-fee basis. This gives some indication of the elasticity of revenue with respect to changes in the quantity of product sold, although information in this respect is far from complete. The value chain of Private Stars is complicated by a number of factors. First, Private Media Group (which owns the content) also directly markets the product itself through both internal and external media outlets and, as part of the product, not only provides mobile content but also (time-limited) access to an online Internet portal with additional content. Second, despite its more direct contact with the consumer in the aforementioned areas, the mobile content is delivered through a number of third parties; a wireless applications company provides SMS content management, which in turn contracts with SMS gateways in each territory where service is provided; in turn, the SMS messages are delivered by the operator to the customer and revenue is collected using reverse-billing.

which formal analysis has concentrated\textsuperscript{186}. Furthermore, the ruthless competition in these value mesh markets results in highly volatile and ‘snowballing’ investment decisions: for states seeking to attract such investment, there is more of a ‘winner-takes-all’ pay-off from the entrepreneurial investment climate provided. There is a tendency in networked sectors to reactions swinging from excess inertia to extreme volatility\textsuperscript{187}. The OECD states: “As digital content markets develop and challenge existing business models, numerous participants are vying to control various parts of a complex and changing value chain.”\textsuperscript{188} The UK ICT trade body states:

“With more players entering the market, new channels emerging for competition and new interdependencies developing, the commercial environment is becoming more complex, dynamic and uncertain... In some cases, this has allowed smaller new entrants to move in, nevertheless, they often have the problem of finding a route to market past the established gatekeepers.”\textsuperscript{189}

This new industrial structure complicates the assessment of regulatory impacts.

The case studies will be analysed for value mesh elements and their dependence on dominant actors in the value chain. The more competition and less dependence, the greater the possibility of innovation from SMEs, although we acknowledge that innovation often emerges from large firms. The dominant firms are also important for the reasons explored in section 2.4: enforcement of the Directive may fall on the network operators. These operators often have dominance, or at least some element of market power. If they choose to enforce the regulation via their upstream contractual links with content providers, that may impose costs that stunt the development of otherwise competitive value meshes in content production.

A regulatory response can be predicated on individual grounds (e.g. when expected compliance cost is large relative to benefits). Regulatory response also has a collective aspect – the choice of a level of compliance is a coordination game, and can have both high- and low-compliance equilibria. This response to regulation can be highly unconventional, according to ‘herd’ (or ‘cascade’ – a delayed domino-type of herding) effects in demand.

To take one extreme of ‘herding’, companies, consumers and investors may simply ignore a new regulation: consider P2P file-sharing of music, where initially, Napster’s investors, company and consumers ignored the regulator\textsuperscript{190}. Therefore, competition may be cut-throat and loss of margins makes investment in innovation nearly impossible (although we


\textsuperscript{188} OECD (2006b), at 18.


\textsuperscript{190} The same could be said of inward investors CompuServe and Yahoo! in Germany and France respectively, until long-running and highly-publicised court cases obliged them to comply with local laws.
note that such are the low costs of entry that new P2P distributors such as BitTorrent emerged despite low margins)\textsuperscript{191}. 

On the other extreme, companies, investors and consumers may take too much cognisance of regulatory proposals or litigation (such as the eventual effect of the Yahoo! case in France), and often in this instance, media coverage and other signalling effects of regulatory prospects (or their caricature) can lead to investment strikes. The effect is to leave the competitive playing field empty except for well-resourced local players whose regulatory strategies overcome these high barriers.

Both over-investing and investment strike responses depend on the degree of internationalisation, sectoral characteristics, available investment and market alternatives, which can exacerbate or dampen the effects.

The new meshed value chain is not necessarily more competitive or more capable of a competitive equilibrium than existing vertically-distinct markets. In fact, the presence of gatekeepers – including regulated actors – may make competitive market failures, and therefore anti-competitive rents, more common. It is an important challenge to impact assessment to attempt to model the potential dangers of bottlenecks developing in such markets.

3.5 \textbf{Portraits of Alternative Futures}

The basis for much market forecasting is to extrapolate past trends. This is perhaps defensible when a market has reached a certain level of maturity and a real trend can be discerned. However, at the beginning of the roll-out of a new product or service, it provides no reliable guide as to how the market will develop in the future. There are many examples that demonstrate the inadequacy of such an approach – in recent times, the take-up of mobile voice, short message service (SMS) and the Internet, to name but a few, were all wildly underestimated. Also, the multimedia industry has been guilty often of making bold forecasts based on the excitement for a particular technology – Integrated Services Digital Network (ISDN) and 3G mobile are two recent examples. Thus industry-generated forecasts\textsuperscript{192} tend to reinforce false assumptions about market development in pursuit of a ‘feelgood’ factor. Forecasting is notoriously difficult but it must be right to assess the potential for a nascent market by taking a socio-economic approach, beginning with the needs of users.

This is where a scenario-based approach can be particularly helpful. Scenarios model futures based on projections from the present and map drivers and inhibitors to such projections. Scenarios are used where linear projections appear unconvincing, such as

\begin{footnotesize}
\textsuperscript{191} Note that the BitTorrent and more recent VidTorrent protocols are open source and therefore developed \textit{pro bono} by a community of developers, see: http://viral.media.mit.edu/wiki/tiki-index.php?page=VidTorrent. Torrent hosting is monetised through advertising. BitTorrent clients (e.g. BitTorrent 4.2) tend to be open source as well.

\end{footnotesize}
where disruptive elements exist in the immediate path of the phenomenon examined, and in the case of very early-stage developments. Multimedia content contains both elements and is well suited to a fuller development of scenario analysis than is possible in this short project. Nevertheless, it is possible to hypothesise several different portraits as the basis for scenarios for the development of the selected sectors to 2011. In industries characterised by disruptive market development, it is of critical importance not to rely on trend projections except as an indication of industry consensus thinking\textsuperscript{193}. For this reason, modelling for discontinuous change is a more useful exercise. Portraits of futures for European content based on previous analysis (for instance, RAND (2006)) include:

1. midband malaise – in which regulatory or market bottlenecks slow growth in the sector and confine Europe to a follower role, with investment growing faster in the USA or East Asia). This can lead to ‘lock-in’ to inefficient legacy sectors, which previously occurred with protectionism in shipbuilding, fifth-generation computing, earlier generations of high-definition TV (HDTV) and other industrial sectors;
2. user-controlled commons – in which consumer-generated and distributed content captures most of the value in the sector for social rather than economic benefits\textsuperscript{194};
3. winner-takes-all – in which one sector, for instance, broadband mobile or online gaming, grows at least twice as rapidly as others, capturing most increased consumer spending and shaping investment, pricing and technological development;
4. win–win – in which all sectors share in the benefits of rapid growth under light touch regulation\textsuperscript{195}.

These portraits may be influenced more directly by other factors such as:
- overall economic growth;
- investment regimes in which taxation is the major deterrent to investment;
- consumer decisions based on non-economic grounds;
- widespread disobedience to law.

These scenarios will be influenced by many factors, but central may be the response of network operators to the surfeit of content on their networks. If they choose to construct a ‘walled garden’, they may be able to ‘manage’ growth in traffic and revenues to ensure a ‘winner-takes-all’ scenario: they would be the winners, as with DoCoMo’s iMode content service for mobile phones. By monitoring traffic they should be able to avoid ‘user-controlled commons’, and by monetising traffic and providing attractive content they could avoid ‘midband malaise’. By contrast, an open-interoperable portal could find itself in either win–win or user-controlled commons scenarios: the first being excellent for the business plan; the latter being potentially disastrous, where increased traffic ‘free-rides’ the

\textsuperscript{193} PriceWaterhouseCoopers (2005b) is the most respected of such projections,
\textsuperscript{194} In this scenario, the mix is determined by relative efficiency in delivering types of content and supporting different types of interaction. The sectors would be partially specialised and partially overlapping (as with today’s converged platforms in other areas) and would be governed by competition from neighbouring sectors and (hopefully) joined-up, but not merged, regulation.
network and content owners do not pay the network operator. We will see in Chapter 7 that content regulation has potentially important effects on which model is chosen.

Therefore, the impact of AVMS may be only a small part of the overall economic impact. The value chain analysis certainly needs to include venture capitalists, whose investment decisions take account of factors in the broader economy (considered further in Chapter 7), as well as market analysts’ perceptions of regulatory risk in the sector. These comprise essential private sector responses to the overall ‘Lisbon Agenda’ i2010 policy.

### 3.6 Conclusions

This chapter considered the analytical insights made possible by value chain modelling in our three case study types in section 3.2. It introduced the concept of value chains in section 3.3 and showed that these chains could include a mesh or web of companies that serve the value chain, in each of the case studies. The concept of meshes can be a powerful descriptor, and standard value chain analysis benefits from the new conceptualisation. In section 3.4 we went on to consider the competitive effects of these value chain linkages, in particular the difficulty for suppliers when the buyer at the next link in the chain is a monopsonist (sole buyer) or cartel – that is, when they have market power. This moves a competitive mesh into a position of dependence on the dominant actor. Rents accrue to the dominant player, and the upstream elements in the value chain are reshaped to account for their lost rents and power lower down the value chain. This will be crucial in our understanding of value meshes and chains in the case studies, and the impact of the AVMS on them.

In section 3.5, we explained that in such evolving value chains and sectors, it is often better to consider the disruptive manner in which markets can form and change, rather than try to project a path with a standard adoption curve towards a future with any degree of certainty. We discussed how fully-worked scenarios can help, and sketched portraits that could be developed fully into such scenarios.

The following three chapters consider each of the three case studies in turn, before we consider in Chapter 7 the indirect impacts of the AVMS on broadband penetration, speed and content, on SMEs and offshoring, and investment decisions that may be made.
CHAPTER 4  IPTV Case Study

4.1  Introduction

IPTV is streamed television on the Internet. For the purposes of this study, we use the term to encompass streamed video within the AVMS definition of ‘linear’ video. IPTV requires a broadband connection to the Internet and can be delivered in two ways: locally via an ISP or cable company; or over the wider Internet. It can be delivered either to the PC or the set-top box for display on a TV. Many definitions have been used but the European Commission’s definition considered in Chapter 1 is relevant to our purposes. The European Commission has made plain that it sees all televisual broadcast content to be regulated as ‘linear’, no matter how it is consumed. Therefore, the material downloaded to a PVR is linear, as is that consumed in real-time.

This chapter comprises five sections following this introduction. In section 4.2, we examine the value chain for global and local distribution of IPTV and explain how the original business models of 1999–2001 failed due to regulatory barriers to entry, market and technological immaturity. We also compare the value chain in IPTV and more traditional broadcast markets. We consider the current state of the industry in the UK. We explore the markets for which IPTV may substitute, namely digital TV markets, and examine their cost structure and value chain. In section 4.3, we consider IPTV globally and examine particular markets with more maturity than the UK, including Hong Kong. We also explore the potential for mobile TV in brief. In section 4.4 we explore the regulatory impacts on the market, focusing on the potential for substitution of VOD for IPTV, especially where IPTV can be regulated as a local linear service but VOD as global, non-linear and possibly without regulation altogether. We also consider PVRs and podcasting and their respective challenges to regulatory definitions. In section 4.5 we explore P2P user-distributed networks and their impact on the linear or non-linear distribution decision. Finally in section 4.6 we make some summary comments on the


197 See RAND (2006), at Appendix 1.
impacts of the AVMS on SMEs and the potential for businesses to evade European regulation by offshoring, using the global rather than local distribution model.

4.2 IPTV Value Chain Analysis

Value chain analysis in IPTV is essentially the same as that for linear broadcasting via broadcast networks, with a crucial difference in that the costs of distributing via IPTV are currently high and profitable business models do not yet exist. Streamed linear TV is essentially broadcast TV relayed over the Internet Protocol, whether to TV or PC. This is a technically challenging task for network operators, integrators and content packagers, and previous attempts to create viable commercial markets failed in the ‘bubble’ of 1999–2001. Multicast distribution is not yet effective and unicast is expensive. Cable operators could switch entirely to IP, and ISPs to multicast, thus reducing costs: running the two systems is more expensive in the transition. However, many IPTV services are being rolled out across both fixed-line and mobile networks in Europe and elsewhere.

The identified literature on the value web in IPTV is limited, but Griffiths’ comprehensive overview uses a ‘nested value net analysis’ on the provision of video-to-PC services. Each layer in the value net encompasses the spectrum of firms or functions that provide the relevant service. This can be used to indicate a large number of value chains or webs, as different functions in each layer can combine to provide a service to the end user, to “illustrate the complexity and inter-connected nature of firms who are simultaneously compelled to compete and complement, sell and buy, in quickly forking and evolving environments, in order to provide video-to-PC oriented services.” Within each layer of the value net, there exist a number of possible value chain nodes. For example, content generation can be undertaken by, among others: an aggregator or syndicator; users; websites; and an asset creator and producer. Access can be provided through a number of different technologies, amongst them xDSL, cable broadband, mobile and wireless. Within each segment of the value net, there are a number of possible combinations of firms and/or functions in order to form many permutations of value chains (or webs). These can be quickly broken down and re-formed in response to new technologies, regulatory pressures, and other factors. Griffiths provides detail as to where many new technologies are posing threats for established players in this value net; and where the merger and demerger of firms is occurring, changing the importance of a value net segment (or, indeed, creating a new value net segment or bypassing an existing segment).

4.2.1 IPTV version 1 and version 2

It is important to distinguish between the stranded investments of the 1999–2000 Internet ‘bubble’ and the current situation\(^\text{200}\). This has been termed the difference between IPTV version 1 (v.1) – which Noam claims died in ‘Black September’ 2000 – and IPTV version 2 (v.2)\(^\text{201}\).

In IPTV v.1, attempts were made to stream video content over the global Internet, as a standalone start-up or supplementary incumbent activity. Global distribution would require global rights, and IPTV v.1 start-ups generally did not have these. The nadir of this attempt was the court cases brought by US copyright holders against Canadian IPTV sites iCraveTV and JumpTV\(^\text{202}\). Copyright lawsuits, lack of content, lack of revenues, low narrowband quality and streaming distribution problems led to the closure of these businesses\(^\text{203}\). Those Internet radio stations with much lower distribution costs, rights clearance and more generic content have continued to operate. The OECD sums up the difficulties:

> “Given that traditional broadcasting is in many countries supported by advertisements and that the likelihood of higher advertisement budgets is small, the future of broadband audio-visual services may be on a subscription-based or pay-per-view business model providing personalised content linked with the opportunity for interactivity.”\(^\text{204}\)

Where video is sent over data service networks, in fixed and mobile telecoms, the additional current costs of ‘unicasting’ the content to each subscriber on request over data networks must be added to copyright clearance and other production costs. This is a significantly more expensive distribution method than broadcast TV (or multicast Internet), in which a single signal can be consumed by any subscriber with the necessary equipment and legal permission\(^\text{205}\).

The surviving IPTV v.1 players – niche channels continuing to distribute over the Internet – are relying increasingly on P2P distribution\(^\text{206}\) (see section 4.4 below). This eliminates

\(^{200}\text{Indepen/Ovum/Fathom (2005), p. 22 refers to IPTV v.1 as ‘TV-over-the-Internet’, and ‘real’ IPTV as the locally cached version. We prefer to use the terms v.1 and v.2.}


\(^{203}\text{For instance, iFilms (acquired by MTV Networks/Viacom in October 2005), Atom (which was acquired by Shockwave), Pop.com and other high-profile companies with substantial backing.}


\(^{205}\text{It should be noted that broadcast TV (which is termed ‘terrestrial) continues to compete vigorously as a distribution channel in Europe with cable and satellite, even if it is in decline in more cabled nations in East Asia and North America.}

\(^{206}\text{Note the success of niche channels launched in 2006 using Narrowstep and other platforms. Narrowstep had 10 partner channels at 1 July 2006, including GolfBugTV, Country Channel, Cycling TV, three Christian channels and two branded channels (London Visitor channel and LandRover channel). See: http://www.narrowstep.com/investors.htm}
most distribution costs at the expense of time-delaying the content transfer\textsuperscript{207}. However, the investments are trivial compared to the IPTV v.1 failures and the IPTV v.2 trials.

Locally-distributed IPTV v.2 has several key differentiators from IPTV v.1, as seen in Table 4.

1. Typically, it is offered nationally, solving the copyright problem. The ‘walled garden’ approach means that copyright holders are protected from unauthorised P2P distribution.
2. Typically, it is offered in a content distribution deal with a local network to broadband subscribers, partially solving quality and cost issues.
3. It is offered as an addition to an existing bundle of services, a ‘triple play’ including phone subscription and broadband connectivity.
4. It may also be offered to the set-top box rather than the PC, where the higher Quality of Service of a local multicast model will be much more obvious on the larger TV display screen.

\textbf{Table 4: Business Models for IPTV Versions 1 and 2}

<table>
<thead>
<tr>
<th></th>
<th>IPTV v.1</th>
<th>IPTV v.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geography</td>
<td>Global</td>
<td>National</td>
</tr>
<tr>
<td>Local distribution</td>
<td>P2P</td>
<td>Network operator</td>
</tr>
<tr>
<td>Major revenue source</td>
<td>Subscription/advertising</td>
<td>Bundled into triple play</td>
</tr>
<tr>
<td>Quality of Service</td>
<td>Best effort</td>
<td>Near-TV quality</td>
</tr>
<tr>
<td>Content type</td>
<td>Niche</td>
<td>Premium</td>
</tr>
<tr>
<td>Example</td>
<td>Cycling TV</td>
<td>NOW TV</td>
</tr>
</tbody>
</table>

As a result of all these changes, it is offered typically by incumbents from the existing broadcast, cable, mobile or telecoms environments. Therefore, the sourcing and packaging cost structure reflects to some extent that of existing broadcast or cable networks.

There is one surviving network of note in IPTV in the UK, Video Networks, which runs the HomeChoice service in north-west London, a localised service including VOD. It has an estimated 34,000 viewers at mid-2006 after seven years of operation, and offers a ‘triple play’ service for under £18 per month\textsuperscript{208}. Its roll-out was delayed from 2001 until relaunch in May 2004 by the high cost of renting local exchange capacity\textsuperscript{209} from British Telecom. Incumbent IPTV sites have closed, with BTOpenworld in 2003 merging with Yahoo\textsuperscript{210} and Kingston Interactive Television closing in 2006.

Table 5 below shows the vertical value chain for the IPTV industry compared with digital pay-TV and analogue free-to-air TV. We note that the value chain for broadcasting typically includes a bottleneck dominant actor in transmission and distribution, whose control may have been leveraged up and down the value chain to extract maximum rents.

\begin{itemize}
\item \textsuperscript{207} Examples include the UK Countryside TV and CyclingTV channels. See: http://news.bbc.co.uk/2/hi/programmes/click_online/5108980.stm
\item \textsuperscript{208} http://www.videonetworks.com/about_history.htm
\item \textsuperscript{209} http://www.videonetworks.com/pr_2004_05_13.htm
\item \textsuperscript{210} http://www.forrester.com/ER/Research/Brief/Excerpts/0,1317,16981,00.html
\end{itemize}
from other parts of the value chain. In this way, companies such as Sky in pay-TV and Microsoft in PC software are able to create innovative new markets for their products, based on control of strategic elements of the value chain. The IPTV value chain does appear very similar to that for digital pay-TV, and the elements are similar, although the platform is IP-based and therefore more interoperability is possible. (We return to this issue in discussing network deployment.)

Table 5: Vertical Layers of the TV Industry and Competitive Effects

<table>
<thead>
<tr>
<th>Vertical value chain stage</th>
<th>Analogue ‘free-to-air’ TV</th>
<th>IPTV</th>
<th>Digital pay-TV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content creation and production</td>
<td>Monopsony of terrestrial broadcasters buying content – contracts and rights supervised by state agency</td>
<td>Note importance of P2P file-sharing of music and video for PC-based IPTV High-quality IPTV localised delivery</td>
<td>Premium sports rights and movies</td>
</tr>
<tr>
<td>Bundling content into ‘portals’ or channels</td>
<td>Command and control – licensed by state agency</td>
<td>Possible in local loop – economies of scale and long-term exclusivity can result in dominance</td>
<td>Economies of scale and long-term exclusivity result in dominance</td>
</tr>
<tr>
<td>Packaging multiple software into multimedia</td>
<td>Command and control – broadcasters only allocated licences by agency</td>
<td>Control over ‘middleware’ services e.g. media players, interactive advertising</td>
<td>Control over interactive services by platform owner</td>
</tr>
<tr>
<td>Transmission and delivery</td>
<td>Command and control – transmission controlled by state agency</td>
<td>Broadband access regulated at wholesale network of incumbent</td>
<td>Dominant pay-TV platform access regulated</td>
</tr>
<tr>
<td>Navigational control of user</td>
<td>TV remote control only</td>
<td>Virus scanning, spyware denial, IPTV filtering for age, and search engines</td>
<td>500 channels and electronic programme guide</td>
</tr>
<tr>
<td>Controls on viewing: set-top box or software browser</td>
<td>Tax on TV households; content regulation imposed by evening ‘watershed’</td>
<td>Personal identification numbers (PIN) for premium and adult content, filtering</td>
<td>PIN numbers for premium and adult content</td>
</tr>
</tbody>
</table>

Note that the control points in digital pay-TV extend throughout the value chain, whereas in IPTV there is at least the possibility that different actors supply different elements of the value chain independently. It is important to note that the highly-integrated, regulated and concentrated value chain in television broadcasting does not necessarily have to be replicated in IPTV. This would depend on whether IPTV is distributed globally as a niche channel, or offered locally over a broadband provider’s ‘walled garden’ network. In the latter case, vertical integration is possible and preferable for the network operator, as it enables bundling of access and service. In the former case, IPTV is simply streamed over the Internet with very little or no integration with the local distribution network. Where IPTV channels may be even more niche than those for satellite and cable TV, this category

of small start-up IPTV businesses may be very sensitive to small changes in business models.

### 4.2.2 IPTV v.2: Local Distribution Business Models

The IPTV market is developing rapidly in geographies where there are significant multi-megabit broadband penetration. However, its business model is unclear and experts remain largely unconvinced that its current iteration can be made profitable as a standalone application\(^{213}\). As it amounts to TV broadcasting over the Internet, it is not clear that any additional mass-market revenue streams apply that broadcasting has not already captured. Therefore, currently it is seen as a ‘loss leader’ for broadband network operators, reducing ‘churn’ – the process whereby consumers switch from one network offer to another. Below we consider niche audience reach via VOD, but this section considers the grafting of the broadcast business model onto IPTV.

Many IPTV operators are attempting to ‘bundle’ IPTV as a service alongside broadband access, telephone line rental and telephone calls. This combination of television, telephony and Internet broadband is described as a ‘triple play’. The idea of offering all three services in one bundle is that the services can be cross-subsidised and offer economies of scope and scale in combining operations such as installation and maintenance, customer service and billing. Consumers may come to rely then on a single provider rather than three separate providers. This is considered important in reducing consumer switch from one operator to another, known as ‘churn’. The more customers stay with a single operator, the less need it has to ‘reacquire’ those customers: to market to them in an attempt to win them back. The UK cable operator NTL is planning to offer customers a ‘quadruple (quad) play’ of Internet, telephone, television and mobile, following its merger with Virgin Mobile.

IPTV may be seen initially as a ‘loss leader’ for these triple or quad play services. In order to make it profitable, IPTV providers will require a critical mass of customers in each local area to recoup the costs of investment in equipment to distribute programming. The current loss-leading activity for IPTV has led to significant doubts being expressed regarding the consumer’s willingness to pay more for a service that replicates their free-to-air broadcast service. The roll-out by incumbent telecoms operators of next-generation networks, which offer IP interconnection for all voice and data, is typically accompanied by IPTV services. The capability to offer these exists, and it is seen as a means to compete for the triple play of telephone line, TV and Internet that cable companies already offer. Table 6 indicates that the cable companies and HomeChoice have enabled over 1 million homes for IPTV and local VOD. So far, user data is limited. OnDemand group provides local VOD and IPTV services to NTL, the cable company. The VOD service served over 1 million on-demand films in 2005\(^{214}\). Taken to the ‘Long Tail’ extreme, it can provide subscribers with an à la carte menu of films and programmes, each with potential price competition from several suppliers, and potentially lower end-user costs. This would

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\(^{214}\) http://www.ondemand.co.uk/press/081205.html
depend on the economics of bundling programming, which is beyond the scope of this report. It may have the effect of reducing costs with mass-customization of the product being distributed.

Table 6: UK Local VOD-Enabled Subscribers (November 2005)

<table>
<thead>
<tr>
<th>Platform</th>
<th>Operator</th>
<th>Subscribers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital cable</td>
<td>NTL</td>
<td>600,000</td>
</tr>
<tr>
<td></td>
<td>Telewest</td>
<td>776,000</td>
</tr>
<tr>
<td>TV/DSL</td>
<td>HomeChoice</td>
<td>34,000</td>
</tr>
<tr>
<td>Kingston Interactive Television</td>
<td>5,000²¹⁵</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1,415,000</td>
</tr>
</tbody>
</table>

Source: Ofcom

Forrester states that “little or no growth in overall consumer spending on content services” is foreseen, and continues: “On average across Western Europe, we predict a cumulative subscriber loss of €3,742 in year 10, thanks to low revenue growth and massive backhaul costs²¹⁶. The cost of distribution of IPTV is seen as central to the problems with the business case. Forrester states:

“It’s hard to see how DT’s [Deutsche Telekom’s] planned €3 billion investment in fiber and VDSL [Very high bitrate Digital Subscriber Line] networks can ever return a profit in a country where consumers enjoy up to 48 free-to-air TV channels and are used to paying very little for TV services.”²¹⁷

However, the investment in VDSL2 and fibre technology in 10 cities, with 50Mb/s downstream and 10Mb/s upstream, is to be carried out, according to semiconductor supplier Infineon²¹⁸. Note that in the US, Verizon has launched FIOS²¹⁹, an IPTV and fast Internet offering.²²⁰

²¹⁵ It is notable that Kingston Interactive Television was dissolved in spring 2006 after seven years’ losses. This demonstrates the need for critical mass in the market, at least under current technology costs.
²¹⁷ Note that the deployment was delayed substantially, according to Burstein, D. (2006) DSL Prime, 1 August, at: http://www.dslprime.com/News_Articles/news_articles.htm: “They now have halted deployment to spend six months integrating the systems, getting the bugs out of Microsoft IPTV and the network, and then adding 3 million more homes by the first quarter of 2007. Martin Frommhold tells IDG: ‘video on demand, electronic program guides and on-demand TV archives are not part of the initial offering. The set top box is from Cisco/Linksys, and has a dual tuner to record one show while watching another.”
²¹⁹ According to Verizon’s Trademark (No. 3001081), FiOS is a Gaelic word for "knowledge". See http://newscenter.verizon.com/proactive/newsroom/release.html?id=92862
If the local IPTV business case is weak, and if the cost of global distribution of streamed video is high, this would suggest a radical response to regulatory cost. The local IPTV solution that offers high quality and avoids the need for DRM (as it is locally hosted and streamed, reducing piracy concerns) may be rapidly supplanted by a more global solution using a P2P distribution model (considered in section 4.4. below). If current pilot P2P distribution models prove successful, this form of VOD may be a workable substitute for IPTV. Given the lower costs of VOD distribution compared to IPTV, that may help to induce a tipping effect from local IPTV to global VOD, especially in high-distribution cost markets.

4.2.3 Producers and Distributors in IPTV

USA-based middleware companies with UK operations include Loudeye, Microsoft and Real Networks. In the UK set-top box market, the largest company is Pace Microsystems founded in 1982, which has revenues of over £250 million and shipped 3.4 million STBs in 2004 out of a global total of 45 million (which is forecast to increase to 58 million in 2005 and 120 million by 2010\(^{221}\)). Pace increasingly outsources its software development to India and manufacturing to partner companies. Also, it has refocused from the mature market for standard STBs to the more advanced PVR market and ships 1 million units a year to Sky and NTL/Telewest in the UK\(^{222}\). Other established IPTV players include Microsoft, which has worked extensively on IPTV\(^{223}\).

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**Example: Yes TV Starts Up in London, Moves to Hong Kong**

An interesting case study is Yes TV, founded in 1996, which supplies end-to-end IPTV technical 'white label' [unbranded] products for telecoms customers to brand as their own\(^{224}\). Kingston Interactive Television was its key UK customer, which ceased trading in 2006. Yes TV is now based on Hong Kong and is active in Singapore, Hong Kong and China markets.\(^{225}\) Its Chief Technology Officer stated at end-2004:

“Although there is increasing activity in the telco video space today, the market is nascent in terms of its commercial relevance as a revenue stream for operators.”\(^{226}\)

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4.2.4 Digital Television Market and Consumption

UK digital TV penetration at end-2005 was 71% of all TV households, with 34% satellite, 32% digital terrestrial television (DTT – i.e. broadcast TV), and under 11% digital cable (differentiated from terrestrial over-the-air). DTT was outselling digital satellite by 500%...
at end-2005, and is making significant penetration of second TV sets in households with
digital TV. Figure 17 shows the trend in digital TV penetration by household since 1998.

![Figure 17: UK Digital TV Penetration by Household 1998–2005](chart)

Source: Ofcom

A recent study shows that younger, less-educated families buy satellite pay-TV, while older
people buy – or are given – DTT. Half of digital households are over-55s, while 46% of
DTT boxes bought in the final quarter of 2005 were gifts (the research suggests this was
often from families for their over-55 parents at Christmas). Switching off the analogue
signal in 2008–2012 will permit universal reception of digital terrestrial services, that is,
free multichannel TV without the need for a cable or Internet subscription.

Viewers ‘time shift’ their audiovisual viewing by using ubiquitous video recorders, and
increasingly rewritable DVD players or PVRs. Revenues are spread increasingly among
multiple platforms, and Figure 18 shows Ofcom analysis of the UK, a highly-developed
‘mixed economy’ broadcast environment with strong digital Freeview and pay-TV, public
service broadcasters and commercial free-to-air TV. It demonstrates growth in all sectors
except commercial analogue. The increasing amounts of revenues for platform operators
indicates a shift from value accruing to the programmers and towards the platform
operators. IPTV is a further example of this.

228 Note that cable and satellite subscribers do not need to change their services, unless they operate
other TV sets with terrestrial-only reception.
Internet users claim to use the Internet more than any other medium except television—which includes use of radio and print media via the Internet. Television use appears to be far lower among Internet users, according to the World Internet Project. Although IPTV is a very small market in comparison with digital TV, its growth may be based on a similar mix of investment as it is effectively a different distribution model for TV. Strong initial IPTV deployments were announced by public service broadcasters BBC, Channel 4 and ITV in the first half of 2006. Ofcom figures for non-subscription/advertising revenues are important indicators of the current spread of non-advertising expenditure, which may indicate the development of the IPTV business model.

Figure 18: UK Television Revenues by Sector 2000–2004
Source: Ofcom

Figure 19: UK Domestic Television Non-subscription/Advertising Percentages
Source: Enders Analysis 2005

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229 Source for October 2003: http://www.worldinternetproject.net/home.html
230 S4C is the publicly-funded Welsh language broadcaster in Wales.
The flows of finance in television in Figure 19 above provide a proxy for financial flows in IPTV, however, there are significant middleware and distribution issues which are not common to all platforms and can vary widely. Thus far, the costs of rights acquisition for IPTV are largely anecdotal accounts of premium rights. IPTV may have an even more complex value chain than digital TV. The rate of progress of digital TV is slower in other EU markets. IPTV is a very immature market and the business model is very uncertain.

4.3 Market Development

Estimates and projections for IPTV growth cannot be taken as an accurate sign of the growth of the business. For instance, ABI Research predicted that global subscriptions will increase from 6.4 million at end-2005 to 514 million by 2011. An OECD survey in 2003 found that the activity in the IPTV v.1 period had largely dissipated. Table 7 below demonstrates that IPTV v.2 deployments date largely from 2004–2005. Note that the use of either of the terms IPTV under ‘platform’ is an indicator of some type of streamed local video over IP service, whether in our definitions this is linear IPTV or non-linear VOD.

Table 7: European VOD over IP Deployments

<table>
<thead>
<tr>
<th>Service</th>
<th>Operator</th>
<th>Platform</th>
<th>Region</th>
<th>Launch</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTH TV</td>
<td>SEAS-NVE/ Dansk Bre</td>
<td>IPTV</td>
<td>Denmark</td>
<td>2002</td>
<td>Movies</td>
</tr>
<tr>
<td>TV2 Sputnik</td>
<td>TV2/Nordisk film</td>
<td>IPTV</td>
<td>Denmark</td>
<td>2005</td>
<td>Movies/TV</td>
</tr>
<tr>
<td>MaLigne TV</td>
<td>France Telecom</td>
<td>IPTV</td>
<td>France</td>
<td>2004</td>
<td>Movies</td>
</tr>
<tr>
<td>Alice Movie</td>
<td>Hansenet</td>
<td>IPTV</td>
<td>Germany</td>
<td>2005</td>
<td>Movies</td>
</tr>
<tr>
<td>T Online Vision</td>
<td>Deutsche Telekom</td>
<td>IPTV</td>
<td>Germany</td>
<td>2004</td>
<td>Movies</td>
</tr>
<tr>
<td>Fastweb</td>
<td>Fastweb</td>
<td>IPTV</td>
<td>Italy</td>
<td>2001</td>
<td>Movies/sport</td>
</tr>
<tr>
<td>Lyse Tele</td>
<td>Lyse Energi</td>
<td>IPTV</td>
<td>Norway</td>
<td>2005</td>
<td>Movies</td>
</tr>
<tr>
<td>Salten TV</td>
<td>Salten Bredband</td>
<td>IPTV</td>
<td>Norway</td>
<td>2003</td>
<td>Movies</td>
</tr>
<tr>
<td>iVisjon</td>
<td>iVisjon</td>
<td>IPTV</td>
<td>Norway</td>
<td>2002</td>
<td>Movies</td>
</tr>
<tr>
<td>Imagenio</td>
<td>Telefonica</td>
<td>IPTV</td>
<td>Spain</td>
<td>2004</td>
<td>Movies</td>
</tr>
<tr>
<td>CMORE</td>
<td>SBS Canal Digital</td>
<td>IPTV</td>
<td>Sweden</td>
<td>2005</td>
<td>Movies</td>
</tr>
<tr>
<td>TeliaDigital TV</td>
<td>TeliaSonera</td>
<td>IPTV</td>
<td>Sweden</td>
<td>2005</td>
<td>Movies</td>
</tr>
<tr>
<td>SF Anytime</td>
<td>Bredbandsbolaget</td>
<td>IPTV</td>
<td>Sweden</td>
<td>2004</td>
<td>Movies</td>
</tr>
<tr>
<td>Solentuna TV</td>
<td>Solentuna Energi</td>
<td>IPTV</td>
<td>Sweden</td>
<td>2005</td>
<td>Movies</td>
</tr>
<tr>
<td>Film Flex</td>
<td>NTL/Telewest</td>
<td>Cable</td>
<td>UK</td>
<td>2005</td>
<td>Movies</td>
</tr>
<tr>
<td>Kingston Interactive Television</td>
<td>Kingstom telecom</td>
<td>IPTV</td>
<td>UK</td>
<td>1999</td>
<td>TV</td>
</tr>
</tbody>
</table>

Source: Screen Digest

231 Note that the determination of revenue flows in the TV industry cannot account fully for flows from transmission networks to programme platforms and channels to producers, or for export–imports of programming.


In markets with high broadband penetration, there is growing use of IPTV. European IPTV subscriber numbers have grown rapidly to over 1 million, as seen in Figure 20. The largest market by far is France Telecom’s incumbent offer, at more than a half of all European IPTV subscriptions. France Telecom and Fastweb in Italy make up over two-thirds of this emerging market (the incumbent Telefónica in Spain claims rapid market growth in the past six months). France Telecom is an incumbent and FastWeb an entrant, but the business model of each is ‘triple play’, aiming to provide more services in a bundle than competitors. The supply of IPTV by European non-incumbents has been conducted only on a commercially significant scale over a multi-year timeframe by FastWeb and Bredbandsbolaget (Sweden), both using Ethernet technology at 100Mb/s, as in Hong Kong or South Korea.

![Figure 20: Largest European Potential Markets and Total IPTV Subscribers in Western Europe 2004–2005](#)

**Figure 20: Largest European Potential Markets and Total IPTV Subscribers in Western Europe 2004–2005**

Source: Strategy Analytics

**Example: Hong Kong and NOW TV**

Pacific Century Cyber Works’ Now TV is the world leader in IPTV with more than 550,000 users, subscribing to the service since its launch in August 2003 and representing over 25% of homes in Hong Kong, and 66% penetration of its broadband customers. Now TV carries 110 TV and audio channels234. VOD was offered since November 2005. In September 2005, its competitor HKBN had 120,000 subscribers typically paying US$16 per month, and cable TV incumbent iCable (not an IPTV offering) had 685,000

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234 Pacific Century Cyber Works (2006b) ‘News Release’, 18 May, at: http://www.pccw.com/eng/Investors/News.html; 50% of all its lines are HDTV-ready, 2006 targets are to increase subscriber base for Now TV to over 750,000, to introduce HDTV, and to achieve break-even on EBITDA. Now TV carries 4 simultaneous live streams of UEFA Champions’ League football.
subscribers paying US$38\textsuperscript{35}, HKBN employs IP next-generation network architecture at typically 100Mb/s for US$27 per month.

Now, which was formerly branded as ‘Networks of the World’, had started in London as a global IPTV v.1 business in 2000–2002. It was offered formerly as a service over the Internet, streamed via content delivery networks, which distribute content globally to local regional or national servers. It relocated to Hong Kong after suffering significant losses. Its new launch as a ‘walled garden’ DSL IPTV v.2 service began in August 2003. Its declared subscriber details are illustrated in Figure 21.

![Figure 21: Now TV Installed Base and Pay-channel Customers](image)

Source: Now TV

4.3.1 IPTV Networks and Middleware

The value chain in IPTV v.2 includes costs for platform and distribution, and it is this ‘middleware’ that has seen most recent investment. Network equipment vendors, for instance Alcatel and Cisco, sell substantial IPTV system upgrades to network operators. It should be noted that almost all European vendors are consolidating rapidly, with Alcatel/Lucent, Nokia Networks/Siemens and Ericsson/Marconi all merging in the past year. In June 2006, the new Nokia–Siemens combination announced a 6,000 to 9,000 reduction in headcount over three years; in April Alcatel/Lucent announced 8,800 job losses\textsuperscript{236}; and Canadian Nortel Networks announced 1,900 further job losses as part of the global restructuring of the industry\textsuperscript{237}. These continued reductions in employment on top of the dramatic reductions in all companies in 2001–2004\textsuperscript{238} demonstrate that the


\textsuperscript{238} For instance, reductions by more than a half at Nortel, Marconi and Lucent, with 200,000 to 300,000 total job losses across the industry. See Light Reading (2001) ‘Grim Reaping: A
telecoms network business is continuing to globalise and reduce its European workforce. The reductions in the European workforce indicate that multimedia and other service sectors appear to be the growth sectors in communications, rather than networking equipment manufacturing and deployment. The new services businesses are start-ups (whether inside communications corporations or independent), and are therefore initially more vulnerable to changing business conditions and sunk compliance costs with regulation.

Light Reading states\(^{239}\) that the three largest IPTV network deployments, FastWeb, Telefónica and Pacific Century Cyber Works, have used middleware developed largely in-house. This is mainly due to the fact that when they started their service rollouts, middleware solutions were limited in availability and in some cases immature. However, as the number of subscribers increases, it is costly for service providers to maintain and further develop in-house designs\(^{240}\). Next-generation middleware platforms are being designed with interfaces more open to higher-layer services and applications, which may enable service providers to roll out differentiated services (beyond IPTV and basic VOD) by allowing Web2.0 application developers to build innovative services and applications on open middleware platforms. Table 8 details the major telecoms network equipment providers and their links with IPTV middleware providers.

**Table 8: Major Equipment Vendors Middleware for IPTV**

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcatel/Lucent</td>
<td>First to articulate a strategy, largely based on its Microsoft partnership. It has its own software and long-term options with the Lucent/Orca Interactive Ltd Partnership and newly-defined Lucent/Telefónica relationship.</td>
</tr>
<tr>
<td>Cisco</td>
<td>Relatively agnostic on the middleware front. Cisco can also leverage the middleware partnerships that Scientific Atlanta has in place. Scientific Atlanta IP set-top boxes primarily support Microsoft and Nokia Siemens middleware.</td>
</tr>
<tr>
<td>Huawei</td>
<td>Working with Cascade Ltd on the middleware side: initial deployments in China. Huawei does not view IPTV as high priority.</td>
</tr>
<tr>
<td>Microsoft</td>
<td>Challenges beyond the middleware components of its end-to-end platform. Fast channel change capability requires hardware investment and suffers from performance issues related to changing between non-adjacent channels.</td>
</tr>
<tr>
<td>Nortel</td>
<td>Recently announced Minerva Networks Inc. middleware partnership.</td>
</tr>
<tr>
<td>Nokia Siemens</td>
<td>Myrio middleware combined with its infrastructure products and home networking Customer Premises Equipment products, total IPTV subscribers in the range of 130,000–190,000.</td>
</tr>
<tr>
<td>Ericsson</td>
<td>Ericsson will supply networking products, and its partner Kasenna provides the IPTV software and middleware. Ericsson is also a strong proponent of IMS technology. The company is working with Sony in the Digital Living Network Alliance, which is working to ensure consumer electronics interoperate with each other in the home(^{241}).</td>
</tr>
</tbody>
</table>

Source: Light Reading

4.3.2 Mobile IPTV

Today, mobile IPTV is an extremely small market but it is predicted to grow rapidly. On 15 May 2006, Pacific Century Cyber Works announced that it would broadcast real-time TV over its Hong Kong 3G network, using Cell Multimedia Broadcast technology. 110,000

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240 Lucent-Alcatel has agreed with Telefónica to support and develop the Imagenio middleware.
customers are in the mobile IPTV trial as part of a quadruple play\textsuperscript{242}. In March 2006 the Finnish government granted a mobile TV licence to Digita, a distributor of radio and television services. The service will begin to broadcast by the end of the year, covering 29\% of the country’s population. It will be the first commercial mobile TV broadcast service in Europe and initially will offer TV, games and interactive services\textsuperscript{243}.

For mobile TV to be viable, there are technical and business issues that will need to be resolved. Questions over viability are a particular concern for small carriers because sharing a broadcasting network with a number of other mobile operators will be essential to assure sufficient returns. Note that the current generations of mobile technology do not support broadcast over cells – rather, they support the expensive unicast or relatively costly multicast\textsuperscript{244}. Mobile TV trials give no sense of the real market dimensions, and the only 3G mobile near-commercial roll-out is in Hong Kong, but it is still far too early to predict willingness to pay for either VOD or IPTV.

Table 9: European Mobile TV Trials

| Source: Nokia |
|---|---|---|---|
| Positive response to mobile TV | Finland | UK | Spain |
| Willingness to pay for mobile TV (%) | 58% believe mobile TV services would be popular | 83% are satisfied with the service | 75% would recommend the service |
| Acceptable monthly fee (€) | 10 | 76 | 55 | 73% were satisfied with the service |
| Average daily viewing | 5 to 30 minutes | 23 minutes per session/ 1 to 2 sessions per day | 16 minutes | 7 |
| Peak viewing times | Mornings/ lunchtimes/ early evenings | While commuting and between 7pm and 8pm | 9am–10am | 1pm–2pm |
| Popular content | News, soaps, documentaries, music and sports | News, series and music | News, music, entertainment, sport, films and documentaries |

Mobile TV is in its infancy and some analysts believe that it will never be financially viable\textsuperscript{245}. However, recently Informa\textsuperscript{246} has forecast that by 2011 there will be 210 million consumers subscribing to mobile TV services worldwide, with 10\% of all handsets sold


\textsuperscript{244} Different technical standards for mobile TV have emerged. Analysts believe that DVB-H is most likely to achieve significant economies of scale on both infrastructure and handsets, mostly because it has wide industry support.


able to receive broadcasts. Mobile TV is likely to be adopted at different rates in different regions, with the Asia-Pacific leading the way. According to Informa, there will be 68.7 million European subscribers by 2011. Tables 10 and 11 show Informa and Analysys projections.

Offering basic mobile content over 3G will be necessary for European public service broadcasters seeking to collect licence fees from non-terrestrial TV users. This will also aid the churn reductions sought by mobile network operators. Video mobile blogs and use of sites such as YouTube will be facilitated by this new distribution means.

Table 10: Projected Mobile TV Users 2005–2010 (millions)

<table>
<thead>
<tr>
<th>Year</th>
<th>North America</th>
<th>Latin America</th>
<th>Asia-Pacific</th>
<th>Europe</th>
<th>Africa/ Middle East</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>4</td>
<td>0.8</td>
<td>31.5</td>
<td>7.6</td>
<td>0.3</td>
<td>44.2</td>
</tr>
<tr>
<td>2006</td>
<td>8.9</td>
<td>1.7</td>
<td>53.6</td>
<td>15.9</td>
<td>0.9</td>
<td>81</td>
</tr>
<tr>
<td>2007</td>
<td>15.6</td>
<td>3.6</td>
<td>78.5</td>
<td>30.1</td>
<td>1.9</td>
<td>129.7</td>
</tr>
<tr>
<td>2008</td>
<td>21.9</td>
<td>5.4</td>
<td>94.7</td>
<td>45.7</td>
<td>3.1</td>
<td>170.8</td>
</tr>
<tr>
<td>2009</td>
<td>25.6</td>
<td>7.1</td>
<td>108.2</td>
<td>54.6</td>
<td>4.4</td>
<td>199.9</td>
</tr>
<tr>
<td>2010</td>
<td>28.8</td>
<td>8.3</td>
<td>116.4</td>
<td>57.5</td>
<td>5.6</td>
<td>214.7</td>
</tr>
</tbody>
</table>

Source: Informa Telecoms & Media

Table 11: European Mobile, 3G and Multimedia Revenues 2005 and 2009 (Projected)

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total mobile revenue</td>
<td>137</td>
<td>180</td>
</tr>
<tr>
<td>3G revenues</td>
<td>9</td>
<td>118</td>
</tr>
<tr>
<td>Mobile entertainment</td>
<td>3.8</td>
<td>9.7</td>
</tr>
<tr>
<td>Mobile videotelephony</td>
<td>0.4</td>
<td>10.4</td>
</tr>
</tbody>
</table>

Source: Analysys

The trials by, for example, BT Movio in the UK and the 2005 trial streaming the World Athletics Championships by YTE and partners in Finland and Estonia, are concerned with both technical and business issues as well as exploring the best type of content for mobile and short-mode use. For example, ‘mobisodes’ use custom made-for-mobile episodes of popular TV programmes, while ‘simulcasts’ transmit programmes from traditional television in real-time or alongside the TV broadcast. The 2006 FIFA World Cup trials provide further lessons in which formats work best.

4.4 Regulation and Non-linear Content

Prior to considering the value chain and regulatory case for non-linear (VOD) content, we consider the consumer proposition. There are several plausible alternatives which RAND (2006) described.

Linear continuum: citizen behaviour will change at the margin, but media consumption will remain a largely linear ‘live’ experience for most;

Digital content divide: the digital ‘haves’ will experience greatly increased interactive media use, while an equal number of digital ‘refuseniks’ will continue exactly as before, relying on offline media and public service broadcasters;
Time-shifting linear consumers: the great majority of the population will use broadband mobile and in-home devices, time-shifting their media to suit their own schedule, not that of the broadcaster, fundamentally altering the media landscape.

It should be noted that there are two distinct versions of the third scenario above. Either consumers choose to stream linear video at alternative on-demand schedules, or follow the following pattern:

Non-linear interactive users: adopting an entirely ‘pull’-based behaviour, in which content is downloaded as if in a P2P music file-sharing network, for offline consumption on demand.

In the first three cases there is no significant substitution of non-linear for linear video consumption. However, most analysts anticipate a diminishing role for the linear model in broadband homes (consistent with previous broadband technology changes from radio to television, for instance). This can be seen in falling advertising revenues and the migration of high value-added and/or price-inelastic services to non-linear services, including VOD.

We now explore the business case for VOD and its effect on the value chain for IPTV.

4.4.1 VOD

We note that the regulatory regime for VOD as a non-linear service will be lighter touch than that for IPTV as a linear service, as the regime sets minimum standards rather than the linear extension of the broadcast regime. Therefore, under any scenario, there will be a regulatory cost case for distributing via on-demand rather than live streamed distribution. The particular uncertainties that drive this network effect are the likelihood that consumers will use substitutes for IPTV. These include:

- non-IP television platforms for ‘live’ television which offer 35 channels or more without additional charge (71% of UK households already have digital TV reception equipment or contracts for pay-TV); and
- VOD services which offer ‘catch-up’ TV and an archive of TV programmes, films and other clips.

The launch of BT Vision, the UK incumbent’s IPTV product, is actually a bundle of Freeview DTT and VOD, with the TV content delivered by terrestrial broadcast TV and the VOD via broadband, both into the same set-top box247. By this means, BT does not intend to have to upgrade its street cabinets between local exchanges and most subscribers – those further than about 1km from the exchange. Therefore, the largest UK broadband operator248 is offering DTT and VOD rather than IPTV. This should delay the need to upgrade the core local network until approximately 2010, when BT’s 21CN249 next-

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247 The set-top box will be supplied by Philips, the software will be Microsoft TV IPTV Edition. See: http://www.btplc.com/news/articles/showarticle.cfm?articleid=da91ed95-0ebb-4bac-940e-18b793bdceb2a

248 Note that BT has only about 26% of broadband connections, with NTL, Orange/Wanadoo, Tiscali and AOL all holding over 10% market share. The retail market in the UK is the least concentrated in Europe. Source: Ofcom (2006a) ‘The Communications Market: Interim Report’, February, at: http://www.ofcom.org.uk/research/cm/feb06_report/commms_mkt.pdf

249 See: http://www.btplc.com/21CN/Whats21CN/Butsstrategyandkeyobjectives/index.htm
generation network is in place. While other incumbents (in the Netherlands, France, Germany and Switzerland, for example) are adopting a more aggressive fibre deployment to enable IPTV and other ‘live’ applications, UK deployment in a very mature digital TV market may focus on VOD.

Thus there is potentially a significant substitution of VOD non-linear services for linear services, in the UK and elsewhere. Regulation of the linear stream at higher compliance cost than that for non-linear will tip the equation further away from linear streaming, although it may be that this regulatory cost is relatively trivial for local network-owned IPTV operators.

4.4.2 PVRs and Hard Drives

VOD includes two options: ‘near-live’ streamed files and file downloaded versions. The ‘near-live’ version requires higher quality and probably local distribution. It would be difficult to offer via current generation global IPTV or P2P networks. It has the advantage that the file buffers and thus can be viewed during download. DRM is less necessary as the file is stored only temporarily and then deleted at the end of the Internet session, and cannot be stored permanently for later replay or copied to another medium. By contrast, P2P is the choice most used for file downloading.

Storage in home devices on a hard disk drive is necessary for downloaded material. The ‘law’ of storage dictates that storage doubles for the same cost every year. Thus, for example, a hard drive that is 80 gigabytes (Gb) in 2006 will be 3.2 terabytes (Tb) for the same price in 2011. This means that today’s PC, PVR or MP3 player can store about 125 films or 20,000 music tracks stored in a relatively high resolution DivX (digital video compression) format, but in 2011 the same device could store 5,000 films or 640,000 music tracks, or hundreds of high-definition (HD) format programmes. Typically the key to the transformative distribution effect is said to be that networks, such as P2P networks, increase the productivity effect with each new addition to the network (known as Metcalfe’s Law), thus creating a ‘bandwagoning’ growth in the adoption of ICTs. However, for VOD services, a more important change may be the increase in storage capacity.

Table 12 below shows the list of interconnected ‘laws’ of ICT technology adoption. Moore’s Law and Metcalfe’s Law are best known but there are a series of ‘laws’ which indicate the increasing abilities of devices and networks to distribute and manipulate ever-larger files, including video files\textsuperscript{250}. All these laws of the network and device have ‘network effects’ on the others – high processing speed (Moore’s Law) and storage (Disc Law) are needed in PCs to process and store the highly-compressed (Compression) data files sent via

\textsuperscript{250} See Gilder, G. (1993) ‘Metcalfe’s Law and Legacy’, Forbes ASAP, 13 September, at: http://www.seas.upenn.edu/~gaj1/metgg.html Moore’s Law is the observation that microprocessing power doubles every 18 months, suggesting that processing will be 10 times more powerful in mid-2011. Metcalfe’s Law suggests that the utility of an interactive (bi-directional) network increases as the square of the number of users. It has recently been suggested that Metcalfe’s Law is incorrect and should see the increase as 1/1+n – a much slower rate of growth. The Storage Law is the observation that hard drive storage doubles each year, indicating that the storage of a PVR, portable MP3 player or games console will be 32 times greater by mid-2011 (for instance a current 80Gb hard drive will be replaced by a 2.5Tb drive).
switchers (Gilder’s Law) and optical fibre (Fibre Law) over the Internet (Metcalfe’s Law). Accompanying this are improvements in video supply. As a result of these and other changes, the Internet is a much improved medium in delivering video to the consumer than it was in the IPTV v.1 period of 1999–2000. However, very significant supply-and-demand questions remain, and the gradual erosion of the barriers to supply may not be reduced to enable manageable and profitable service for several years251.

Table 12: Technological Advances in End-user Devices

<table>
<thead>
<tr>
<th>Technology nomenclature</th>
<th>Component</th>
<th>Cost-efficiency effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moore’s Law</td>
<td>Microprocessor</td>
<td>Doubles every 18 months, e.g. from 2GHz to 4GHz</td>
</tr>
<tr>
<td>Metcalfe’s Law</td>
<td>Network</td>
<td>Increases potential value of network by square of number of nodes</td>
</tr>
<tr>
<td>Disc Law</td>
<td>Storage – hard disk</td>
<td>Doubles storage cost-efficiency each year</td>
</tr>
<tr>
<td>Data packet transfer</td>
<td>Data compression</td>
<td>Increases: boosted by improved codecs e.g. DivX, RealPlayer, Windows Media</td>
</tr>
<tr>
<td>Gilder’s Law</td>
<td>Transmission equipment</td>
<td>Bandwidth increases three times faster than microprocessor power – Moore’s Law x3.</td>
</tr>
<tr>
<td>Fibre Law</td>
<td>Transmission network</td>
<td>Capacity doubles every nine months</td>
</tr>
</tbody>
</table>

Source: RAND Analysis

The increasing cost-efficiency of video distribution is predicted to continue, but the increased storage cost-efficiency of multimedia-ready PCs and PVRs is likely to be the biggest change in consumers’ homes in 2011. Ofcom provides a simplified version of the adoption curve shown in Figure 22 below, which illustrates the early stage of development of PVRs and VOD compared with other market technologies.

Figure 22: Composition of Current Technologies on the Adoption Curve

Source: Ofcom

4.4.3 Regulation and Non-linear Content

The AVMS intends to regulate PVR content as the same as any linear broadcasting from which it is recorded. Therefore, PVR material taken from broadcast TV is linear content. The launch of the TiVo broadband-ready PVR in autumn 2006 will enable the PVR to download non-linear VOD programmes stored on the same drive as the digital TV programming that current boxes support. This will mean that consumers will not necessarily make any distinction between digital TV and VOD, even though a different regulatory regime will apply to each.

VOD which does not enter the consumer’s possession as linear broadcasting is considered to be non-linear content in all its forms, including that saved to the PVR (such as the Philips box that supplies BT Vision’s VOD content). Therefore, PVRs and PCs will contain three types of content: recorded, regulated linear TV content; downloaded, co-regulated non-linear VOD content; any other such as unregulated content. Note that using devices such as the Slingbox, users can transmit their linear and non-linear PVR content from their home to any other global location via webstreaming at sub-broadcast quality (about 1Mb/s). Such location-free broadcasting is a problem for content regulation as well as copyright, as it means that a viewer in Europe can easily access content that is broadcast initially outside Europe but rerouted via the Internet.

Government will be obliged to monitor and authorise self-regulatory codes intended to enforce such restrictions. Self-regulation has emerged already in several European new media markets. The European Commission has commissioned a report on the types of media self-regulation in the UK, which includes a detailed analysis of the Association of Television on Demand (ATVOD) system\(^{252}\). Woods states: “ATVOD was formed in response to concerns that traditional mechanisms for protecting children in particular were ineffective given the development of digital technology. It seems that at least some of the members viewed the development of the code of practice as other means of continuing to fall outside a state regulatory system.”\(^{253}\)

Ofcom has noted what it sees as the success of ATVOD: “We have already seen good progress in self-regulation, encouraged by bodies such as ISPA [the advertising self-regulator] and ATVOD”\(^{254}\). It suggested that future self-regulation might use a kite mark [accreditation sign] type of publicity-based self-regulation: “Perhaps we might move to a

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\(^{253}\) Woods (2006), supra at p. 51 states: “Although OFCOM has included ATVOD in its media literacy working group, ATVOD has not been delegated any formal powers by OFCOM, nor does OFCOM back-up the sanctions applied by ATVOD. Indeed, the sanctions in general seem relatively weak, essentially consisting of the publicity factor.”

sort of ‘opt in’ regulation, where some content providers agree to meet certain standards, in return for a publicly recognised kite mark or mark of approval. This does not necessarily need to involve the regulator.” In practice, such self-regulatory solutions can provide the type of flexibility required in Internet regulation, although this must be weighed against the risk that free-riders have little incentive to comply. Note that ATVOD members are all local IPTV and VOD providers, not global companies supplying locally.

The impact of the AVMS on podcasting is unclear, but it appears that a weekly subscription to a video blog with advertising support could be classified as linear broadcasting. If a video podcast is part of a broader programme that is extracted and reformatted as a video podcast, it appears likely that the content will have been formatted with linear rules attached. If it is a standalone programme made exclusively for video, it may be classified as VOD.

4.5 **P2P Distribution**

P2P distribution uses the resources of each computer in a network to distribute via that network of webs of servers (Figure 24), rather than using a central server hub to distribute to the ‘spokes’ – end-users (Figure 23). The differences between the two types of architecture have been examined in great detail in both technical and social scientific examination of systems of control and innovation, but the important issue for this case study is this: the increasing availability of broadband connections for end-users with no Quality of Service to degrade their file transfer means that users can form their own distribution networks, working without control from the network provider. This is a potentially revolutionary development both in decreasing costs and shifting control over the use of the network. ‘Peering’ is the practice of two separate networks exchanging IP traffic at a certain interconnection point.

**Figure 23: Hub and Spoke (with central peering point)**

![Hub and Spoke](image1)

**Figure 24: Web (with random peering points denoted by red and blue dots)**

![Web](image2)

In this section, we discuss ‘peer-to-peer’ – where there are many peering points and the complexity is managed by those peering points being selected by user-installed software protocols rather than by commercial agreement. P2P relies on the bandwidth available to
each user and the recipient’s willingness to delay viewing until the video is finally distributed in full. Some systems use a partial peering system, whereby servers are distributed throughout the network to form a content delivery network (CDN). Peering is used to speed the local distribution of that content. However, there is a substantial difference. A content delivery network has an entity responsible for its operations, and therefore someone subject to regulatory enforcement. P2P networks decentralise this accountability and make it nearly impossible to enforce regulation. The BBC network in Figure 25 overleaf demonstrates a global IP media distribution network with its peering points.

The most efficient systems, such as Kazaa and BitTorrent, deliver files in parts for reassembly as a whole. File transfer is slow but very economical, with low bandwidth consumption. A 700Mb file – the approximate size of a DivX encoded two-hour feature film – can be sent in 700 x 1Mb files by 700 computers and automatically reassembled into the original file at the user’s computer. The early-adopter use of P2P to download files overnight for playback the following day is a recognised consumer behaviour that is likely to become a mass-market phenomenon. Although this threatens the offline on-demand video and DVD rental business more than the broadcast business, it means that there is an accepted consumer behaviour that VOD can accommodate with legitimate content. In Canada, a more developed broadband market, analysts suspect that P2P is a negotiating tool with network operators:

"Technically, P2P may not have much to gain over head-end caching. However the advantage to the content provider of P2P is that it disintermediates the cable company. In the end P2P will be a business strategy for the content providers to negotiate higher fees from the cable company VOD systems."255

Time Warner began using P2P to deliver video in Germany and the USA in spring 2006256. Sky is using P2P technology to deliver film downloads in the UK using Kontiki’s solution. In the UK the BBC also uses it, as does NTL, which has an agreement with BitTorrent and CacheLogic for a trial. An important regulatory question is: who has liability for the content being distributed if host computers are being used? It is not clear that the owner of the PC has any control over the content being shared via their computer. It seems unlikely that the AVMS could be held to apply to a PC owner who happened to be a member of a P2P distribution network, but who had no complete file in their hard drive or an intention to ‘broadcast’ in return for commercial benefit. This question is fundamental to the distinction to be drawn between P2P and CDN.

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4.6 Conclusions

This chapter introduced in section 4.1 the concepts of local ‘walled garden’ and global types of IPTV distribution, describing in section 4.2 the failed early IPTV commercial
ventures using global distribution as IPTV v.1, and the later locally-hosted and cached systems as IPTV v.2. The value chain analysis for IPTV v.2 was seen to be similar to that in TV. In section 4.3, we saw that IPTV is only at a stage of mature commercial deployment in Hong Kong, and to a lesser extent in France and Italy. In section 4.4 we considered the non-linear services available and the effect of regulation on developments such as PVRs. In section 4.5, we saw that it is still too early to model peering costs and the alternative distribution models with any certainty. Therefore, we recommend a more intensive and focused research project into the costs of local IPTV versus VOD and multicast distribution costs, in order to analyse the costs of unicast, multicast and broadcast, and the transitional costs in running multiple systems.

If the variance is very high (which is possible, but by no means certain), the costs of regulatory compliance between linear and non-linear regimes may be trivial by comparison. That is to say, migration from linear to non-linear distribution will be commonplace for all but essential ‘live’ events which continue to use the costlier linear distribution method. However, the risk of offshoring for multinationals, and business failure for SMEs, appears quite high, particularly in the more global sectors such as VOD and niche content.

European market development may be more reliant on workable regulation to support the high-distribution cost model for IPTV than content regulation models. Also, it may depend on the ability of IPTV networks to prevent competitive P2P distribution of video, in order to ensure that consumers access IPTV offers rather than possible free-riding alternatives. This has wider implications than content regulation in the AVMS, particularly an approach that substitutes toll-keepers in networks rather than open access. We consider this further in Chapter 7 on indirect impacts.

The next case study considers a sector with earlier co-regulation and self-regulation, higher entry barriers and greater control over content creators and distributors: mobile multimedia.
CHAPTER 5 Mobile Multimedia Case Study

5.1 Introduction

This chapter examines the mobile multimedia industry in the UK and assesses the indirect impacts of the AVMS on the actors in the sector. It provides an overview of mobile multimedia, describes the value chain and explores trends and drivers of change. The chapter considers applications, services and users, the firms in the sector and employment. The remit here is to assess the indirect impacts of the AVMS on the value chain, and consequently the chapter considers the impacts on investment, location of activities, employment, SMEs and the broader economy.

Note that we do not consider mobile TV and mobile games in this case study (as they are examined elsewhere) but concentrate on the regulation of existing services that the network operators intermediate: ringtones predominate and subscription or ring-back scams in the industry have led to an elaborate co-regulatory regime being adopted\(^{257}\). User-generated video has become subject to scandals in the UK and elsewhere\(^{258}\). Given the high concentration of network operators with more or less closed ‘walled gardens’ in this sector, and the very complete and relatively high-cost classification system and media literacy campaign introduced in 2004 by the mobile network operators in the UK, this is a relatively closed environment with fixed and high self-regulatory costs\(^{259}\). It differs substantially from other sectoral case studies, where there is less control exerted by network operators, and therefore a stronger case for market entry by content providers.

The vertically-integrated and closed ‘walled garden’ business models of the mobile sector are very different to that which we have just examined in IPTV (and particularly VOD). There is no tradition of open competition and net neutrality in mobile data, but competition within a small group of tightly-integrated and heavily-capitalised licensed operators, with clusters of content developers building on common standardised technologies. Entry barriers for new network owners are extremely high, and the survival of

\(^{257}\) [Website](http://www.icstis.org.uk/consumers/adjudications/default.asp)


\(^{259}\) Also Ahlert, C., Marsden, C. and Nash, V. (2005) ‘Protecting Minors from Exposure to Harmful Content on Mobile Phones’, European Internet Coregulation Network, at: [Website](http://network.forumInternet.org/article.php3?id_article=24)
content suppliers depends heavily on the business models of the mobile networks. Some virtual operators compete in the market (for instance, Virgin Mobile in the UK), but this is predominantly price competition for large corporate and low-end pre-pay consumers rather than added-value service competition for multimedia. There is potential for incumbents to play the self-regulatory systems in place to their own advantage, in order to raise entry costs and to pass through all (or even excess) costs to content providers, although there is no evidence that this occurs in practice.

Since 2003, when initial projections and business cases were made for 3G telephony and therefore broadband data including multimedia, the industry has increased its self-regulatory efforts. At that point, the three ‘G’s were portrayed as potential $10 billion industries: girls, games and gambling. The decision to regulate content more strictly within the network operators’ ‘walled gardens’ was made with the adoption in 2004 of a common code of conduct and classification scheme for content which tied content providers’ liabilities into their contractual relationship with network operators. In this way, network operators have a strong incentive to police and otherwise regulate the content that is branded with their portal. Where users step outside the ‘walled garden’ into the wider Internet, in which network operators provide no self-regulatory scheme and both the business case and content of providers is independent, there is effectively no regulation.

We note that mobile multimedia is a new sector and only limited data is available to assist in this task. Moreover, the sector has been subject to much hype and market forecasts have proven to be an unreliable guide to the way in which mobile multimedia will develop over the next five years. Thus, the assessment presented here should be viewed within this context. Overall, we find that the costs of compliance with the AVMS are likely to be outweighed by the regulatory ‘legitimacy’ that it would provide. The Directive could boost consumer confidence in the fledgling mobile multimedia industry at a time when trust in the mobile video Internet continues to be a problem.

5.2 Mobile Multimedia Value Chain

The Open Mobile Alliance (OMA) defines ‘mobile’ as “services, which can be received, used and purchased with battery-powered hand-held terminals both indoors and outdoors.” Historically, this refers to narrowband mobile – voice and SMS for a handheld instrument. But with progress in radio technologies, content delivery over mobile increasingly will be broadband – that is, above 200kbps, and often beyond 1Mbps so it may support multimedia forms – full-motion video with the resolution to see a football cross a goal-mouth. As they slowly evolve to become a fairly promising new content delivery channel, mobile platforms will progressively offer varied multimedia content to the consumer. Such a channel is privileged in both ubiquitous access and having a user population which is growing fast, globally.

260 See Ahlert et al. (2005), supra.
The interplay between these two areas – mobile delivery platforms and digital content – is based on mobile or wireless platforms that provide users with ‘always-on’ connectivity, over radio technologies using both licensed and unlicensed spectrum. The major licensed technologies include GSM, GPRS, various forms of 3G. Unlicensed, shorter-range alternative wireless technologies (AWTs)\(^\text{262}\) include wireless local area network (WLAN), and Bluetooth, with longer range WIMAX and other proprietary technologies.

5.2.1 Sector Description

The mobile multimedia sector embraces stored entertainment content, such as music, games and TV, as well as live broadcasts for sport and news, all for consumer interaction, video messaging, etc. As Figure 26 shows, there are a wide variety of broadband-based modes, mainly: downloads (e.g. music, movies, games, sports clips, etc.) for content to replay in the user’s own time; P2P social networking (e.g. gaming, dating); linear live streaming or from remote stored content bases for replay on-demand (e.g. VOD); and client–server transactions for mobile commerce; messaging storage and forwarding.

![Figure 26: Value Chain in Mobile Multimedia Products](source: SCF Associates Ltd, 2006: Economic Impacts of Spectrum Allocation Methods)

These primary types of mobile data service fall into four functional categories:

1. content-enabled services, e.g. addition of location-enabled application with maps and search function, to form a navigational service that navigates to destinations;

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2. e-commerce transaction services, including financial transactions;
3. content-based data services, including music, TV and entertainment-based educational content (‘edutainment’), games, health, video, news, transport information and adult entertainment; and
4. communications-based data services, primarily involving P2P communications such as voice, messaging (SMS and multimedia messaging service: MMS) and email.

The categories of content-based services are our primary focus here. Note that generally, the provision of content to consumers is organised in one of three major approaches, which also may be mixed:

1. ‘walled garden’ – the mobile operator creates a users’ space for wholly controlled content and services, some of which may be bought in from third-party content providers. The ‘walls’ around the ‘garden’ keep consumers within this space and tied to these offerings;
2. open access – any website or services over any mobile operator that allows Internet access and has a suitably fast mobile network for multimedia services;
3. semi-open access or web-access approach – as used by NTT DoCoMo’s i-mode service. This is more open than a ‘walled garden’ and uses connection to any web-enabled site via its proprietary software, but has two tiers of accessible sites and business partners. This creates a two-tier type of access for both customer and service provider, where open Internet access is available but ‘walled garden’ content is accessed more easily.

5.2.2 The Value Chain
A simplified view of the basic operational value chain or mesh for multimedia mobile is based on extensions from narrowband 2G digital mobile as shown in Figure 27. It becomes clear that, whether the model is a ‘walled garden’ or open access, mobile network operators play a fundamental role in the mobile multimedia content value chain which might be described as that of a ‘gatekeeper’. Note also that the handset supplier may preload some limited multimedia content on the handset to provide resident applications for off-air as well as on-air usage. This is illustrated in Figure 28. The role of the mobile network operator or Mobile Virtual Network Operator is critical to the decision whether to allow open access or to vertically integrate operations ‘in-house’. This changes the risk-reward in the value chain and the type of regulatory arrangement that is likely to be effective.
Figure 27: Main ‘Walled Garden’ and Open-access Business Models for Mobile Multimedia

Source: SCF Associates Ltd (2005), Mobile Multimedia Product Studio design

Figure 28: The New Value Chain for Mobile Services

Source: SCF Associates Ltd (2001)
Estimated relative values of the various segments for building the multimedia value chain in 2006 and for operating it in 2011 are illustrated in Table 13. Note that it includes the extra costs associated with capital raising and regulation, whether self-regulation or government-imposed. It is broken down further than the previous value chain examples in order to model costs as specifically as possible (for instance, adding the elements of network investment and testing, IT hardware and systems integration) which do not conform exactly to the value chain diagram, but are provided in order to add extra granularity.

Table 13: Estimated Relative Value of the Mobile Multimedia Value Chain

<table>
<thead>
<tr>
<th>Segments of the multimedia value chain</th>
<th>Relative value 2006 (%)</th>
<th>Relative value 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile operator, operations costs</td>
<td>33</td>
<td>35</td>
</tr>
<tr>
<td>‘Walled garden’ internal production of content with external post-production charges</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Open-access content/broadcast/media/entertainment access and agreements</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Imaging and content preparation/repurposing</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>External content service provider charges</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Multimedia application development</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Additional network investments</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Testing</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>External ISP/Wireless ISP/portal charges (if used as extra access channel)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Handsets and hand-held devices subsidies</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>IT hardware</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Systems integration</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Diverse value-added services (e.g. base station site acquisition and outsourced operation)</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>WLAN products and services (if used as extra access channel)</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Government/regulatory/associations</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Finance/banking/venture capital</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Specialist consultancy</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Ways of protecting mobile content have been fought over for at least five years, with many forms of DRM being suggested to control content usage and its passage among users. Some music publishers have been waiting for working DRM before their making content available. The 2G/2.5G data access protocol, WAP (wireless access protocol) enabled the mobile network operator to control content usage within the closed cellular network in ways that are not possible for the all-IP environment of many 3G mobile and Wi-Fi/WiMax networks. With premium content such as real-time video clips of goals and mobile TV – which demand much higher acquisition costs than, for instance, ringtones – DRM is seen as a significant issue by content providers. All the major content providers have their own technology, with major content players from Microsoft, Apple and Orange to Disney having a view on proprietary technology; collaboration is also common, with the

263 SCF Associates Ltd, based on industry estimates, 2006.
OMA’s version, which separates the content from multimedia rights, being one leader among several approaches.

The multimedia content provided by mobile service providers is similar to that on the Internet. However, while Internet content is often free at the point-of-use (albeit usually supported by advertising), often mobile entertainment is charged for by the mobile service provider. MacInnes et al. argue that this reflects their ‘gateway’ role. This is reflected in the indicative revenue shares reported by mGain. The other ‘hub’ firm in this value chain is usually the content provider, which also collects a significant share of the revenue.

It is worth noting that there are many prospective business models for the provision of mobile games from the perspective of wireless network providers, and the above case studies may describe only one. McInnes et al. classify them according to four models:

1. pipe – the wireless network provider simply provides transport services;
2. pipe-sales – the wireless network provider interacts more directly with game providers and provides billing services;
3. portal – the wireless network provider delivers the content via a portal, and so exerts bargaining power over the game providers;
4. full portal – the wireless network provider takes control of all aspects of branding, marketing and delivery, and the game provider simply supplies content wholesale.

The different models have obvious implications for the power of the operator within the value chain, with the last offering full functionality and the ability to create a vertically-integrated ‘walled garden’. However, different actors, such as device manufacturers or publishers, also can act to provide portal services and act as aggregators (e.g. Nokia’s Club Nokia). The success or otherwise of one business model over the others should be viewed within an evolutionary competition perspective. In particular, the ‘fitness’ of one business model over another will be determined by its ability to adapt to changes (technological, regulatory, etc.), and the ability to access finance (reliant upon the business model producing an adequate business case).

Relative power within the value chain also has the potential to be altered by upstream and downstream integration in two ways:

- mGain states that the mobile entertainment value web is still a very “fluid space” and that transaction costs seem relatively large (which would promote integration of transactions within a firm hierarchy, rather than in market-based relationships);

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265 mGain (2003), supra.
267 Http://www.nokia.com/clubnokia
268 Pynnönen (2004), supra.
269 mGain (2003), supra.
both mobile network operators may wish to expand up the value chain, and content providers may wish to expand down the value chain, into service provision and content aggregation.

This has two implications for the value chain analysis. First, the internalisation of certain functions that were previously available in a competitive market will increase barriers to entry and thus market power. Second, integration may have implications for the amount of regulatory pressure brought to bear (and this will be anticipated in any integration decision process).

5.3 Market Development

The take-up of mobile multimedia content services depends first on the availability of suitable networks. Of course there is evidence to support the view that increasingly, business and consumers will demand mobile multimedia content. Let us compare the expansion of the mobile market with the other growth platform for multimedia – the Internet. Figure 29 shows mobile penetration growing much more rapidly than the Internet worldwide since 1995. It is conceivable that extensions of current mobile networks could be the next platform for Internet access and multimedia such as IPTV.

A key driver for mobile multimedia is likely to be social networking, due to the ubiquitous nature of the mobile offer. One of the reasons for i-mode’s success in Japan is dating and potential partner presence detection. For example, the socialising site Student.com, with 740,000 PC users mainly in the 13 to 24-year-old age group, is typical of the kind of Internet offer that is hoping to evolve in the mobile space. Student Mobile will offer ringtones, graphics, video, lifestyle texts and alerts and allow users to carry their online social networking experience into the mobile space with mobile photo and video blogging, mobile podcasting, mobile messaging and mobile chat.

To a large extent, trends in mobile multimedia are governed by the state of current technology in its handling of high-speed data, rather than just low-speed voice. Enhancements over 2G mobile have brought higher data rates than the original 9.4kbps of
the first GSM. GPRS and enhanced networks have pulled 2G data rates towards 2.5G with around 100kbps, and sales of the ‘walled garden’ multimedia portal Vodafone Live! have prospered. Note that the all-IP network, which is more efficient in distributing content, i.e. 3G mobile, is still immature. There are some 100 million 3G users worldwide mid-2006 after three years of market exposure. There are now about 4 million 3G subscribers in the UK, but the transfer of subscribers from 2G is occurring only slowly and it is far from clear that 3G is the next evolution in mobile communications\(^{270}\). Most of the current technologies in major global usage, 2G and 2.5G, are fairly low in received bandwidth (less than 100kbps) in reality, despite higher advertised rates\(^{271}\). The roll-out of 3G networks has been slowed by overspending on licences, limiting the funds available for solving technical problems to bring a new and difficult technology to market\(^{272}\). Higher data rate services than these are available in some countries, notably South Korea and Japan, but Europe is still behind.

The data rate – and its pricing, which goes with network capacity for high bandwidth – is essential in setting the expectations of customers and thus the sales of multimedia services and content. The data rate sets not just the volume of sales but also the type of content that will sell. Thus we see that simpler content with lower bandwidth demands for download such as ringtones and music are the leaders. In Europe, 3G is being enhanced with next-generation (3.5G) networks to try to sell multimedia. However, at the current roll-out rate, the enhancement HSDPA will achieve only around 20 million users by December 2008 in the EU\(^{273}\). More affordable lower-end HSDPA handsets could arrive in 2007, so 2008 may be when HSDPA is more widely available to the mass market. In consequence, the high costs of 3G networks – Vodafone spent over £5.1 billion worldwide in the 2005 financial year on its 3G networks\(^{274}\) – means that alternatives for lower cost high-bandwidth AWTs are being sought across Europe, often by alternative providers to the incumbent telcos and mobile network operators.

One major trend concerning data rates which has delayed multimedia take-up is the price of data transfers over mobile, as measured against disposable income. Price has been used by mobile network operators as a way of limiting demand, to protect network capacity in the hope that faster high-capacity networks can be rolled out soon. Mobile data transfer costs for use of the network to download content or for streaming remain high, so users tend to minimise the amount of data transferred. Moreover, the markets targeted for much mobile content are the teens and twenties, who have quite limited income compared to other social groups. This has acted as a major brake on content sales.

\(^{270}\) Ofcom (2006a), supra.


There are conflicting trends towards vertical and horizontal integration in the multimedia content industry. While the larger players (such as TV and film studios) are interested in verticalisation and consolidation of more links in their value chain, there is also a rapid proliferation of small, virtual and creative businesses with clustering in the UK around, for instance, west London, Soho, the M4 corridor and northern England.

In addition, increased demand for user security with take-up of multimedia content is a trend due to the unwelcome consequences that come with Internet access. Spam, ‘phishing’\(^{275}\), worms, trojans, viruses, ring-back scams to premium numbers and other malware that affect safe Internet access may slow the development of online content as the mobile environment opens to the Internet. A major denial of service attack on the Japanese emergency services wiped out access for a day, with attackers using i-mode servers as the attack medium\(^{276}\). In August 2001 it only took 400 infected handsets to block the emergency numbers by constantly ringing them.

Technical trends in multimedia mobile on the handsets side include larger resolution screens, better batteries, faster connections, more memory and faster embedded processors. Disk storage is taking off for the MP3 market, so in theory mobile phones could rival or surpass the portable MP3 player market. In 2004, Samsung’s SPH-V5400 handset offered a hard drive with 1.5Gb of storage, while Nokia’s N91 has 4Gb and most recently, Samsung’s SGH-i310 has 8Gb, so it can store 1,000 to 2,000 songs. Nevertheless, the evidence so far is that they have much ground to make up on dedicated MP3 players.

Media servers for download and streaming and interactive sessions are changing towards ever-larger installations of clustered blade servers – with grid computing promising much, but so far delivering little for real operations.

On the software side, we see much use of Java environments, often based on J2ME, but with the arrival of Java-based web services in a resource framework, and open-source software (OSS) generally. Sun’s recent open-source licence for Java is advantageous for the OSS community. Nokia is pursuing the possibility of putting a web server on a handset, so mobile phones can host their own websites – with this, a much larger proportion of websites globally might reside on mobile phones. This is likely to have impacts on opening ‘walled gardens’ and permitting users to access a wider variety of multimedia.

There is an ongoing battle of operating systems to run multimedia on the mobile handset. Newer entries for the Java play are SavaJe, now on the Jasper S20, announced June 2006, while Qualcomm pushes Brew but the dominator is still EPOC from Symbian, with Nokia behind it, despite marketing hype from some players.

For open-source developers, Motorola has just launched opensource.motorola.com, a portal for Motorola source code, open-source projects and programming information for Motorola devices. The first two big projects are JSR 271, better known as the MIDP3 specs, and an open-source Java test framework. Also, many leading mobile and electronics brands are now collaborating to support development of a small footprint-embedded

\(^{275}\) The attempt to mimic e-commerce sites in order to fraudulently access users’ passwords and account details.

Linux for mobile, to limit the fragmentation that has marked the move towards a Linux for mobile multimedia. Against this OSS trend, Microsoft is negotiating with Qualcomm to install its operating system (OS) in CDMA chipsets, so that the mobile content providers can align with Qualcomm’s plans to launch a cable TV-like model of broadcasting, with a set-top box, for its mobile TV network. This will require an OS, such as that offered by Microsoft, on the Qualcomm handsets for the smartphone market.

On the techniques for mobile TV broadcasting, the winning standard has yet to appear from the several technologies being promoted: DVB-H has wide industry support today, while DAB-IP could be the cheapest solution.

5.3.1 Applications and Services, Customers and Types of User

A recent study of future mobile services for the European Commission identified over 130 mobile services by 2020, many of them dependent on multimedia operations. Future business uses of mobile multimedia services include:

- multi-way video conferencing;
- a limited use of cooperative applications such as spreadsheets and presentations, the latter to include some usage of video applications such as design for property, aerospace, health, etc.;
- highly-specialised vertical applications, e.g. 3D image databases for construction, with the larger screen smartphones, or insurance damage assessment photos and video footage, etc.

The future consumer mobile multimedia marketplace can be divided into two main markets:

1. entertainment services – for example, ringtones and skins, games, gambling, sports, music downloads, TV (IPTV, etc.), movies, adult, dating, horoscopes, etc.;
2. non-entertainment consumer utilities – for example, mapping and navigation with location services, news, multimedia communications, video calls, MMS, email, instant messaging, travel services, online health, search and information services, early ‘edutainment’ and other forms of alerts.

Forecasts for multimedia growth are bullish but real take-up has been slower than expected, especially compared with forecasts from 2000–2002. Ringtones are the biggest market segment, although this may be slowing following some well-publicised charging scams. Music downloads are growing and, according to one recent report, US users of over-the-air music downloads may surpass the total number of online music service users by 2010. By then, the US over-the-air market is predicted to have over 50 million users,

277 See the study for Future Mobile Services, at: http://fms.jrc.es
278 Future Mobile Services, supra. See further section 5.3.4.
generating more than $1 billion in revenue. Perhaps more surprising is the prediction that by the end of 2006, the total number of over-the-air users will be about half the number of online music service users. The current dominant device, the iPod, could be challenged by these developments. The US mobile content market is predicted for all forms of mobile music to generate total revenue of $13 billion by 2011.

Customers and types of users so far have been early adopters, both male and female and largely below 40 years. Games have been taken up by the eight- to 28-year-old male population in Europe more enthusiastically than other customer segments. Again, music downloads have attracted this age group, especially as mobile multimedia marketing is now concentrated into two major categories: 10–18 years and 18–30 years, with other age groups largely ignored. Some marketing teams for multimedia mobile feel that today’s real markets effectively stop at 25 years as far as promotion is concerned, so the product designs are largely oriented to lower age groups.

5.3.2 Current Number, Size and Distribution of Firms
Generally, the firms in the multimedia mobile industry may be divided into fairly coarse categories, although finer segmentation is possible. For each of the segments below we give several types of content provider. The first is the network operator, and the other four are largely dependent on the strategy that the network operator decides on, between ‘walled garden’ and more open forms of access.

- ‘walled garden’ mobile network operators who prepare and own their content – for example Hutchison, owner of the ‘3’ network, which has created content or bought in exclusive content, with product studios and R&D for such enabling services as location-enabled applications. There are many questions about this model despite its favour among some of the leading UK mobile network operators;
- original content owners and producers – among the largest entering mobile content are Disney, the BBC, film and TV studios; some of the smallest are new four-minute production companies for the third screen, in France especially. All music industry players now have mobile divisions. One example of the category is Universal Studios (see box below);
- content processors and repurposers – post-production, edits, with soundtracks, voiceovers, adjustments, etc., e.g. BBC Technology;
- specialised mobile content aggregators – ringtones and games; Monstermob (UK) with properties worldwide is among the largest in Europe. Such groups are growing all over Europe, especially in Spain, France, Scandinavia and the Baltic states;
- specialised mobile content producers – ringtones and games especially; specialised studios and software producers for animation, sound and images, who act as third parties for content providers or perform their own ownership and marketing.

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Other content creators – the growth of P2P content by ordinary mobile web users self-originating content and webcasts, web TV stations and radio stations, text blogs (and now multimedia blogs), is a recent phenomenon in content creation. A consumer may ‘pull’ content from other consumers. These creative activities do not fall into the above categories, unless they involve advertising or other commercial applications. Web TV that charges its audiences are within this latter category. This segment can include any content that the consumer pulls from the web, including chat and personality sites such as MySpace.

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Universal Studios goes to popsicle licking sharks for creation of new mobile division.\textsuperscript{282}

Following the trend that mobile music comes before video, Universal Studios has followed its music counterparts’ lead and created a mobile unit for its movie business called Universal Mobile Entertainment. It is considering developing original video based on Universal properties. However, focus will initially be on games, ringtones and licensing of existing video clips, including tie-ins to new movies and shows like \textit{The Fast and the Furious: Tokyo Drift} and \textit{Battlestar Galactica}, as well as older properties like \textit{Jaws} and \textit{Kojak}.

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5.3.3 Quantified Level of Economic Activity, Investment and Employment

The major revenue generation from mobile multimedia falls within three general areas:

- operator revenues from downloads (music especially) rather than interactive services or multimedia communications, such as video calls. The airtime for data transfer must be added to this pure content charge;
- royalties and payments for content providers of all kinds (original producers and owners, aggregators and creative studios). This includes revenues gathered from viral marketing by users who send a piece of content to friends, for a fee, under DRM policies that allow sharing for a fee;
- advertising – often included with services sales, or placed inside multimedia products, such as a golf game showing promotional advertising for T-Mobile UK’s CustomPlay Golf.

There are no reliable statistics on the quantification of these revenues.

Revenues from the mobile multimedia industry in the UK compared to 2G mobile revenues and employment in the sector are both fairly small\textsuperscript{283}. This would include between 1,500 and 2,500 jobs directly concerned with creating, designing and manipulating content for mobile distribution, the remainder being in supporting functions (product definition, marketing, IT operational support, etc.)\textsuperscript{284}. For comparison, we note

\textsuperscript{282} Fierce Wireless, 12 June 2006
\textsuperscript{283} Data for this segment are not readily available, but Blackman and Forge estimate, based on official figures and other evidence, UK employment specifically concerned with mobile multimedia content to be in the region of 7,500 to 10,000 full-time jobs.
\textsuperscript{284} It is likely that employment levels in 2006 are somewhat lower than their peak around 2002–2003. Initial high expectations of rapid roll-out and take-up were not fulfilled, leading to job cutbacks in the mobile network operators and small content producers.
that a 2002 study for the south-west region estimated that there were about 50,000 employees in the digital media sector across the UK, with perhaps a further 8,000 self-employed workers. Thus employment connected to mobile multimedia is quite small, while the numbers working more generally in multimedia are somewhat greater. One could speculate that, should the mobile multimedia market take off as a result either of a 3G or 4G success story, we might see migration of those multimedia jobs specifically to mobile multimedia.

5.3.4 Estimates of Likely Growth to 2011
Analysis of the market up to 2011 raises a number of conflicting scenarios, with a growing number of reports and forecasts for the growth of mobile multimedia content, although comparable market definitions are not used so direct comparison is difficult. Although it is still a relatively new industry, mobile content is seen as a major driver of growth for both the telecoms and media industries. Two segments – music and games – are undergoing substantial growth, although estimates vary. Note that many forecasts are predicated on an optimistic scenario of major 3G mobile take-up across Europe, which has not occurred, as well as rapid user education and no fears of scams or malware.

One estimate is that European and North American mobile content markets will grow from €1.8 billion in 2003 to €4.3 billion in 2006, according to a report quoted in an OECD working group report, which also estimated the Asia-Pacific region mobile content market to be worth €2.65 billion, rising to €5.7 billion by 2006. However, other research has forecast that the global market for mobile data will grow from $16.7 billion in 2003 to nearly $78 billion in 2007, with the majority of revenues going to mobile operators and carriers, not content creators. It concludes that although the USA is catching up with Asia and Europe in the number of wireless subscribers, European and Asia carriers obtain nearly 20% of their revenue from data offerings, while US carriers only have 2% of revenues from data services. Other studies tend to contest these figures.

A study commissioned by the European Commission in 2002 estimated the European mobile content market size in 2006 at around €19 billion. Of this, €5 billion would

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comprise games, as multiplayer offerings become available, with €2.7 billion in music offerings and €3.7 billion for news services. In contrast, in 2003, Strategy Analytics projected that worldwide revenues from mobile data services were expected to increase from £34 billion in 2004 to £106 billion in 2009, of which revenues from mobile entertainment were expected to account for 28% (some €30 billion). A further 2004 report estimated that mobile data services, including ringtones, games, video and music, would generate new traffic and new revenues streams for mobile service providers with a value of $8 billion in Western Europe by 2008. However, another report from 2004 estimated that wireless data in Western Europe will account for $50 billion over the five years to 2009, driven by entertainment products. Yet back in 2001, Jupiter Research estimated the Western European market for mobile content to be €255 million, with 70% of the content being adult entertainment. In the UK, a 2005 study by Spectrum Strategy Consultants for the UK Department of Culture highlighted revenues from mobile online paid content of around £500 million, forecast to increase to around £2 billion by 2007.

Breaking down by content sub-segment, the largest areas of growth appear to be in mobile games and downloadable music including ringtones. Estimates are highly variable. For example, in 2003, global ringtone revenues estimates ranged from £1.6 billion through £2.3 billion and $3 billion to $3.5 billion. IDC estimated the US ringtone market to be $16.6 million in 2002 and $50 million in 2003. However, the estimates are considerably smaller than markets in Europe (€200 to 400 million) and Japan ($720 million).

For the mobile games market, many estimates exist such as a 2005 report, which estimates spending across Asia, Europe and North America will rise from $1.5 billion in 2004 to over $11 billion in 2009. Europe, the Middle East and Africa’s spend on wireless games would rise from $458 million in 2004 to $3.7 billion in 2009. In the US, the spend on wireless games would increase from $281 million in 2004 to $2.1 billion in 2009. For

289 OECD (2005b), ibid.; Strategy Analytics.
Asia, the first real wireless games market, sales of wireless games would rise from $783 million in 2004 to $5.5 billion in 2009.

A further report\textsuperscript{298} estimated the online games market to be worth $4.75 billion, of which 50% would be mobile. However, in 2005 \textit{Screen Digest} reported\textsuperscript{299} that mobile game revenues worldwide had grown 500% since 2002, predicting that global mobile gaming download revenues would increase 600% by 2010, to be worth $6.4 billion (£3.5 billion).

It is clear that forecasts are very wide-ranging and conclusions are difficult to synthesise from the projections. What is clear is that the qualitative rather than quantitative approach we adopted in value chain analysis helps to explain the drivers of growth in the sector.

\subsection*{5.3.5 Potential for SMEs to Participate in Growth}

The entry barriers for SMEs to participate in content production are fairly low as this element of the multimedia mobile market is not capital intensive. It has two basic inputs:

- software for editing the designs, usually on relatively low-cost machines today;
- creative talent to design multimedia ‘products’.

Thus we can expect a growing participation by companies with less than 10 employees being established across Europe. The most important factor for their survival will be the state of the economy, as this sets disposable income levels and therefore demand.

Development of a wider and therefore more secure base for their offerings will depend on the education of the market, to move up from ringtones for the eight to 28-year-olds to higher value products and more sophisticated applications for a much more general market, such as location-enabled products. Only widespread take-up of mainstream products, both in entertainment and non-entertainment, will assure a thriving market for SMEs rather than stagnation in minority products, although the chances of survival there perhaps are stronger than for a large company with major overheads.

\section*{5.4 Regulation and Multimedia}

Here we explore the impacts of the AVMS on the various players in the value chain up to 2009–2011. Our concern here is with the indirect impacts on the mobile multimedia sector of complying with such a regulation, for instance, the impacts on investment decisions. Thus, this assessment takes into account which mobile applications and services would be affected by the AVMS, the impact on investment, location of activities and the potential for offshoring, the impact on employment, and the impact on SMEs. Finally an assessment is made of the impact of the AVMS on UK and EU gross domestic product (GDP).


\textsuperscript{299} Cited in OECD (2005b), supra.
5.4.1 Mobile Applications/Services Affected by the Directive

The areas that could be affected include:

- mobile content generation of all types, including advertising;
- content aggregation;
- content distribution into the mobile operator;
- mobile operations end-to-end, including content ingest and storage, content preparation post-production, provisioning, billing and customer service processing with user interaction and download/streaming/interactive transactions.

The question is: how much would they be affected? Currently, The European mobile multimedia world is fairly closed. Unlike fixed-line access to the Internet, there are two constraints on full openness compared to fixed-line Internet access via a PC:

- the position of the mobile network operator as responsible body for content carried, already covered by legislation and self-regulation;
- the nature of the access network, which is in some ways a closed world with its limits today in bandwidth in Europe (and to 2012).

One grey area is security – especially the authorised and mandated disclosure provisions on mobile communications for national security (also known in the USA as the Communications Assistance to Law Enforcement Act of 1994). Proposals for government eavesdropping on IP data over mobile, including VoIP calls, could compromise security, as noted in recent research, which states that IP networks differ in critical security areas from the switched circuits for which previous mobile call data logging was written. Making technical accommodations for such schemes could open doors to unobserved eavesdropping and data gathering by unauthorised persons.

5.4.2 Impact on Investment, Location of Activities, Offshoring

Assessing the potential impact of the Directive on levels of investment and location of activity has to be viewed within the larger context. Decisions to invest in mobile multimedia will be determined largely by the usual factors – assessment of the market size and potential returns, first mover advantage versus risks, availability of funds, etc. Similarly, with regard to decisions on location of activity the determining factors include:

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300 We note that the mobile network operators in the USA are beginning to offer broadband wireless access that is approaching desktop speeds. There are significant business case differences between the USA and Europe, but this is a potential development path for European mobile content.


general business environment and the costs of doing business; skilled labour availability and its costs; access to capital; infrastructure such as telecommunications and transport; clusters around centres of excellence, centres of the creative industry, centres of demand, and so on.

Within this context, the Directive appears to be unlikely to be a causal factor that would significantly affect investment decisions that would drive the creation and distribution of mobile media content out of the EU. This claim depends on the mobile network operator remaining a closed offering. If business value requires access to the internet from mobile platforms, then the AVMS decisions will make a difference about what new content is created within Europe or pushed offshore. Moreover, external content being supplied over mobile networks from outside the EU can be subject to blocking software and filtering tools, if it contravenes either national laws on content, and its purveyance, or the current proposal. Furthermore, the blocking of unacceptable content from outside the EU may well attract a stigma to those companies operating outside, and especially offshore, such that all such established players would wish to move inside the EU to avoid that damaging image. They would not wish to be associated with proscribed material, as evidenced by their willingness to agree codes of conduct to protect children from unsuitable content\(^\text{303}\). It is important to remember that the mobile device is not the PC – it is much more personal and pervasive. It is used far more widely by far more people of all age groups than the PC and its users are in a more intimate and unprotected situation than the PC, which causes concerns over the more generally ineffectual nature of Internet ‘parental controls’.

While the case for extension of the AVMS to mobile multimedia is weak, nevertheless it may have beneficial effects. The Directive could give an aura of respectability to the market. Could the Directive help to ‘protect the industry from itself’\(^\text{304}\)? Although it could give no real guarantee, due to the volume of material, the number of actors, etc., the Directive might well give the perception of control and reliability.

The Directive might help also to clarify the position of offshore sites which are mobile Internet-accessible and provide harmful material. With a Directive in place, if a list of proscribed sites is maintained by the authorities and enforced through a blacklist of URLs in the mobile carriers, the sites could be blocked. Of course, there would be some costs associated with this to the NRAs and mobile network operators, but these would most likely be low to negligible.

\(^{303}\) In January 2004 the UK mobile operators (Vodafone, Orange, T-Mobile, 02, 3 and Virgin) announced a joint Code of Practice for the self-regulation of new forms of content on mobile phones, designed to facilitate the responsible use of new mobile phone services while safeguarding children from unsuitable content on their mobile phones. See: http://www.imcb.org.uk/classificationframe/introduction.asp

\(^{304}\) Industry experience in developing the first 3G mobile industry multimedia products for gambling, gaming, adult entertainment, movies and dating suggests that this is not just sensible but needed. An inside view of the mobile media industry is that it could be big – but only if it is more careful with its public perceptions.
5.4.3 Impact on SMEs and Employment

For the small company entering a new market with many uncertainties, especially for seed investments and a clear market for its content, could the new Directive either stifle or promote the small venture? The key question for investors in the new ventures is: will the Directive heighten or decrease business risk? Being in the EU and the subject of minimum content standards would act effectively as a barrier to entry for non-compliant offshore competition, since ‘illegal’ content from such sources could be blocked by mobile network operators and thus could lower business risks. It is clear that the mobile network operators would make contractual decisions whether to accept such content onto their portals, failing which its distribution would be very limited, even if not actively blocked. Thus, a European standard for content might help the smaller entrant, as large overseas competitors also would have to comply in terms of content of media material, making for a more level playing field for competition.

Will the Directive impede or hinder the development and sale of new products as content is regulated, and so limit employment and investment in the sector? We can find no real evidence to support this contention. The AVMS would lead to a small increase in sunk regulation costs and therefore middle- to low-level management employment in certain industry sectors. We estimate this to be in the order of 10 new jobs in each of the larger EU economies, and fewer in the smaller Member States. These positions would be held by those who would be responsible for implementing and policing the AVMS. This would be a small but necessary addition to overheads. Each large EU economy would require, for instance, between one and three compliance staff for the whole industry, as well as between one and three staff policing content generally and more widely. Each major mobile network operator would then need compliance and policing staff, at the level of between a half full-time equivalent and a whole full-time equivalent per mobile network operator, creating perhaps between two and four mobile network operator jobs per large EU economy.

Note that it can be argued that open mobile Internet access would spur creativity and generate more jobs, although it is our view that enhanced consumer confidence leading to increased demand would be a much more significant factor in driving growth in the sector.

Taking all of the above into account, it seems most likely that the implementation of the AVMS will have very limited or no impact on GDP as a result of its application to the mobile multimedia sector. However, if the Directive enhances consumer confidence and drives the take-up of mobile multimedia more quickly, the effects on GDP growth could be positive.

5.5 Conclusions

In summary, we see very little impact resulting from the application of the AVMS to:

- the various actors in the value chain of the multimedia mobile industry;
- employment – any impacts are likely to be low, although it possibly could fractionally increase employment in the major mobile network operators and national regulatory authorities;
European and national GDP. It is difficult to justify the extension of the AVMS to mobile multimedia content on the usual impact assessment grounds.

In signalling support for self-regulation, the mobile multimedia sector may appear more credible and legitimate in the public’s eyes. It adds very little in terms of regulatory burden for existing actors – most provisions are already adhered to through self-regulation in any case – but the Directive could enable the industry across Europe to generate the right kind of publicity. Most likely, the Directive will change little, achieve little, and will not be the threat to the industry that some fear. Rather, it is our view that the costs of compliance are weighed against the regulatory ‘legitimacy’ that would be provided by the Directive. It might lead to higher quality content exports to Asia and the USA.

These benefits only accrue if the Directive is ‘sensibly’ drafted and implemented by Member States, with:

- minimal cost to mobile network operators, ensuring particularly that it does not increase entry barriers to smaller content providers;
- strong codes of conduct on marketing services to children, ‘endorsed’ by the AVMS;
- low cost to NRAs and the European Commission to police.

The classic mobile ‘walled garden’ provides its own policing for the most part, and is therefore the case study least affected by state regulation. However, we note that such regulation reinforces this status quo and thus raises entry costs to what is already a market with extremely high entry barriers. We return to the trade-off of content control and entry barriers in the concluding Chapters 7 and 8.
CHAPTER 6  **Online Gaming Case Study**

### 6.1 Online Gaming Value Chain

For the purpose of this report, online games have been broadly defined to include any digital game which requires a live network connection to be played, either entirely or in part. As such, it includes not only games played on the Internet but those played across mobile networks or via P2P networks, whether facilitated by wired or wireless connection. These games include single player, multiplayer and massively multiplayer genres. It excludes games which do not require an active network connection for gameplay such as those played locally but which use the Internet to post high scores, download game elements or asynchronously exchange data.

We recognise that, in order to be ‘platform neutral’ between Internet and other forms of video delivery, this definition relies on drawing boundaries based upon service rather than content. This raises potential issues for regulation and users in that an offline–online distinction may appear arbitrary, as a game played offline is potentially subject to the AVMS if online elements are used, such as multiplayer competition. (We return to this point below.)

Note that computer games increasingly use HD video formats, and this may be a substantial driver of uptake for HD displays, such as large HD-ready replacements for standard definition TV sets, in the short to medium term, as HDTV is relatively uncommon and is currently delivered as a premium subscription service. It would be in the broad interest of the ICT economy to encourage this part of the software sector – which in total produces more jobs, exports and revenues than traditional broadcast – to incorporate as much HD imagery as possible in order to drive sales of displays and other peripherals. Policy should note the indirect effects of driving format type in assessing content regulation.

#### 6.1.1 Typology of Online Games

As game styles and genres rapidly change, there are few ideal types. It is recognised that there are four main types of games currently played online. Each of these demonstrates not only a different use of technology but variations in consumers’ engagement, duration of play and business model. In brief these games types are:

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305 As such, correspondence chess played via an online server such as http://www.chesshere.com or games facilitated by the International Email Chess Group (IECG) would not come under our working definition but real-time games (or ‘blitz chess’) would.
**Minigames/browser games**: Online versions of classic arcade, board or digital games made available free and used either on websites to promote ‘stickiness’, or in Java, Shockwave or Flash forms on specific gaming portals supported by advertising. One of the first computer games, *Spacewar*, originally run on the PDP1, can be found as an online game[^306]; Flash versions of *PacMan* can be found on various websites[^307], as can card games such as *Solitaire*[^308] and *Blackjack*[^309], as well as board games including draughts/checkers[^310], *Ludo*[^311] and *Othello*.[^312] Together with trivia games – both recreational[^313] and educational[^314] – these types make up the majority of online games played. These games often include links to developers’ or sponsors’ websites and are strongly linked, with rebranding, to some of the simpler forms of ‘advergames’.

**Advergames**: Those games designed to promote a particular product, company or political perspective. Most directly, advergames will feature a company’s new product prominently and either be played online at the company’s website or made available for download. They are strongly linked to viral marketing campaigns, with the games attempting to spread product and company awareness by word of mouth, email and featuring in blogs. Advergames used to increase awareness of a particular issue include:

- *America’s Army*[^315] – developed by the the US Government to drive forces recruitment; and

**Networked play games**: Commercial games played in whole or part online usually with a PC but increasingly via a gaming console with Internet access. They cover the majority of game genres and facilitate multiplayer gaming across the Internet. Their popularity has increased with broadband diffusion. The first game to exploit online play was the ‘first person shooter’ game *Doom*. In online first-person shooter games, players can compete head-to-head or in teams. ‘Real-time strategy’ games are games based upon tactical planning and are a computer-based development of traditional wargames. Although historical warfare is still a theme in many real-time strategy games (e.g. the *Age of Empires* series and *Rome: Total War*), Tolkeinesque themes (e.g. *Lord of the Rings: Battle for Middle Earth*) and science fiction narratives (e.g. *StarCraft*) are not uncommon.

**Massively Multiplayer Games (MMORPGs)**: These differ from other online games in two important factors: the number of concurrent players participating in a single game (often in the thousands) and the persistent nature of the game (i.e. play continues whether a particular gamer is participating or not). Also, as online worlds, these games tend to provide a more open-ended approach to gaming and are notable in the non-gaming social and communities aspects made available through the service.

[^309]: [http://www.2flashgames.com/ff/70.htm](http://www.2flashgames.com/ff/70.htm)
[^313]: [http://www.2flashgames.com/ff/337.htm](http://www.2flashgames.com/ff/337.htm)
[^314]: [http://www.ababasoft.com/music/music_quiz.html](http://www.ababasoft.com/music/music_quiz.html)
MMORPGs have received significant attention, with the advent of *Everquest* and the entry of the Korean game *Lineage* into the European and North American markets.

![Figure 30: MMORPGs by Active Subscribers (X Axis Total Subscribers per MMORPG)](http://mmogchart.com/)

While not making up the majority of online gaming, MMORPGs demonstrate significant number of paying members who contribute to the publisher’s revenue, as seen in Figure 30 Blizzard Entertainment/Vivendi Game’s *World of Warcraft* has in the region of 6 million subscribers (1 million in Europe)\(^{317}\) and over 1.5 million in China\(^{318}\). Other North American MMORPGs have attracted less users. *Everquest*, which was once considered the market leader, has approximately 500,000 subscribers, and *Ultima Online* has 250,000\(^{319}\). Although the market has shown rapid increase in the last few years, there are signs that it has become saturated with titles, as some high-profile launches have failed to attract the forecast number of players. For example, Warner Brothers’ *Matrix Online* was sold to Sony having attracted less than 50,000 subscribers\(^{320}\).

Any current plateauing of MMORPG subscriptions in 2006 as seen in Figure 31 may be due more to user inertia than any saturation of the market: because gamers place significant investments of time and effort into MMORPGs, their churn is low. The release of *Lineage* into the global market has demonstrated that innovation in the MMORPG market can generate significant changes in consumer behaviour. MMORPGs have begun to influence not only other games but other online environments which have focused on the social, community and communicative aspect of MMORPGs. For example, the virtual world *SecondLife*, from the San Francisco-based Linden Lab, claims over 300,000 subscribers, with 9% UK residents, and an increasing proportion of international users (37% at 30 June 2006). Korean *Cyworld* has in the region of 12 million

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subscribers in Korea, Japan and China and 17 million unique visitors a month\textsuperscript{321}: it is due for a North American release in the near future.

![Figure 31: Total MMORPG Active Subscriptions](http://mmogchart.com/)

**Example:** 

**Lineage/Lineage II**

*Lineage* (리니지) is a MMORPG released in 1998 by the Korean developer NCsoft. The game allows players to enter into a medieval fantasy game world and take on characters in the form of human, dwarf, orc or elf avatars. Like many of the persistent multiplayer gaming environments, players move through the game by completing quests, defeating monsters, gaining experience points and character attributes. As with similar MMORPGs, while progress through the game is possible as a single player, benefits are to be found from being part of a clan or team in order to combine skills and work together to overcome larger obstacles (such as capturing a castle).

*Lineage II*, released in Korea in 2003, featured a significant change in the user interface with a move from an isometric, overhead gamer perspective to a 3D first-person viewpoint, making use of the *Unreal* game engine from the North American company Epic Games. Since 2004 the game has had several large updates (known as ‘Chronicles’) which have provided updates in the game world, gameplay and the game’s internal storyline. The current version of the game, *Lineage II*, claims over 4 million subscribers\textsuperscript{322}, with the majority being in South Korea. The game is now considered to be the most commercially successful MMORPG and its release in the USA has sought to strengthen that position.

In summary, MMORPGs will represent a key area for growth, technical innovation and agenda setting for the next generation of multimedia technologies.


\textsuperscript{322} http://www.lineage2.com
6.1.2 The Games Industry

The digital games (variously referred to as video games, computer games, interactive software or entertainment software) industry is a vibrant, dynamic and rapidly developing industry in which European companies play a significant role, especially at the design, development and programming stages. The digital games industry has a dynamic and innovative nature at the meeting of interactive and convergent media. Technically, in development of new business models, and in exploiting new markets, it has been argued that 'online games are the future of the interactive entertainment industry'323. It is a relatively young industry, employing a highly-skilled labour force, and one in which Europe has a significant presence in the global market.

In the UK, the leisure software industry has a positive impact on the national balance of trade, generating £197 million in 2003324. It employs over 20,000 people in the UK, including 5,600 in development studios325. Globally, the industry was estimated to be worth about $21 billion in 2003326. Figure 32 shows a projection for regional digital games sales to 2009, showing the increasing importance of European and Asian games markets.

According to data published by the Entertainment Software Association (ESA), the US digital games market was worth $7.3 billion in 2004, rather higher than Figure 32 indicates327. The value of digital games for Europe has been estimated at €5.6 billion, which is approximately equal to Figure 32328.

![Figure 32: Digital Games Sales by Region and Total 2001–2009](image)

Source: PriceWaterhouseCoopers (2005b)

Clearly, estimates vary. In the UK, digital games account for approximately half of the market for toys and games, estimated for 2003 at between £1.26 billion and £2.1 billion. The UK is the world’s third largest market for digital games, after the USA and Japan. In the UK, software and hardware combined are worth more than £2.2 billion, with software accounting for £1.2 billion of that. While there is obviously discrepancy in these estimates, it does allow an illustrative comparison of the value of digital games in relation to other media products as in Tables 14 and 15 below.

Table 14: Summary of Global Sales of Digital Games (£s)

<table>
<thead>
<tr>
<th>Market</th>
<th>Annual value</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising (UK)</td>
<td>£16.2 billion</td>
<td>2002</td>
</tr>
<tr>
<td>DVD sale and rentals (USA)</td>
<td>£11.2 billion</td>
<td>2002</td>
</tr>
<tr>
<td>Cinema box office receipts (global)</td>
<td>£11.1 billion</td>
<td>2002</td>
</tr>
<tr>
<td>Digital games (Global)</td>
<td>£10.2 billion</td>
<td>2002</td>
</tr>
<tr>
<td>DVD and video software (UK)</td>
<td>£2.9 billion</td>
<td>2004</td>
</tr>
<tr>
<td>Digital games (UK)</td>
<td>£2.1 billion</td>
<td>2003</td>
</tr>
<tr>
<td>PC business software (UK)</td>
<td>£1.6 billion</td>
<td>2002</td>
</tr>
</tbody>
</table>

Table 15: Comparative Sales Value of Digital Games

<table>
<thead>
<tr>
<th>Software sales (£ billion)</th>
<th>Source</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>18.6</td>
<td>Screen Digest 2001; Spectrum 2002</td>
</tr>
<tr>
<td>2001</td>
<td>13.4</td>
<td>Deutsche Bank 2002</td>
</tr>
<tr>
<td>2001</td>
<td>16</td>
<td>DataMonitor 2002</td>
</tr>
<tr>
<td>2003</td>
<td>15.56</td>
<td>Screen Digest 2004</td>
</tr>
</tbody>
</table>

Sources: Screen Digest and International Video Federation (IVF)

6.1.3 Platforms for Gaming

Digital games have been played on PCs, gaming consoles (e.g. PlayStation, Nintendo 64, etc.), standalone gaming devices (such as the Game-and-Watch), handheld consoles (including Gameboy, Atari Lynx, PSP) and, increasingly, wireless devices such as mobile phones. The launch of Xbox Live in 2002 gave a push for console games to develop online elements, and since the launch of Xbox 360 all games developed for it are ‘Xbox Live aware’ with games allowing not only multiplayer but voice communication through a headset. The latest handheld consoles (Nintendo DS and Sony Play...
Station Personal (PSP)) also allow multiplayer gaming via Wi-Fi connection. For consumers, console gaming has led the market, with innovations in PCs slower in the market (such as Creative’s SoundBlaster soundcard and graphic processing chips), although developments have been encouraged by gaming enthusiasts.

Comparing gaming platforms, we see that as a standalone platform, PC gaming is beginning to decline (Figure 33). This sector is recognised as the least profitable gaming platform, with individual games selling at a lower price, and with more software piracy, than console games.

![Figure 33: Global Digital Game Platforms 1999–2008](image)

Source: OECD (2004b), supra drawing on PriceWaterhouseCoopers figures

During 2005, console games outsold PC games by approximately 300%\(^{340}\), while in Europe as a whole, console gaming was worth more than twice that of the PC gaming market\(^{341}\). While this suggests a decline in PC gaming, the growth in online gaming (played mostly using PCs) looks set to offset this. Wireless gaming is forecast to grow significantly in coming years, but consumer demand and network capability have limited the growth which was suggested by some during 2000–2003. South Korea platform growth shows the rapid rise of PC games in the most advanced online games market (Table 16).

### Table 16: Sale for Each Games Platform (South Korea; $millions)

<table>
<thead>
<tr>
<th></th>
<th>Online</th>
<th>Mobile</th>
<th>Console</th>
<th>PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>224</td>
<td>30</td>
<td>0.14</td>
<td>162</td>
</tr>
<tr>
<td>2002</td>
<td>377</td>
<td>84</td>
<td>130</td>
<td>137</td>
</tr>
<tr>
<td>2003</td>
<td>490</td>
<td>163</td>
<td>208</td>
<td>124</td>
</tr>
<tr>
<td>2004</td>
<td>612</td>
<td>244</td>
<td>250</td>
<td>119</td>
</tr>
<tr>
<td>2005</td>
<td>766</td>
<td>318</td>
<td>350</td>
<td>115</td>
</tr>
</tbody>
</table>

Source: Ministry of Culture and Tourism/Korea Game Development and Promotion Institute [2003]

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\(^{341}\) ScreenDigest and ELSPA (2005), supra. Console total in 2004, €3,571 million; PC games total, €1,509 million.
Access to online games is still primarily through PCs, not necessarily because of lack in processing power or Internet connectivity of mobile, console or TV set-top box devices, but due to the need for a keyboard to allow in-game communication and community building. However, as PCs are an open system which permits interoperable software to run without the need for developers to purchase proprietary licences, they do not require a licence to develop games for them or purchase of controlled software development kits, as do the major consoles. Barriers to entry for new companies are lower and the ability to work independently may promote greater innovation in developing new games.

An open question is whether this will influence the ‘walled garden’ approach to mobile communications? Given that the value of PC games increases with the number of potential players from a network effect (Metcalfe’s Law), there could be pressure to open mobile networks to increase the number of potential players (for example, for Europeans to compete against Koreans). They are not likely to be on the same mobile provider’s network, if ‘walled gardens’ remain.

Table 17 shows a timeline for the introduction of games, showing the critical developments that have marked the first 33 years of the industry. Note that the development of the industry has been marked by both ‘hit’ games which increased the universe of players, and the successful marketing of new platforms for gaming, from the PC in the 1980s to the new console types of the 1990s until the present day.

342 Plans for a console based upon the open-source operating system, Linux, were developed in 2000. The product was speculatively named the Indrema L600, but failed to make it to the market.
Table 17: Digital Games Timeline: 1973–2005

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973</td>
<td>Atari create the first Pong arcade games.</td>
</tr>
<tr>
<td>1980</td>
<td>Atari releases Space Invaders for the VCS 2600.</td>
</tr>
<tr>
<td>1981</td>
<td>IBM launch the IBM PC.</td>
</tr>
<tr>
<td>1983</td>
<td>Nintendo launch Family Computer (Famicom) in Japan. Commodore 64 released.</td>
</tr>
<tr>
<td>1984</td>
<td>Apple releases the Macintosh.</td>
</tr>
<tr>
<td>1985</td>
<td>Nintendo Entertainments System (NES) released, Microsoft develops Windows.</td>
</tr>
<tr>
<td>1986</td>
<td>Nintendo releases NES (Famicom) to the worldwide market. SEGA releases SEGA Master. Commodore releases the Amiga.</td>
</tr>
<tr>
<td>1988</td>
<td>Tetris is released.</td>
</tr>
<tr>
<td>1989</td>
<td>Nintendo launches Game Boy and Atari release their own handheld games machine, Lynx. The Internet becomes open to public use. Creative Labs releases SoundBlaster card.</td>
</tr>
<tr>
<td>1991</td>
<td>Nintendo releases Super NES. S3 introduces single chip graphics accelerator for the PC.</td>
</tr>
<tr>
<td>1993</td>
<td>Atari releases the first 64-bit gaming console – Jaguar. SEGA has over half of the games market. Doom is released by id Software. Mosaic, the first graphical browser for the Internet, is launched.</td>
</tr>
<tr>
<td>1995</td>
<td>Microsoft releases Windows 95. PlayStation is released in the USA.</td>
</tr>
<tr>
<td>1996</td>
<td>Nintendo launches the Nintendo 64. Tomb Raider (and heroine Lara Croft) is launched.</td>
</tr>
<tr>
<td>1997</td>
<td>Intel release the Pentium II processor. Quake II (id Software/Activison) is released.</td>
</tr>
<tr>
<td>1998</td>
<td>Sega Dreamcast launched. Apple release the iMac</td>
</tr>
<tr>
<td>2000</td>
<td>Launch of Sony’s PlayStation 2.</td>
</tr>
<tr>
<td>2002</td>
<td>XBox released in UK. Nintendo release the Gamecube. SEGA stops producing Dreamcast.</td>
</tr>
<tr>
<td>2004</td>
<td>Nintendo DS is launched.</td>
</tr>
<tr>
<td>2005</td>
<td>PSP launched by Sony in Europe and USA – Microsoft launch Xbox 360.</td>
</tr>
</tbody>
</table>

6.1.4 Market Structure and Actors

The European games development market is very globalised in comparison with mobile multimedia or IPTV. As shown in Table 18, only two European (both UK) companies feature in the top 10 leading development studios.

Table 18: Most Successful Game Studios 2005

<table>
<thead>
<tr>
<th>Rank</th>
<th>Studio</th>
<th>Revenue £s</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EA Canada</td>
<td>113,626,485</td>
<td>Canada</td>
</tr>
<tr>
<td>2</td>
<td>Pandemic Studios</td>
<td>33,552,796</td>
<td>USA</td>
</tr>
<tr>
<td>3</td>
<td>Konami Corporation</td>
<td>32,267,824</td>
<td>Japan</td>
</tr>
<tr>
<td>4</td>
<td>Maxis</td>
<td>31,505,453</td>
<td>USA</td>
</tr>
<tr>
<td>5</td>
<td>Nintendo</td>
<td>25,191,080</td>
<td>Japan</td>
</tr>
<tr>
<td>6</td>
<td>Ubisoft (Montreal)</td>
<td>24,688,832</td>
<td>Canada</td>
</tr>
<tr>
<td>7</td>
<td>Polyphony Digital</td>
<td>21,788,528</td>
<td>Japan</td>
</tr>
<tr>
<td>8</td>
<td>EA Redwood Shores</td>
<td>21,495,003</td>
<td>USA</td>
</tr>
<tr>
<td>9</td>
<td>Traveller’s Tales</td>
<td>20,354,592</td>
<td>UK</td>
</tr>
<tr>
<td>10</td>
<td>London Studios</td>
<td>19,854,040</td>
<td>UK</td>
</tr>
</tbody>
</table>


Traveller’s Tales is a Cheshire-based company founded in 1989. In 2005 it employed 105 people and has a revenue of £20.36 million. It is the studio behind games such as Crash Bandicoot, Finding Nemo and Lego Star Wars. London Studios is owned by Sony Computer Entertainment Europe (SCEE) and develops exclusively for the PlayStation. Established in 1993, it had 2005 revenues of £20.36 million with a staff of 250. As well as titles such as The Getaway, and World Tour Soccer the studio has had notable success with developing games which use Sony’s innovative ‘EyeToy’ and ‘SingStar’ devices. European games development companies account for more than one-quarter of games sales in the UK. Figure 34 shows the very low revenues for developers in Europe except for the UK.

Figure 34: Digital Game Revenues by Developer Territory


In games publishing there is no indigenous UK representation in the top 10 games publishers (as opposed to studios), whether measured by unit sales or revenue. The only European companies in the list are French companies Ubisoft and Vivendi Universal Games. The top 10 publishers account for 70% of market revenue. The UK company

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343 ELSPA (2006), supra.
EIDOS\textsuperscript{344} is a top 20 company along with CodeMasters (\textit{Micro Machines}, \textit{TOCA Touring Car} series, \textit{Colin McRae Rally}) and publishers specialising in budget price software, including GSP and Focus Multimedia.

6.1.5 Gaming Value Chain

As with any emerging industry, the value web of the video games industry has evolved in response to technological changes, market forces, and so on. Readman and Grantham\textsuperscript{345} argue that since its origin in the late 1970s, the electronic games value chain has become global, extended and complex. Driven by the development of increasingly powerful games hardware (PCs and consoles), a specialised development sector had emerged by the early 1990s. Major developments during the 1990s included the growing influence of console manufacturers, the extended development of independent publishers, the growing division of labour in games development, the emerging power of retailers, and the increased incidence of cross-fertilisation with other publishing media (such as games spin-offs from successful film franchises or books, and films based on video game characters and storylines)\textsuperscript{346}.

The recent development and uptake of multiplayer online gaming, our specific focus in the corresponding case study, has not been reflected widely in the identified literature. Therefore, first we present findings on the gaming value web without explicit reference to the special case of multiplayer online gaming; second, we discuss the possible implications of the growth of online gaming for the video game value web.

The production of video game software is based on the coordination and combination of both tangible and intangible (including human capital innovation) inputs with connections between a number of different actors at each stage. Figure 35 shows a simplified value chain to illustrate.

Within each node of the value web, concentration, competition and vertical market power affect the relative power of each firm. In turn, these factors are determined by sources such as exclusive licensing, back-channels for handling (and ultimately redistributing) user-generated content and cross-platform development (whereby proprietary platforms give access to captive downstream markets; although there is an increasing tendency for certain market segments to own multiple platforms).

\textsuperscript{344} It is known primarily for the \textit{Tomb Raider} series, as well as \textit{Hitman}, \textit{Commandos}, \textit{Deus Ex} and \textit{Thief}.


\textsuperscript{346} Op. cit.
In this value web, the publisher holds a pivotal role\textsuperscript{347}. Financing for developers is provided in the majority by publishers, and the publisher usually retains the intellectual property rights to, and decision-making powers over, the game until it reaches the consumer. The role of the publisher has changed as the games market has moved away from a niche market to mass-market appeal, and the importance of finance for developers grows as development budgets increase; mass market games are developed on large budgets (in excess of £2 million in 2003, according to Readman and Grantham\textsuperscript{348}, and upwards of €5 million, according to Johns\textsuperscript{349}).

The interaction among developers, publishers and console manufacturers is the most ‘networked’\textsuperscript{350}. This arises because of the control that exclusive manufacture of the game gives to the console manufacturer. The licensing process not only generates a source of revenue for the console manufacturer, but also enables implementation of a quality control process and geographical segregation of markets. Allowing poor-quality games to be published on their platform adversely affects consumers’ perception of the quality of

\textsuperscript{348} Readman and Grantham (2004), supra.
\textsuperscript{349} Johns (2006), supra.
\textsuperscript{350} However, this is not an undirected network, as the choice of console (by consumers and by developers) is taken before the choice of software, but with anticipation of future software provision and uptake by others. Thus uncertainties (e.g. regulatory uncertainties) can have disproportionate effects.
available games due to an element of asymmetric information. This drives down the quality and price of games, an effect exacerbated by interactivity\textsuperscript{351}. Exclusive manufacture of games affords the console manufacturer a significant revenue stream. As early as 1986, Nintendo was selling hardware at cost price, identifying hardware merely as a tool to sell software\textsuperscript{352}. Finally, the licensing process is often split geographically between the three major markets (Japan/south-east Asia, Europe and North America) with licensing obtained individually for each market.

The development process is complex not only because of the developer–publisher–manufacturer interaction, but also because of the increasing pressure to outsource development activities. As games become increasingly complex, they have become increasingly ‘modularised’ — so middleware (such as a physics engine or a graphics engine) can be bought in by developers. To some extent this tendency is resisted by developers\textsuperscript{353}, as it reduces their competitive advantage or value creation; the ultimate risk to developers is that they become mere aggregators of others’ technology and lose unique competitive advantages.

Furthermore, the geometry of the technology used and the geometry of the value chain will interact. Not only do developments in technology affect the value chain (as above, increasing complexity drives outsourcing of development) but also the structure of the value chain will affect the technology developed and adopted.

Johns\textsuperscript{354} attempts to assess the relative ability of the actors in the value web to capture the retail value from a console game, suggesting that the console manufacturer is able to capture 20% of the total retail value; developer and publisher (combined), 40%; distributor, 10%, and retailer, 30%. The console manufacturer’s position in the value chain enables it to capture significant value and exercise significant power, while the developer is relatively isolated with a weak bargaining position (although the bargaining position can be improved through reputation).

Online gaming may radically alter the structure of production and access to finance and distribution\textsuperscript{355}. A reduction in physical game production and distribution may reduce the power of console manufacturers over game content and revenue, as games can be distributed through alternative (online) channels. Also, it could have the converse effect — DRM technologies could be used to ensure that consoles will accept only ‘signed’ games, and the presence of such a technology could allow the console manufacturer to centralise software distribution through a portal, bypassing distributors and retailers.

Furthermore, if such developments did enable new ‘upstart’ developers to gain a foothold, the dynamics of the value web would be altered further due to financing requirements; without a large capital base, finance would have to be obtained from external sources.

\textsuperscript{352} Ibid.
\textsuperscript{353} Readman and Grantham (2004), supra.
\textsuperscript{354} Johns (2006), supra.
\textsuperscript{355} Op. cit.
6.2 Market Development

Although the networking of digital games dates back to 1969, when Rick Blomme wrote a two-player version of Spacewar to run over a remote network, the popularity of such multiplayer gaming began in 1993 with the release of Doom. This coincided with the entry of dial-up Internet connections into homes. However, with the growing diffusion of broadband and the release of consoles with online capability (including Wi-Fi access in the case of Sony PSP and Nintendo DS) this form of gaming has grown rapidly. Microsoft released its online gaming service Xbox Live in November 2002, which allowed online play and content for about 100 Xbox games. However, it is expected that the trend for most games to have online or wireless networked game facilities will grow, such that almost all games will have some network capability in the coming years\textsuperscript{356}. The number of gamers playing online has more than doubled in the last five years (see Figure 36, growing in the USA from 19% in 2000 to 44% in 2005, with more than half made up of puzzle, board or trivia style games\textsuperscript{357}. With Wi-Fi integrated into Sony PSP and Nintendo DS handheld consoles, mobile online and P2P networked play is increasing.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure36.png}
\caption{Online Game Subscribers Cumulative\textsuperscript{358}}
\end{figure}

We offer a note of caution. While attention has been placed on MMORPGs, research from the USA in Figure 37 suggests that online versions of classic card or trivia games (which are unlikely to be video enhanced) still make up the majority share of online games.

\textsuperscript{356} OECD (2004b), supra.
\textsuperscript{357} ESA (2006), supra.
While there is evidence to suggest that penetration of gaming consoles is plateauing in markets such as the USA, DFC Intelligence has suggested that globally, online games will continue to show significant growth from $3.4 billion in 2005 to more than $13 billion in 2011. This growth is both in access to gaming platforms and the use of broadband. Use of gaming consoles as Internet devices and an increased expectation from consumers that software titles will be ‘Internet ready’ will drive the latter, as demonstrated by the Korean case study. We caution that South Korea’s development may be conditioned by culturally specific factors and should be used for indication rather than prediction.

**Example: Korean Games Industry**

In the mid-1990s, the Korean government demonstrated its dedication to the next generation of communication technologies by investing $1.5 billion in broadband infrastructure, providing $1 billion of soft loans and deregulating the state-run telephony monopoly. Korea rapidly developed high broadband and wireless connection rates. A 2002 report showed that Korea had 60% home broadband penetration, compared with 4% in the UK. This broadband infrastructure, along with the growth of ‘PC bangs’ (cybercafés catering for online gaming) offering cheap access at approximately 1,000Won per hour ($1), had a significant impact on the development of online and wireless gaming in Korea, as has the support given to the digital gaming industry by the Korean Game Development and Promotion Institute, and events such as the World Cyber Games held in Seoul.

The growth of online games such as Lineage, Ragnarok and Laghaim has contributed to a growth of the number of online gamers, especially to rapid increases in female and older players. In 2002, online games accounted for 37% of gaming revenue – more than any other platform.

359 ESA (2006), supra.
Given this success, and that online games have the best ‘development to shelf life’ time of any game type, they are seen as the most promising area for exploitation by the Korean games industry. The release of successful Korean MMORPGs outside Korea shows their international appeal.

While PriceWaterhouseCoopers suggest that “online games enable players to compete against each other”, online gaming has developed as a profoundly communal social activity with community building, communication and team-based strategies. In addition, online play has grown since *Doom* provided a rich form for user-developed content. In particular, First Player Shooter PC games have gained value from allowing users to develop their own in-game characters (‘skins’) and create new levels or even entire games using the basic First Player Shooter structure (‘mods’).

As with many other cultural products, advertising in digital games can be used to offset losses in an industry where only about 10% of ‘hit’ titles make a profit. Product placement in digital games is an increasingly important market, due to exposure to the 18 to 34-year-old male demographic often missed by other forms of media, and high levels of advertisement recall demonstrated by users.

Development costs for digital games are escalating significantly. Since 1999 the cost of producing a game has trebled and the new generation of games consoles (Xbox 360 and PlayStation 3) are estimated to be double those for the previous generation. Along with these increasing development costs, the growing importance of buying intellectual property rights licences on which to base games will continue to add significantly to game costs. ScreenDigest has suggested that games using third-party intellectual property rights can sell approximately 25% more units than equivalent games.

### 6.2.1 Payment Models

The models used by online games to generate income fall broadly into four categories:

**Free to the gamer:** Online games supported by advertising and free to the user. The advertisements may be through product placement and games feature links to commercial websites. The games may offer ‘tasters’ of commercially-available console and PC games, as does *Flash Sonic*, for example. Portals which feature collections of these games (such as [http://www.flash-game.net](http://www.flash-game.net) or [http://games.yahoo.com](http://games.yahoo.com)) generate revenue through online advertisements including click-through listings and paid advertisement space. The games in this category tend to be mini-games using Java or (more commonly) Macromedia Flash.

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563 Ibid.
564 PriceWaterhouseCoopers (2005b), supra at p. 343.
568 ScreenDigest research reported BBC (2006), that in a list of the top 40 best-selling games ever, only eight are non-original games.
One-time fee/retail: The usual model for digital games. However, the growing integration of Internet multiplay into games has meant that more games include free online play bundled into the purchase. The servers that support this may be provided by the game publisher, hardware producer, a third party or the gaming enthusiasts themselves. There is an increasing number of game service providers leasing multigaming facilities especially for third-person shooter games (including Counter Strike, Call of Duty, Half-Life and the UK-based Game2XS).369

Pay-per-play: Here, users pay either for the amount of time spent online or data they transfer across the network. This is currently most common in ‘walled garden’ mobile games, where the cost are used not only to generate revenue but to manage network traffic. However, mini games available through digital TV also employ this pay-per-play model. A variation of this model is also important to the massively successful bang (cybercafé) market in Korea where gamers are charged per hour to play.370

Subscription: Gamers pay a (usually) monthly fee for unlimited online gaming, either:

- using purchased games with Internet connectivity: The Sims Online charges a monthly $9.99 subscription, with Star Wars Galaxies’ basic monthly subscription being $14.99; or
- gaining access to online mini-games, new game content and community-building features. Microsoft’s Xbox Live has more than 2 million subscribers and an annual subscription cost of £39.99 for its ‘gold level’ membership, but free trials are available both with hardware and game purchase as well as online registration.

In practice these models are used often in conjunction. The Korean MMORPG World of Warcraft requires retail software purchase and a monthly subscription of $12.99 to $14.99, depending on how many months are purchased at one time.

6.3 Games Self-regulation

In April 2003 the Interactive Software Federation of Europe (ISFE) finalised the Pan-European Game Information (PEGI) system after discussion with industry and national trade associations. The voluntary scheme is supported by the entire value chain from software developer and hardware manufacturer through to publisher, distributor and retailer. It is used in 25 countries and provides a classification of digital games using a two-stage certification scheme: a suggested minimum age for players and icons to represent particular types of content (bad language, discrimination, drugs, fear, sexual content, violence).

PEGI ratings are displayed on the covers of boxed games and on the websites of many online retailers, including Amazon and Play. The PEGI ratings have been applied also to

369 See: http://www.game2xs.com
some mobile games, such as those developed for Nokia N-Gage. A PEGI Online scheme is currently in development by ISFE and its partners.

Of the 4,690 games rated with the PEGI scheme between 1 April 2003 and 31 June 2006, 82% were considered suitable for players aged seven years and under and only 4% received an ‘18’ and over adult rating. This broadly corresponds with the Entertainment Software Rating Board (ESRB) rating in North America, where adult content rated games make up the minority of sales (see Figure 38).

**Figure 38: PEGI-rated Games by Age Category**\(^{371}\) and US Game Sales by Age Rating\(^{372}\)**

Games featuring significant amount of video footage implicated under the Video Recordings Act of 1984 (e.g. violent content, or content of a sexual nature), are also covered in the UK by the British Board of Film Classification (BBFC) regulations with distributors responsible for submitting the game for classification. Unlike the PEGI system, the nature of BBFC certification makes it a criminal offence to sell an ‘18’-rated game to a minor.

### 6.3.1 User Experience of Games and the Linear/Non-linear Distinction

Users engage with digital games in a more ‘active’ manner than with TV. ‘Active audience’ theories surrounding media consumption have been popular since the 1990s\(^{373}\). While digital gaming is ‘non-linear’ as it is played on demand, user input is central to the gaming experience in shaping the flow and development of the game.

Users’ experience with digital games, their ability to change events in the game and explore gaming environments may be thought of broadly as ‘interactivity’\(^{374}\). This gives gamers a

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\(^{372}\) ESA (2006), supra.

\(^{373}\) For an overview see, for example, Abercrombie, A. and Longhurst, B. (1998) Audiences. London: Sage; also more recent policy-related developments with Ofcom’s Media Literacy programme: http://www.Ofcom.org.uk/advice/media_literacy/

\(^{374}\) The use of ‘interactivity’ is derived more from a computer science notion of interactivity, in that software responds to user input in a real-time fashion rather than following a prescribed set of
significant level of autonomy in gaming compared to TV watching, even with the growth of technologies which allow features such as changing camera angles in sporting events and voting by SMS in reality TV and game shows. Moreover, this autonomy takes control away from the developer or publisher as consumers structure and develop their own games. While interactivity in offline digital games means that games allow users to tailor their playing experience, development in gaming technologies and the changes in online gaming features have allowed significant development and innovation with relation to interactivity. Online games enable users to develop personal online identities (avatars) which not only impact on the gaming experience, but provide an online identity which is increasingly important to the user experience. The sense of community which online in-game interaction offers has been identified as one of the key aspects of online gaming that drives and maintains participation as people develop new social networks.

Given their interactive nature, a linear/non-linear distinction is not readily applicable to digital games. Developing this idea, the ISFE has argued:

“In reality, online gaming (featuring the fully interactive involvement of a consumer with other consumers at a time of his/her own choice) has nothing to do with Video on Demand (passive watching at a time of one’s own choosing), even less so with traditional broadcasting (passive watching of fixed content at a fixed time). As a matter of fact, movies, TV shows delivered by these methods do not feature artificial intelligence (‘AI’) or an unscripted plot, two integral and defining features of online games.” (emphasis in original)

Given that online games, especially MMORPGs, are not about the AVMS definition of ‘provision of moving images… to the general public’ but user content creation, gamer input and community development, their inclusion in the mass media-oriented AVMS may be seen as anomalous.

Gaming is a cultural artefact which was considered appropriate for industry self-regulation, home use and minors when used on a standalone machine or wired network. It would become subject to AVMS regulation when played online. For example, the driving game Project Gotham Racing 2 for the Xbox has a PEGI age rating of 3+. The game allows gamers to compete against the console and other players with a controller attached to the console. However, online play is facilitated also by the Xbox Live service, where gamers can compete in race challenges, chat with other gamers and feature on leaderboards.

Implementation of the AVMS where games are classified as linear or non-linear regulated video would mean that the user’s connection to the network, not the game or its content, would make the gaming subject to new regulation. As the trend to include online elements into digital games increases, we can expect that effectively all games will have some access routines. The sociological understanding of interactivity is defined more strictly, drawing on elements such as reflexivity and orientation.


AVMS Article 1(2)(a).
to online content, multiplayer or community resources by 2011, irrespective of platform. This will ensure that any attempt to demarcate between offline and online gaming will be impossible to define, as data flow will become increasingly seamless, whether to support software updates or display top scores on web boards.

Together these factors highlight the problematic nature of drawing any offline/online distinction in digital games. With console games now following a trend established in PC gaming for online features, it would be unclear both to legislators and users at which point in the gaming experience gaming and gaming services becomes subject to the AVMS, and why different elements of the play are regulated differently.

6.4 Possible Regulatory Impacts on Games

The AVMS as currently proposed will apply to linear and non-linear video games with the same regulation of content, advertising and so on, as with IPTV or mobile video. Legislative measures that precipitate movement of the industry outside Europe, or curtail innovation, will not only have an effect on competitiveness in the games industry. They can impact on knowledge transfer, which supports the development of new media and multimedia activities in industries including telecoms, digital TV and software development, given the importance of gaming developers to other multimedia sectors.

Digital gaming is becoming increasingly global. With the average console game costing $3 to $5 million to develop 378, developers are using specialised labour across the world to support 24-hour development schedules, with code being sent across time zones for design, testing and quality assurance. Studios in Japan, Korea and India are used to supplement European expertise as well as reduce labour cost and shorten development times. While skilled labour may locally demonstrate inertia, the global workforce and networked basis of online games means that relocating elements of the industry is relatively straightforward, where considered cost-effective.

6.4.1 Impact on SMEs

The costs associated with implementing the Directive will be absorbed with differing levels of difficulty by producers and publishers of online game content. While the largest (often US or Japanese) publishers could integrate administration with little difficulty into their quality management framework, young, developing and hobbyist developers would have difficulty in doing so. In general, these are companies with insufficient previous legal and regulatory knowledge to integrate a compliance function without significant upheaval. The impact on these developers – who often produce mini-games supported only by advertising on their website or modifications (‘mods’) for existing games sold only to cover hosting costs – would be disproportionately high. The economic consequences of removing ‘modders’ from online games could be high, given their role within the ecosystem of the digital games industry.

378 Kerr (2006), supra.
It is estimated that a game modification produced by users can have a value of 10% of a game’s original labour cost (about $520,000 a year), at no cost to the developer. These game modifications can have a direct economic effect on game sales, adding value to the games and extending the short shelf-life of digital games. Additionally, for ‘modders’ who produce new levels, characters or whole new games with commercial games, this acts as an effective training ground for entry into the games development industry. It allows the development of skills, experimentation with innovative ideas and development of a games portfolio for entry into paid work.

Regulation of the video element of the digital games industry through the AVMS will have an uneven economic impact across European Member States. In Eastern Europe the relative cost of consoles and games makes their penetration much lower. In Estonia the division in the games industry between PC and consoles is 65% and 35%, with similar disparities in the Czech Republic. Any regulation which affects PC games primarily (which are largely driven by online gaming) will affect in particular the European states with lower average wage levels.

Estonia has significant expertise in Internet and P2P technologies, notably producing the VoIP software Skype and the P2P client Kazaa. The use of such web-based technologies is one area which is likely to see significant innovation and consumer adoption in the years to 2011. Digital games are likely to be one area driving innovation and adoption of these P2P services and their real market potential.

6.4.2 Web2.0: Interactivity, Innovation and User-developed Content

As part of the development of online gaming, access to game and game-like web communities will become increasingly important for the gaming demographic. As flat-metered Internet access drove the development of newsgroup identities and broadband services are driving net presence in forums such as MySpace, these new game-like communities will shape online interactions and relationships. Already community-focused environments such as Second Life are successfully using avatar-driven approaches to building online communities.

The cultural importance of user-generated environments will grow, as will difficulty in drawing distinctions between the media, due to:

- gaming innovation informing developments in other areas of multimedia technology.

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382 According to Alexa, MySpace is the fifth most visited site on the Internet after the portals Yahoo! and MSM and the search engines Google and Baidu.com, see: http://www.alexa.com/site/ds/top_sites?ts_mode=global&lang=none
• online games increasingly being the site of live performances\textsuperscript{384}, and
• games being played in online communities such as Second Life, with users developing games within the communities.

In order to compete in these developing markets, not only will companies entering the field have to compete on innovation, but in the cost for the services provided to users.

\begin{center}
\textbf{Example: Second Life}\textsuperscript{385}
\end{center}
Second Life has 270,000 members – almost equally split between men and women (median age = 34). Second Life is a 3D digital world imagined, created and owned by its ‘residents’. While the Second Life interface and display are similar to most popular MMORPGs, there are two key, unique differences.

\textit{Creativity}: Second Life provides near unlimited freedom to its residents. If you want to start a business, create a game or build a skyscraper, you can. There are four independent multimedia companies making their business on Second Life and dozens of full-time merchants who make their entire living from Second Life.

\textit{Ownership}: Instead of paying a monthly subscription fee, residents can obtain their first basic account free. If you choose to own land on which to live, work and build, you pay a monthly lease fee based on the amount of land that you own. You also own anything you create – residents retain intellectual property rights over their in-world creations.

SecondLifers have created their own games inside the world\textsuperscript{386}. They include \textit{Tringo}, which has been sold on to other platforms by its developer\textsuperscript{387}. They write 3 million lines of code every week.

About 30\% are European and the French and German language communities are starting up. They have movie previews before cinema releases held by Hollywood studios and BBC multimedia shows. There are 40 university courses.

The BBC has bought its own island. It describes that it “staked a claim to a virtual tropical island where it can stage online music festivals and throw exclusive celebrity parties”. Second Life held its first BBC event with bands including Muse, Razorlight and Gnarls Barkley. The virtual party mirrors BBC Radio 1’s real-world, ‘One Big Weekend’ event, being held in Dundee from 12 May. The virtual music festival is not the BBC’s first foray into the virtual universe of Second Life. In 2005, \textit{Newsnight} presenter Jeremy Paxman and business correspondent Paul Mason broadcast TV’s first ever face-to-face studio session from inside the computer game\textsuperscript{388}.

6.4.3 Regulation of Video in Virtual Worlds
Conceivably, the regulatory decision about whether to regulate the video content within a virtual world could attempt to regulate the suppliers of that video – the inhabitants which include such media companies as the BBC. Note that the video available may be linear as well as non-linear: the BBC’s ‘One Big Weekend’ was a linear broadcast stream. Film

\textsuperscript{385} See further: http://beyondbroadcast.net/wiki/index.php?title=High_Order_Bit:_Second_Life
\textsuperscript{386} Http://wiki.tinypirate.com/tiki-index.php
\textsuperscript{387} Http://www.businessweek.com/magazine/content/06_18/b3982001.htm?chan=tc&chan=technology_technology+index+page_today%20%27s+top+stories
\textsuperscript{388} Http://news.bbc.co.uk/2/hi/technology/4766755.stm
premieres are non-linear. We suggest that it may be counterproductive to regulate the virtual world hosts, for the following reasons.

First, they provide some tools for the creation of the virtual world, but many others are supplied by SMEs working with inhabitants. Therefore, it is not clear who has editorial responsibility, although in descending order the most influential actors are: the inhabitants themselves who display the video content; the creators of the tools and resources that the inhabitants use; and the virtual world hosts themselves. The kind of ambiguity below would be resolved based on the ‘deep pockets’ principle. The BBC would be the target, since it could afford to pay the most fines or damages. Understanding how such an ambiguity would be adjudicated is important to understanding future behaviour (and is outside the scope of this study).

Second, the servers which supply the virtual world need not be based within the EU – they can be sited anywhere in the world. The servers which provide video are not owned or paid for by the virtual world hosts but by the inhabitants, including the BBC. So, the video has no commercial relationship with the host. If liability were to be placed on such a virtual world host, it would be expected that they would choose to exit the European market or not locate there initially. With French and German language territories emerging in SecondLife, and the successful expansion of South-Korean MMORPGs, the location of some development and hosting inside Europe would be expected. Regulation could have a chilling effect on this investment decision.

Third, inhabitants have as many choices of behaviour as people in the real world: they can simply choose not to view the content. In fact, they have to seek out the content by going to the BBC’s territory in order to see the stream. There are more layers of self-censorship available than in the linear TV world. As with TV, they can switch off their PC altogether; and parents can prevent children who have logged in from viewing objectionable material, or from using the programme at all. Users can not only stop watching the content; they can go to other parts of the world, they can stop the software programme and exit that world. There are many points at which ‘virtual worlders’ can cease viewing adult or offensive content. Media literacy is a vital element in this.

Virtual worlds can be expected to contain as much objectionable material as the human mind can fantasise, just as in the real world. In the same way as an adult can walk into a video or DVD shop and buy material unsuitable for broadcast, the same can be done within a virtual world. It is community and individual self-regulation and the normative values of a group which are a much greater regulator of behaviour than law. Criminal and contract law continue to exist in virtual worlds, but regulation of the individual video provider would appear to be highly cumbersome, and either impossible or prohibitively expensive to enforce.

Placing barriers to European growth in this market could have significant impacts. The moving of game hosting servers outside Europe (or new initiatives not developing a physical European presence) may have a limited economic impact individually, but games development and support offices are of greater importance and the investment decisions are linked. Games developers are struggling to compete (North America has led the market but recently it has shown signs of significant penetration of Korean companies). With high
development costs, management costs and software churn rate, the additional costs placed on EU developers run the risk of excluding them from the market.

This has several potential effects:

- the knowledge and skills associated with the cutting-edge of game development may leave Europe. There has been significant evidence that such a ‘brain drain’ occurred in the 1990s with European software programmers moving to the USA, where investment and career opportunities were greater;389
- this ‘brain drain’ may impact on the next generation of Web2.0 community-based software, which is likely to draw on gaming technologies, thus affecting innovation and competitiveness in this nascent market;
- European cultures will not be represented properly in these persistent online gaming environments, a problem both for European gamers and those outside the EU.

6.4.4 Advertisements and Product Placement

Advertising as well as selling premium memberships (which provide additional features and service) will be used to generate revenue in online games. The increased penetration of online games has led to the development of advertising, for example by McDonalds and Intel in The Sims Online. The recent opening of a virtual store by the socially conscious US clothing chain American Apparel in the non-game virtual world of Second Life further demonstrates the link between online entertainment and advertisement.

There is a long-established association between digital games and advertisements, and product placement is becoming well established in the industry.391 These advertisements can take a number of forms. They might follow a film-style product placement, where goods feature in the game background, they may be featured as advertisement hoardings as part of in-game realism (as with Batman Begins in Splinter Cell) or they may be more tightly-integrated into the game (for example with Dole bananas in Nintendo’s Super Monkey Ball). Together, these forms of advertising are estimated to be worth $60 million but predicted to grow to $500 million by 2009.393

Currently, the ISFE is exploring the ramifications of in-game advertising and is looking towards producing guidelines for its members and the European games industry more broadly. However, the application of rules drawn directly from TV advertising to games

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389 See Kogut (2003), supra.
391 Coca Cola and the Sony Ericsson smartphone feature in Ubisoft’s Splinter Cell; EA’s Need for Speed Underground had placement of Radio Shack’s XMOD radio control cars, EA’s SSX Tricky features the Honda Element and 7Up and the caffeinated soft drink BAWLS had prominent placement in Vivendi/Interplay’s Fallout: Brotherhood of Steel, although the company did not pay for this.
392 The branding of in-game bananas by Dole was removed for the later Xbox release of the game.
would be flawed for a number of reasons linked to the profound differences in the media and the way that they are used, for several reasons. The notion of a watershed does not readily apply to games, which are non-linear and played at the discretion of the user. Further, given the interactive and non-linear nature of games, there is no way of ensuring that certain parts of the game featuring in-game advertisements (including product placement or roadside posters featuring advertisements) can be managed easily.

Currently, it is unclear in the AVMS at which point the realistic portrayal of events becomes product placement. For example, Electronic Arts’ (EA) *FIFA Soccer 2006* features 21 leagues and 10,000 players in realistic stadia, with game commentary from ‘household name’ TV pundits Clive Tydlesley and Andy Gray. The mimicry extends to TV-style camera angles, licensed player images and versions of the teams’ football shirts which, in the digital games, as with the physical game, feature logos advertising companies including Vodafone, Siemens, Eurotel, Umbro and so forth. If the AVMS were to regard such representation as advertising, additional licensing deals would have to be brokered allowing digital game developers to licence kits and players but to exclude sponsors’ advertising. This would involve additional costs that would have to be passed on to consumers, as well as renegotiation of existing sponsorship contracts.

If European companies are restricted in their use of advertising, then attempts to develop a model solely around subscriptions will disadvantage children’s access to games, and residents in countries with low credit card ownership (including Eastern Europe).

### 6.5 Conclusions

We have seen that the value chain in online games is much more globalised and footloose than that for IPTV or mobile multimedia. In section 6.1 we saw that platforms, software innovation and game types have played crucial roles in the development of games into an extremely important element in the creative industries. New developments include MMORPGs and virtual worlds. In section 6.2 we saw that self-regulation in the sector reflects the degree of user control and active engagement with games compared with ‘sit-back’ video-watching. However, as the AVMS is currently drafted, online gaming may be considered as linear and/or non-linear video content and regulated in the same way as broadcast TV or VOD. In section 6.3, we saw that by not explicitly excluding online games from the AVMS there is a risk of impeding European competitiveness, encouraging a ‘brain drain’ out of Europe, with an impact on the knowledge base for the next generation of multimedia technologies. The digital games industry is at the vanguard for exploiting the use of network technologies for user engagement, users’ creativity and community building and it would seem short-sighted to consider placing limitations on this rapidly developing industry at this point.
CHAPTER 7  Indirect Impact Assessment for Broadband ISPs

7.1   Broader Impacts of Case Studies Considered

This chapter explores the underlying logic and further implications from the case studies, and reintroduces our portraits from Chapter 3. We consider the choices facing market actors: to create regulated ‘walled gardens’ or ‘open access’ portals, and to be regulated as linear or non-linear. In this chapter, we draw back from the specific case studies to consider competition both for and in the affected markets, and the consequences for: structure (the number, power, and integration of firms); conduct (pricing, innovation, etc.); and performance (efficiency and equity). The overall focus is on service providers and network operators as regulatory ‘pinch points’, themselves influenced by heavy, light-touch or litigation-driven regulation. In the concluding Chapter 8, we continue our analysis of the potential for costs of regulation to be passed through from regulated actors, by focusing on regulated actors providing incentives for others to leave or avoid the jurisdiction (offshore), specifically new entrants versus incumbents and SMEs versus larger and/or vertically-integrated firms. In turn, this leads to various possible – but significantly different – portraits of how the future may unfold.

7.1.1   ‘Walled Gardens’ and Open-access Portals

The case studies demonstrate two exemplary business model and regulatory choices:

- ‘walled gardens’ with vertically-integrated value chains;
- open-access ‘free-for-all’ competition dominated by Web2.0-type applications.

The new multimedia models affected by the AVMS are typified by:

- online gaming in an open, global platform with industry-led regional self-regulation; and
- mobile ‘walled gardens’ in a national, interoperable but contractually-bound platform with significantly higher levels of content control.

Decisions as to whether and how to regulate Internet video will affect organisation and competition in each structure. In particular, the regulatory decisions and industry responses interact with each other, although in principle the former is guided by policy and the latter by commercial considerations.
The business strategy choice of ‘walled garden’ or open platform is also a choice of potential regulatory burdens. The rules in the E-Commerce Directive 2000/31/EC and the Annex to the 1998 Recommendation on the Protection of Minors and Human Dignity establish the ‘blind’ provider model, where liability for content only arises where the ISP chooses to filter. For a variety of reasons, that 1998 Recommendation’s suggested self-regulation approach will be supplanted in the proposed AVMS by a co-regulatory or regulatory approach. Therefore, the provider of sighted ‘walled garden’ content will be departing from the E-Commerce Directive approach and entering the proposed AVMS enforcement regime. This is a move from the fixed ISP business model as developed through the history of the consumer Internet, towards a cable or mobile ‘walled garden’ model. It may be that this works with new distribution models, for instance, in our IPTV case study the move from IPTV v.1 to IPTV v.2. However, we note that the America OnLine (AOL) ‘walled garden’ was forced to give way to the open model in the 1990s. Without pre-judging the outcome, we highlight this business model choice and the effect of the AVMS on that.

The value meshes of the sectors under consideration will respond differently to regulatory signals. Computer gaming is the most ‘globalised’ in both production and distribution, while nationally-based IPTV and national or European (i.e. regional) mobile multimedia are more sensitive directly to national or European regulation, with less chance of ‘offshoring’ of activity to less-regulated jurisdictions. Online gaming companies can make a binary choice about where to invest. By contrast, market access for IPTV and mobile companies is necessarily more regulated and therefore likely to change incrementally, rather than offshoring operations completely.

We can describe two pathways for broadband multimedia development.

- **Rent-capturing incumbents** can use regulatory capture or leverage and self-regulatory or co-regulatory behaviour to soften the impact of competition in new markets. This can raise sunk costs and other entry barriers towards those of heavily regulated markets. Similar incumbent protections can be achieved by leveraging strategic market-based but regulated assets (e.g. copyright-protected content ‘hits’) from established prior markets. These ‘reusable’ assets include market power (through bundling and branding), intellectual property rights and economies of scale.

- **A ‘free-for-all’ open access future** can display the Tragedy of the Commons: regulation and incumbents fail to gain effective purchase and attempts at self-regulation erode, resulting in congestion from unregulated free-riders and scope for market abuse. Domestic multimedia markets may be dominated by foreign investors with reduced regulatory burdens or a ‘weightless’ self-regulation, in which lack of entry barriers and behavioural sanctions produces a ‘race to the bottom’.

This is not to say that either necessarily produces better outcomes: this is not a ‘good versus evil’ dichotomy. One might argue that AOL is a victim of the Tragedy of the Commons, but Google and Yahoo! have built very successful businesses based on

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394 In particular, markets where entry is controlled and regulation enforced by licensing regimes.
advertising tied to the value of the information that they add to the public commons (the Internet) – that information being the proprietary basis for their search results. Rather than a ‘good versus evil’ or ‘successful versus failed’ market portrayal, perhaps we can view this as the difference between two different (predominant) cost recovery models: ‘walled-garden’ subscription and open-access advertising.

Recall our four portraits from Chapter 3: midband malaise, user-controlled commons, winner-takes-all, and win–win, illustrated with case study analysis in Table 19.

Table 19: Four Portraits and Likely Outcomes under Business Model Exemplars

<table>
<thead>
<tr>
<th></th>
<th>‘Walled garden’</th>
<th>Open access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midband malaise</td>
<td>Unlikely – content revenue shared and portal content available</td>
<td>Possible – if no content is made available</td>
</tr>
<tr>
<td>User-controlled commons</td>
<td>Unlikely – network operator prefers contracted content</td>
<td>Possible – if no content revenue model emerges</td>
</tr>
<tr>
<td>Winner-takes-all</td>
<td>Likely – mobile operators aiming for platform success</td>
<td>Unlikely – interoperable content deployed across all platforms</td>
</tr>
<tr>
<td>Win–win</td>
<td>Unlikely – different platform approaches means fragmented content markets</td>
<td>Possible – model for content owners and network operators interoperable</td>
</tr>
</tbody>
</table>

The ‘walled garden’ intends itself to be the winning platform in winner-takes-all, and to share success to its own advantage between network operator, content provider and user. Only where content can be deployed interoperably across all platforms can it be truly described as win–win, but that is possible (although less likely) with ‘walled gardens’. Clearly, user-controlled commons is less likely in the ‘walled garden’ business model, as content from within the ‘walled garden’ is granted preferential treatment. Therefore, open-access is more likely to result in that future, as well as midband malaise, in which content owners free-ride the network operator and there is less incentive for the latter to upgrade than where they can capture some part of revenues. The interoperability of content offered by the open-access model may be more likely to generate the win–win portrait.

While this approach creates ideal types and is necessarily simplified, it produces powerful conclusions and illustrates ‘tipping’ between open and closed business models and portraits. The result in either case is the failure of effective competition: either excessive market power inhibits innovation, or powerful immiserising competition bids away necessary margins and punishes risk-taking.

It should be stressed also that the ‘intervention logic’ of impact analysis is inherently dynamic. In the first instance, national entities (legislatures, then regulators) make decisions about how to implement the AVMS. Then participants respond by accepting or backing off from regulatory liabilities, changing investments in products and pricing, etc. These decisions ultimately determine both the effectiveness of the regulation (the degree of compliance) and the incidence of regulatory costs. But the key driver is users’ reaction to these changes. Many of the data available thus far concern specific sectors and/or early-adopter populations. These may not be fully representative of the mature market, for three reasons.

1. Late adopters may have systematically different willingness to pay for ‘walled garden’ protections and specialised or user-generated content.
2. Content tends to be both socially-consumed (leading to ‘superstar’ clustering of content types) and an experience good – you only appreciate its value when you begin using it. Thus the viability of e.g. localised and/or user-generated and user-hosted content might evolve over time. This has been demonstrated already with P2P networks, which initially were devoted almost exclusively to redistribution of mainstream commercial content and only gradually saw the emergence of more diverse and ‘independent’ content.

3. It is necessary to consider convergence and substitution agnostically. Access channels tend to act as gateways rather than final destinations. In some places, cable TV has provided an introduction to a wider set of interactive services, while in others the ‘lead application’ may have been dial-up, broadband or even mobile (especially in Eastern Europe, where GSM substitutes for, rather than complements, fixed-line telephony and where, as a consequence, mobile platforms may enjoy a sustained lead).

The gateway effect channels initial demand to the most attractive channel; therefore regulatory asymmetries can affect initial winners and losers profoundly but may lead to the same destination in the medium term. In interpreting these possibilities, it is important to resist a facile connection between short-run and medium-term outcomes. The sustainability of regulatory and provider strategies will depend on consumer responses – especially on whether late adopter Internet users are willing to pay compliance costs in exchange for ‘walled garden’ regulated protection. But to reach the long term requires short-run survival. This means that it is necessary to compete successfully with unregulated companies for early adopters.

It is also important to balance competition, and communications or content, policy goals. In policy terms, this means taking account of the different approaches of the AVMS and E-Commerce Directives to the content-related liability of network operators and service providers. In market terms, it is conceivable that cut-throat competition combined with the cost burdens of (especially) a heavy regulatory stance might weaken or destroy parts of the European value mesh in some sectors. This can be the case especially if compliance costs are shifted to vulnerable smaller content providers via existing contractual relations. A ‘softer’ form of competition could facilitate a more cooperative approach to finding optimal allocations of compliance liabilities and costs. Thus, despite the apparent scope for contradiction, it may be that the medium-term interests of competition and content policy can be linked directly.

This insight leads to economic analysis of the two business models noted above for a broader range of market stakeholders, including firms and consumers. It is not only firms who can choose whether to:

- inhabit a cartelised, integrated ‘walled garden’ (via, as we term it, ‘sighted’ service providers); or
- risk a competitive, unregulated and unintegrated world (via ‘blind’ providers).

Consumers connect to content via ISPs – regulatory constraints applying to content can be internalised within the contractual parties in a ‘walled garden’, but may be harder to deal
with when the ISP has only a loose market connection to content providers. In addition, consumers may be (or choose to be):

- early adopters – risk-takers who enjoy unregulated and innovative markets; or
- late adopters – typically more cautious and less educated in the broadband market.

They also play a game in deciding to which type of ISP to which to subscribe\textsuperscript{395}. The game that we work through for these adopters in Appendix A indicates their propensity to prefer lighter or heavier touch regulation, and therefore the blind open-access scenario, or the sighted ‘walled garden’ approach. We use this series of conclusions to work through another example: the ability of ‘walled gardens’ to price-discriminate on the basis of content.

### 7.1.2 Competitive Effects: Linear and Non-linear Substitution

We begin to identify our blind and sighted types by reference to their idealised preferences for regulation. Note that by regulation, we refer to forms that can include a heavy touch self-regulation as well as light-touch state regulation: it is the sunk costs that matter for the analysis, not the institutional arrangements\textsuperscript{396}. We anticipate a diminishing role for the linear model in broadband homes. This can be seen in falling advertising revenues and the migration of high value-added and/or price-inelastic services to non-linear modalities. However, as with all technological switches based on interactive advertising and niche marketing business models (such as radio to TV, paid to free newspapers and single to multi-channel TV), a totalising hypothesis must be treated with caution. This is especially so in view of the deregulatory trend in the linear AVMS proposals, which liberalise the regulatory framework for traditional TV.

Although we focus in this work on the possible adverse effects on non-linear and non-traditional TV sectors, RAND (2006) established that the effects of AVMS proposals for broadcast TV are broadly beneficial. Long after 2011, many consumers will choose to spend many hours communally watching drama and live sport on the ‘dumb’ TV under a form of linear TV regulation, rather than interacting and gaining ICT skills by interacting with a broadband channel. Incumbents will continue to serve this slowly eroding market. Existing TVWF and other regulatory arrangements serve to balance the public interest in these mature or ‘legacy’ technologies. In combination with current European Commission moves to cut the regulatory burdens on licensed (linear) operators, this suggests a ‘soft landing’ for the sector. Of course, this depends on an appropriately far-sighted and flexible regulatory stance. As non-linear competition strengthens, it is possible that those currently bound by national licensing and broadcast regulation might simply withdraw into satellite or Internet distribution, if the residual advantages of licensing fail to compensate for the costs of new regulation.

\textsuperscript{395} This assumes that early adopters understand risks. In ‘free-for-all’ scenarios, these ‘fish’ may attract sharks, which could lead savvy consumers to wait or choose sighted suppliers. Tipping happens on both demand and supply sides – coordination of consumer and market types could produce perverse results. The game in Appendix A covers this in more detail.

\textsuperscript{396} Although these themselves must be the primary influence on sunk costs, they are not the only influence.
The first issue informed by the case studies is the varying nature of competition in these markets. There is a particularly strong difference between linear and non-linear services. Non-linear services such as IPTV v.1 are traded and sited more easily outside the EU (because there is no need to access the mass market with such immediacy). The linear business model is fairly high-cost and relies on interweaving advertising, sponsorship and product placement, with content in a linear timeframe (and with new interactive services adding direct response, enhancing marketing effectiveness)\textsuperscript{397}.

The linear/non-linear distinction is vital in deciding on regulatory strategy.

- Non-linear enforcement is a critical issue. User-generated and user-hosted content create their own problems\textsuperscript{398}. There are tens of thousands of potential commercial video podcasters, but no regulatory body in the sector can register such a body of AVMS suppliers. \textit{The only feasible way to enforce the Directive is via the intermediary, content host or service provider as a proxy for the content editor.}

- For incumbent linear operators, the nominal burden of regulation will not change. Secondary effects may arise from changing patterns of subcontracting, etc. in the value net and/or diffusion or reorientation of regulatory attention. Hence, \textit{incumbents and regulated actors have incentives to drive up regulatory costs in other parts of the value chain}. Should they choose not to do so, they must hope to leverage their position in the emerging value chain in order to compete successfully with entrants from outside the industry.

- New linear operators (e.g. new channel providers) will face relatively heavy regulatory burdens under all scenarios. They are likely to licence over to incumbents or otherwise consolidate. Therefore, \textit{regulation reinforces concentration}. In fact, it is difficult to imagine new entry succeeding in any but niche channels, because sunk costs make entry uncompetitive in ‘established’ new media channels.

- For both old and new linear operators, the ‘referred liability’ that makes them police content is controlled via commissioning relationships with content providers (including advertisers). \textit{Therefore, linear actors can pass on regulatory risk via co-regulatory and self-regulatory arrangements}. Where costs cannot be passed on except to end-consumers, linear offers may lose out to non-linear services.

- Regulatory burdens on non-linear operators range from none to minimal (by scenario, value web structure, contract terms, and location). Content regulation connected with advertising represents a continuing compliance burden.

\textsuperscript{397} Given Vint Cerf’s comments that only 15% of television content needs to be distributed ‘live’ via streamed service, elements of the ‘content stream’ and their geographical location are transferable: advertising – in-picture adverts are product placement under AVMS; embedded interactivity and click-through; illegal advertising types (drugs, alcohol, etc.); Cerf (2006) supra.

\textsuperscript{398} These are not always non-linear. For linear niche content, the extreme cost of enforcement on users may create a ‘safe haven’ in the shadow of the regulation. Users and others below the regulatory radar could populate the linear market niche as suppliers, and as users of other users’ linear content if the regulation inhibits the incumbents who currently dominate the linear sector.
This has serious implications for regulation. If the service provider is to enforce the Directive effectively (why else implement the Directive?), all sighted service providers will have to invest in (or contract for) deep-packet inspection technology or its equivalent to enable sifting of different packet types, identify video streams and potentially P2P traffic of different types. Anonymised P2P traffic can be distributed without the service provider’s knowledge, with video packets interspersed in an encrypted stream of other data. This technique is already used in VoIP to prevent the port-blocking and traffic-filtering tactics of service providers that wish to block such third-party traffic cannibalising their existing voice revenues. There will always be the ability for determined and resourceful video podcasters to evade packet inspection. To clarify blind/sighted, we should explain that this evasion can happen within the ‘walled garden’, and differs from the ‘see no evil’ of current ISPs.

As stated in Chapter 1, we consider three specific regulatory scenarios that we believe reflect the range of potential types of content regulation:

- **Strict regulation:** Under the uniform regulation scenario, broadcast-type regulation will be extended to all entities that have a relationship with the regulator. This implies the need for a compliance unit, even for small firms – in particular, to police compliance issues that might emerge at other points in the value web.

- **'Light-touch' regulation:** Under the light-touch regulatory regime, it is possible for many parties (especially in non-linear parts of the system) to localise, minimise, outsource and/or pool compliance certification. For instance, in a ‘portal-type’ model, small content providers might outsource compliance to the portal operator, or might be able to create a form of self-regulatory body to handle the regulatory interface collectively.

- **'Litigation-driven' non-regulation:** Under the ‘litigation-driven’ scenario, the compliance burden is light, but risky and potentially severe. In addition, its selective application makes it available for strategic use, either by other stakeholders or the regulator. There are specific examples of litigation from the European ISP sector, in particular the Compuserve Germany and Yahoo! France cases, as has been highlighted recently by the arrest of a European citizen, David Carruthers of Betonsports, in an airport transit lounge in Houston, Texas, on charges of breaking US law on Internet gambling. Non-regulation by certain Member States leads to wide divergences between market actors in their compliance response, between walled gardens and open access, causing consumer confusion as well as choice for the particularly well-educated consumer. At the margins, it

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provides sensationalist newspaper headlines that may cause consumers to become less adventurous in their use of new Web2.0 applications\(^{400}\).

In the following three sections, we analyse the impacts of:

- broadband penetration (the decision to obtain broadband services) and the ‘pull’ effect of multimedia;
- ‘knock-on’ incentives for customers to demand and providers to invest in higher broadband speed and quality, as in the win–win or winner-takes-all portraits;
- broadband use to (re)distribute content: the stimulus for user-generated and distributed content, as in a user-controlled commons.

This competition has specific implications for the three main areas of indirect impact, expanded in section 7.2 (and Chapter 8):

1. the broadband and ICT market – value chain structure, concentration, rate of technology advance, capacity formation (investment) and utilisation, etc.;
2. the role of SMEs – entry barriers, profitability, survival, clustering (geographically and by market segment) and integration (or otherwise) into value structures;
3. foreign direct investment – both inward and outward investment, contracting-in/out, imports/exports, globalisation and/or global integration.

We now consider the broadband market effects in turn.

### 7.2 Impact of Regulation for ICT and Broadband Deployment

A controversial aspect of the Indepen/Ofcom study was the assessment that the proposed AVMS would delay broadband adoption by one year, resulting in “net present value of EU GDP forgone… up to €125 billion”\(^{401}\). It is very unclear how the AVMS necessitates such a delay. Indepen considers that “there may be net benefits from applying the basic tier of regulation if it is done through co-regulation”. We further analyse this impact on broadband and ICT via the portrait-based methodology\(^{402}\), based on three factors.

**Universal penetration:** Currently, approximately two-fifths of UK households do not subscribe to a fixed-line Internet service\(^{403}\). It is necessary to divide these between those likely to do so and to upgrade to broadband by 2011, those who have (or will) obtain a wireless connection, those who access the Internet only at work or school, and those who will not adopt. We can anticipate that a proportion will choose to adopt a lower speed and more filtered Internet via digital TV (with final UK regional analogue TV switch-off in

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\(^{400}\) For example, regarding German cannibals, child pornographers and French neo-Nazis, all of which describe illegal activities not covered by the AVMS.

\(^{401}\) Indepen/Ovum/Fathom (2005), supra, at p. 13.


2012) or mobile networks. There are useful surveys on the reasons for Internet adoption in: Ofcom Media Literacy surveys; Sonia Livingstone’s research\(^{404}\); and World Internet Project data including input from the Pew Center\(^{405}\). As we saw in section 2.3, cost and user-distributed content have been the most important drivers thus far.

**Faster broadband:** Most existing UK home Internet connections already incorporate broadband. The migration path to 2011 is for higher bandwidth (speed, capacity, reliability) services. Consider the FTTH (Fiber to the Home) Council view\(^{406}\) that the fibre market in 2006 is in the same state of development as the broadband market generally was in 2001. The higher cost of installing fibre, combined with consumer service demand uncertainties, mean that it cannot be assumed that fibre will achieve a penetration rate approximating to current broadband by 2011, but the rate of adoption of fibre and fibre-like (50Mb/s and upwards) connections is an essential element in the assessment of the AVMS. This discussion explains one route forward (FTTH), but mention should be made of others. In addition, it is reasonable that the positive feedback between bandwidth availability/affordability and bandwidth-intensive content/service demand will catalyse further growth.

To expand this definition: ‘bandwidth’ includes speed, capacity and reliability. One reason is that routes to growth flow differently, depending upon which factor is favoured. Another is that quality of service for linear, non-linear and P2P modes of interaction are differently dependent on mixes of these. Recent Analysys work for the Broadband Stakeholder Group on use of multimedia applications is a helpful contribution, demonstrating the high peak demand generated by linear streamed media\(^{407}\).

**Web2.0: User-generated and distributed content:** The effect of the AVMS on ICT markets generally includes adoption of consumer hardware. Household expenditure on ICT hardware in the past five years has focused on content-generation and interactive devices: digital cameras, personal computers, PVRs and games consoles (with flatscreen/plasma/LCD television displays, DVD recorders, mobile camera phones and digital TV reception equipment). These devices can generate content as well as distributing or storing. This enables individuals and SMEs to develop content at low cost. This may well create the infrastructure for a future with a significant component of P2P and openness. Both the World Information Technology and Services Alliance (WITSA)\(^{408}\) and the OECD provide a detailed international breakdown for these markets\(^{409}\). As Figure 6 illustrated, the costs of video hardware are seven times greater than those of computer consoles and games, and twice as high as TV subscription costs per annum.

\(^{404}\) Http://www.children-go-online.net/

\(^{405}\) Http://www.worldInternetproject.net/


(We develop in the final chapter a chain of logic for market development which we believe represents a basis for considering the impact of the AVMS on ICT adoption.)

7.2.1 Universal Penetration
The need for regulation suggested that the self-regulated model for the Internet may discourage risk-averse late adopters and prevent universal penetration of the technology. Even in the absence of mobile Internet browsing, this no longer appears likely. The OECD figures for the end of 2005 in Figure 39 indicate that several early-adopter European countries are now approaching universal broadband saturation, and South Korea has seen a levelling off of demand, indicating that a lack of a formal universal service obligation has not seriously affected take-up (with the exception of rural areas, disabled users and a clear lag in penetration among over-55s). However, note that this measurement is for fixed-line broadband access, rather than wireless. Countries with historically lower fixed-line penetration (for instance, in Eastern Europe) are adopting consumer broadband via 3G mobile, and we can anticipate some substitution rather than complementary adoption: that is, that consumers will subscribe to mobile rather than fixed-line access.

Figure 39: Broadband Penetration by Household Percentage, Historic, Top Five Countries for December 2005

Source: OECD (2006a)

The Group of Seven (G7) largest industrialised countries lags two to three years behind these early adopters (see Figure 40). However, there is no longer evidence of a serious or sustained lag in broadband penetration or correlation between population density and broadband penetration, as both Iceland and Denmark lie in the top group. France and the UK have reported broadband availability above 99%. The driver for broadband appears to be a combination of price and user-generated content: email and Internet applications. In the average UK household, 1.93 adults (2.31 people) inhabit according to the 2001 census.

410 See generally OECD (2006a), supra.
411 It should be noted also that currently, the ‘digital divide’ is greater in many new Member States, both in terms of the relatively modest penetration of high-speed, content-intensive access and in terms of the general e-skills of the population: it may be that new Member State users of high-speed applications are more ‘early adopter-like’ on average than in the EU-15, while those who have not chosen such access may be more naïve.
census[^412]. Taking account of the 20% of adults who have not used, or intend to use, the Internet, 40% subscribers per 100 is saturation of the adult Internet population, assuming that subscribers share a household at the national average. This produces penetration at about 79% of the adult population. Note that South Korea’s plateau is explicable by the much higher total of adults per household, as well as other factors. We suggest that further analysis into the socio-economic characteristics of non-subscribing households will reveal whether the UK non-Internet user population has high levels of single-inhabitation.

![Figure 40: Broadband Penetration by Household Percentage, Historic, G7 Countries](image)

The Pew Center reports that the US broadband penetration rate was 42% in March 2006 (30% in March 2005) or 62% of all home users. Overall, Internet penetration has increased from 66% to 73%[^413], with 8% only using the Internet outside the home and 65% having home access. Of the broadband households, 57% cite speed as their reason for getting broadband as compared with the 3% motivated by price, suggesting that people are willing to pay more for the benefits of high-speed access. However, only 17% knew the claimed speed of their broadband subscription. Of the dial-up users, 39% expressed an interest in changing to broadband. The possible reasons[^414] for dial-up users’ statements that they do not plan to upgrade include the following:


[^414]: This population may become more accessible even if the regulatory burden keeps costs high, provided that content improves. Other reasons for denying intention to upgrade include the following:

- fear of a marketing purpose behind the survey;
- the utility of workplace access depends on employer policies regarding personal use of the connection (which may change, displacing the 8% into home users without price or service improvements);
- drivers for switching could come from content as well as subscription (the nested decision and option value of broadband issue).
- 22% of dial-up users who do not want to get broadband at home already have high-speed access at work;
- dial-up users who do not want to switch to broadband are older and/or have lower incomes than dial-up users who express a desire to switch.

Of over-50s with dial-up, 46% do not want broadband, while 32% want broadband. In general, advancing age is associated with less interest in broadband-enabled content production and multimedia consumption. There is a small differential based on age, with older users less likely to claim to want to upgrade.

In the UK\textsuperscript{415}, this apparent satisfaction with less choice may be reflected in the increasing penetration of digital terrestrial as opposed to digital cable and satellite linear content channels. Note from Chapter 2 that the majority of the 71% digital TV households in the UK have terrestrial access and the majority of those are over-55. This suggests that a significant challenge for both industry and government may be to persuade over-55s to increase channel capacity from narrowband and the ‘basic tier’ of digital TV channels\textsuperscript{416}.

The differences in broadband penetration appear to be due largely to speed of deployment and pricing differences. This analysis for the richer OECD countries may not hold for the Eastern-European EU Member States, and further research is necessary in this area. In particular, for those countries now achieving market maturity, analysis of the success of ‘converting’ the final digital refuseniks would be very helpful in assessing the factors in choosing not to use the Internet. This may isolate the effects of age, ICT skills, poverty, any lingering rural cost-connectivity problems, security and spam/virus issues, and the possibility of content regulation having some effect. In addition, the mobile Internet may have some substitution effects for fixed-line broadband as 3G is deployed more widely.

### 7.2.2 Faster Broadband

Broadband demand has proven extremely difficult to predict, particularly given the generational technology changes in both supply and demand. The initial consumer broadband offer was ADSL or cable broadband at 512Kb/s downstream and lower speeds upstream. This resulted in high broadband penetration over a relatively short time period, although introduction of service at prices competitive with narrowband was delayed until 2001. The asymmetry between upstream and downstream speeds obviously tilted the playing field against user-generated and user-hosted content, as reflected in the price differential between Asymmetrical DSL and Symmetrical DSL. However, in another instance of the gateway effect, these differentials are eroding – and capped services seem slowly to be giving way to traffic-shaping in order to cater to more P2P-orientated users.

Transport technology and pricing are not neutral with respect to content and usage

\textsuperscript{415} Caution should be used in comparing the UK and the USA, in view of profound differences in content availability, access pricing and the development of different access channels.

\textsuperscript{416} Alternatively, this may be a transitory asymmetry that will be eliminated by the ‘gateway effect’, especially after the analogue switch-off. Willingness to pay is obviously a critical aspect; high digital penetration is traceable largely to the low fixed and zero marginal cost of Freeview and Freesat, as well as the higher picture quality (for most). This suggests that introductory pricing (and the regulatory models that permit it) will continue to be important drivers.
development. The EITO has conducted a survey and analysis of Internet users in 2005. In 2004 it was estimated that online content accounted for only 3% of total revenues in music, videos and games. Access speed was the main driver for broadband, with a few providers in France and Sweden already providing 8Mb/s bandwidth. The Institut de l’Audiovisuel et des Télécommunications en Europe (IDATE) has produced analysis showing the recent upgrading in connection speeds amongst broadband users, as seen in Figure 41.

Figure 41: Broadband Subscriber Speeds in Europe 2004–2005
Source: IDATE

Pricing is problematic because consumers’ perception that ‘the Internet is free’, hinders providers by limiting willingness to pay. Where marketing or experience with congestion make consumers sensitive to speed, this further creates a competitive advantage for capped-download offers. These are good ways of increasing penetration, but limit the deepening on which sustainable growth depends. End-user behaviour considers ‘always-on’ access and utility; among the young there is a shift towards music downloads as the main driver; home networking is becoming more popular.

417 The initial penetration of asymmetric services shaped the growth of demand; it satisfied the general demand for access to the ‘brave new world’ in a way that favoured client–server service and business models with minimal backchat, small footprint uses (content requests, transactions authorisation) and non-linear uses, such as email. This may inhibit P2P and slow development of symmetric uses such as VoIP and online gaming compared to ‘asymmetry-tolerant’ uses such as BitTorrent and eDonkey.

7.2.3 User-generated Content and Web2.0 Contribution to Broadband Upgrade

The growth of P2P file-sharing services, especially for music and, later, video, has driven content demand beyond network supply, as seen in Figure 42 below. In response, network operators are increasing download speeds (and often the total monthly ‘cap’ or limit on downloads as part of the basic broadband subscription) by introducing later generations of xDSL or cable upgrades. Therefore, the trajectory of broadband downloads has increased from less than 1Mb/s (ADSL) to up to 25Mb/s (ADSL2+) for some consumers. The next generations of broadband offer up to 50Mb/s (very high data rate DSL) and then Ethernet connections (100Mb/s). In Sweden and Italy, Broadbandsbloaget and Fastweb have offered these latter speeds for several years.

Figure 42: Potential Scenario for Disruptive Supply and Demand for Broadband over Time

We may be seeing (at least in urban high-density locations) a type of supply–demand ‘arms race’, as higher speed connections and higher bandwidth applications continually drive each other towards higher speed access. However, if networks and content providers cannot monetise their respective parts of the value chain, network effects can reverse into a vicious circle, in which neither content nor network can secure investment to provide service, and the inflexion points – at which investment in the lagging element is needed to prime the next phase of disruptive growth – become turning points instead. Networks and content providers could fail in the absence of revenues, as occurred in 2001–2002.

The dynamics of market development involve successive waves of excess supply and excess demand. During either phase, imbalances are resolved by a number of simultaneous

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419 This interacts with other telecom structural changes, notably as a driver of local loop unbundling (LLU), triple-play and ‘free broadband’, which should facilitate cross-over growth by bringing various types of use into the same contractual space, but very much in the ‘walled garden’ mode.
processes. For instance, during an excess supply phase (when overall investment may be static), there will be a degree of ‘shake-out’ (failure or exit of weaker firms), some channel substitution (existing under-utilised capacity shifted to other sectors), and attempts to ‘sweat the assets’ through cost-based competition and some attempt to develop or pick up on break-out product innovation. There is also likely to be some amount of vertical and horizontal integration (e.g. by merger) and a rising weighted average cost of capital.

In terms of the impact of the AVMS, the changes to the extent to which operators are able to capture returns to content provision, in turn will drive investment in high-speed and high-quality broadband infrastructures. There are a variety of distinct possibilities. If ‘insiders’ (incumbents or a select group of co-regulatory partners) are able to restrict access, a two-tier system may emerge, in which walled-garden denizens pay for protected access and for authorised content, while those in the open-access world have much cheaper – but also much riskier – access to (often illegal) content. If insiders are wholly unable to monetise content provision, they may lose the incentive to invest in broadband networks. A ‘happy medium’ is one in which (for example, by bundling or content-related charging) operators retain sufficient returns to drive investment in network enhancements that – to some degree at least – support ‘public good’ infrastructures capable of sustaining sector development. This positive/negative circle, seen in Figure 43 as the virtuous circle, is at the heart of the debate around content liability and network charging, and our approach to indirect impacts on broadband and ICT, SMEs and foreign investments has this as its focus.

**Figure 43: The Virtuous Circle of Broadband Supply, Skills and Demand**

The contribution of Web2.0 to this policy is relevant to the AVMS discussion. European consumer use of ubiquitous broadband will drive ease of adoption by businesses. European workers will have better ICT skills and develop creativity and innovation in their use of these skills. In contrast to the ‘dumb box’ which is television, home broadband users will develop advanced ICT skills through sharing their user-generated content such as videos uploaded to (hopefully European equivalents of) YouTube, photographs shared via European versions of Flickr and avatars generated by European online worlds such as SecondLife and other sites.

However, much depends on the relation between access providers and content creators or rights holders. At the moment, many of the latter are located in the USA, with access to home markets via a very different regulatory and market environment. As discussed in the ‘offshoring’ section of the concluding Chapter 8 below, regulation can be enormously influential in determining whether and how European access providers support for European content creators.

7.3 Conclusions

In this chapter, we considered the general structure, conduct and performance implications of broadband development in section 7.1, as well as the decisions of ISPs as ‘walled gardens’ or open-access portals, and those of consumers whether to be early or late adopters. We also demonstrated how these choices can influence which of the portraits introduced in Chapter 3 is more likely to emerge. We drew some inferences for industrial concentration emerging from the AVMS enforcement logic that are important indicators of how ISPs might ‘game’ the regulator. In section 7.2, we considered three specifics: broadband availability, affordability and performance, showing how either virtuous or vicious circles of content and broadband supply can emerge, further illustrating the alternatives described in the portraits. Against this background, we now analyse for our conclusion SME participation and offshoring, and the effect of regulation on the investment flows that determine which portrait of the future proves most accurate.
CHAPTER 8 Conclusion: Indirect Impacts of the AVMS

8.1 Incumbents, Regulatory Games and the AVMS

The final chapter is brief, and covers three areas: the ability and incentives for broadband stakeholders and especially ISPs to ‘game’ the AVMS regulation to secure competitive advantage; the ability of companies to offshore, and so evade the potential ill-effects on their businesses of regulation and the price discrimination of incumbents; the resulting portraits for investment prospects in broadband video content and services resulting from these factors. In conclusion, we marry the investment portraits with the regulatory options to produce a recommendation. We note that the conclusions must be contingent upon further clarification of the scope of the AVMS proposal.

Incumbents with strongly-integrated value chains can view such regulation as a source of protective cost-based entry barriers. Instead, potential market entrants would choose offshoring, ‘flag of convenience’ locations, entry by affiliation with incumbents or investment in other sectors altogether. In particular, games industry developers and others are a ‘moveable feast’, which can be transferred between regions or substituted with some ease if market conditions dictate. Before a cluster emerges, they are flexible ‘putty’ – afterwards, due to cohesion, they are a bit more like clay – the employment they offer is more transferable than the workers. Thus, expectations about regulation are likely to affect them more than small changes in implementation after the AVMS takes effect. Venture capitalists have strong preferences for markets that permit innovation without regulatory approval or sanction. We note that the hype around a deregulated Web2.0 space may have caused the interviewees to overstate the importance of content regulation compared to tax treatment, availability of human and financial capital and other factors.

The overall message is that these innovators cluster with others in software ‘hubs’ such as those in the Greater Helsinki area, Cambridge UK, Amsterdam and Munich420. These

'creative hubs' are critical to regional competitiveness, and depend in large part on their clustering of creative and innovative companies. The argument is that:

- developers cluster socially and culturally;
- they have ‘putty/clay’ dynamics;
- they will cluster for economic reasons near venture capital hubs; and
- even if the developers do not pay much attention to national regulation (looking towards global markets), their financial backers will\textsuperscript{421}.

This suggests a need to consider the alignment of the AVMS regulatory stance with the financial regulatory stance, since this has already determined the location of venture capital sources. In the following section, we explore the theoretical economic evidence for investment and regulatory gaming, and its contribution to this analysis.

\textbf{8.1.1 Competitive Impacts of Disruptive Broadband Supply and Demand}

The regulatory stance will change the costs of providers and content types in two specific ways. First, the implementation of the regulation is likely to be non-neutral as regards content (linear/non-linear, provider/user-generated, one-way/interactive). This differential (and reallocated) impact can be monetised: it raises the same issues as content-based price regulation. The second issue is that this differential impact has a range of consequences throughout the industry in terms of market outcomes and future evolution. This will happen whether the emphasis is on content compliance on its own, or includes broader considerations of ‘neutrality’ (across stakeholders, content types and/or technologies).

This ‘rebalancing’ of impact will have a shaping influence on demand and the overall impact of the regulatory framework itself. Most arguments ostensibly in favour of ‘neutrality’ or against content regulation, for instance, are arguments for free entry and enforcement through competition. It is not reasonable to support the survival of inefficient goods, services and market players, or to deter the entry of efficient ones. But this is a likely consequence of too-simple or too-rigid principles of neutrality or compliance. The issue is not whether ‘prices’ (including regulatory costs) can vary by content, but rather whether they can vary sensibly by aspects of content or use along the value chain.

Demand- and supply-side integration and bundling will drive market evolution and determine the impact of regulation. Bundling of broadband access with video services may internalise linear content regulation burdens and lead to more cost-effective compliance. By the same token, bottleneck access providers can enforce vertical integration more easily and, in the process, throttle back user-generated content, compared to an unbundled world\textsuperscript{422}. Regulation may fall asymmetrically on players, content types and uses. The

\textsuperscript{421} See Kogut (2003), supra.

\textsuperscript{422} Determinants include interactivity, time-sensitivity, the impact of property rights (from backbone through DRM and personal information), value chain geometry and flexibility. On the demand and supply sides of broadband, value and cost (respectively) vary by content, size, reliability, time of day, ‘currency’ (novelty), etc.
subsequent rebalancing of commercial relations can be analysed in the same way as price
discrimination along the same lines.

An important aspect of this is pricing. In particular, non-linear pricing (e.g. by content
characteristics or separating access and usage pricing) may well be an important part of
the story. This is especially so, taking account of user learning and gateway effects and
incentives (or otherwise) for innovation and investment423.

For some kinds of content, slower delivery or ‘blackout curtains’ are the basis for price
discrimination, but this may raise a ‘durable-goods monopoly problem’ or restrict
variety424. In addition, the analysis should take account of possible abuse of this power:

- through predatory broadband service provider behaviour (access price foreclosure);
- through collusion, e.g. between ISPs and content providers; or
- among content providers using the ISP to police their regulatory compliance and
  entry deterrence.

In view of the spill-overs in demand and supply, Ramsey pricing analysis further reinforces
the case for non-linear pricing models.

- Some societal objectives (analogous to universal access/universal service) require
  implicit subsidy – particularly where goods and services have public goods supply
  or demand characteristics. Governments have declared an interest in encouraging
  the development of ICT and broadband in order to improve productivity, and
  video as a means to aid this development.
- Further externalities drive dynamic efficiency incentives for cumulative, disruptive
  and/or bottom-up innovation and optimality requires cross-subsidisation.

Regulatory uncertainty can delay investment, or accelerate it if the sector sees an
opportunity to shape or speculate on future regulation. The valuation of regulatory risk
can be factored into the real options valuation of investment decisions as part of
competition for the market.

All relevant futures involve competition in the market as well. While firms struggle to
capture demand, they also recognise the costs of this competition – costs that do not
sustainably increase value for consumers or firms. In particular, the churning of customers
between incumbents has been a pervasive feature of liberalisation in telephony and
broadband services to date, and has resulted in lost investment and high marketing costs. It

423 Non-linear pricing may be needed to reconcile efficiency with coverage of fixed (and regulatory)
costs, including price discrimination directly through charging more for recent content, or
indirectly via composite charges for priority, sunsed DRM, etc. One consequence of such
content-linked pricing may be more efficient allocation of capacity, if high-value uses such as IPTV
crowd lower value uses into lower-cost non-linear channels. Another is that content suppliers will be
encouraged to differentiate their products.

424 This was first described by Coase, R. (1972) ‘Durability and Monopoly’, Journal of Law and
Economics 15: 143–9. In a non-linear world, excess returns to unique content should support
innovation and invite investment. But they can be undermined by competition from ‘similar’
content (as seen in recorded music and films), a provider’s past and future production.
is reasonable to expect firms – especially incumbents who have been through this before – to use some degree of bundling and internal arrangements to limit churn. But the balance between ‘rent conversion’ (churn that dissipates producer surplus and encourages inefficiency) and ‘normal competition’ is a delicate one. Different stakeholders have different preferences, and we need to reflect case specifics in order to analyse this. The impact of regulation on churn and the ‘turbulent’ impact of churn on market growth need to be considered.

- For instance, regulation may encourage price–feature competition or reduce firm survival.
- Churn – or even vigorous cost competition – may reduce the scope for product innovation on the supply side, and innovative (user-generated) activity on the demand side.
- On the other hand, both bundling and improvement of service attributes benefit the consumer, adding value. The next step may be to compete on pricing models (once the triple/quadruple play is in place). Clearly, this happened with commodity voice services and it not only led to lower prices but service innovations (new services to bundle with basic voice).

8.2 Regulatory Compliance for ISPs under the AVMS

Regulatory competition acts as a complement to market competition. The existing evidence shows a range of behaviour in different contexts: the ‘race to the bottom’, ‘race to the top’, and patterns of differentiated location (comparative advantage) of economic activity matched to specialised regulatory regimes. The case studies differ in the globalisation of the market and the ‘stickiness’ (or otherwise) of human and organisational capital in content production. This changes the relative ranking of economic and content (social) regulatory objectives. The economic objective is to minimise the cost of implementation; the societal objective is to maximise compliance. In isolation, the regulatory mechanism would seek out a cost-effective compromise. But in strategic competition, this might not happen. Two other aspects are considered.

- If regulatory strategy in other jurisdictions is not aligned with the linear/non-linear distinction, there is a possibility of unforeseen consequences to regulatory competition and differential sector development.
- Delayed or foregone investment will have a powerful impact on competitiveness, because an alternative is overseas direct investment in more permissive markets.

The regulatory stance can alter the speed of these different mechanisms, and thus where the system emerges into the next phase of development, which affects its efficiency, competitive health and other factors.

- Heavy and asymmetric regulation (falling mostly on the linear side) will induce a rapid shift of activity to the non-linear side with loss of regulatory purchase, foreclosed or stranded investments, etc.
- There may be ‘regulatory flight’ to non-EU regimes, since this form of linear content is inherently less bound to jurisdictions than broadcasting.
- Heavy and symmetric regulation (using existing powers to regulate content on the commercial video part of the Internet) will result instead in gradual slowing of development, weakened self-regulation (even where efficient) and ‘offshoring’ flight.

- If regulation is light, much will depend on the extent of litigation and its uptake into either regulatory or self-regulatory norms of behaviour. It is possible that the result will be increasing returns to innovation, in part because regulatory risk is either reduced or easier to assess reliably.

The ‘future’ in this respect should take account of the demand for, and supply of, infrastructure capability and intermediate services, as we have seen in the development of IPTV and mobile value chains.

The balance of pricing along the value chain generally has led to debate about the fairness of charging users twice (once for access and again for content – hence only ‘first-degree’ discrimination), and charging senders based on the content that they send. As argued above, the fairness aspect obscures the efficiency argument in terms of efficient capacity utilisation and hence investment and innovation incentives. It also clouds the distinction between ‘walled garden’ and open-access models. If, as can be anticipated, users self-select suitable ‘walled gardens’, they will pay bundled prices that reflect their usage and content demand. By definition, this customisation is unavailable in the open-access world, further tipping the playing field. However, many consumers appear to want to choose and bundle content that suits them, not necessarily the provider. The old ‘package’ models may be starting to break down. If it does, then content aggregators become more like editors, and we suspect that technology breakthroughs in search may erode that position over time. This is why we noted in Chapter 2 the role that search technology seems to play in the future outcomes and the desire on the part of the consumer to publish or distribute those playlists, as with podcasting.

The equity argument cuts across (and thus distorts) the choice of channels. For instance, regulatory rules can be imposed on ‘walled-garden’ operators (e.g. mobile, cable and broadcast entities) regardless of whether they are content originators. Thus they will be less able to compete with operators who can take refuge behind the E-Commerce Directive’s combination of protection from liability and ‘cost-based’ pricing. This asymmetry may undercut effective competition, investment in networks and regulatory purchase.

This leads to a fairly clear prediction that liability and charging are affiliated. In other words, the non-linear world presents a fairly clear choice between (being) one of two types of ISP. One is a ‘blind’ ISP, which neither asks nor tells about content, exercises no control and makes no charge – on the basis of content. The other is the ‘walled garden’ model of the ‘sighted’ ISP, which shoulders and charges for regulatory and therefore network liability. As we suggested, the former is like the traditional fixed ISP, the latter more like cable or mobile operators.

A third possibility is a two-tier regime, in which heavy facilities-based regulation is applied even to non-linear operators and much lighter regulation is applied to ‘weightless’ entities in a fragmented non-linear sector. To cover the costs, the facilities-based operators would have to transfer liabilities or pursue a vertically-integrated ‘walled garden model’ (like
mobile operators). If they are unable to capture the rents or shift the costs via differentiated pricing, they will need to shift to less-efficient access rather than usage-based pricing.

To assess the up- or down-stream impact, suppose both types of ISP are present in the world, and that ‘users’ can choose between them. The value of choosing one or the other kind will depend on others’ choices:

- An early adopter or ‘content-sharer’ generally will prefer a blind ISP, but will be sensitive to the presence of normal or late adopters who may have different attitudes to content availability, congestion, etc. They will be aware also that it is possible to pursue their desired pattern of activity under both kinds of ISP: a blind ISP will not charge or bar them, but may impose ‘fair use’ limits or leave them unprotected from e.g. legal or regulatory enforcement. By contrast, a ‘walled-garden’ provider may provide protection in exchange for a degree of self-regulation and (perhaps) a premium ‘heavy user’ charge or capping of total downloads.

- A normal or late user also will be able to operate under both regimes; ‘paying’ for protection in a ‘walled garden’ or exposed to risk and congestion in a blind ISP.

There is an aspect of foresight to this.

1. Blind ISPs that attract many early adopters with heavy use and ‘risky’ behaviour may suffer degraded service levels in peering with larger sighted rivals (especially incumbents) and/or attract regulatory attention, which in turn makes them a particularly bad deal for far-sighted early adopters, or lead to excessive churn and consequent heavy marketing expenditures. By contrast, late adopters would not be penalised, as they could choose a sighted ISP.

2. A sighted ‘walled garden’ does provide protection, but those paying for it may not need its restrictions, since they would self-enforce by their conservative and low-use behaviour. This leads either to inefficiently high levels of compliance cost, or excessive rents.

‘Crowding types’ in either model can be represented by the different kinds of users and how one type may ‘chase’ the other from ISP to ISP – the blind ISP will be preferred by more sophisticated users, but over time this comes to represent the majority of users as ‘newbies’ become more experienced.

We explain the behaviour of both ISPs and users in a game. The game is illustrated in Appendix A. Discrete choice modelling with stated preference data would make the values ascribed to blind or sighted ISPs by early and late adopters more robust, but for the model we assume that early adopters have stronger preferences for particular usage types than late adopters (on the basis that you only care about capping, ‘flex-speeds’, traffic-shaping, etc. or filters if you are an educated consumer and therefore know that they exist – to date, and

425 This may operate like ‘Paris metro pricing’, where the protection against congestion, etc. is purely price-driven: if only compatible users pay the charge, they eliminate most of the externality without doing (or getting) anything else.

426 The degree of congestion and tiering/peering difficulties that different ISPs suffer are a further subject for research and we raise the issue for comment.
not by accident, the greatest product/cost variation is in the blind world\(^{427}\). The central insights from the game are that:

- regulation influences the evolution of the system;
- full compliance is neither feasible nor efficient;
- small changes in regulation can produce major shifts in outcome where there are delicately-balanced investment decisions;
- the market could show abrupt changes, cycles and path-dependence if individual users’ costs, risks and exposure depend on the prevalence and severity of others’ behaviour.

The analysis also assumes ‘end-to-end’ geometry, more specifically a ‘universal connectivity’ geometry in which all ISPs are available to all users. If the network structure is differentiated (e.g. by client–server ‘stars’ or ‘small world’ clusters), compliance and the balance among regulatory objectives and socio-economic outcomes can be differentiated locally. In particular, changes in the behaviour of a ‘hub’ in a star-shaped (client–server) network can heavily influence ‘spoke’ behaviour, which justifies the attribution of regulatory or legal liability to such key players. By contrast, a clustered network may display excessive inertia in responding to regulatory or market signals. This approach applies to Member State differences and/or offshoring. An obvious example is a mobile or cable network, which is licensed locally and more easily regulated.

In reality, network structure is itself endogenous; a change of ISP or services used (e.g. from online gaming to IPTV) inevitably alters user interactions. Heavy regulatory pressure on hubs will change the geometry of the network towards either small worlds or a ‘flat’ P2P structure (as has been seen already in music downloads). Individual choices are based on perceived interactions and pay-offs as much as on real ones. The proportion of late adopters is really the prevalence of late-adopter behaviour, and may change as individuals progress through different services. In addition, it will be influenced as much by expected as by real behaviours among the reference population: beliefs as to the proportions of users and ISP choices will be influenced by real experience, press coverage and policy action.

An alternative to differentiation by (neutral) ISPs is ‘tiering’ by means of fair-use restrictions or externality-based specific rules relating to video. Pricing and other restrictions by intermediaries (e.g. ISPs) are driven by externalities (such as congestion), cost-sharing and revenue-sharing. Service and facility bundles change these sharing possibilities. In the same way, user choices among bundles will depend on current needs and pricing arrangements and, in turn, drive future demand.

It can be argued further that the advent of the AVMS in such a rapidly-developing area should permit removal of outdated or distorting regulatory barriers. For example, specified uses for spectrum in particular bands could be counterproductive in ‘mesh’ environments, where the same content could be provided using a network of short-range devices.

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\(^{427}\) Because the availability of ISP choice that internalises these compliance costs depends on the homogeneity of the clientele base (and thus the predictability of those costs), the parameter assumptions are not unreasonable.
operating in the ‘commons’ part of the spectrum. In the same way, local restrictions on the number of service providers and the type of services that they are permitted to offer must be weighed against foregone competition. This is not necessarily bad, any more than the migration of content to the unregulated (or differently-regulated) non-linear domain is bad. But there is no presumption that the reallocation would be optimal, or that the resulting loss of regulatory control is compensated by the removal of a regulatory ‘barrier’.

8.3 Offshoring Impacts of Regulated Access and Content Costs

The ‘Country of Origin’ aspect of the AVMS removes or weakens the need to establish economic entities in every target market (although presumably tax, transactions cost and other reasons will persist). It further opens up the possibility of regulatory competition among Member States and between the EU and the rest of the world, resulting in:

- homogeneous ‘race to the bottom’ or ‘race to the top’ outcomes – e.g. local adoption of heavy, light-touch or litigation-based enforcement;
- differentiated strategies – e.g. where advertising, harmful or illegal content, copyright, etc. are treated differently in different territories.

The AVMS imposes costs on those with editorial content control. At the moment, US players (and others offshore) do not face such costs. However, the net neutrality/Quality of Service debate in the USA opens up the possibility of content-based additional costs. These costs might reduce the absolute disparity between EU and non-EU players (providers), but will do so along different lines. The results in the short term may be a change in global sales in EU markets and EU sales in global markets. This depends in particular on whether AVMS costs are ‘fixed’ (and thus diminished in average terms by globalisation) or ‘variable’ (and thus additional, incurred even for foreign sales).

The incidence of the AVMS and open-access costs will change value mesh geometries in both regions, as the costs are transferred, minimised and reallocated. In the medium to long term, business activity (especially content generation) may flow to the areas of lowest incident cost. This may mean that the lowest-cost area in case costs fall only on service providers (always somewhat localised, especially for linear), but may differ if integrated business models mean that costs flow back to content producers. The bottom line is that relocation of business also changes the reach – and thus the effectiveness – of the regulation. It has four associated potential outcomes.

- It may limit incentives for ‘efficient compliance’ via self-regulation or standards.
- It may mean a flood of essentially unregulated outside content via blind ISPs, satellite and other means.
- This, in turn, may encourage ‘heavy’ regulatory regimes or a push for international harmonisation.
- In the latter case, the issues of content regulation and net neutrality become linked.

A major part of the analysis is the connection (or otherwise) between the implementation of the AVMS and price discrimination. The Directive makes editorial controllers
responsible for monitoring content to ensure compliance and fairness in commercial communications. These additional costs are faced by non-EU players, including the US entities, which provide the principle competition to European content. However, the USA is engaged currently in a legislative debate around net neutrality. Clearly, there is a trade-off in business models between the costs and benefits of complying with European regulation and the potential costs of distribution, and the primary competitor market conditions in the USA.

In the resulting strategic game among companies and regulators, forbearance or business-friendly application of regulation in one territory can attract companies from less attractive locations. Below, we explore an example of the effects which can result.

We illustrate this in Table 20. Note that the effect of network charging is that content must be inspected for type in order to price discriminate: therefore there is a stronger possibility of enforcement of content compliance against both domestic and foreign services, as all services will be monitored. Note that in this instance we assume that packet inspection is generally feasible for most networks against most rich media file types (although we note the current practical difficulties and circumvention possibilities). We also make no judgement as to whether end-users carry the extra costs that each regulatory and content charging system imposes.

<table>
<thead>
<tr>
<th>No network charging</th>
<th>EU network charging</th>
<th>US network charging</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No compliance in Europe or USA</strong> 429</td>
<td>1: Zero regulatory and lower network cost</td>
<td>2: All content in Europe less competitive</td>
</tr>
<tr>
<td><strong>European content compliance</strong></td>
<td>4: European content uncompetitive</td>
<td>5: European content uncompetitive US content very competitive on P2P</td>
</tr>
<tr>
<td><strong>US content compliance</strong></td>
<td>7: US content uncompetitive</td>
<td>8: US content uncompetitive in Europe</td>
</tr>
</tbody>
</table>

This is not a straightforward series of scenarios, but it does leave nine possibilities, of which boxes 4 to 6 are straightforward competitive losses for Europe, and 7 to 9 the same for US content. Box 1, the current situation – prior to European content compliance or US network charging – is that there are no costs imposed for these factors (which means that Box 2 is more expensive for all content in Europe, and Box 3 more expensive for all content in the USA). Box 6, the situation if both European content compliance and US network charging is introduced, is a net ‘double deficit’ for European content. Not only is it more expensive in Europe – where US content cannot be monitored – but also it is more expensive in the US – where local content does not need to comply with content regulations, but all content is charged for distribution. Only in the politically unfeasible

428 RAND analysis. Note that where both Europe and the USA enforce content compliance (which in the US case would require self-regulation, as the First Amendment precludes any government restriction on such speech), the effect between them is neutral but makes both uncompetitive with more liberal regions. Where networks in both Europe and the USA price discriminate, once more, the effect is neutral. It is under circumstances of competitive deregulation or reregulation (races to the bottom or top) that differentials emerge.

429 Self-regulation would continue to apply.
situation where US content is regulated but not European, while European networks charge but not US, is European content at an advantage.

The conclusion from the simple worked example is clear: European content faces a potential double deficit, with both higher compliance costs in Europe and no ability to discriminate against less compliant US content in either Europe or the US. The effect of US price discrimination in content transport is that US networks can charge European content for transport, while Europeans cannot ensure content compliance against US companies.

Also note two further results.

1. US content owners may be able to negotiate bulk discounts in their local market, which are denied to European firms with less critical mass. This is also true for European content owners in each other’s markets, given the low demand for intra-European content viewing (i.e. German films are not popular in France).

2. Both US and European content owners may be at a disadvantage compared to East-Asian rivals, whose governments impose no content regulation costs and whose network operators choose (or are commanded) not to impose price-discriminatory charging for multimedia content. Indeed, the Korean government has set a target for $1 billion in exports for games software producers by 2008, thereby incentivising the industry towards Web2.0 type applications.

We note a further impact. The ‘Long Tail’ discussed in Chapter 2 does not arise simply due to choice in a non-differentiated fashion. As P2P network development has illustrated, the consumer is driven to the ‘Long Tail’ by the gateway of first using the service, and this first use is driven by ‘hits’. Having sampled the initial ‘hits’ on the site, the consumer gains confidence and education, and is more likely to return to sample the ‘Long Tail’ of other content. However, if the ‘hits’ are separated from the other content, as would occur where US content was denied to European operators and entirely served from offshore providers, then the ‘Long Tail’ sites would not be able to attract the initial views. Therefore, it can be postulated that European ‘Long Tail’ sites need US ‘hits’ in order to prosper. Further research into the use of these sites is needed to confirm this initial hypothesis.

This general competitiveness framework must be borne in mind in considering the effects of European content regulation in the concluding assessment and sizing of regulatory impacts, which follows.

8.4 Conclusion: Future Paths for Multimedia Investment under the AVMS

The price in permitting controlled content to replace user-generated content may be paid in delayed innovation. This is a further indirect effect that must be considered: locking in regulation and liability risks locking in existing business models and excluding new approaches. The lost innovation is intangible but essential to consider in an indirect impact assessment.
In this concluding section, we consider the overall effects of the AVMS impacts on market development, based on our portraits. We extend the win–win portrait to consider an extreme example, Web2.0. We note that the medium-term effects are differentiated largely between Member States according to their enforcement decisions, and that these will have impacts on both investment and competition in the sectors. We caution that further research is needed to model these more fully in quantitative rather than qualitative terms. Nevertheless, our analysis shows that the supposed ‘unanticipated consequences’ of regulation of Internet video can be estimated, and that regulators can become more aware of these consequences by using regulatory games to simulate real market behaviour.

Recall that the sectors under consideration – and the component parts of their value meshes – display differential responses to regulatory signals. Whereas online gaming is the most ‘globalised’ of the sectors under consideration, with both production and distribution displaying advanced global as opposed to regional characteristics, both nationally-based IPTV and European (i.e. regional) mobile multimedia are somewhat more localised and thus more directly sensitive to national or European regulation. Investment by online gaming companies (with the exception of highest quality distribution) can make more of a binary choice as to whether to invest or not. By contrast, market access for IPTV and mobile companies appears to be more regulated and therefore a question of the degree of investment in each location, rather than offshoring operations completely. This brief analysis of 2006 may not hold true for the significantly more complex, richer and more powerful applications of 2011.

The first conclusion is that the most footloose and immature elements in the value chain are most responsive to regulatory sunk costs and uncertainties. This either causes businesses to offshore or to invest in other sectors. Our preliminary conclusion is that these businesses are found most often in gaming, but also VOD (as opposed to IPTV) companies and some links in the otherwise tightly vertically-integrated and localised mobile value chain. We expect these businesses to have a high sensitivity to regulatory proposals. As business models develop, we can expect to be able to quantify and analyse these responses to regulation in more detail and with more certainty. Regulation includes any changes to current regulated pricing and classification of content, and the interplay between content regulation and content pricing is, in our view, an essential area for future research.

The second conclusion is that we do not believe that it is possible to estimate the impact of the AVMS regulation on the broader economy in terms of ICTs and productivity. Clearly, broadband Internet use is a necessary prerequisite to future ICT use and it is important that current and future human capital is ICT-literate. However, it is difficult to model changes in regulation against broadband Internet use with any certainty.

Instead, we offer several portraits of the future, from midband malaise, peering future and winner-takes-all to win-win. Figure 44 below illustrates the possibilities. The figure plots OECD broadband penetration and European Internet advertising growth against the

430 The interviewees in this project have indicated that Quality of Service on the Internet is a complex issue and that net neutrality needs greater analysis in order to ascertain the real investment options that can drive content and network investment in Web2.0 and next-generation network futures.
European venture capital available for communications investment. We note that both of the current projections would be significantly interdependent with the scenarios that we portray for the future: the higher the scenario projection of investment, the higher the rate of deployment of services, and hence some further presumptive increase in the rates of broadband adoption and access/advertising growth.

![Figure 44: Potential Outcomes for Investment in European Communications](image)

Sources: RAND analysis from OECD, PriceWaterhouseCoopers, European Venture Capital Association

These correspond to our portraits from Chapter 3, which we revisited at the beginning of this chapter:

1. midband malaise: an environment where content owners and network operators cannot monetise content;
2. user-controlled commons: P2P distribution becomes highly popular and widespread, displacing streamed live content on the Internet and displacing traditional business models;
3. winner-takes-all: in which one type of content wins consumer revenues over all others, taking advantage of the contagious effects of digital networked content;
4. win–win: all content sectors can grow their markets and create a virtuous circle of bandwidth upgrades and industry growth.

The final portrait is a modified version of win–win, which potentially has the largest impacts. It is not only consumer usage and potentially distribution of content which drives the virtuous circle. It is also consumer generated and/or modified content. This is the Web2.0 scenario. If European regions can recreate in some way a Silicon Valley – the 'Shangri-La' of ICT innovation – such an investment spike could occur. Smaller localised examples already exist in locations such as Sophia Antipolis in France, Munich in Germany, Cambridge in the UK, and Greater Helsinki region in Finland.
The conclusions are premised on a light-touch regulatory regime, encouraging self-regulation and market-based, low-cost solutions. Dominant and entrenched market actors in regulated ‘bottlenecks’ play games with regulators in order to increase the sunk costs of market entry for other actors, and to pass through these costs to both consumers and innovators. Very high cost co-regulation and self-regulation can be as effective a regulatory ploy as direct regulation. A light-touch stable regime provides investors with a reasonable level of business certainty. Investors require some certainty that regulation will not cause unwelcome ‘surprises’ that distort their business case. Proposals that non-linear content such as user-generated video and online computer games be regulated under a European directive can be included in such ‘surprises’. The costs, investor signalling and market reputational effects of a non-regulation regime can also be very damaging and lead to ‘surprises’.

Therefore, we suggest that a form of self-regulation in which market actors and self-regulatory bodies maintain a constant dialogue with regulators and consumers is a preferable ‘light-touch’ regime to those of government-funded regulation and non-regulation.

8.4.1 Nine Further Research Suggestions for Broadband Services

The conclusions we make are based on hypotheses designed to isolate the effects of content regulation within the many other parameters in the development of broadband services. The report details the various areas of development that invite further research, and we here highlight the most pertinent and relevant areas that we have identified. These research areas can inform ongoing assessment of indirect impacts of the effects of content regulation on the Internet. They are ordered from the particular to the general.

1. *Internet peering and distribution costs:* We recommend more intensive and focused research into the costs of local IPTV, VOD and multicast distribution. It can be postulated, for instance, that European ‘Long Tail’ sites need US ‘hits’ in order to prosper: further research into the use of these sites is needed to confirm this initial hypothesis. Further research on an ongoing basis is needed into user-generated content creation and self-regulation.

2. *Price discrimination and content regulation:* Regulation includes changes to current regulated pricing and classification of content, so the interplay between content regulation and content pricing is in our view an essential area for future research. ‘Net neutrality’ needs greater analysis in order to ascertain the investment options that can drive content and network investment in Web2.0 and next-generation network futures.

3. *Converging Quality of Service and next-generation networks:* On the Internet, ‘Quality of Service’ is a complex issue. Data, voice and other applications have different ‘legacy’ Quality of Service standards – at least implicitly in their technologies and consumer preference. In converged domains, the necessary evolution will affect entry and profitability. The economics of these interactions require further clarification, as the current empirical base reflects ‘impulse’ effects not market development.
4. **Venture capital flow analysis**: In order to explore the fluctuations in venture capital more accurately, it would be necessary to research the individual funding agreements. This helps in real option analysis of the choices made by venture capital investors.

5. **Switching costs, regulation and innovation**: The impact of regulation on churn and the ‘turbulent’ impact of churn on market growth need to be considered. Regulation may, for instance, encourage price/feature competition or reduce firm survival. Churn – or even vigorous cost competition – may reduce the scope for product innovation on the supply side and innovative (user-generated) activity on the demand side.

6. **Drivers for broadband penetration**: Differences in broadband penetration and capacity utilization appear to be largely explicable by speed of deployment and pricing differences. This observation for early adopters in richer OECD countries may not adequately describe late adopter incentives, and may not hold for the eastern European EU Member States. Further research is necessary in this area, and may benefit from discrete choice modelling using stated preference data.

7. **Stated preference analysis**: User demand for access and services is not wholly driven by current offerings, but reflects as well a ‘real option’ decision based on potential future goods, services, and types of interaction (especially with regard to user-generated content). This has powerful implications both for uptake and utilisation. Because these options are framed by existing uses and service offerings, revealed preference data cannot shed light on underlying preferences or the structure of the underlying decision (e.g., the extent to which content drives broadband adoption or vice versa). Discrete choice modelling with stated preference data would make the values ascribed to ISP choice by users more robust and give deeper insight into the possible future evolution of the sector under different regulatory regimes.

8. **Quantitative assessment of harmonisation and enforcement**: We note that the medium-term effects of regulation are largely differentiated between Member States according to their enforcement decisions, and that these will have impacts on both investment and competition in the sectors. We caution that further research is needed to model these more fully in quantitative rather than qualitative terms, and to shed light on the possible future shape and consequences (e.g., regulatory cost, effectiveness, and ‘flight’) of regulatory competition both within the EU and between the EU and other global regimes.

9. **Game theory and regulatory impact assessment**: Our analysis has highlighted the importance of different models for the discharge of regulatory liabilities (blind versus sighted ISPs, as analysed in Appendix A) and for consumer interaction (open access versus ‘walled gardens’). Since these partially align with the Internet versus next-generation network split and since they are already visible, it would be helpful to have a better understanding of this ‘competition of organisational forms’. Our analysis shows that the supposed ‘unanticipated consequences’ of regulation of Internet video can be estimated, and that regulators can become
more aware of these consequences by using regulatory games to simulate real market behaviour.

We urge those responsible for impact assessment in this area to consider the need for ongoing and detailed analysis of these fast-emerging markets and the effects of regulation thereon.
References


Directive 2000/31/EC on Certain Legal Aspects of Information Society Services, in Particular Electronic Commerce, in the Internal Market


EU Network of Independent Experts on Fundamental Rights (2005) 'Combating Racism and Xenophobia through Criminal Legislation: The Situation in the EU Member States, Opinion No. 5-2005, 28 November


APPENDICES
Appendix A: A Simple Game for ISP Choice

As discussed in Chapter 7, the enforceability and market impacts of the AVMS depend on the extent to which service providers and network operators are willing to serve as the ‘eyes and ears’ of the regulator. This choice is strategic – in other words, it depends on the regulatory stance and choices of other providers and operators. But the choice is also, and critically, a commercial one, taken in anticipation of the market response. This response, which shapes the choices made by ISPs and thus the impact of regulation, is not a simple matter of winner-takes-all, but reflects instead coordination among different user types. This Appendix analyses the possible and likely market outcomes in order to clarify the success of blind or sighted ISPs and the consequences for regulatory effectiveness and cost via a simple game-theoretic model based on two exemplary types of user.

Although formulated as a two-player game, the analysis applies to larger populations and can be extended to deal with multiple types. The model also takes into account the limits of users’ strategic behaviour. Rather than requiring from the outset that each user fully evaluates all others’ behaviour and the likely consequences of a change in strategy, it is compatible with an ‘evolutionary’ approach in which users gradually ‘drift’ towards more attractive options. The analysis illustrates the range of possibilities and their sensitivity to parameters, reflecting both details of ISP behaviour (e.g. backing off from regulatory liabilities) and the stringency and focus of regulation. Moreover, the predicted outcomes are sensitive to the structure of links among users that arise from direct interaction (e.g. P2P sharing) and/or reputation and word-of-mouth about the risks and benefits of different choices. This points the way to a deeper analysis in which ISP choices lead to the formation or destruction of clustered ‘communities of interest’.

The underlying model is simple, but illustrates a range of possibilities and a policy perspective. Suppose, for simplicity, that users are either early (θE) or late (θL) adopters, that there are fixed numbers (N_E, N_L) of each and that each has a choice of two (types of) provider (blind or sighted). A player of type θE or θL interacts in principle with all other players, so the relevant state of the system is described by the proportions (β_E and β_L) of each type who choose the blind ISP. The pay-offs in the game reflect the ‘match’ between the ISP type and the user type, and the externalities created by the choices of other types of user. Pay-offs further vary by:

- the mixture of uses involved (e.g. mobile multimedia, IPTV, gaming); and
- the nature of the regulatory regime – in particular because it affects the costs of using the two types of provider and the additional costs incident on a user.
A simple case will illustrate the style of analysis. Let us collapse the interactions into a 2 x 2 matrix, showing the choice made by a representative user of each type:

<table>
<thead>
<tr>
<th></th>
<th>Early ($\theta_E$)</th>
<th>Late ($\theta_L$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blind</td>
<td>A</td>
<td>2</td>
</tr>
<tr>
<td>Sighted</td>
<td>2</td>
<td>B</td>
</tr>
</tbody>
</table>

The particular network pattern underlying this simplification is that early adopters interact primarily with late adopters (sharing content with them) and only indirectly with other early adopters, at least as far as the choice between blind and sighted ISPs is concerned.

We assume that $A < 2$ and $B < 3$. In other words, an early adopter would prefer a sighted provider if late adopters choose a blind ISP, in order to benefit from the protections of self-regulation and manage the risks to which they may be exposed by sharing content with unprotected and unregulated late adopters. By the same token, if early adopters opt for blind ISPs, the consequent congestion and risks associated with gaining access to content shared by early adopters will induce late adopters to pay for sighted ISP services.

This implies that there are two (asymmetric) equilibria. In the efficient equilibrium, early adopters choose blind ISPs (to allow them to distribute their content freely) and late adopters choose sighted ISPs (to enjoy protection from congestion, etc.). In the efficient equilibrium, late adopters forgo the protection (and expense) of sighted ISPs by going blind, while early adopters choose the self-regulation and certification that the sighted ISPs provide.

Note that this outcome is preferred by both parties to the second equilibrium, in which they may find themselves 'trapped'. Note also that the efficient equilibrium is collectively better than the disequilibrium (symmetric) outcomes in which a single type of ISP dominates the market; this does not mean that this dominance cannot occur, but it could be prevented if (e.g. via content charging) it were possible for those who gain by sorting to compensate those who lose. Specifically, if the market were dominated by blind ISPs, it would be preferable for sighted ones to emerge and serve the late adopters; in a market dominated by sighted ISPs, blind ones should emerge to serve the early adopter community.

These parameters were chosen to produce these results. While the assertion that the efficient equilibrium 'Pareto-dominates' the inefficient equilibrium is relatively uncontroversial, the pay-offs to the symmetric outcomes depend on how the regulatory liabilities are imposed on ISPs, how liability exposure varies with sighted versus blind status (e.g. how the AVMS and E-Commerce Directives are balanced) and whether the ISPs can recover compliance costs (or shift liability) to different user types via e.g. content charging.

There is, of course, no a priori reason why the market should immediately (or ever) end up in one of these equilibria. Suppose that the players can periodically change ISP. Because we ignore intra-type externalities, this is a simple decision that reflects the proportions of early and late adopters who choose blind ISPs ($\beta_E$ and $\beta_L$, respectively):

- an early adopter will wish to choose a blind ISP if $A\beta_L + 3(1-\beta_L) > 2\beta_L + B(1-\beta_E)$

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- an early adopter will wish to choose a blind ISP if $A\beta_L + 3(1-\beta_L) > 2\beta_L + B(1-\beta_E)$
• A late adopter will wish to choose a blind ISP if $B\beta_E + 2(1-\beta_E) > 3\beta_E + A(1-\beta_E)$

The decisions are likely to be subject to some error or noise, because users cannot tell how vigorously an ISP will enforce regulatory guidelines, some may make mistakes or be less successful at optimising their ISP choice, or delays in switching may lead others to change their subscriptions before prior decisions have taken effect fully. This creates a Markov process, which will converge either to the efficient or the inefficient equilibrium. Efficiency will prevail if it takes relatively fewer ‘mistakes’ (less churn) to escape from the inefficient equilibrium – in other words, if the efficient outcome is risk-dominant ($1 > B - A$).

Appropriate policy choice (e.g. indemnifying or magnifying liability, an explicit stance favouring blind or sighted ISPs, or policy relating to content-based charges that can allow ISPs to recoup the costs of regulatory liability) can shift the parameters A and B. The interesting point is that it is only dominant (in the sense that the decision is not affected by the choices of others) for users to choose the efficient outcome if $A > 2$, so the change in A required to ensure the efficient equilibrium is less if the evolutionary perspective is taken into account.

The analysis can be extended to deal with the change in proportions of the types, the strategic choices of ISPs and the concrete impact of regulatory strategies. It is also possible to consider explicitly the way that choice of ISP – particularly choice of a sighted ISP – may ‘rewire’ users’ network interactions, by bringing them closer to other users of the same sighted and/or making it more difficult for them to engage in P2P interactions. With different network geometries, the global convergence result is changed: it may happen that one type of ISP dominates, or that ‘pockets’ following the efficient and the inefficient equilibria can coexist.
## Appendix B: Glossary

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>3G</td>
<td>Third-generation mobile networks, providing voice and data capacity at midband speed above 128 kilobits per second</td>
</tr>
<tr>
<td>ADSL</td>
<td>Asymmetric Digital Subscriber Line</td>
</tr>
<tr>
<td>ADSL2+</td>
<td>Asymmetric Digital Subscriber Line 2</td>
</tr>
<tr>
<td>AVMS</td>
<td>Proposed new Directive to replace TVWF (see below)</td>
</tr>
<tr>
<td>AWTs</td>
<td>Alternative wireless technologies to mobile GSM and UMTS: these include WiFi, wireless local area network (WLAN), RFID and Bluetooth, with longer range WIMAX IEEE 802.16x and other proprietary technologies</td>
</tr>
<tr>
<td>CDMA</td>
<td>Code Division Multiple Access</td>
</tr>
<tr>
<td>COO</td>
<td>Country of Origin principle; basis for freedom of reception of services in the EU. This principle establishes that service providers need only conform to the law of the country in which they are first established, not that of the recipient of services, in this case, audiovisual services</td>
</tr>
<tr>
<td>DG INFSO</td>
<td>Directorate General Information Society and Media. One of 25 Directorate Generals of the European Commission, established by the merger of DG INFOSOC (Information Society) and the Media Directorate of DG Culture in 2004</td>
</tr>
<tr>
<td>DivX</td>
<td>MPEG-4 based digital video compression format</td>
</tr>
<tr>
<td>DSL</td>
<td>Digital Subscriber Line</td>
</tr>
<tr>
<td>DTT</td>
<td>Digital Terrestrial Television</td>
</tr>
<tr>
<td>EC</td>
<td>European Commission; executive body of the EU, responsible for developing and implementing the <em>acquis communautaire</em>, the body of EU law.</td>
</tr>
<tr>
<td>EEA</td>
<td>European Economic Area; the Internal Market of the 25 EU Member States and other members of the EEA, notably European Free Trade Area countries Switzerland, Norway and Iceland.</td>
</tr>
<tr>
<td>EU</td>
<td>European Union, as established in the Treaty of Maastricht 1992. Formerly</td>
</tr>
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</table>
the European Economic Community (EEC)

EU-15 Fifteen pre-existing Member States at 31 December 2003, prior to the new Member States' joining the EU

European Council Council of Ministers of EU Member States, responsible for proposing legislation to the European Parliament

FTTx Fiber To The Home: high speed ethernet-ready transmission wire offered as FTTH (Home), FTTC (Curb) and FTTC (Cabinet – street furniture for telecoms normally available to each neighbourhood, therefore more local than the exchange) varieties

GB Gigabyte (1024 megabytes)

GSM Global System for Mobile Communication also known as 2G, second-generation mobile telephony.

HDTV High Definition Television

ICT Information Communication Technology

IP Internet Protocol

IPR Intellectual property right

IPTV Internet Protocol Television; video programming delivered over IP networks rather than broadcast (cable, terrestrial and satellite) networks

ISP Internet Service Provider; company providing access to the Internet for consumers and businesses. The largest ISP in most Member States is provided by the incumbent telco. ISPs often provide content, have 'portal' pages which offer news, weather and video reports, dating, chat, search and other functions. Mobile networks are also ISPs

ITU International Telecommunication Union

KB Kilobyte

kbit/s kilobits per second

MB Megabyte (1024 kilobytes)

Mbit/s Megabits per second

Member State Member State of the EU; 25 in total with 10 new members ratifying membership to join on 1 January 2004

MPEG Moving Picture Experts Group

New Member States 10 new members of the EU, joining in 2004. These are central European countries (Slovenia, Czech Republic, Hungary, Slovakia, Poland), Baltic states (Estonia, Latvia, Lithuania) and Mediterranean islands (Cyprus and Malta). The populations are typically younger and poorer than in the existing EU-15, with lower broadband use.

OECD Organization for Economic Cooperation and Development. ‘Think-tank’ for developed nations: 30 national members; membership is limited by commitment to a market economy and a pluralistic democracy. Formed in 1961 and grew out of the Organization for European Economic Cooperation (OEEC), established in 1947

PVR Personal video recorder; hard disk recordable drive connected to the video
stream in the household and permitted by digital rights management to record and store live programming for time shifted viewing at a later period

**Telco**
Telcommunications provider; term normally used for incumbent former national monopoly provider. There are also ‘competitive telcos’ – all other providers of switched telecommunications services except the national incumbent

**TVWF**

**UMTS**
Universal Mobile Telecommunications System, also known as 3G, third-generation mobile telephony.

**VDSL**
Very high bitrate digital subscriber line

**VOD**
Video on Demand; provision of video programming at individual demand rather than by an editorial controller in a scheduled sequence

**VoIP**
Voice over Internet Protocol: technology to digitise sound in packets sent over the Internet. Its primary advantage is that distance does not affect the cost of the call between two VoIP enabled phones (or PCs attached to the phone or a data system)

**Wi-Fi**
Wireless Fidelity – standard for WLAN designed to Institute of Electrical and Electronic Engineers (IEEE) 802.11a/b/g specification

**WiMAX**
Worldwide Interoperability for Microwave Access

**WLAN**
Wireless Local Area Network