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TECHNICAL REPORT

Responding to Convergence

Different approaches for Telecommunication regulators

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Preface

This report was prepared for the Dutch Independent Telecommunications and Post Regulator (OPTA). The study was conducted over the period March 2008–August 2008. The objective is to define and describe 'convergence' of the communications and audiovisual content markets; to determine its impact on regulations and market governance; to explore specific issues, such as spectrum policy and net neutrality; and to review different regulatory and governance approaches in the United States, United Kingdom and South Korea.

Three case studies were conducted and their reports form separate documents. Their executive summaries – supported by specific sections, tables and figures from the case reports – are presented in Chapter 4 of this report. As stand-alone pieces of research, they provide valuable insight into the set-up and approaches of the three countries; as well as specific rulings and other interesting content that could not all be incorporated into this report.

This report develops general insights. In setting the scope of this study OPTA decided to exclude specific assessment of the situation in the Netherlands, or the application of the study findings to the Dutch context. This report is thus intended to provide background information to a wider debate in the Netherlands on the review of the overall regulatory and governance approach; and not pre-empt such a discussion. It is written for an audience with a basic understanding of the underlying economics.

The content of this report reflects the findings and views of the authors and neither represents the opinion nor policies of OPTA.

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Thank you

Executive Summary

The independent telecommunication regulator of the Netherlands, OPTA, commissioned this report to describe the phenomenon of convergence in the market for digital information and communication and to assess the consequences of this development for telecommunication regulators and regulation; with the ultimate goal of drawing useful lessons from approaches applied in United States of America, United Kingdom and South Korea.

Approach

1. The report is based on a review of relevant literature to define 'convergence' and what regulatory issues it triggers. In internal meetings with the OPTA team the insights were discussed to allow effective scoping of the issues (technical, economic and societal) to be researched further. A limited number of expert interviews were used to validate findings. On the basis of this general understanding of the issues three detailed case studies were conducted of the market governance and regulation in the United States, the United Kingdom and South Korea. The cases were selected because of their distinct characteristics, and aimed to disclose different regulatory approaches to allow insightful assessment and comparison. The case study process involved a review of policy documents, presentations, scientific literature, existing case studies, and annual reports as well as interviews with local stakeholders and experts.

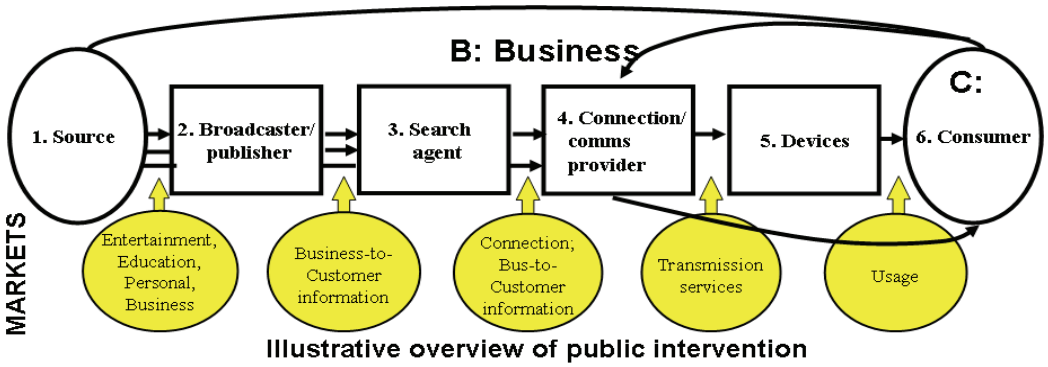
Convergence

2. In the past, broadcast and telecommunications were clearly separate markets, based on different technologies, with distinct governance and regulatory frameworks. Broadcasting often had a strong public-sector interest, driven by concerns about free speech, diversity of supply, decency, programming (cultural content, sports, major events), advertisements, objective information provision, protection of minors, etc. Public broadcasters were supervised by content boards or similar institutions ensuring that the supply of content services complied with the desired societal objectives. Through media ownership restrictions and other rules these were also extended to commercial broadcasting services. Telecommunications markets were ruled by economic and technical issues, including network access; the public interest was the derived goal of ensuring affordable services to everyone. Telecommunication markets, which were mostly liberalised in the 1990s, usually had a regulator to ensure that neither the natural monopoly nor the technical characteristics of incumbent operator(s) would be used to restrict network access or otherwise be exploited to create and abuse significant market power.

3. Through a number of technological advances – especially the increase of processing speed, storage capacity, transmission speed, compression techniques and standardisation – this well-organised and segregated situation changed, allowing for a single or similar set of services to be offered over different platforms (e.g. over cable, satellite, and telecommunication networks), and for the bundling of distinct services onto a single platform (triple and quadruple play). The process of this change is usually referred to as 'convergence'. It challenged the previous modus vivendi because new forms of competition by unregulated players tended to undercut the implicit subsidies of the old model and to disrupt long-term governance relations.

4. This convergence trend is painting a new and much more diffused picture, which can be (temporarily) captured in an image of an integrated 'Information delivery' chain (Figure A); running from the information (or content) source, through publishers and broadcasters, search agents, connection provides, and devices to the ultimate consumer of the information. In the current 'converging' situation none of these elements of the delivery chain are stable and many of the established players are experiencing the impact of disruptive technologies and business models. New services and new entrants are emerging, whilst established players are vertically integrating or even exiting the market.

5. It should be noted that this is a very dynamic situation in which suppliers to one market consistently try to expand into adjoining fields and absorb the market that exists between the functions. Information sources try to bypass publishers by gaining access to search agents and the consuming public. Producers/publishers try to integrate forward by providing search capabilities of their own and sometimes also by offering competing information sources. Soft- and hardware producers try to enter the information delivery chain in the understanding that this is the area where value added will grow. Search engines are investing in mobile devices and operating systems. Connection providers, who realize that the value-added of transmission services can only decrease as bandwidth supply increases, are actively trying to integrate upwards in to additional search and publishing/producing activities. Thus the chain should be seen as a heuristic to help visualize the new converged reality, whilst acknowledging that in practice it is neither linear, nor clearly defined.



Illustrative overview of public intervention

T=Tech;	-	Personal Information, network security	Communications network security	Spectrum, interference; device neutrality	Encryption; Info security
E=Econ	Competition; IPR	Public value test; Media ownership	Competition;	LLU	Competition
S=Soc	Policing; SPAM (pornography)	Pluralism; freedom of speech indecency rules	Universal service; must carry	Universal Service	Awareness raising; privacy

A: AUTHORITIES

Figure A: the "TES" drivers and "ABCs" of the information delivery chain and its markets

Regulatory responses

6. Traditional Broadcasting and Telecommunication regulations are driven by a mix of technical, economic and societal (TES) objectives. Figure A also presents an indicative overview of policies in the various markets. The evolving context leads to a convergence on the regulatory side – as the values and policy objectives of one policy field flow into the other when the regulation (and the regulator) follows the platform into new service areas where traditionally-regulated services are being provided through other (unregulated) channels.

7. Administrations, business and consumers/customers/citizens (ABC) are affected, at different levels and in different degrees, by convergence. Administrations and regulatory authorities are forced to converge in response to markets; and to reinvent themselves to enable 'joined-up' coherent policies and responses to be made to new market realities. Business sees opportunities and challenges, depending where in the delivery chain they have traditionally provided their services. Consumers are presented with a wide supply of affordable services and an overflow of information, including indecent, harmful and/or illegal content that is hard to counter and against which the authorities cannot provide adequate protection. At the same time, they have increasing opportunities to take on the roles of content creator, distributor and even regulator, alone or in partnership with business and government.

8. The choice of when to regulate balances need, burden and efficacy considerations. Regulation at one part of the value chain has impacts elsewhere, in either traditional or

converged setups, raising the question of where to regulate[1]. If convergence affects the distribution of need, burden and/or efficacy through the chain, it thus challenges both decisions.

9. The most apparent risks of a traditionally fragmented regulatory approach are:

   - Weakening the effectiveness of regulation if alternative providers in other channels can not be regulated;
   - Distortion of competition between regulated and alternative providers;
   - Reduced supply or increased cost of bundled goods and services, benefiting from internal subsidies;

   Beyond the increased complexity of regulating multiple delivery channels, the globalisation of ICT adds an international dimension; potentially leading to:

   - Loss of regulatory effectiveness and of potential economic returns due to *regulatory flight* - firms move or are taken over by firms outside the regulator's jurisdiction. This is exacerbated if convergence giving less-regulated foreign firms a cost advantage.
   - *Regulatory competition* - globalisation threatens a regulatory 'race to the bottom' convergence creates competition among regulators in the same country with overlapping remits.

10. Critical in addressing these challenges is that the whole information delivery chain needs to be taken into account. Policy makers must rethink lines of policy responsibility and governance, forms of intervention and the associated operational objectives. Examples of these changes include increased scope for self-regulation and market-assisted methods such as spectrum trading, to support and complement traditional regulation and competition policy.

Policy instruments

11. *Self-regulation* plays a visible role in both US and UK responses to convergence. Self- and co-regulation become viable alternatives to traditional regulation, where the speed of change and difficulty of control and enforcement require instruments that are more flexible, better grounded in the market and therefore more credible and less burdensome to stakeholders. Specifically, formal telecom regulators that typically compel the behaviour of one or a few dominant providers in relation to their regulated activities only indirectly influence other parts of the value chain, and non-telecom providers of analogous services and unregulated activities. A self-regulatory body can adjust participation, rules and enforcement, as the situation changes and thus enjoys 'shorter' and more effective chains of command in addressing convergence-related issues. But because self-regulation primarily serves participants' collective interests, it may be vulnerable to collusion, corruption or the erosion of effectiveness, transparency, accountability and proportionality. This vulnerability may require government support, constraint or monitoring especially where self-regulation replaces or outsource formal regulation.

[1] This includes the use of existing regulatory relationships to encourage the cooperation of e.g. service providers in the governance of activity originating or ending at other parts of the chain (e.g. file-sharing).

12. *Spectrum allocation* has become a strategic policy tool. Wireless communications are essentially free from many fixed facilities - which make them harder to control ex post and makes it more effective to regulate them ex ante by attaching conditions to the right to broadcast or receive signals. Figure B summarises this change and the strategic objectives that regulators seek to achieve through spectrum policy.

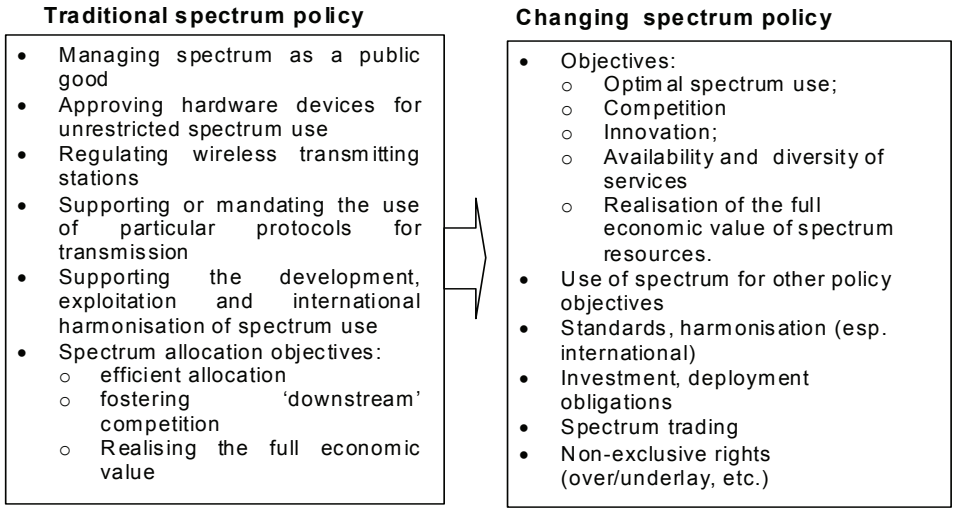


Figure B: changing role of spectrum policy

Auctions have become the leading allocation method, intended to reduce exposure of the spectrum authorities to legal liabilities, and to allocate spectrum where it is most highly valued.

Case studies

13. Three Case studies – in the US, UK, and South Korea help gauge possible regulatory responses and changing market governance approaches, and their impacts in the area of technology, economics and society (TES). They were chosen as they represent very distinct approaches to the governance of very dynamic local information markets.

14. Specifics of the US case.

The main regulator in the 'information delivery' market is the Federal Communications Commission (FCC). The FCC is in itself not a 'converged' regulator, as it shares its competences at the federal level with the Department of Justice (DoJ) and the Federal Trade Commission (FTC), dealing with competition and consumer protection policy; and at the state and local level with the state public utility commissions (PUCs). The FCC board is a political body appointed by the US President and conformed by the Senate; for the rest it is largely under the control of the Congress.

The case study analysis has shown a very strong contrast in the US approach to that revealed in the UK, as the US telecoms regulators essentially lack a coherent and forward-looking approach; rather, the US policy has been fundamentally reactive, resolving conflicts as they arise between consumers, incumbents and new players. Also with respect to convergence, there is no grand strategy but more of a 'muddling through' approach. The US system depends to a great extent on court rulings, and an active civil society involvement. However, where the FCC intervened, its decisions had a major impact on

convergence and market developments. The intervention to ensure local market competition lead to a nation wide telecommunication duopoly; deregulation of broadband access supported cable operators, as telecommunication networks remained regulated; and the dilution of media ownership rules have boosted the online presence of major broadcasters.

The reactive nature of the US approach provides for a very predictable, robust regulatory environment in which new entrants can challenge existing practice. This has allowed breakthrough rulings and keeps the FCC at the forefront of setting policies dealing with the effects of convergence. However this comes at a high legal cost and allows incumbents to delay or stop new players from entering.

The US is one of a few countries with strong inter-modal broadband competition between Digital Subscriber Lines (DSL) and cable modem, and with a significant Fibre-to-the-Home (FTTH) development. However, the FCC has been less effective to ensure competition over the networks, which is also reflected in the fierce debate over net neutrality, which has not (so far) been much of a concern to European regulators. All in all he US market and its regulators provide a lot of interesting cases as it is here where the innovation is highest and regulatory challenges come to the fore. The US is also an interesting market to observe as it has pioneered with new policy instruments like self-regulation and sophisticated spectrum auctions. A major difference between the US and many other countries is the comparatively low level of content regulation in the US, making it easier to accommodate convergence of content distribution.

15. Specifics of the UK case.

    The UK communications market is one of the more competitive in Europe and is characterised by a complex industry structure with a dominant telecom incumbent, a mix of good (uptake of digital television, content diversity) and bad (broadband penetration, price and quality) performance, a content industry strongly affected by a public sector incumbent, the BBC and a converged regulator employing highly sophisticated tools and closely engaged with industry, community and academic communities.

    The UK case stands out as having the most 'converged' regulator, Ofcom, which was deliberately formed out of a merger of five existing regulators to deal with the new realities of integrated information delivery markets. However, Ofcom does not serve as a comprehensive and independent regulator of all aspects of the information delivery chain. It is more appropriate to think of it as a central platform on which converging issues, tools and styles of analysis can be integrated and through which the activities of key policy stakeholders can be coordinated. Ofcom is independent and has significant policy setting, supervisory and regulatory powers, which it applies with a strong inclination towards liberalised markets and deregulation. Ofcom's duties fall under separate government departments and thus separate Commons Select Committees. There is no single structured House of Lords system of oversight of Ofcom.

    The UK case is interesting as Ofcom strives to lead the way in many areas; actively procuring and conducting research, piloting new spectrum auction designs, conducting wide scale consultations, engaging stakeholders and supporting self regulatory solutions, especially in the internet domain and the area of audiovisual content. It uses its position to

support innovation and competitiveness whilst protecting the interests of consumers. The case study identified five major shifts in methods, (1) Compliance shifted from telecommunications licensing towards authorisation, requiring companies to certify compliance with 'conditions of entitlement' (e.g. must carry rule, network, significant market power conditions, etc) – facilitating entry and flexibility while minimising the need to extend regulation to 'converged in' outsiders. (2) Spectrum management shifted towards a market-based approach opening the way for spectrum trading among licensed and unlicensed spectrum users and increasing unlicensed use where technically feasible. (3) Licensing moved from detailed and prescriptive terms towards a more transparent and liberal regime with greater co- and self-regulation. (4) Content regulation moved to a 3-tier regulatory structure to rationalise gaps and overlaps. (5) Media ownership is being extensively liberalised.

Content and broadcast policy were only partially transferred to Ofcom and remain the least-integrated parts of its portfolio. Most aspects are handled by the Department of Culture, Media and Sport (often in partnership with Ofcom) and most competition policy enforcement is handled by the Competition Commission (on referral from the Office of Fair Trading - to which Ofcom can itself refer complaints); this includes cross-ownership restrictions. Ofcom has been active in domains relating to internet content.

16. Specifics of the South Korean case.

South Korea has a dynamic market environment, high broadband penetration, and apparent leadership in the development of converged services. Its market development is mostly dominated by large telecommunications companies, less by bottom up innovation of new entrants or content industry. The government has actively supported the roll out and access to broadband (FTTH) and embraces ICT as the main driver of competitiveness for the Korean economy. The convergence trend in South Korea was lead by the market and the government was relatively slow to follow. After 2004 it has initiated a reform process of its market governance and regulation, in response to convergence. The government sees convergence as a positive development and a policy goal in itself, with high potential for innovation and new service development. South Korea chose to adopt the single regulator model by merging the telecommunications regulator MIC and the Broadcast regulator KBC in the new KCC. KCC has been given a broad remit involving a range of technical, economic, and societal objectives.

However, this converged approach is only partially implemented, as its reporting structure continues to follow the segregation between broadcast and telecommunication and there remains a rift between the legacy regulators as to the structure of a new 'converged' communication regulation. Overall South Korea demonstrates the ability and drive to balance the technological, economical and societal (TES) objectives. This balance is influenced by regulatory legacy, with content policy being dominated by societal concerns and telecommunication policy by the market and technology perspectives.

In the application of new policy instruments South Korea is less advanced than the UK and the US. Spectrum auctions have so far not been used as allocation mechanism. SK still relies mostly on beauty contests and administrative pricing, with a very prescriptive approach to usage and technologies to be applied. Much effort has gone into creating secondary spectrum markets and reuse of abandoned spectrum, but without notable effect

so far. South Korea has access to significant private and public research capacities to support forward looking policy making, but is slow to integrate scientific knowledge into regulatory practice.

Conclusions

17. Comparison of cases

The three cases share a number of important features. They all acknowledge convergence as a relevant trend that has the potential for disrupting the market and the existing governance structures and regulation. This awareness has lead to regulatory adjustments in the case of the US, and a total overhaul of the regulatory landscape in the UK; with a more modest review in Korea currently being implemented. These change processes were strenuous and encountered a lot of internal resistance, which required political leadership and perseverance to succeed.

The impact of regulators on the market proves to be strong. In all cases a degree of path dependency can be observed in the market based on the legacy regulatory system. This tends to have a distorting effect on the market, and often leads to incoherent policies across the information delivery chain; e.g. biasing (large) telecom operators in South Korea; strengthening the duopoly, and discriminating between (unregulated) cable and (regulated) telecommunication infrastructure in the US; and strong ties between the regulator and the incumbent telecommunications provider, and favouring economic over societal objectives in the UK.

None of the cases have a fully converged solution. In the UK Ofcom is not fully in charge of content and media policy; whilst the FCC does not have powers over the internet. The South Korean situation is still developing, but the current set up suggests that communications and audiovisual content policy will retain certain of its traditional characteristics. In all cases a general competition authority plays a complementary role.

Typically all cases have chosen to integrate spectrum policy in the mandate of the 'information' regulator; as it is considered a key strategic ex ante policy tool with large impact on the 'information' market and society as a whole. The traditional technological objectives have been replaced by a more strategic balancing of TES objectives, which requires coherence and consistency in their application. The allocation mechanism of choice is the increasingly sophisticated spectrum auction. Differences occur in the views on the need to ensure technological and service neutrality, and mechanisms on reuse, and extending licences.

Markets:	Source to Publisher	Publisher to Search agent	Search agent to Connection provider	Connection Provider to Devices	Devices to Consumers
United States		**= FCC**	**= Other**		**= Shared**
T=Tech	-	-	Cyber security; (DHS, DoJ)	Spectrum; hardware access; ntw sec.	Information security, self- regulation
E=Econ	DoJ, FTC	Fair acess; Media ownership	FTC	FCC in Telco, FTC in cable	DoJ, FTC
S=Soc	DoJ (e.g. child pornography)	(very limited) Indecency rules	-	Universal service policy	Self-regulation
United kingdom		**= Ofcom**	**= Other**		**= Shared**
T=Tech	-	Personal Information, network security	Communications network security	Spectrum, device neutrality;	Encryption, Info security, Self-regulation
E=Econ	OFT, CC	Public value test; Media ownership	Telecom group, BT undertakings	Regulation	OFT, CC
S=Soc	DCMS, self regulation	Public interest test	-	Universal service policy; digital dividend	Awareness raising; privacy; ICO
South Korea		**= KCC**	**= Other**		**= Shared**
T=Tech	-	-	Enhance Cyber security; Network upgrades	Spectrum; hardware access	KISA; Information security
E=Econ	Competition, innovation, access	eg IPTV law Media ownership	Competition; KFTC	Regulation, Competition	Competition, KFTC
S=Soc	Policing of eg bullying, pornography	Active content policy	-	Universal service policy; digital dividend	Privacy, Consumer rights

Figure C: Indicative overview of competencies of regulators in the 3 cases across the information delivery chain in the TES domains

18. Differences between cases:

As Figure C indicates, the level of regulation and coverage of the information delivery chain by the 'Information' regulator differs between cases; with a high level of integration in the UK and low levels of regulation and a more fragmented mandate for the FCC in the US. Where systems are less integrated they tend to depend stronger on inter-institutional coordination. A certain degree of institutional competition can also be observed which may lead to inconsistent policy outcomes and distortions in the market.

On the competition angle there is an important difference that needs to be noted: European/UK policy has not succeeded in forcing a "second wire to the home", while US policy has not succeeded in forcing a "third wire to the home" – nonetheless, competition is stronger in Europe; despite the very different rates of e.g. cable penetration, etc. European customers have a greater choice of alternative internet service providers (ISPs) and therefore of services, applications and content. South Korea leads the way with effective competition between and over networks.

From a regulation perspective, both the US and the UK are committed to minimal regulation to deal with significant market power (SMP) and to deregulation where

possible. In the UK, the separation of enforcement powers and Ofcom's independence have helped put this principle on a firm and objective analytic footing. In the US, the ambiguities and increasingly-outdated provisions of the 1996 Telecommunications Act have left the FCC vulnerable to politicisation and lobbying and have, as a result led to a retreat from a pro-competitive philosophy towards a form of deregulation closely aligned with incumbent's interests.

We can therefore anticipate that the market and regulatory situations will continue to diverge. The UK (and by extension Europe) will likely see a richer diversity of alternatives through increasing unbundling and facility-based competition. Unlike the US situation, infrastructure competition will be introduced in an environment where service, content and application competition and weakening of vertical constraints have already taken hold. By contrast, the US duopoly situation seems likely to continue and strengthen.

In addition, the linkage between competition and societal policy domains driven by convergence (and exemplified by the European perspective on net neutrality) should help to eliminate stovepipes and improve coordination both within converged European telecom regulators and among telecom, consumer and competition regulators. By contrast, the US regulator does not have explicit powers to regulate the Internet. While the FCC could seek to develop such rules using its overall (but vague) jurisdiction over electronic communications (Title I of the 1996 Act), it could only do so by in effect shifting from an executive to a legislative body, but without the formal checks and balances to which Congress is subject.

Thus, the convergence-spawned issues facing the UK and the US differ in severity, detail and the capacity to handle the problems within the existing framework. The chances of disruptive rather than evolutionary change are therefore probably greater in the US where competition is weaker and the legal framework less clear, and less clearly adaptable to the particular challenges of convergence

Responses and recommendations

19. Change is on-going and cannot be pinned down by a single approach. The most integrated and coherent approach adopted in the UK still faces difficulty in responding to uncertainty and change. A critical feature for dealing with uncertainty is to retain closeness to the market, effective involvement of stakeholders, and control over flexible tools to intervene.

20. A monolithic information regulator is not the sole or not even the best answer to deal with convergence. Even in an integrated regulator traditional stove pipes remain and new ones emerge. This may not be a bad thing al together as this leads to different view points and debate, which would otherwise be smothered inside the organisation.

21. The cases demonstrate the need for a balanced set of ex post and ex ante policy tools. Ex post rulings can be slow to react to changes in the market and due to their costliness prejudice in favour of large incumbents and punish new entrants (services and technologies). On the other hand ex post approaches make sure that rulings are limited to areas that have real relevance; and the risk of misjudging the trend is very small. Ex ante tools like spectrum policy are able to support favourable developments and outcomes more directly. However they risk picking the wrong 'winners' and supporting interventions at the 'wrong' stage in the technological development and deployment cycle

22. Convergence needs a regulatory/policy response across the whole information delivery chain. This does not mean that all functions have to be accrued in one organization, but it requires that there is:

    - a coordinated application of tools/instruments
    - a central governance structure for the coordination of the activities of different regulators, that allows effective arbitration between TES and ABC to achieve coherent decisions
    - a system which has the ability to identify, acknowledge and adjust to change.

23. It also requires establishing overall public value objectives at the political level, to ensure that all instruments and organizations are aware of the need to achieve/defend a balanced application of policy objectives (TES) for all stakeholders (ABC); thus aligning of objectives, structures, processes and policies.

24. More active partnership between telecom and competition authorities; and between the telecom/spectrum and the broadcast/content 'silos' in and between the regulator(s) is required to deal with the convergence challenges like net neutrality problems.

25. To deal with convergence, regulation is not enough, as enforcement becomes more difficult and more direct impact can be achieved by applying other instruments:

    - self- and co-regulation
    - ex ante instruments like spectrum allocation and management policies
    - stakeholder and expert consultations
    - general competition policy

26. Following the logic of the cases the information regulator should also be in charge of spectrum policy. The cross-cutting nature of this instrument and its critical strategic importance require that it is applied in a fully consistent and coherent manner with other regulatory instruments, and across all related policy areas (telecommunication, media and broadcasting, content). This is necessary for achieving broad societal and economic objectives, in addition to taking account of technological concerns.

27. With regard to self-regulation, in developing and implementing either a reactive or a proactive response to convergence, regulators must consider:

    - How to evaluate existing and proposed self-regulation
    - How to develop strategies of cooperation, support and even deferral to suitable arrangements

The implementation of a clear and coherent strategy for ensuring that self-regulation preserves accountability and transparency, maintains regulatory effectiveness, and does not produce additional problems of e.g. collusion and exclusion.

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Glossary

ABC: Administration, Business, Citizen/Consumer

ARPU: average revenue per user

AV: audiovisual

AVMS Directive: European Union's Audiovisual and Media Services Directive

B2B: Business-to-Business

BCN: Broadband Convergence Network

BERR: UK Department for Business Enterprise and Regulatory Reform

BBC: British Broadcasting Corporation

BEM: Block Edge Mask

BERR: UK Department of Business, Enterprise and Regulatory Reform

BSC: UK Broadcasting Standards Commission

BT: British Telecom

CB: Content Board of Ofcom

CC: UK Competition Commission

CEPT: European Conference of Postal and Telecommunications Administrations

CLEC: US Competitive Local Exchange Carrier

CR: Cognitive Radio

CTO: Chief Technology Officer

CTT: UK Convergence Think Tank

DCMS: UK Department of Culture, Media and Sport

DEL: departmental expenditure limit in the UK

DMB: Digital Media Broadcasting

DMC: Digital Media Centre

DoD: US Department of Defense

DoJ: US Department of Justice

DRM: digital rights management

DSCF: Department for Children, Schools and Families

DSL: Digital Subscriber Line

DTT: digital terrestrial television

EC: European Commission

EU: European Union

EULA: end-user licence agreements

ETRI: South Korean Electronics and Telecommunications Research Institutes

FCC: US Federal Communications Commission

FDD: Frequency Division Duplex – voice-only, two-way, two-channel (paired) signal transmitter

FTC: US Federal Trade Commission

FTTH: Fibre-to-the-Home

HSDPA: High-Speed Downlink Packet Access

ICO: UK Information Commissioner Office

IPTV: Internet Protocol Television

ILEC: Incumbent Local Exchange Carrier

IPR: intellectual property right

Ipsos MORI: polling company

ISPs: Internet Service Providers

ITC: Independent Television Commission

IWF: Internet Watch Foundation

KBC: Korean Broadcasting Commission

KCC: Korea Communications Commission

KCC: Korea Communications Commission

KFTC: Korea Fair Trading Commission

KISA: Korea Information Security Agency

KORPA: Korea Radio Promotion Agency

KT: Korea Teleco

LTE: long-term evolution

LLU: local Loop Unbundling

MACs: Migration Access Codes

MIA: market impact assessment

MIC: South Korean Ministry of Information and Communication

MPP: multiple programme provider

MSO: multiple system operator

MVNO: Mobile Virtual Network Operator

NAO: UK National Audit Office

NCC: UK National Consumer Council

NGA: next-generation access

NGN: next-generation networks

NGO: non-governmental organisation

NO: network operator

NPRM: Notice of Proposed Rule Making

OEM: original equipment manufacturer

OET: Office of Engineering and Technology

Ofcom: The Office of Communications

OFT: Office of Fair Trading

OFTEL: Office of Telecommunications

OSAB: The Ofcom Spectrum Advisory Board

OSMU: one source multi use

P2P: peer-to-peer

PDA: Personal Digital Assistant

PEGI: Pan-European Game Information initiative

PIT: public interest test

PPP: public–private partnerships

PSB: public service broadcaster/broadcasting

PSTN: public switched telephone network

PUC: US public utility commissions

PVA: public value assessment as applied in the UK

PVT: public value test as applied in the UK

PVR: personal video recorder

Quadruple Play: the provision of video, Internet, telephone and mobile service by a single broadband service provider

RA: Radiocommunications Agency

RAu: Radio Authority

RFID/USN: Radio Frequency Identification/Ubiquitous Sensor Network

RSPG: Radio Spectrum Policy Group

SME: small and medium-size enterprises

SMP: significant market power

SO: system operator

SUR: Spectrum Usage Right

TDD: Time Division Duplex – a two-way, single-frequency (unpaired) signal transmitter

TES: Technical, Economic, Societal/Social

Triple Play: the provision of video, Internet and telephone by a single broadband service provider

TVWF: EU Television without Frontiers Directive, predecessor of AVMS Directive

UKSSC: the UK Spectrum Strategy Committee (an official coordination committee of the Cabinet Office, of which Ofcom is a participant)

UNE: unbundled network elements

UNE-P: unbundled network element-platform

VDSL: Very high speed DSL

VOD: video on demand

VoIP: Voice over Internet Protocol

WAPECS: Wireless Access Policy for Electronic Communications Services

WiBro: wireless-broadband

WLAN: Wireless Local Area Network

WSD: White Space Devices

Introduction

Objectives

OPTA has approached RAND Europe to review and describe the phenomenon of convergence of the telecommunication and broadcast markets and assess the various regulatory consequences. Particular focus areas – in view of the sharpness of convergence issues and the breadth and innovative character of regulatory responses – are content and spectrum policy. These are traditional policy areas, corresponding not only to traditionally-separate market segments but also to distinct regulatory 'stovepipes' – and even separate regulatory bodies. As a result, issues arising from market convergence (and associated regulatory convergence) are especially important to analyse in order to gauge the structural pressures on regulators struggling to preserve their effective influence on traditional regulation issues in the face of market changes. At the same time, new policy issues are emerging as a result of changing market structures that do not have a natural 'home' in the regulatory portfolio of most countries, but which cut across existing areas. As an example of such an area, the discussion of net neutrality and approaches to its implications are also discussed.

From a user perspective, convergence can be defined as: the ability of the consumer to obtain multiple services on a single platform or device; or obtain any given service on multiple platforms or devices[2]. This is facilitated by technical development via convergence in services and in the contracts and markets through which they are provided. These changes affect the basis for regulation (some problems or sources of market failure may be resolved by convergence; some may move beyond regulatory solution[3]; and other issues requiring regulation may arise); the tools available for regulation (eg *ex ante* controls [licensing, spectrum allocation, etc.] may become less effective; *ex post* controls [eg standards and pricing monitoring, investment or merger approval] may become more powerful, etc.); or policy issues may become cross-linked. These changes not only affect the *conduct* of regulators, regulated firms and unregulated bodies in the value chain, but also both the market and regulatory *structures*.

This study explores the relationship between governance structures and the extent to which convergence has affected the market. This is not a purely static analysis: history strongly

[2] "What is Convergence". A submission by Ofcom, Ofcom 2007, p1

[3] Eg if the offending activities can be carried on by parties outside regulatory control, or if the availability of different channels removes the power of regulated entities to manage problems.

influences the situation, so things that work well or poorly in one country or market segment may behave very differently in another. In addition, the performance of a particular regulatory approach may be strongly influenced by the regulator's relationship with other public sector institutions and the country's relationships (in law, policy and market) with other countries or supranational bodies. Indeed, as the history of spectrum allocation policy demonstrates, path-dependence has both a cross-sectional and a longitudinal component – to describe the history of 3G auctions crudely, one might say that "everything works the first time; nothing works the same way twice[4]". In addition, today's policy is tomorrow's policy history – many of the more profound regulatory experiments (eg in the UK and the US) seem to have been undertaken in a conscious attempt to shape the future evolution of the sector. The other obvious lesson of convergence is the challenge to policy coherence: as regulated bodies and issues overlap, it becomes harder to manage overlaps and gaps resulting from legacy assignments of responsibility. In this sense, change is as much a matter of evolution as of design, and the experience reviewed in this study should be seen as exposing trends and constraints that may not be obvious from external or 'objective' indicators of sector and regulatory structure, conduct and performance.

To shed light on this past and future history, the study reviews relevant governance models in the United Kingdom, the United States and South Korea. These represent three different approaches to dealing with convergence and provide insights into individual effectiveness, common elements and thus provide both specific and general lessons for OPTA.

The report is intended to provide a comparative factual and analytical basis for a wider discussion in the Netherlands over market supervision, especially in the broadcast (or audiovisual) and telecommunications markets. The basic presumptions are that a fragmented governance structure cannot adequately supervise an integrated (or integrating) market and that convergence changes the power of markets to self-regulate and therefore lays the groundwork for a different partnership between the regulators, the regulated entities, those whose interests are protected by regulation and other entities affected by regulatory decisions (eg those operating in unregulated parts of the value chain). In addition, we recognise from the outset that legacy regulators are bound by different constraints, motivated by different values and empowered with different (or differently-effective) tools whose operation may prove hard to reconcile.

Thus, when we examine the impact of convergence, we find a combination of:

- regulatory convergence that matches or complements market convergence
- a realignment of technical, economic and societal tools with technical, economic and societal objectives
- a redrawing of the boundaries of regulation, expanding in some areas and retreating in others.

[4] Klemperer (2006)

We also find a mix of historical accident, natural experiment and intentional regulatory (re)design.

Methodology

First the a horizon scan of literature and meetings with OPTA were used to scope the issues and define the concept of convergence as well as the parameters of the study. Then a factual basis was laid by reviewing scientific literature and policy documents on the technical, economic and societal aspects of convergence in telecommunications and audiovisual markets. At the request of OPTA extra attention was given to audiovisual policy, spectrum allocation and Net Neutrality. The findings were applied to a model of the changing information delivery chain; and validated though a limited set of interviews with experts.

The second phase contained three case studies of United Kingdom, United States, and South Korea, based on a case study protocol (see Appendix B). For every case study relevant policy reports, evaluations, annual reports, and existing case studies were reviewed. In addition semi-structured key informant interviews were conducted with a selection of stakeholders

Finally an analysis was made of the Capabilities, Limitations, Opportunities and Threats (CLOT) of each case. This analysis assessed the appropriateness, coherence, and impact of the different approaches, as well as their robustness and flexibility. These were subsequently compared across cases.

Content of the report

Chapter 1 Gone are the stovepipes: realities of converging markets

This first chapter addresses the changes in the market, due to convergence. The basic trend is discussed whereby segregated audiovisual and communications markets are now merging into one 'information' market, enabled through technology. This trend impacts on the incumbent players, and their business models; but also invites new players to enter the market and other's to exit. These phenomena are addressed by describing the information-delivery chain and its various components.

Chapter 2 The regulatory challenge: keeping up with the change

The trends described in Chapter 1 raise new regulatory issues and have a profound impact on the governance of the information market and the tools and instruments to control it. In the light of this, spectrum policy and new self-regulatory solutions receive some specific attention in this chapter; as well as new challenges such as net neutrality.

Chapter 3 Instruments for effective intervention in converging markets

Responding to regulatory challenges will also require the effective deployment of new instruments. Self-regulation will become increasingly important in the internet domain; whilst spectrum policy proves a powerful *ex ante* tool for influencing markets and the deployment of new technologies.

Chapter 4 Case studies: learning from the United States, United Kingdom and South Korea

In this chapter, the issues raised in Chapters 1 and 2 are researched in the context of three distinct case studies. The approaches of the United States, United Kingdom and South Korea are reviewed and compared, to draw lessons on how to deal with convergence phenomena.

Conclusions and recommendations

This final chapter presents the conclusions emerging from the three case studies and identifies common elements and divergent approaches and determines which interventions and initiatives have been effective.

CHAPTER 1

Gone are the stovepipes: realities of converging markets

This chapter explores the phenomenon of convergence from the perspective of the telecommunications and traditional broadcasting markets, to identify the changes and the associated regulatory challenge. Specific attention is given to the technical, economic and social aspects of the evolving delivery chain of information/content.

1.1 Communications and Broadcasting: two different roots

It is only forty years ago, in 1967, that colour TV was launched in Western Europe, 25 years ago that the Personal Computer was launched and 20 years since GSM popularised mobile telephones. There is little that has not changed. Technologies are new. Markets and suppliers are new. Consumer demands are new. Regulation however has tended to develop more gradually and has had a tendency to lag behind the opportunities that the new technologies have provided. Typically, regulation initially focused on making sure that the consumer had access. In the next phase, affordability became important. And, finally, the quality of service both in terms of technology and content has become the most important element of regulation, in particular in the case of broadcasting.

In the post-war era, communications for private and public transmissions were technologically separated into surface transmission (telegraph, telex, telephone) and wireless communications (radio and TV broadcasting), as is demonstrated in Figure 1.

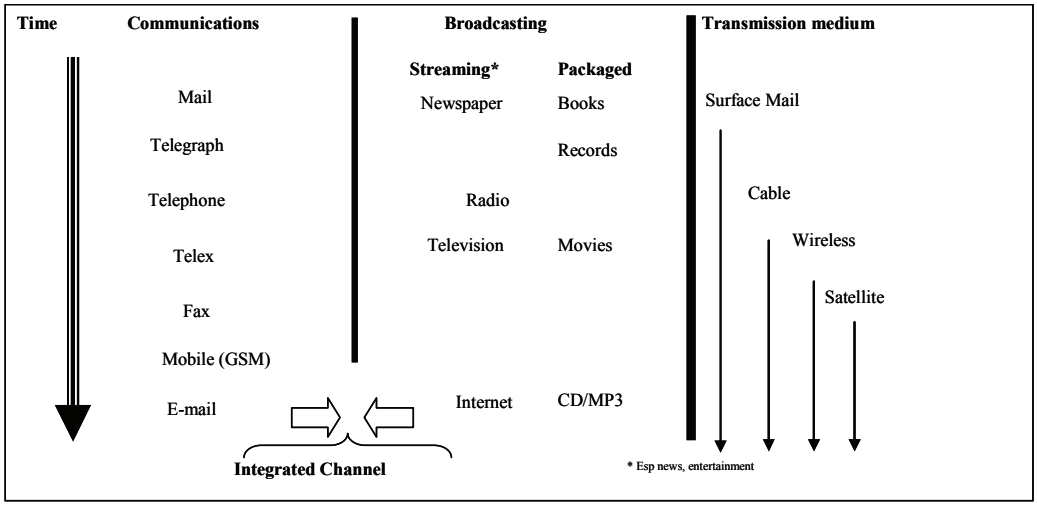

Figure 1 Segmentation of the information delivery chain: traditional view

Figure 1 illustrates the separation of the two businesses, but also how this separation came to a rather abrupt end with the emergence of internet and e-mail, allowing data, other than voice messages, to be sent over telephony infrastructure.

1.1.1 A history of regulation in two different channels

Until the end of the 20th century, communications and broadcasting markets were entirely separated. This separation had its roots in technology and functionality – communications like telephone and telegraph used entirely different equipment and services for most of their delivery. It was supported by the nature of the services. After all, two-way communications between individuals was something totally different from a broadcast to a large audience. Unsurprisingly, the approaches that were used to regulate them also followed their own development paths. In case of (peer-to-peer) communications, the emphasis was on access, with additional demands for reasonable cost and reasonable quality. Thus, connectivity and a universal service policy (USP) were predominant issues. Later on, pricing became an important subject, but mostly in the context of a general societal demand for competitive markets that also saw important changes being imposed in other business like air transport and finance. Societal issues as well as the impact on growth and innovation were almost non-existent and quality was only moderately important.

In the case of broadcasting, however, societal and cultural issues have been at the forefront of policy development (eg freedom of speech, freedom of information, cultural and local programming, diversity, and protection against indecency). Whilst economic issues like broadcasting/publishing monopolies have also received attention, pricing was less relevant and the technology issues centred on interference and capacity. The two arenas been thus totally different in character but did share a few characteristics. Both delivered voice and text. And both businesses served the same end-user. Both were, at least in Europe, essentially public services delivered by public organizations. And both also served defence and security functions that, in combination with a scarcity of bandwidth, called for a form of regulation.

Text box 1: Old paradigms made obsolete by convergence – IPTV in South Korea

> Legacy regulators for telecommunication (MIC) and media/broadcasting (BCC) markets locked horns over the question of whether IPTV should be regulated as a communication or a broadcasting service. The broadcast regulator (BCC) argued that, from the customer's point of view, IPTV is similar to cable TV hence should be regulated under the Broadcasting Act. However, the telecommunications regulator (MIC) viewed IPTV as a communication service expanded through technological innovation
>
> *(Fair competition issues in the telco/broadcasting convergence (II), KISDI, 2007).*

1.1.2 Technological enablers of change

The dramatic reconfiguration of the world's information delivery started in the 1970s and 1980s and was brought about, or at least made possible by, the coming of a range of new information processing and transmission technologies. Among those, five key technology enablers that can be identified:

- Increase in processing speed. Following Moore's law the speed of processing, and thus processing power, of a device of given proportions doubled every 18 months for the last 20 years. Though current techniques (using nano-technology) are reaching the limit of what is simply physically possible, new technology like quantum crypto promises to bypass the constraints imposed by physics in the manufacturing and design of semi-conductors. One should also note a trend to move from a complete reliance on hardware improvements to that of mixed hardware/software enhancement (eg or distributed processing).
- storage capacity – the size and speed of storage devices also increased by the equivalent of Moore's law. This increase was enabled by hardware advances, but also by software and a restructuring of the nature of storage itself: we now see a move from central storage (eg YouTube) to decentral storage (eg Joost), which places much lower demand on the capacity of both storage and communication nodes.
- transmission speed – increased by the availability of more bandwidth, which now enable broadband delivery to the home (eg through DSL lines) and to the mobile phone (via DMB and DVB-H).
- compression software – still in its growth phase, this has been an underrated major influencer. Thanks to compression, video can now be delivered – even in "real time" (streamed) – to the home and the personal device.
- standardisation – of both software platforms (eg. Microsoft MS DOS, Windows) as well as the internet communications and programming software and protocols (eg. www, html, IPv4), have made it possible to popularise the technological advances mentioned above, thereby reducing their cost to levels that enable mass-consumption. They have also been major enablers for improved usage of bandwidth.

An important consequence of these factors has been the exponential growth of information offerings available to the consumer. As a result, he/she reaches out for tools to screen and select information of value and becomes more sensitive to reputation and branding as a way of recognising relevance and quality of information. Growth of the network itself

became a major driver of change; as Metcalfe's Law states that the value of a network to society is proportional to the square of the number of users of the network[5].

One of the most important consequences of these developments has been the convergence of communications and broadcasting.

1.2 Convergence of information delivery

1.2.1 Defining convergence

The term convergence is used for a range of phenomena relating to technical and market developments in the telecommunication and audiovisual media domain, driven largely by the internet. A number of definitions are given in Text Box 2.

Text box 2: Convergence can mean many things

- In general terms, technical convergence is:
  - the phenomenon of different products or technical systems that evolve towards performing identical or similar tasks.
- In the media and telecommunications business:
  - the tendency for services to merge into one offering that combines the features of the original services.
- In a transmission context:
  - the integrated delivery, via a single delivery channel, of voice- and other services.
- Regulatory convergence:
  - the integration into a single regulatory framework of formerly separate responsibilities or the creation of explicit means of coordination among regulators concerned with similar sectors, issues, etc.
- **From a user perspective, it is the ability to:**
  - **obtain multiple services on a single platform or device**
  - **obtain any given service on multiple platforms or devices.**

For this study we chose to apply the user-driven definition, whereby convergence is defined as the ability of the consumer to obtain multiple services on a single platform or device or obtain any given service on multiple platforms or devices[6]. A demand centred approach is useful as it helps in defining the remit role of government regulation in the public interest. But alternative definitions remain relevant - in particular, and finding of significant market power (SMP), which depends on an analysis of market boundaries (usually by means of cross-elasticities) and is thus more supplier-centred.

A prime example of convergence is the mobile device that used to provide only voice connection, but now also records and transmits photographs and movie clips, gives access to the internet and popular radio and TV channels. Its business variants now also transmit e-mails and offer PC services like text and image processing. Our broadcasting channels now provide us with telecommunications services such as telephone and internet connection. Similarly, we can now see the two screens in our home – our TV and our PC

[5] Sarnoff, V. & Metcalfe, R.M., Evolution of the laws that deal with the utilization of information networks, Springer 2005 pp 427-438

[6] "What is Convergence". A submission by Ofcom, Ofcom 2007, p1

– converging as both now offer news, entertainment, communications, transactions and a wealth of other functions; both becoming interchangeable interfaces for processing bit streams.

1.2.2 Convergence of applications, services and markets

As result of the technological developments described above, and the market responses that these have triggered (or enabled), we now have an integrated and highly dynamic information delivery environment. Consumers and providers have a wide choice of options to communicate, and to create, produce and transmit content, gather and share information, play games, etc. and all this via traditional fixed line, via cable, and "on the move" via mobile internet, wireless broadband or satellite. Providers have the same channels available when they want to approach us, but face competition either within their own channel or from adjoining channels.

At this point, technological barriers between information delivery channels and markets are disappearing, and the situation pictured in Figure 1no longer exists. Since transmission, storage and processing capacities are turning into commodities, new markets have emerged based on functions. There are parties (1) who produce information (2) who package and disseminate it (3) who select it for use (4) who transmit it (5) who make and programme devices that enable people to receive and use information and, of course (6), those who consume it. These markets are distinct, but the players move across the different functions. For example, consumers can also be producers; infrastructure owners may sell TV services and own rights to content; search engines can bid for spectrum licenses. In each of these functions, powerful players have emerged who all attempt to strengthen their position by branching into adjoining functions.

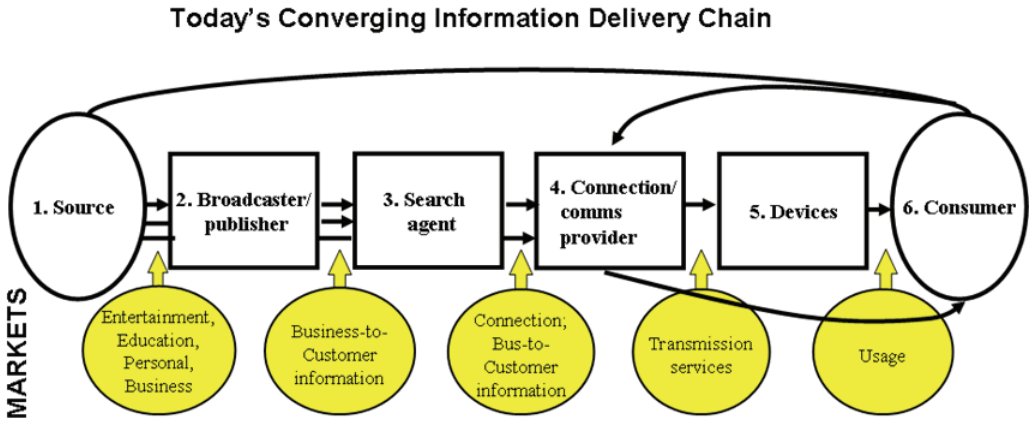

Figure 2 The information delivery chain and its markets

1. Information sources

As has been observed, a migration has taken place from a two-world concept of communications and broadcasting to a world in which the boundaries between different forms of one-to-one and mass communication have disappeared. Individuals provide source material when they submit their camera shots to CNN and BBC for broadcasting, and upload their video clips to YouTube. And parts of the "sourcing business" that has existed for a long time, eg in soccer clubs or movie studios, are migrating into publishing

and broadcasting. Good examples are the soccer associations like KNVB (Royal Dutch Football Association) who have tried to enter the broadcasting business.

2. Broadcasters and publishers

Broadcasters and publishers used to play – and to a large extent still play – a crucial role not only in organising and funding the generation, packaging and distribution of information but also, in particular, in screening and selecting quality information. In recent decades the volume of information available to consumers has already grown exponentially, a trend that will continue into the foreseeable future. Consumers thus depend on a reputed broadcaster as an 'infomediary' to deliver material that they consider worthwhile. This applies to a wide range of businesses, be it a broadcaster like CNN who selects news, Warner Bros who select the best scripts and turn them into movies, Nintendo who buys or commissions the best games for their portfolio or Reed-Elsevier who select the best scientific articles for their journals. The business base of publishers/broadcasters has always been their hold of information sources that traditionally had little if any means to by-pass them. The soccer club needed the TV station, the author his publisher. This stronghold is now deteriorating, with other selection mechanisms (eg RSS feeds) and peer review instruments (eg open access publishing, ratings, polls) taking over. Moreover new publishers or producers of content are entering the market, as large corporates move into music and film production as new channels for advertising (eg Procter&Gamble investing in TAG records, with other examples being Nike, Red Bull, and Bacardi; *International Herald Tribune*, 7 July 2008).

3. Search agents

Search engines are relative newcomers in the delivery chain, and owe their rapid growth to the crucial function that they provide: they enable a consumer of information to rapidly search large amounts of information – including the entire internet. Their business base is the understanding that they have gained of the needs of the consumer. Accordingly they have rapidly built a position both in terms of content, eg by providing specialised information, and in terms of economic power. They are also branching out into related areas like software development, digitization of information sources, and even communications (as the recent participation of Google in the 700 MHz D-band spectrum auction in the US seems to suggest). Electronic Programming Guides (EPGs) can also be classified as search agents when their main function is to find programming that fits a given consumer need (as opposed to providing consumers with a long list of offerings). And a new development that is emerging is that of "infomediary" or "virtual guardian agent", that is a trusted device residing in the consumers' computer or provider that selectively passes on information to the consumer, and from the consumer to suppliers that can cater to his/her demands[7].

4. Connection/communications providers

Communications providers – the PTTs – traditionally were the dominant link in the information delivery chain. Their function is to transport the information from one

[7] Poiesz, T and Van Raaij, W.F.: Strategic Marketing and the Future of Consumer Behavior, Edward Elgar, Northampton MA, 2007

location to the other. The heavy capital investment needed to build communications networks helped protect the customer base of the traditional communications providers. With the arrival of the internet these incumbent providers were forced to provide network access to internet service providers (ISPs), thus enabling competition on the network. In addition competing infrastructures emerged, ie cable and later wireless networks, which further reduced the market power of incumbent telecommunication providers.

5. User devices

The dedicated functions of radios and of TV sets have been subsumed by PCs, mobile telephones and PDAs. Today intelligent handheld devices (hard and software) make it possible to conduct a telephone conversation, send text messages, make and send a photograph, watch TV and play a computer game more or less simultaneously and on the go. The devices can technically connect to a variety of communication providers, search agents and broadcasters, using different mobile and wireless technologies (Bluetooth, WiMax, WiFi, UMTS, GSM, etc). Accordingly, they are the point where convergence becomes tangible for the consumer. Behind this convergence trend a fight is currently ongoing between WiMAX (wireless) and the 4G mobile standards; reflecting different philosophies of the PC industry, ISPs and search engines (open and interoperable) and handheld devices and telecommunications industries (closed and proprietary). Communication providers and handset developers aim to lock in customers, applying standards that limit access to their own offerings. An interesting example was the introduction of Apple's i-pod in the United States, which was not only linked to a subscription by AT&T but also to Apple's own music store for content. On the other side, Google was bidding in the 700MHrz auction to ensure the free flow of information and break the duopoly of Verizon and AT&T (see US case study).

At the same time the functions provided by handheld devices commoditise rapidly and their prices decline, which makes it easier for a provider to hand out devices as add-ons to their main offerings[8]. Hardware producers are aware of the trend and are building positions higher up the delivery chain[9]. Nokia is a good example as it is trying to stay ahead of this trend by transforming itself into an entertainment platform[10]. Sony is following a similar strategy and already derives less than two-thirds of revenues (65.4%)[11] from devices and hardware, a number that is steadily declining, as its games and entertainment businesses continue to grow. While others like Apple are still investing in the hardware business, betting on their ability to provide superior and thus premium functionalities and user experiences, linked to wider (proprietary) service offerings like iTunes.

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[8] Martin, C. "Products become commodities" in Net Future, McGraw Hill 1999 pp 124-129

[9] Faber, E., Bollen, P., Baum, H., Haak, T. Rietbrink, O., Stein, M., Designing business models for mobile ICT services. 16th Bled Electronics Communications Conference, June 2005

[10] Nokia 2007 annual report p. 13

[11] Sony Corporation 2007 annual report p.56

6. Consumers

If anything, the consumer is becoming more and more important as the choices that he/she has multiply. Traditionally, the consumer could subscribe to the local PTT and have a telephone (or not). He/she could buy a TV and tune in to the local broadcasts (or not). Nowadays, choices between telephone and broadcast services are multiple. Telephone conversations can be held via the traditional telephone channel, via mobile and satellite, via the TV cable or via internet (VOIP).

Also, the consumer is becoming more engaged in the information-sourcing process. Traditionally, this role was limited to peer-to-peer communications like telephone. Nowadays, YouTube enables a consumer to broadcast his ideas, and social networking sites like Hyves, Facebook, MySpace allow new forms of information sharing. Amateur information sources are nowadays eagerly sought, for example by broadcasters who use the clips (often made with mobile telephone sets) in their programmes. This explains the line connecting consumer and source in Figure 2.

The reality of information delivery of course is more complex and cannot be completely captured in a schematic like Figure 2. From a forward looking policymakers' perspective, the view is more limited. The functions in the delivery chain that have to be considered in this analysis are those that can be expected to have a significant (potential) impact on availability, content, timing, and quality of information delivered to – or transmitted by – the consumer. Furthermore, the function should have characteristics that make regulation possible[12]. This is typically the case where markets emerge, ie between the steps in the chain.

1.3 Emergence of a highly dynamic environment

1.3.1 Convergence and divergence

In the past decades, communications has not excepted itself from Steve Gould's theorem on punctuated equilibrium that states that most systems experience little change in their history but that change when it occurs does so in rapid, dramatic bursts. Gould's line of thought was successfully applied to the computer industry by Tushman and Romanelli who analysed, among other topics, the development of the microcomputer disk drive from this perspective. When their views on development are projected on the information-delivery business, one can hypothesise that this business is at the end of a rapid development process in terms of technology, but at the beginning of a stage of dramatic change in terms of societal absorption of the new-gained functionalities. As new generations become familiar with the greatly expanded functionalities of their information environment, we can expect major changes in the way people work, live, enjoy themselves and participate in community affairs[13]. These changes can be expected to have an impact on the demands that are made on the information delivery chain. We can thus see

[12] For example, listening to illegitimate information can not be regulated without invading the private world of the consumer

[13] Living Tomorrow – Information and Communication Technology in 2015. by Valeri, L., Van der Mandele, M., and Oranje, C. RAND, 2005

ourselves in a spiral of technological and societal developments that have major impacts on each other.

Similarly, one can state that a business that passes through a period of transition in a punctuated equilibrium will experience a redefinition of its segmentation. For example, in the first days of the computer industry, the main producers like IBM, Univac, Burroughs and Digital Equipment all produced not only their own mainframes, but also their own controlling software, peripherals, applications software and sometimes also their own content. Segmentation was along the lines of overall system performance and, to some extent, customer lines. The 1970s saw an upheaval with the entry of the PC. At that point, overall performance and customer groupings suddenly became less important and the segmentation was rearranged along functionalities like processing (Intel, Micron), platforms (MS, Apple), applications and content[1415].

The information delivery business appears to be in such a transition where, on the one hand we can see convergence of the traditional businesses and thus disappearance of the segmentations in that business, and on the other the first signs of a divergence into new segments, with more personalised and differentiated service offerings. Broadcasting and communications are merging, but a new segment, the search agents, has emerged. The segmentation provided in Figure 2, therefore, is appropriate for this moment but can be expected to change in the future[16].

1.3.2 The battle for function

It should be noted that this is a very dynamic situation in which suppliers to one market consistently try to expand into adjoining fields and absorb the market that exists between the functions. Information sources try to bypass publishers by gaining access to search agents and the consuming public. Blogs, Wiki's and YouTube are good examples of this bypass. Producers/publishers try to integrate forward by providing search capabilities of their own and sometimes, also, competing information sources. Software and hardware producers try to enter the information delivery chain in the understanding that this is the area where value added will grow, as opposed to the hardware which is in a continuing price and margin grind, and software where the limits to improving functionality and prices are coming in sight[17]. Thus, Nokia has started Music Store. And Microsoft has launched a bid for Yahoo that was blocked, it appears, only on pricing grounds. Search agents like Google are expanding (or considering expansion) upward (ie increasing direct access to information sources) and downwards (by buying bandwidth into connection services). Connection providers, who realise that the value-added of transmission services can only decrease as bandwidth supply increases, are actively trying to integrate upwards

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[14] Tushman, M.L. and Romanelli, E., Organizational Evolution: a metomorphosis of convergence and reorientation, in Research on Organizational Behaviour vii B.M. Stow and L.L.Cummings (eds) 1712-222, Greenwich, Mass, 1985

[15] Tushman, M.L., Newman, W.H. & Romanelli, E., Convergence and Upheaval, Managing the Unsteady Pace of Organizational Evolution, California Management Review, Fall 1985 Vol 29 Issue 1 22-45

[16] Kanter, R.M., E-volve – Succeed in the digital culture of tomorrow, HBS Press 2001 pp 284-288

[17] Siebold, P., Customer.com, Time Books 1998 pp 214-245

into additional search and publishing/producing activities[18]. Good examples here are both BT and KPN entering into digital TV.

In each of the markets described above, regulation is possible. The need for intervention and the form it takes depends on the policy drivers, which we have separated into technical, economic and societal drivers. In each of our cases, we have identified the use of regulation and the market drivers.

[18] Moore, G.A., Inside the Tornado, Harper Books 1995, pp 175-183

CHAPTER 2 The regulatory challenge: keeping up with the change

The trends described in Chapter 1 raise new regulatory issues and have a profound impact on the governance of the information market and the tools and instruments to control it. In this light spectrum policy and new self-regulatory solutions will receive some specific attention.

2.1 Information policy drivers: technology, economics, society (TES)

Policy drivers are written or unwritten statements defining the mission and charter of an 'information' regulator[19], conventionally divided into three overlapping domains:

- **Technical regulation** – standards and technical licence conditions motivated by concerns of interference, safety, interoperability, quality of service, etc.
- **Economic regulation** – market access, pricing, investment and merger approval, etc. motivated by a broad range of market failure concerns.
- **Societal regulation** – content controls, broadcast regulations, etc. motivated by, societal and cultural value concerns – freedom of press, freedom of opinion, diversity, social cohesion, inclusion, neutrality, privacy etc.

The mission and duties of communications and media regulators can usually be identified along these technical/economic/societal ("TES") dimensions. For example, the Ofcom (UK) charter lists its specific duties in six areas (see Table 1).

These governance dimensions are mirrored outside government as well:

- Technical – technologists, engineers, produce *standards*.
- Economic – commercial entities produce *IPRs*.
- Societal – users, communities, and civil society actors produce *codes of conduct*

They thus structure both comparison of different cases and analysis of future policy needs.

[19] (tele-)communications authority or media regulator

Table 1: Drivers of Ofcom's specific tasks and objectives

Tasks	Drivers
1. Ensuring the optimal use of the electro magnetic spectrum	Technical
2. Ensuring that a wide range of electronic communications services (including high speed data services) is available throughout the UK	Economic, Societal
3. Ensuring a wide range of TV and radio services of high quality and wide appeal	Economic, Societal
4. Maintaining plurality in the provision of broadcasting	Economic; Societal
5. Applying adequate protection for audiences against offensive or harmful material	Societal
6. Applying adequate protection for audiences against unfairness or the infringement of privacy	Societal

Note that a fundamental assumption underlying Internet regulation is the "end-to-end principle" – in essence, it maintains that the 'ends' of the network (content providers, end-users, etc.) are the best arbiters of economic and societal regulation, and that the 'job' of service and transmission providers is to make coordination between the ends as effective as possible by guaranteeing the highest technical standards of reliability, quality, speed and security and by remaining apart from economic and societal regulation. This modesty has not always been respected, is not shared with other policy domains and has recently been challenged in partial response to convergence.[20]

From a technology perspective we can at least hypothesise that the need for intervention (eg through regulation and/or the allocation of spectrum) increases with the volume of information passed through the delivery chain.

When we look at economics, the overall size of the market, span of control and aggregate impacts are important factors in determining the potential need for regulation. This need for regulation can be traced along the development of market activity:

- In small and/or early-stage settings, the predominant modes are barter and negotiation, with close contact among a few parties, and almost no significant externalities.
- In competitive markets, the predominant mode is price-mediated trading, with remote contact among many parties of similar power, but again relatively few significant externalities.
- In regulated markets, there are generally large power asymmetries and significant externalities, so the predominant mode shifts to more formal rule-driven processes.

The need for societal regulation depends on the 'size' of the external impacts, the population (number of people involved) and the 'time' dimension (how rapidly the effects are produced and, in consequence, how easily and how effectively affected parties can

[20] Clark at TPRC 2007.

respond. Regulation is in some ways an alternative to negotiation, so need depends on barriers to discourse; asymmetries of power, fragmentation among the affected parties, etc. [21]. The Dutch Scientific Council for Government Policy (WRR) expands on the societal policy drivers by identifying a) the need to protect freedom of expression and of opinion through the pluriformity, accessibility and independence of information access, b) the need to maintain social cohesion by counterbalancing the fragmentation of supply and demand, c) the need to provide information quality, and finally d) the need to protect privacy[22]

2.2 Balance of regulation between authorities, business and consumers (ABC)

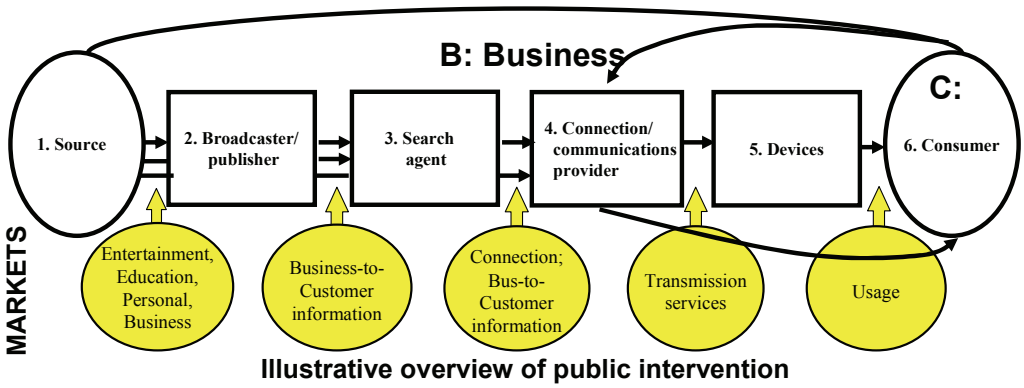
The actual need for and form of regulation depends on the situation of and interactions among:

1) **A**uthorities - policy makers and regulators
2) **B**usiness - markets
3) **C**onsumers - citizens, customers

Each of these parties plays two roles: as representative of stakeholder interests and as actors in their own rights. The powers of these parties are not equal. In particular, regulators learn about the interests of: firms (or at least regulated firms) through regulatory processes; citizens through statutory duties and political interactions; and other authorities through internal coordination mechanisms. The interests of the consumer and unregulated firms (including new entrants, SMEs, etc.) at other points on the value chain are sometimes under-represented. The need to protect these interests while at the same time encouraging innovation (including non-commercial and informal innovation and innovation in governance) further influences regulators' choice of where to regulate, as shown in Figure 3.

[21] OECD: Policy considerations for audio and visual content distribution in a multiplatform environment, OECD paper 2007

[22] Wetenschappelijke Raad voor Regeringsbeleid, Focus op Functies: uitdagingen voor een toekomstbestendig mediabeleid, Febr 2005.



T=Tech	-	Personal Information, Network security	Communication network security	Spectrum, Interference, Device neutrality	Encryption, Information security
E=Econ	Competition, IPR	Public value test, Media ownership	Competition	LLU	Competition
S=Soc	Policing, SPAM (pornography)	Pluralism, Freedom of speech, Indecency rules	Universal service, Must carry	Universal Service	Awareness raising, privacy

A: AUTHORITIES

Figure 3 The "ABCs" of the value chain, and indicative TES policy areas

According to the end-to-end principle, *technical regulation* is only needed to assure the quality of the signal at the consumer end of the delivery chain; the maintained assumption is that economic or commercial interests should provide incentives for 'sufficient' quality of service. But this view is coming under increasing challenge; the increased unreliability of the 'ends' of the network is seen by some as forcing technical regulators and standards bodies to assume more (especially societal) responsibility. Moreover, convergence has resulted in different types of usage sharing the same channels (eg voice and data over TCP-IP networks; paired and unpaired uses of spectrum. The quality of service standards appropriate to different uses and the interference they impose on each other may be asymmetric, and these crowding externalities cannot be handled easily by markets or without deep technical input. As we shall see (Chapter 3), technical licence conditions are an essential pre-cursor to economic regulation.

Economic regulation – the avoidance of market breakdown – is a potential issue at all levels of the delivery chain. At the source level Intellectual property rights (IPR) can limit openness of the information flow; and there is a risk of monopolistic abuse by dominant information providers (eg sports broadcast rights). At the broadcasting/producer/publishing levels there is extensive concentration[23] ranging from broadcasting (eg, Mediaset/Italy) to scientific publishing (eg Reed Elsevier). In search agents, there is much discussion about the dominance of Google and its vertical power (eg to favour or mask certain searches). These examples show dominance rather than abuse, and thus merely flag a potential need for regulation.

[23] Note that there are also examples of broadcasters (delayed download by BBC, ITV, many radio stations) and publishers (open-access archiving by Elsevier) making content available for free under certain conditions.

Societal regulation is particularly relevant at the producer/publisher and the search agent levels. Direct societal regulation at the source end is traditionally discouraged by free speech concerns, but is being revisited where it provides the most effective way to deal with eg harmful or illegal content. Societal regulation is also a topic in transmission to the extent that quality of service (QoS) will play a role in Universal Service and must carry requirements. Finally, societal regulation is hardly a topic in the market for transmission services.

In addition to protective measures, many content support policies may be largely obsolete. 'Long tail' economics – ubiquitous access by a much larger pool of customers with specific interests and low production costs can make niche production economically viable.

2.3 The economics of regulation and the rationale for intervention

TES concerns create the basis for regulation, but the *case* for intervention depends on a balance of costs and benefits, and thus on the 'intervention logic.' Key to this is the functioning of external stakeholders and institutions, with market forces taking the most prominent role. For example, it is widely believed that competitive markets will deliver an optimal mix of: technical compatibility, quality, safety, etc. characteristics; economic efficiency; and societal equity – or at least that a suitably-regulated market system provides the most robust and least costly way to attain these objectives. This assumes that competition is a) feasible and b) desirable. In specific cases, one or both may fail: for instance. In thin markets or those with large informational or other entry barriers, competition may not be feasible or may be fragile. In the presence of large economies of scale, competition may not be desirable (implying higher costs). The regulatory task in this case is to make desirable competition feasible (eg by reducing entry barriers) and to make feasible competition desirable (eg by ensuring that stakeholders take externalities, societal interests, etc. into account in their decisions).

The choice of *when* to regulate thus balances need, burden and efficacy considerations. Regulation at one part of the value chain has impacts elsewhere, in either traditional or converged setups, raising the question of *where* to regulate[24]. If convergence affects the distribution of need, burden and/or efficacy through the chain, it thus challenges both decisions. In order to deal consistently with both internal (within the regulatory framework) and external (in the market) convergence, it is also necessary to take into account different 'geometries of convergence,' illustrated by example in Figure 4, which distinguishes convergence 'at the ends' (left diagram) from convergence 'in the middle'.

[24] This includes the use of existing regulatory relationships to encourage the cooperation of eg service providers in the governance of activity originating or ending other parts of the chain (eg file-sharing).

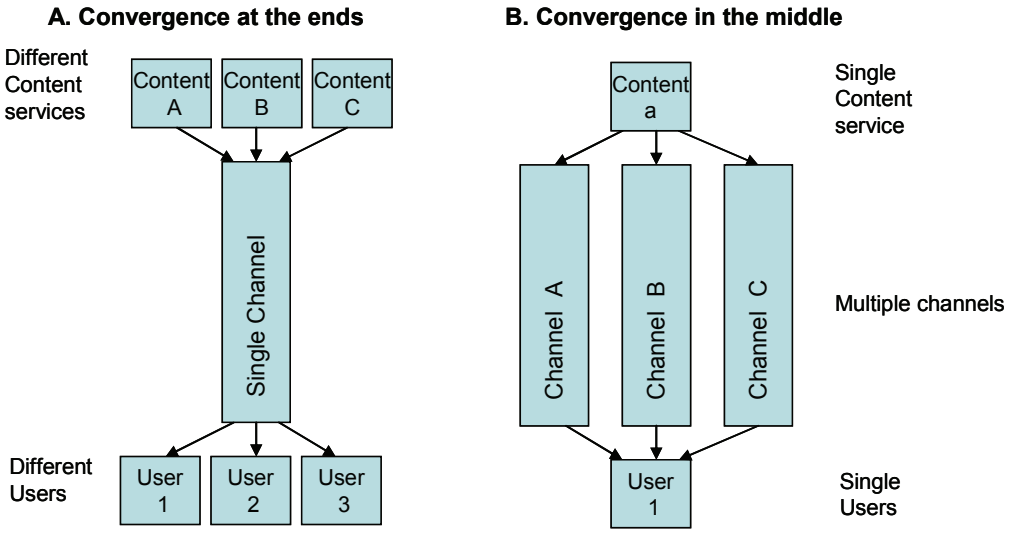


Figure 4 Two different convergence geometries

Regulation in the middle (ie regulation of service providers) is challenged by convergence at the ends because the interests of a broader range of 'third parties' must be taken into account. It is challenged by convergence in the middle because (currently) unregulated entities can provide the same services from the perspective of the 'ends' as regulated service providers, but without the costs, the obligations or even the advantages associated with regulation[25]. Regulation at the ends is also challenged in different ways by the two types of convergence. In short: convergence at the ends means that additional, unregulated parties become players; convergence in the middle changes the pathways through which 'remote effects' are produced.

Just as these geometries of market convergence produce different challenges for different types of regulation, regulatory convergence (merging or combination of regulatory institutions, objectives and tools) produces different effects. Originally, telecommunications regulation emerged 'between' technical regulations (eg of electrical devices, etc.), competition regulation and (sometimes) societal (content/media) regulation to handle overlapping issues. In most countries, the idea was that telecom-specific approach regulation was only an interim step until the market had matured to the point where 'reconvergence' along the original lines would be possible[26]. In the event, many countries have instead shown a convergence of powers on the telecommunications regulator[27], who can internalise policy balance affecting the telecommunications industry, but at the cost of a weakened ability to balance cross-industry concerns. In addition, the

[25] The US provides a clear example where broadband is unregulated as the FCC declared it to be an information service and not a telecommunication service; leaving cable operators free to develop telco services, whilst telco operators are bound by regulatory constraints

[26] Hence the original name of Ofcom was OFTel, signalling overtly that ultimately it would return its regulatory powers to the competition and consumer protection regulator, the Office of Fair Trading (OFT).

[27] UK, South Korea

convergence of regulatory powers and concerns *on* a telecom regulator does not necessarily mean that they have converged *within* the regulator – in other words that they various domains are appropriately joined-up[28].

One additional complexity should be mentioned. Good regulation[29], which involves proportionate as well as effective intervention, must take the whole gamut of costs and benefits – and the likely response of other stakeholders into account. This in turn means giving access and voice to a wide range of stakeholders and recognising that regulation is always costly but has the potential to stimulate less-costly alternatives: like standards, technological 'fixes' for today's regulatory problems, self-regulation, etc.

2.3.1 Effective policy is applied in the entire information delivery chain

The discussion in the previous section argues that convergence on the outside is linked to convergence on the inside, but also that the co-location of regulations in one organisation does not mean effective convergence. Fragmentation of regulatory powers and issues could:

- Weaken the effectiveness of regulation if alternative providers[30] cannot be effectively regulated;
- Distort competition between regulated and alternative providers;
- Reduce supply or increase cost of bundled goods and services[31] benefiting from internal subsidies[32]; and
- Weaken the flow of information from the regulated sector to the regulators, especially if innovative and high-growth market activities shift to unregulated firms[33].

Beyond the increased complexity of regulating multiple delivery channels, the globalisation of ICT adds an international dimension. This creates further possibilities for:

- Regulatory flight – firms move or are taken over by firms outside the regulator's jurisdiction. This comes from globalisation and even the successes of the Single Market), but is exacerbated if convergence giving less-regulated foreign firms a cost advantage. Potential dangers include loss of both regulatory effectiveness and economic returns on ICT services, which are a valuable part of the economy and foster other (public and private) goods and services that use ICTs.

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[28] See Ofcom case as and example

[29] See eg EC (2002) "The Better Regulation Action Plan" European Commission (COM(2002)278 final), at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2002:0278:FIN:EN:PDF

[30] Eg ISPs providing formerly broadcast content or broadcasters providing unregulated (eg download) services.

[31] Eg if the costs of commissioning content (or producing music and video) are in part underwritten by the protections of regulated status or are reflected in regulated prices.

[32] This argument is made by many content producers today and was demonstrated by the way competition jeopardised Universal Service provision in international telephony and postal services.

[33] They may wish to keep regulators in the dark if this leaves regulated competitors under outdated or burdensome constraints.

- Regulatory competition – globalisation threatens a regulatory 'race to the bottom' convergence creates competition among regulators in the same country with overlapping remits. For example, market outcomes (entry, conduct, pricing) can be influenced by technical (standards, licenses) or societal regulations. On the other hand, cross-border or cross-portfolio links can also spur regulatory entrepreneurism, a race to the top or best practice sharing.

An integral approach also allows regulating the part of the chain where there is 'regulatory traction' to achieve impacts further down the line where regulatory intervention is less effective.

The combined impact of these drivers thus require policy makers to rethink lines of policy responsibility, forms of intervention and the associated *operational* objectives. Examples of these changes include increased scope for self-regulation and market-assisted methods such as spectrum trading. In the following section we discuss two of the most effective policy instruments to support traditional regulation and competition policy.

2.4 The EU context

All EU Member States' policies are framed by European Directives and Regulations, in particular the Audiovisual Media Services (AVMS) and the Television without Frontiers (TVWF) Directives.

The Audiovisual Media Services Directive (AVMS) Directive extends television broadcast regulation to the Internet Protocol delivery. It 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).

The Television without Frontiers (TVWF) Directive 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 broadcast: the 'Country of Origin Principle'.

The AVMS encompasses all commercial media services offered over the Internet, mobile networks, telecom networks, terrestrial, cable and satellite broadcasting networks, or over any other electronic network whose principal purpose is the provision of mobbing images to the general public. It also touches on the provision of multimedia services over all forms of video communications. The Directive applies 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' includes 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 are subject to less regulation than traditional TV 'linear' services, but more controls than the general law.

Table 2 indicates the Commission's interpretation of excluded services from the definition.

Table 2: Exclusions from AVMS Definitions

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

The AVMS leaves substantial leeway to Member States to adopt different regulatory approaches whether lighter touch or otherwise.

2.5 Net Neutrality; and how to regulate ISPs

To put the net neutrality debate – and regulators' responses to net neutrality issues – in perspective, it is necessary to briefly recap the history of the issue and the economic issues it does (and does not) raise.

In essence, the term arose in the wake of the FCC decision to allow Verizon limited freedom in pricing in order to support new broadband capacity investment. Verizon argued that the new capacity would support the higher quality of service (QoS) needed for eg IPTV and that the costs should be recovered by specific charges for providing such services. In particular, because the technology did not (at the time) make it easy to charge users for access to such services, Verizon sought and obtained permission to charge content providers more. A further thread, neutrality of access by any device capable of functional connection, arose from the so-called Carterfone rules (cf. Sec. 4.1.3).

The range of net neutrality definitions[34] in the literature and policy documents can be disaggregated into three (related) conditions:

- Access providers (usually ISPs) should not be permitted to *charge more* for high-priority (higher QoS) delivery. The debate is confused as to whether QoS in this respect means anything more than 'priority,' whether all forms of price discrimination are to be proscribed and whether any form of prioritisation (even if not charged for) is prohibited.
- ISPs should not be allowed to *deny their subscribers access* to particular websites, services etc.
- ISPs should be *structurally separated* from content/application production.

[34] See eg Cave and Marsden (2007), Cave and Crocioni (2007), Baumol, et. al. (2007) and Sidak (2006).

In the US context, where these suggestions first gained prominence, they have been seen as a response by content providers (used here to include service providers and search intermediaries like Amazon, Google, eBay, Yahoo!, etc.) to the (possible) threat by platform providers (used here to include both 'retail' providers of telecom/broadband services and 'walled-garden' providers who impose greater limits on customer mobility) to use price and QoS discrimination, access blocking and vertical integration to capture gains from trade between to two 'ends' of the market:

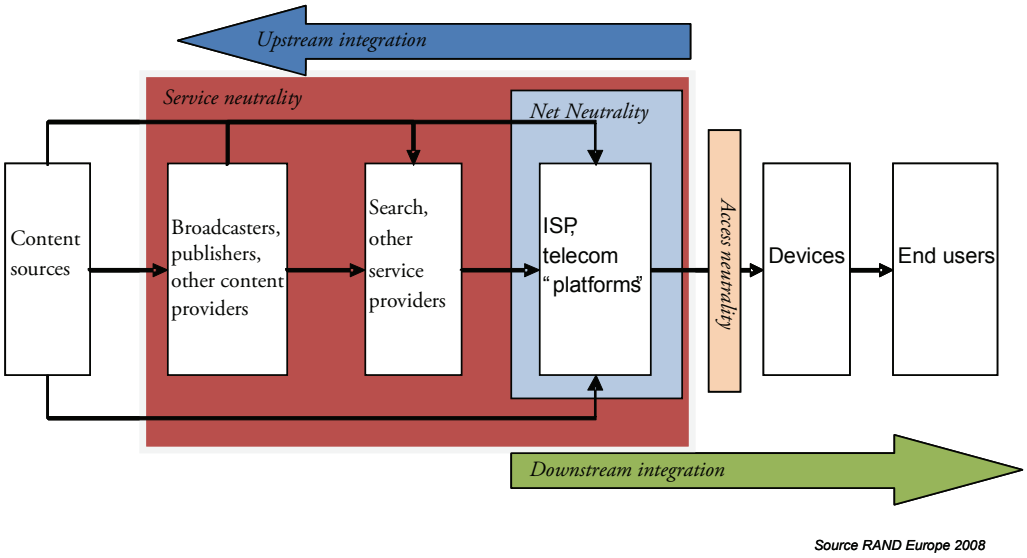

Figure 5 Two-sided market view

The rapid escalation of the debate was noted by Thorngren (2006), who pointed out that it was somewhat unusual that an otherwise mundane:

> *"conflict of interest – content versus the network industry and its vendors – has risen to such a high position on the business agenda."*

Part[35] of the explanation as to why this occurred first in the US and why the debate in Europe took a different course can be found in structural and regulatory specifics. The US has had limited success at forcing network providers to grant open access to a broad spectrum of those intent on using their 'pipes' to service end users. As a result, its value chain tends to be more vertically integrated, and natural monopoly aspects of network infrastructure provision produce excessive concentration even in potentially contestable parts of the value chain (eg US customers have fewer alternative suppliers of retail broadband services than those in the European Union[36]). The FCC has worked to strengthen facilities-based competition among vertically integrated businesses and gradually dismantle remaining access obligations. The advantage of a more direct

[35] There are also political reasons (see Sec. 3.1.7 and Chapter 4 of the US case study.

[36] See eg Marcus (2008). While the US at one time had more than 7100 ISPs, deregulation and economies of scale produced a severe concentration – less than 3.1% of DSL lines are currently provided by non-dominant operators, and most Americans have only a choice between cable and a the dominant telco's broadband offering. By contrast, in Europe, third parties provide more than 40% of DSL lines. Note that this same relatively higher concentration applies at the wholesale level as well.

regulatory relationship with key players throughout the value chain (US ISPs are far more likely to be affiliated with network access providers[37]) is offset by greater vertical markets power with potentially severe consequences for innovation and competition alike. In contrast, both Member State and EC-level policy have, since 1988, successively strengthened and extended access obligations under the developing Regulatory Framework (see below).

By contrast, US retail ISPs can effectively change traffic priorities, control end-user access and therefore extend their power to the ends of the market, so in the US, network neutrality may need to substitute or compensate for missing competition (see Sec. 4.1.7 for FCC 'consumer rights' principles).

2.5.1 Different interventions and their effectiveness

From an economics perspective, the 'degrees' of net neutrality remedy given above have different implications. This section considers the national and economic specificities of non-discrimination, anti-blocking, and structural separation remedies proposed during the net neutrality debate.

A *prohibition on price discrimination and/or prioritisation* preserves end-to-end gains from trade but may encourage non-price discrimination aimed at displacing rivals and their customers[38] and prevent mutually-beneficial discrimination that may be essential for market efficiency – or even existence[39]. The original 'end-to-end' design of the Internet neither envisaged nor provided for such discrimination; most applications were not sensitive to QoS, most participants came from government and academe rather than the business world, and congestion performance and expectations were broadly aligned. Recent technological progress and convergence challenge this *modus vivendi*. The dominant form of broadband in Europe (ADSL) prioritises download over upload; symmetric service provision (eg SDSL, LTE) costs (or is likely to cost) much more. New business models (charging for search priority, 'sponsorship' by hyperlinks to (other) commercial offerings and click-through payment by results) all involve differential charging allied with differential access. Moreover, modern networks have more processing power 'in the middle' and are thus more capable of distinguishing among types of traffic – and thus of implementing both good and bad discrimination.

'Must carry' or open access conditions (prohibiting blocking) seem less problematic, except as and where it conflicts with societal policy on harmful or illegal content, security, fraud, etc. Indeed, there is little scope for profitably excluding access except for vertically integrated firms (Figure 5). Any such restrictions must be based on broad participation in order to provide effective protection and avoid giving cover to illegal restraint of trade.

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[37] Cave and Crocioni (2007).

[38] Comcast decision: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-284286A1.pdf; AT&T admission of P2P blocking: http://www.fiercewireless.com/story/t-bans-users-wireless-p2p-sharing/2008-07-31?utm_medium=nl&utm_source=internal&cmp-id=EMC-NL-FW&dest=FW; Google intervention in Comcast: http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6520035883.

[39] Cave and Marsden (2007).

Functional separation has only been imposed (to date) in the UK when Ofcom in 2005 forced BT to separate its network and service subsidiaries. Further separation was mooted in the second Ofcom strategic review, at which point it re-entered the European policy debate[40]. The UK separation was credited with a three-fold increase in phone lines (eventually leased to competing telecom service providers) though others cite the resulting market uncertainty and consequent low investment levels.

In the US, the Verizon case has been followed by other cases (recently Google[41], AT&T[42] and BitTorrent/Comcast[43]) that clarify net neutrality issues and generate hard evidence of anticompetitive use of ISP power. To date, most European discussion has been theoretical, though range of ISP subscriptions, increasingly stringent 'fair use' provisions, use of interrupt packets to disrupt P2P traffic and recent (co-regulation) policy initiatives to *suppress illegal file-sharing* suggest that momentum is developing here as well. Demand for priority is certainly growing with real-time and other QoS-dependent applications as is the ability of ISPs to filter traffic.

2.5.2 The EU regulatory framework

To see where the future might lead, it is worth briefly considering the powers and perspectives contained in the overarching European Regulatory Framework. Many of the markets affected by convergence are "two-sided" - that is, value arises from the interaction of different 'ends' (retailers, content providers, etc. on one side; customers, content users etc. on the other) over an intermediary 'platform.' Each 'end' demands platform (communication) services primarily as a means of reaching the other side. Therefore, the two ends are complements - the more one side uses the platform, the more the other end wants to use it. Economic analysis suggests that when the 'ends' mutually benefit from interconnection, the 'middle' (platform providers) can capture most of the gains from trade by strategic price discrimination between the ends. This 'bottleneck' market power ultimately creates deadweight loss and limits the ends' innovation and investment incentives. In two-sided content markets, 'platform power' is optimally exercised by discriminating in favour of content providers whose presence attracts end users, even to the point of subsidy. Current European markets seem instead to discriminate at end-user level - against those who make most use of downloaded content (who offer the greatest potential two-sided gains from trade). This suboptimal strategy may be a second-best response by ISPs when open-access obligations prevent them from effectively discriminating between their own and rival content, but it risks provoking a struggle against content providers with significant market power (SMP). This double marginalisation leads to even higher welfare

[40] See Portugal, Germany and EC proposal for a telecom 'super-regulator' (EC (2006).

[41] Google was one of the principle proponents of net neutrality, but is now a major network owner as well, and has intervened in the ongoing Comcast case: http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6520035883

[42] AT&T has recently admitted blocking wireless subscriber access to P2P sharing – http://www.fiercewireless.com/story/t-bans-users-wireless-p2p-sharing/2008-07-31?utm_medium=nl&utm_source=internal&cmp-id=EMC-NL-FW&dest=FW.

[43] See also Text box 5 on in section 4.1.7. – the settlement of this blocking case allowed the FCC to avoid imposing a fine, but the FCC decision did establish a precedent that blocking is illegal.

losses than situations where only ISPs (or only content providers) have market power. Thus, net neutrality proposals of the sort outlined above will do little to address the clear and present danger posed by attempts to foreclose vertical markets in the European market context.

The ground rules for regulatory responses are set by the European Framework for Regulation of Electronic Communications Services. This was originally promulgated in 2003; it simplified and unified previous arrangements, placed regulation on an explicitly economic basis, and explicitly embraced the principles underlying Ofcom's strategy: technological and service neutrality; encouraging competition; and protecting user rights. The Framework moves Member States towards a common, essentially deregulatory, role. Convergence increases the 'contact' between telecoms and other sectors of the European information economy - thus highly telecom-specific regulations - and in particular ex ante controls imposed before market impacts can be seen - run the risk of creating unintended spill over in other sectors and/or of losing effectiveness as regulated activities are conducted primarily in non-telecom segments. The Framework addresses this challenge by moving telecom regulation towards greater consistency with overall competition and consumer regulation by incorporating elements of conventional competition policy (e.g. SMP tests as a precondition for imposing remedies) and by deliberately adopting a broad electronic communications service definition (thus weakening sector-specificity). The framework establishes a three-way test for applying ex ante regulation and restricts the allowable remedies. The test criteria are:

- High and continuing barriers to entry over the period during which ex ante remedies are applied;
- A strong likelihood that such barriers will persist after the remedies cease to bind; and
- A well-founded belief that ex post competition law cannot effectively address the problem under consideration (particularly problematic for collective dominance, which often escapes SMP tests).

The allowed remedies treat wholesale[44] and retail[45] markets differently. The wholesale remedies apply most directly to 'platform power' in two-sided markets. Regulators can impose: transparency; non-discrimination (providers cannot charge different prices for the same service); accounting separation, mandatory (must-carry) access; and cost-based pricing. They are more flexible than standard *ex ante* remedies (e.g. rollout or public infrastructure construction conditions) because their application rests on a 'proportionality' test that expected benefits exceed expected costs. Retail regulatory duties include ensuring that end-users benefit from consumer protection and that all tariffs and conditions of use (e.g. download limits, speeds, 'fair use' restrictions, etc.) are transparent.

This general framework applies to net neutrality – 'platform power' might involve:

[44] Access Directive, Articles 9-13 (Directive 2002/19/EC

[45] Universal Service Directive, Articles 17-19 (Directive 2002/22/EC

- Excessive pricing (abuse of bottleneck position if consumer mobility and search is limited); or
- Exclusivity, blocking of access or discriminatory pricing
  - to competing platforms for access to end-users;
  - to rival content, application providers by a platform provider integrated 'upstream'
  - to rivals' subscribers by a platform provider integrated 'downstream.'

These concerns, which motivate US content/service provider net neutrality proponents, seem to lie squarely within the conduct addressed by the European Framework (and eg Ofcom's recent initiatives in relation to mobile, cable and fixed-line operators). Transport and access services (according to the EC) currently meet the conditions for *ex ante* regulation; regulators are obliged to identify SMP operators and intervene appropriately. Structural separation is not on the list of remedies, but price discrimination – at least – can be prevented by the imposition of cost-based access obligations. Non-discrimination remedies could be used against blocking and QoS degradation and accounting separation can be used to facilitate consumer search and make access conditions more transparent. This does not mean such methods always work – non-price discrimination has been particularly problematic, as witness the recent Ofcom initiative to validate and clarify the meaning of advertised broadband speeds. But the power is there, in principle. The future of net neutrality in Europe lies in development and application of the existing framework, while the gathering body of US case law seems to point towards a resolution by further legislation and a consequent change in the powers and obligations of the regulator.

Two final comments are appropriate. First, (especially in the US context), net neutrality debates often involve security concerns, and thus depart from the remit of even converged telecommunications regulators. This brings to the regulatory convergence table 'senior' authorities to whom telecom regulators have traditionally deferred. Second, SMP can be exercised by content providers as well[46], in which case a focus on platform providers may be inadequate. This might be addressed under competition law without recourse to the Framework, but cases have been rare; there is a general presumption that low fixed costs make content market dominance harder to establish and maintain and many likely SMP players are public corporations already subject to regulation, albeit of a different kind.

However, 'good neutrality' may be threatened by integration downwards from content providers to platforms, and the difficulty of applying eg open access obligations to content providers. Therefore, it is possible that, in Europe at least, the net neutrality debate may be turned on its head.

[46] Especially 'non-linear' provision of previously-broadcast material which escapes the AVMS Directive.

CHAPTER 3 Instruments for effective intervention in converging markets

As identified in the previous chapter, traditional regulation and rulings are not sufficiently flexible, adaptable, close to market and enforceable to effectively regulate the rapidly evolving information delivery markets. As such traditional regulation may even lead to market distortions. Other complementary instruments are thus required, of which two are discussed in more detail in this chapter: self and co-regulation and spectrum allocation policy.

The first (self-regulation) adds flexibility, and market intelligence; where as spectrum policy provides a strong ex-ante tool to markets that are hard to control ex-post like mobile applications. Spectrum policy thus illustrates the interplay of ex post and ex ante policies, the spill-over from technical to competition (and even societal) policy impacts and the use of regulation at one part of the value chain to address problems arising elsewhere.

3.1 The growing role of self- and co-regulation in the internet domain

Societal problems do not necessarily require government action. Convergence brings new stakeholders into market contact and can energise self- or co-regulation, which *may* out-perform unaided statutory regulation:

- having potentially a better grounding in expert information or market realities,
- lower or more appropriately-distributed burdens,
- more credible and realistic rules,
- greater flexibility, fewer fixed jurisdictional limitations,
- lower costs/higher levels of compliance.

In particular, such initiatives naturally track convergence. Indeed, not only does the proliferation and changing pattern of self-regulation indicate the progress on ongoing market convergence, but their very existence demonstrates convergence in the governance sphere: convergence between public and private regulation (in the domain of co-regulation) and regulatory convergence across legal as well as market boundaries (because self-regulatory bodies are often as international as their members).

Such schemes already form a vital part of the regulatory landscape, and are set to increase in importance as convergence proceeds and ICTs become more deeply embedded in society as a whole. At the same time, they are not government organisations – they do not have a statutory basis or formal powers of compulsion, they do not have a fixed mandate, and their membership and external contacts are fluid and often difficult to measure. Most importantly, their activities serve their members' interests; they exemplify the observation that public service is not the same as acting in the public interest. This means that they may advance public objectives where those parallel members' interests, or as a result of explicit or implicit reciprocity. This makes them challenging partners for regulators. This is not entirely a criticism; because they are less strongly institutionalised, they tend to guard their prerogatives less jealously and the best of them are more open to lay stakeholder influence than formal regulators.

Self- and co-regulatory bodies act for two main reasons: because members' interests are best served by joint action (eg where formal regulation is weak, ineffective or inefficient) or where the members are best placed to manage a particular risk or problem (even if they are not directly affected). They form in response to a growing consensus for the need to act, a crisis event or the personal ambitions of key stakeholders. They employ a wide range of modalities; from closed groups of industry players to broad multi-stakeholder public fora – and instruments – from voluntary codes and standards to mandatory practices, certification and information disclosure. Members benefit (differently) from organisational formation, policy making and compliance; hence, such organisations may be more or less effective than formal regulators in the same area. Specifically, formal telecom regulators that typically compel the behaviour of one or a few dominant providers in relation to their regulated activities only indirectly influence other parts of the value chain, non-telecom providers of analogous services and unregulated activities. A self-regulatory body can adjust participation, rules and enforcement as the situation changes and thus enjoys 'shorter' and more effective chains of command in addressing convergence-related issues. The motivation of the members may range from public spirit through varying degrees of enlightened self interest, driven by eg the hope of more appropriate and compelling rules, reduced regulatory burdens, regulatory forbearance or the prospect of forestalling more burdensome, less-flexible or otherwise suboptimal formal regulation[47]. Because self-regulation primarily serves participants' collective interests, it may be vulnerable to collusion, corruption or erosion of effectiveness, transparency, accountability and proportionality. This vulnerability may require government support, constraint or monitoring especially where self-regulation replaces or outsource formal regulation.

In developing and implementing either a reactive or a proactive response to convergence, regulators must therefore consider:

- How to evaluate existing and proposed self-regulation
- How to develop strategies of cooperation, support and even deferral to suitable arrangements

[47] For example, The PEGI consortium's development of video game standards and accompanying certification that initially pre-empted repressive enforcement and later attracted explicit government approval.

- The implementation of a clear and coherent strategy for ensuring that self-regulation preserves accountability and transparency maintains regulatory effectiveness and does not produce additional problems of eg collusion, exclusion or predation.

It is worth noting that self-regulation plays a visible role in both US and UK responses to convergence. In the US, this is most clearly seen in the Government backing (and constraint) of the Internet Corporation for Assigned Names and Numbers (ICANN) which has always operated under State Department ownership and influence, but which exists outside the government (as any such international body must) and which is complemented by more self-regulatory bodies in the form of an open consultative shadow (ICANN at large) and liaisons with more truly independent and international for a such as the Working Group on Internet Governance (WGIG) and other bodies spawned by the UN-initiated WSIS process.

In the UK, 'responsibility sharing' has been a prominent part of the 'Better Regulation' agenda in many sectors, but particularly in relation to the most difficult to regulate and police aspects of internet policy such as harmful or illegal content (eg PEGI, London Action Plan, CleanFeed), IPR enforcement and consumer protection[48]. The UK regulator has recently conducted a further consultation on the extended use of self-regulation[49]. Traditional regulators must therefore consider how to evaluate self-regulatory bodies and incorporate them in their plans; they may take an active role in self-regulatory bodies' design, maintenance and operations or even participate as partners (rather than controllers) in a new 'shared multi-stakeholder governance' approach[50].

3.2 Spectrum policy

This section provides a brief overview of issues relating to spectrum policy and the changing technologies and markets; leading also to a review of spectrum allocation as an important *ex ante* tool for economic policy.

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[48] In moving against restrictive practices limiting broadband customer mobility, Ofcom initially directed complaints to a non-governmental body for action and evidence collection; they then developed guidance on how to obtain a migration access code in consultation with industry. The original implementation was voluntary, but compliance was poor, so Ofcom instituted General Condition 22: Service Migrations to require broadband providers to supply consumers with a MAC upon request and free of charge. This mandates self-regulation (providers have to provide a mechanism meeting certain conditions, but the details are left to the retail and wholesale providers), with an Ofcom backup complaint procedure.

[49] So has the Department for environment, food and rural affairs (DEFRA) in relation to animal disease management. Note also that financial services in the UK are regulated by a tripartite arrangement between government (the Treasury), the independent central bank (the Bank of England) and a self-regulatory body (The Financial Services Authority). This body has been strongly affected by convergence – in particular the offering of financial services by non-bank (and hence lightly-regulated) alternative institutions.

[50] Cave, Marsden, Simmons, Robinson (2008); Options for and Effectiveness of Internet Self- and Co-Regulation (Final) Report; DG Information Society and Media (TR-566-EC) This RAND Europe project mapped and analysed a large number of self- and co-regulatory schemes in the internet and ICT domains, identified conditions predisposing them to success, failure, institutional creep or accountable flexibility and developed tools for evaluating their strengths and weaknesses vis-à-vis formal regulation and incorporating them into policy design.

3.2.1 Why regulate?

If access to the spectrum was completely unregulated, interference would cripple wireless communications. Broadcasters, for instance, might engage in broadcast 'arms races' trying to drown each other out, resulting for the most part in nobody being able to receive a signal. Indeed, this is exactly what happened in the US in the 1920s.

"Spectrum management" seeks to minimise interference, primarily by distributing the right to transmit on a particular frequency at a particular power over a particular geographical area. There is often an international dimension (radio signals do not stop at borders) and a time dimension (technological change and competition issues were dealt with by limiting license duration, albeit at some cost to investment incentives and reallocation).

In recent years, demand has begun to exceed supply, the number and range of users and uses has exploded and command and control regulators are being left behind in information and strategic sophistication.

Spectrum allocation has thus become a strategic policy tool. Wireless communications are essentially free from many fixed facilities – which makes them harder to control *ex post* and makes it more effective to regulate them *ex ante* by attaching conditions to the right to broadcast or receive signals.

3.2.2 Objectives for spectrum policy

The electromagnetic spectrum is a public good, used to support both mobile and fixed communications and an ever-expanding array of critical services.

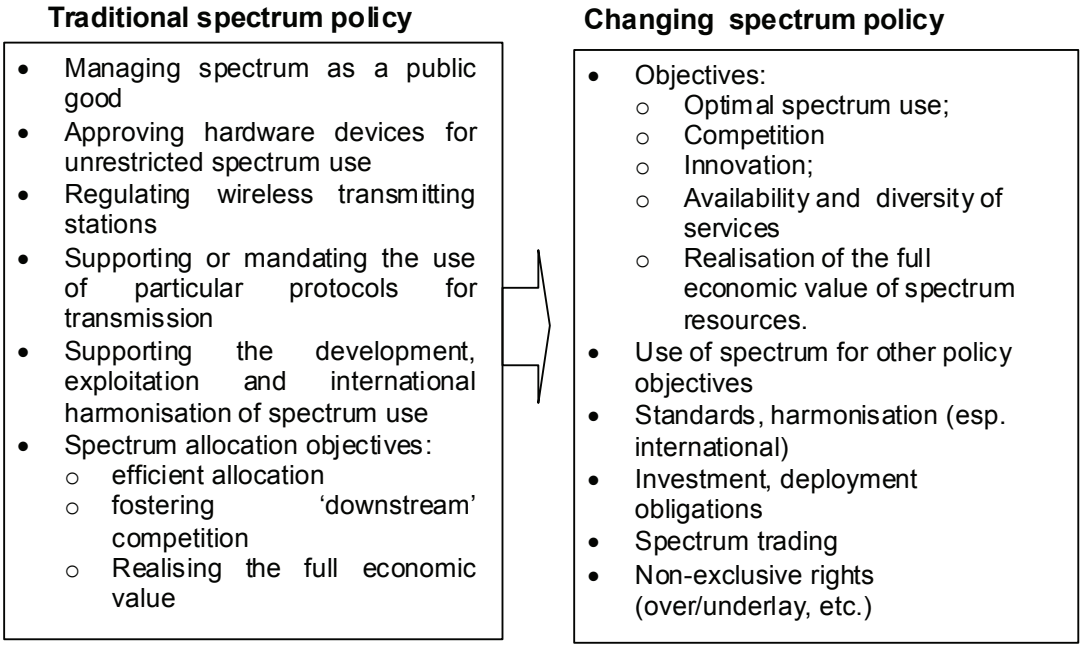


Figure 6 Changing objectives in spectrum policy

Objectives of spectrum policy are changing (Figure **Error! Reference source not found.**6). However, these are neither distinct nor easy to define in practical terms. They

can be expanded into the following group of objectives, whilst considering how they interact with spectrum allocation:

- *Optimal spectrum use.* Technically, this means minimising interference and maximising utilisation. Economic efficiency means: minimal service cost (including external costs); maximal net benefit; and/or optimal investment and innovation incentives. 'Spectrum efficiency' is increasingly understood sought as the *combined* result of initial auction allocation and spectrum trading. Management must balance seeking efficiency 'the first time round' with moves to strengthen spectrum trading to sustain efficiency. Associated operational objectives include *technology and service neutrality* needed to ensure that the 'best' approach wins.
- *Competition* is generally regarded as an operational rather than a strategic objective – the best means of attaining efficient and fair outcomes (not just for spectrum). The main impediments are *imperfect information* and *significant market power (SMP)*. If risks cannot be freely traded, prices may not fully reflect information. As for SMP, spectrum rights create monopolies; the use of auctions rests on Coase's suggestion that competing for monopoly rights would 'bid away' inefficient profits (rents), but the winner of such an auction will be the firm(s) capable of capturing the greatest monetised return[51]. By definition, a profit-maximising monopolist can outbid competitive firms even though competitors create the greatest aggregate economic value, and inefficient monopolists may survive and even prosper while efficient entrants are deterred.
- *Innovation* The value of innovation under the (direct or market-mediated) control of spectrum users should be reflected in bids or spectrum trading, which shifts rights to better uses as they arise. Flexible auctions can promote this 'dynamic efficiency' – if bidders replace estimated returns with their real option values[52]. But spectrum trading has not always worked well and dominant spectrum holders can hold innovators to ransom in spectrum trading unless auctions and trading are carefully designed to reinforce each other.
- *Diversity objectives* are reflected in technological and service neutrality but spectrum allocations always provoke anxiety among stakeholders who fear that incumbents may deter entry by alternative technologies, services or firms. Moreover, the diversity protected by neutral auctions is limited to that valorised by the market and does not include societal benefits.
- Finally, it is necessary to clarify '*full economic value*.' Many auctions and much theory model auctioneers as primarily driven to maximise revenues. But "full economic value" combines maximal economic return to the country as a whole with payment by bidders of the opportunity cost of other spectrum uses (and thus a fair price for use of a public resource). If bidders pay 'too much' or 'too little', this can distort subsequent investments and reduce total economic return.

[51] Not the same as public value or social return.

[52] The expected value of optimal future use including sale to innovators.

Two other aspects of spectrum policy must be mentioned. The first is that modern technologies and associated convergence of multiple services on the same spectral bands are expanding the relevant governance modes from command-and-control regulation based on exclusive licensing to include: spectrum sharing (eg underlay, overlay and easement or 'use-it-or-lose-it' licences)[53]; market alternatives to administrative procedures[54]; and unlicensed or 'commons' alternatives to spectrum 'ownership.' The second is that spectrum allocation is an *ex ante* tool whose effectiveness depends on the market and other (possibly *ex post*) regulatory controls[55].

Subsequent competition and technical policies can recover rights or constrain spectrum use depending on: whether spectrum is used or hoarded; merger, bankruptcy, takeovers, etc.; delivery of social services; new developments on interference and international harmonisation, etc. Because regulators know less about spectrum use and benefits than potential users and their customers and because these will change there will be a continuing need for active spectrum management. Most advanced economies try to deal with this through *liberalisation* – giving markets maximum flexibility to decide how, and for what purposes, spectrum will be used[56], but many technological and societal policy concerns do not fit smoothly with markets, so there has historically been a need for ground rules (eg type approval and licence conditions) or ex post requirements. But rules designed for one technology may inadvertently block others that do not suffer the same problems, so neutral regulation (that gives equal treatment to all technologies and services subject only to necessary controls on sources of market failure – eg interference, danger to competition, harmonisation across national boundaries, etc.) is gaining ground.

Other functions tied to spectrum use serve broader objectives eg conditions on customer-facing aspects of mobile communications services (quality of service, consumer protection) and content regulation (discussed elsewhere) included with broadcast licences.

3.2.3 The EU context

The Full Competition Directive liberalised the European telecommunication market in 2002 and clarified the current regulatory position in respect of spectrum trading. By virtue of Article 9(3) of the Framework Directive, Member States are currently permitted, but not required, to introduce spectrum trading. It states that:

> *"Member States shall ensure that an undertaking's intention to transfer rights to use radio frequencies is notified to the national regulatory authority responsible for spectrum assignment and that any transfer takes place in accordance with procedures laid down by the national authority and is made public. National authorities shall ensure that competition is not distorted as a result of any such transaction. Where radio frequency use has been harmonised through the application of Decision No 676/2002/EC (Radio Spectrum Decision) and other Community measures, any such transfer shall not result in change of use of that radio frequency". (Decision*

[53] Cave, M. (2006)

[54] Cave, J. (2006)

[55] eg competition policy, investment, roll-out and deployment obligations, public service obligations (US 7000 MHz auction), etc.

[56] A recent EC report by Analysis Mason estimated the EU-wide benefits of trading and liberalisation at €9bn per year.

No. 676/2002/EC of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community)

According to Article 1(1) of the Spectrum Decision, the aim of the Decision is to "establish a policy and legal framework in the Community in order to ensure the coordination of policy approaches and, where appropriate, harmonised conditions with regard to availability and efficient use of the radio spectrum…"

In 2007, there have been indications of further movement towards market mechanisms. The European Commission has pursued flexible spectrum management through its WAPEC initiative, its recent mandate to CEPT to develop flexible licensing approaches and its proposal to reform spectrum management across the EU following its review of the regulatory framework for electronic communications. This in turn had led to greater flexibility in a range of European countries.

3.2.4 New spectrum challenges

Current spectrum needs could be accommodated using expected technologies for compression, spectrum sharing, cognitive radio, etc. The gradual penetration of fibre optic cable should take away spectrum limitations for most applications in the (near future). Whilst in wireless, inefficiencies in spectrum use and the physical limitations combine to maintain spectrum scarcity that gradually diminishes as the demand side of Moore's Law eventually flattens off and compression technology reduces demand growth for spectrum for a given information (Baud) volume.

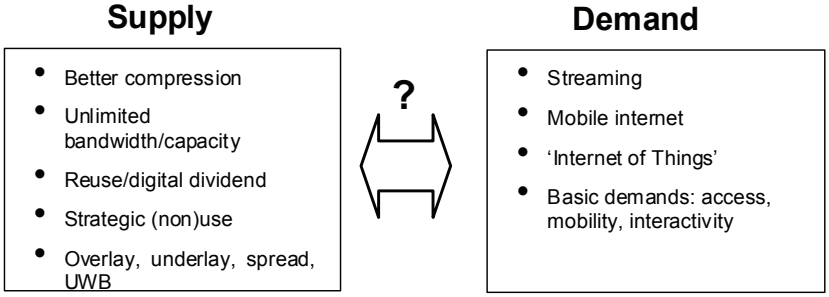


Figure 7 Uncertainty in future spectrum supply and demand

However there are two big uncertainties for this picture as far as scarcity per se is concerned:

- There are new uses of spectrum on the horizon that could be enormously demanding Figure 7 and new constraints that could limit the useful spectrum available for them. New uses include a push for an increasingly wireless environment; the potential flood of new traffic coming with IPv6 and the potential for vast amounts of high-bandwidth (eg WiMAX-like) traffic as content-sharing increases. The constraints include sitting constraints for repeaters and antennae, health and safety concerns coming from increasing public awareness /concern and increasing radiation densities.
- There are also strategic uncertainties. The interests of current spectrum holders are to perpetuate scarcity. In many of the spectrum release plans, arrangements for technology and service neutrality have raised concerns about spectrum hoarding or

'warehousing' – in other words, artificial scarcity. In addition, interference levels may become harder to police as spectrum becomes more widely available – in other words, if spectrum becomes too abundant to be a tool of economic policy, it will be necessary to reassert technical regulation – which will lead to a form of 'legal scarcity' (ex ante access and use regulation).

Another point that is worth noting is spectrum policy's effectiveness as an instrument of general economic policy (eg by encouraging competition in services, applications and other markets potentially delivered over regulated spectrum). If spectrum allocation remains in the gift of the government (even if it is not scarce in the real world) it remains a valuable policy lever – the government in effect has the right to demand obedience in exchange for the right to do business. Other licensing arrangements are similar – there is no a priori limit on the number of driving licences, passports, lawyers, businesses, etc. – yet all of them are regulated as to entry, and this regulation is used as a tool of economic policy (and social and technical regulation as well).

CHAPTER 4

Case studies: learning from the United States, United Kingdom and South Korea

Three cases have been chosen to assess different ways to deal with convergence: The United States, the United Kingdom, and South Korea. The cases are designed to review the regulatory environment, and governance solution that have been sought in explicit or implicit response to converging technologies, markets and services. Explicit attention is given to the way institutions work together to achieve coherence in policy and to reduce the risk that the institutional and regulatory set up has a direct (negative) impact on market developments. Thus this tests the ability of the system as a whole to deliver the overriding technological, economic and societal objectives across the entire delivery chain in a consistent manner for the benefit of society. This includes the governance of the market, the application of regulation, and content policy; but also the use of ex ante instruments like spectrum allocation.

The cases are chosen because they represent dynamic markets for converged services and because the regulatory and governance approaches are very distinct. The US and UK situations will be explored in more depth: the US because its political landscape is dominated by vertically-integrated oligopolists; the UK because it lives under the European Framework. The SK case shows up some differences of approach at the regulatory/market behaviour level, but the lessons of the SK case are more concerned with practice - and some background to give context. The communalities and differences will be presented at the end of this chapter on the bases of individual analyses of the capabilities, limitations, opportunities and threats (CLOT analysis) of each case. Detailed methodology of the case studies is explained in Appendix A and the case study protocol can be found in Appendix B.

4.1 The US case: a powerful judiciary reacting to change

4.1.1 Introduction

For telecoms regulators and industry observers internationally, the US telecommunications market provides insight into *both* the new technologies that are being deployed in the marketplace *and* the regulatory challenges emerging from such deployment. The combination of a large integrated economy, liquid financial markets and a hotbed of innovation in the East- and West-coast technology clusters means that many of the incumbent–new entrant 'clashes' are first demonstrated in the US. Of particular interest for the Netherlands should also be that the US is one of a few countries with strong inter-modal broadband competition between Digital Subscriber Lines (DSL) and cable modem, and with a significant Fibre-to-the-Home (FTTH) development.

The case study analysis has shown a very strong contrast in the US approach to that revealed in the UK, as the US telecoms regulators essentially lack a coherent and forward-looking approach; rather, the US policy has been fundamentally reactive, resolving conflicts *as they arise* between consumers, incumbents and new players. This has, in the last few years, led to substantial deregulation of broadband services from different suppliers, who had been regulated differently. The remaining regulatory approaches to converging industry segments have, however, not been fully homogenised yet. A major difference between the US and many other countries is the comparatively low level of content regulation in the US, making it easier to accommodate convergence of content distribution.

4.1.2 Regulatory design, supervision and market governance

The Communications Act of 1934 and its major revision through the Telecommunications Act of 1996 provide the foundational set of rules. The 1934 Act set up the Federal Communications Commission (FCC) to regulate telecoms policy, while the 1996 Act clarified and somewhat strengthened its role on a federal level. The FCC is influenced by:

- the US president through the original appointment of commissioners
- Congress through the FCC budget process and the threat of heavy-handed legislative interventions.

Other important regulatory bodies are:

- the state public utility commissions (PUCs), dealing with state and local issues
- the Department of Justice (DoJ) and the Federal Trade Commission (FTC), dealing with competition and consumer protection policy.

Given the complex legislative system in the US, major legislation is relatively rare, and so a lot of the 'action' takes place through the rule making and enforcement of these agencies. In addition, the judiciary system plays a very important role in the interpretation of the law, or challenges to the FCC and other agencies' rules and interpretation of the law. FCC decisions are thus clearly subject to various checks and balances.

4.1.3 Dealing with convergence

The 1996 Act did not deal explicitly with the key issues of convergence. The FCC and the judiciary have therefore emerged as highly important in the convergence processes, as they both seek to interpret and adapt the inherited telecoms regulatory system in *reaction* to the various convergence technological developments.

The FCC has two main decision-making powers:

- it can *adjudicate*, making often contentious decisions affecting specific parties
- it can establish *new rules* within the discretion provided by the Communications Act.

This rulemaking ability allows the FCC (within limits) to deal with convergence issues by adapting regulations to create more level playing fields in the convergent areas. Sometimes, adjudication can have a long-lasting impact; for instance, in the 'Carterfone rules' case of 1968, the FCC forced AT&T to allow the attachment of non-AT&T devices directly to the AT&T network. This allowed the emergence of 'telephony devices' such as fax, answering machines and the modem. Currently, the FCC is under pressure to extend similar rules to the mobile Internet service providers.

Most FCC decisions to act or not to act must be seen within an overall inclination toward allowing a 'free market' to work *unless*:

- there is evidence of market failure; *and*
- intervention is deemed appropriate.

In addition, compliance with the Administrative Procedure Act slows down the FCC's decision making through due process and the involvement of key stakeholders in the decision process. The process of consultations and strong stakeholder powers restricts the FCC's capacity to plan and develop a 'top-down' coherent framework (such as the EU Communications Framework).

We list several important FCC interventions relating to convergence

Text box 3.

Text box 3: FCC interventions relating to convergence

1. Local Market Competition: The FCC adopted regulation enabling competition in local markets. This Act was influenced by the "stepping stone" (or "ladder-of-investment") hypothesis, according to which resale and unbundling obligations of incumbents would open the door for new entrants, which would subsequently re-invest in their own networks, helping increase competition over time. This policy initially induced substantial service-based entry but only led to network investments downstream of the facilities provided by the incumbents. Only MCI and (the old) AT&T survived as major service-based entrants and they were swallowed a few years later by Verizon and SBC, after the FCC had abolished the most stringent unbundling obligation. In the meantime, however, cable TV companies emerged as a major and increasingly successful competitor to telephone companies that are fully facilities based and not dependent on the telephone incumbent networks: and first movers in the broadband space. This is a significant step towards convergence that

was partly made possible by the deregulatory step of the FCC that had handicapped service-based competition.

2. Information Services Classification: In several orders issued in the early 2000s the FCC declared all broadband access (including cable TV and DSL) to be information services rather than telecommunications. Information services, which include the Internet, are deemed competitive and therefore not subject to the same regulations as telecommunication services. Hence the services most likely to be affected by convergence were taken out of the common carrier regulation system, and line-sharing obligations for incumbents were abolished. The FCC also declared that it would refrain from regulating new fibre-optic lines installed by incumbents. As a result of these developments intra-modal competition reduced and inter-modal competition intensified. In addition the large ILECs increased their investments in fibre for Very high speed DSL VDSL and FTTH (fibre to the home).

3. Net Neutrality Rules: In 2005 the FCC set out Four Principles of Internet Freedom by which the FCC would be guided (discussed in the Net Neutrality chapter). The impact of this policy statement will become clearer over time through specific rulings of the FCC and the Court system. But it is already becoming the framework of reference for industry participants

4. In 2007 the FCC took the decision to dilute the ownership concentration restrictions for media companies, arguing that increased online content competition and convergence has led to a decreased relevance or need for content concentration regulations. Yet the 'jury is out' on the extent to which convergence will lead to decentralisation in market power in terms of content. On the one hand new Web 2.0 creative tools (such as YouTube, MySpace) have decentralised the content generation landscape, and provided a genuinely independent *and decentralised* competitive force to the incumbent media groups. At the same time incumbents have been able to replicate 'readership' and 'viewership' patterns over the internet, as they have used their strong offline brand and news and content infrastructure to extend their market leadership to the Internet.

Over the last few years, many of the regulatory changes were brought about by innovative market players, who often broke regulatory rules established by the FCC or used loopholes or unintended regulatory consequences to enter into established markets with legal barriers or to create new markets. These companies often used the court system to force the FCC to clarify or change its regulations.

Table 3: Role of Judicial Review in US Telecoms Regulatory Policy: Key Cases 1956-2008

Year	Area of Regulation	Judicial Case	Judicial Institution	Description	Impact on Telecoms Policy
1956	Network appliances connectivity	D.C. Court: Hush-a-phone	D.C. Circuit Court	AT&T lost right to exclude non AT&T devices	Opening up of competition between providers of network appliances; resulted in fax, answering machine, modem. This was followed with the FCC ruling in the Carterfone Case: broadly following the reasons developed in the 1956 'hush-a-phone' case

Year	Area of Regulation	Judicial Case	Judicial Institution	Description	Impact on Telecoms Policy
1969	FCC Mandate	Red Lion Broadcasting Co. v. FCC, 395 U.S. 367	US Supreme Court	Red Lion had challenged the FCC's right to auction off spectrum under the 'First Amendment' (Freedom of Speech). The Supreme Court found in favour of the FCC: having some people able to speak was better than allowing everyone to speak at the same time and none be heard because of the interference	FCC allowed developing Spectrum auctioning/selling of 'public' space. The ruling was in the context of the Fairness Doctrine
1984	Content transmission	Sony Corp. vs. Universal City Studies: The 'Betamax' case	US Supreme Court	The US Supreme Court found that the use of Betamax/Videos by viewers to time shift shows was *not* a copyright infringement	This ruling provided the basis for Kazaa's victory almost 2 decades later: arguing peer-to-peer sharing is the Internet's equivalent to Betamax
1997	Regulation of Internet content	ACLU vs. Renu	US Supreme Court	ACLU successfully challenged the applicability of the 1996 Content Decency Act over Internet content	Indicated the US Supreme Court's position that the Internet is not the subject of the same regulatory principles as traditional media
2001	Sharing of content	A&M Records vs. Napster Inc	U.S. Court of Appeals for the Ninth Circuit	This was the first major case to address the application of the copyright laws to peer-to-peer file-sharing. The court ruled that Napster could be held liable for contributory infringement of the plaintiff record company's copyrights.	The complexities and publicity of the case demonstrated the feasibility of delivery of media over the internet. Arguably, it was the birth point for iTunes and many other converged media services
2005	Definition of Broadband	FCC vs Brand-X	US Supreme Court	In a 6-3 decision, the Supreme Court overturned a federal court decision that would force cable companies to share their infrastructure with Internet service providers such as Brand X and EarthLink.	Internet service provided by cable classified as "information service", and *not* "communications service": hence exempt from infrastructure sharing requirements. The FCC argued that rules that have applied to the phone industry have led to higher prices and slower broadband growth. Keeping cable companies exempt from line-sharing rules will spur investment, and benefit consumers more in the long run. This is why the FCC classified cable broadband as an information service.
2005	Mobile Carriers Bluetooth Feature Crippling	Class Action vs. Verizon	LA Superior Court	Verizon customers in California filed a class action lawsuit against the company, claiming that the company has been disabling bluetooth operability, in order to charge additional fees	Devices interoperability: Mobile – Bluetooth; Net Neutrality issues: mobile operators' operating a walled garden & restricting user freedom to operate devices.

Sources: Own research, media and respondents information

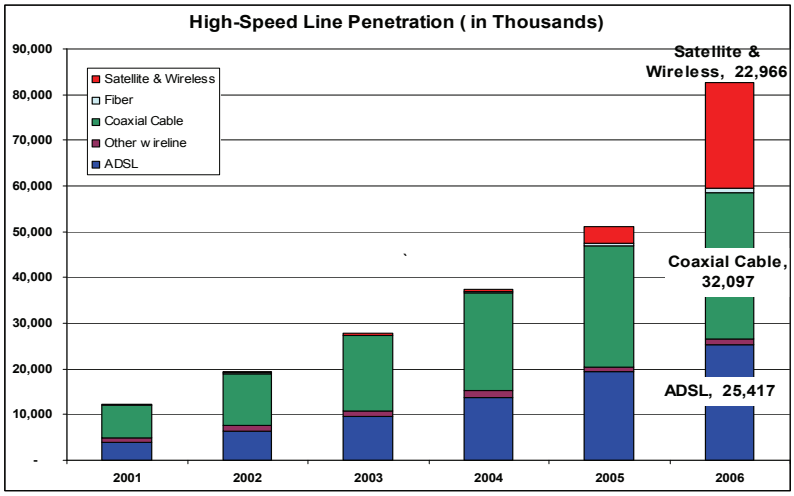
Another regulatory tool that could be used to assist convergence is the Universal Service policy. Thus far, this costly instrument has largely been restricted to affordable telephone

connections for the poor and in rural areas, and to high-speed connections to schools, libraries and hospitals in rural areas. There are increasing pressures by Congress and stakeholders to extent the Universal Services policy to broadband and converged telecommunications services. If such a move were implemented, it may result in universal broadband access for the population at large and for rural areas in particular.

4.1.4 Policy coherence

By having a single entity in charge of wireless and fixed-line telecommunications, cable TV and broadcasting and – to the extent that it is regulated – the Internet, the US system seems well suited to deal with convergence. The 1996 Act has also succeeded in stimulating cable and telephone companies to enter each others' territories. However, there are several factors that hinder the policy coherence of US telecom regulators:

1. There is essentially a 'dual-track' regulatory environment, where telecommunications networks are regulated as common carriers, while cable TV companies are not, despite both offering increasingly similar service packages. As a result, cable TV companies do not generally have to provide competitors with unbundled loops or other types of access to their facilities, while telecommunication networks are required to do so by law. When it comes to market power issues, cable TV companies are disciplined by competition policy as implemented by the FTC and not so much by the FCC.
2. As mobile Internet service providers increasingly compete with cable and telephone broadband providers, we are in effect seeing a 'third track' regulatory approach, built on the legacy of very light regulation of the mobile telephony oligopoly.
3. The FCC's approach of (partially) dealing with convergence through deregulation has meant that the future responsibility for convergence issues is shared with and partially shifted to the DoJ and the FTC as the relevant antitrust agencies. In particular the FTC, being in charge of mergers, price-discrimination issues, unfair competition, and unfair and deceptive trade practices seems to be preparing itself for this new role. The role of antitrust agencies is enhanced by the duopoly structure of the broadband access markets and oligopoly structure of the mobile telephony markets.



Source: FCC (2007) Statistics of Communications Common Carriers, own calculations

Figure 8 Relative composition of high-speed lines

4.1.5 Regulating a running target: audiovisual (AV) content policy

Content regulation in the US is limited to very specific issues, such as child pornography, intellectual property rights, and desirable properties of Voice over Internet Protocol (VoIP) and mobile telephony. In addition, the US is concerned with the openness of the media to expression of opinions and freedom of speech. Although politicians regularly pay lip service to content quality, and interest groups pressure politicians on content, there exists no quality regulation or major government efforts to provide higher quality levels. The 'high-quality' radio stations (National Public Radio) and TV channels (Public Broadcasting System) are essentially sponsored by the private advertising-financed stations.

The content landscape in the US is changing at a breathtaking speed. New players appear every moment, while old players, such as the big media groups, drastically restructure their organisations in order to compete in the converged media landscape. The view of content that used to be restricted to newspapers, movies, radio and TV has been expanded to include VoIP, the World Wide Web and many more types of content provided over IP networks.

In 2007, the FCC took the decision to dilute the ownership concentration restrictions for media companies, arguing that increased online content competition and convergence has led to a decreased relevance or need for content concentration regulations. Yet the 'jury is out' on the extent to which convergence will lead to decentralisation in market power in terms of content.

- On the one hand, new Web 2.0 creative tools (such as YouTube, MySpace) have decentralised the content generation landscape, and provided a genuinely independent *and decentralised* competitive force to the incumbent media groups. Online content providers may have lower overheads than offline content providers, and can also reach broader audiences more cheaply.

- At the same time, incumbents have been able to replicate 'readership' and 'viewership' patterns over the Internet, as they have used their strong offline brand, and news and content infrastructure, to extend their market leadership to the Internet. Table 4 demonstrates this trend.

Table 4: Top 10 Parent Companies by Search Traffic 2008

Parent	Unique Audience (000)	Time Per Person (hh:mm:ss)
1. Google	127,636	1:48:41
2. Microsoft	123,333	2:16:00
3. Yahoo!	115,605	3:13:23
4. Time Warner	107,778	3:24:16
5. News Corp. Online	79,058	1:45:31
6. eBay	66,240	1:46:12
7. InterActiveCorp	64,627	0:20:33
8. Wikimedia Foundation	57,343	0:17:18
9. Amazon	55,365	0:27:45
10. New York Times Company	51,148	0:17:27

Source: www.nielsen-netratings.com, August 2008

The ongoing changes in both incumbent and new players' business models are making the implementation of 'old media' rules, focused on TV, radio and print, increasingly difficult, especially in conjunction with the traditionally 'non-regulated' aspects of Internet-based media businesses. The biggest change in content brought about by convergence may be the shift in boundaries and power between content providers and consumers. The boundaries become increasingly fuzzy with the rise of the likes of YouTube, MySpace, iTunes and other decentralised broadcasting media.

The FCC is also trying to increase the number of broadband access providers, from two in most parts of the country (only one in many rural areas) to three, by establishing 4G mobile networks (see Text box 4). Regarding broadband 'content regulation', cable companies do have some degree of control, at least in principle, over how content is displayed (especially in the shift to VoIP); while mobile Internet service providers have a history of 'walled garden' content provision. So the debate over net neutrality is also entering the AV content policy debate.

4.1.6 Spectrum policy: allocation and use

The US has been leading a number of developments in radio spectrum use in the past: specifically through its innovative use of spectrum auctions, but also by permitting spectrum trading and spectrum leasing. These allow for adjustments in spectrum use made necessary by market developments. It also includes the provision of unlicensed spectrum for flexible or intermittent users.

Auctions have been used both as a revenue source for the government and as an efficient allocation mechanism of a scarce resource. The FCC pioneered a new simultaneous multiple round auction design that allowed for auctions in many different territories at the same time. These mechanisms became a major 'export article' for the economic consultants involved. A recent evolution of the mechanism (used in the recent 700Mhz auction – see

Text box 4) is to allow for packaged bids covering many areas along with bids for individual areas. The winners can then be either packages or aggregate bids (of single or various bidders). In addition, the FCC has most recently implemented a fully anonymised bids system, to prevent strategic bidding behaviour by players.

Text box 4: The C-Band/700MHZ 'digital dividend' spectrum auction

The FCC auctioned the Radio-frequency spectrum space that TV broadcasters will no longer be using due to the switch from analogue to digital broadcasting (also called the C-block). Stakeholders had different rationales:

- FCC: stimulate innovation and competition; create a third broadband pipe into the homes
- Wireless companies: to offer an improved Internet experience; as transmission is cheaper, as the signal 'travels further'.
- Telecoms companies: delivering a 'fast, robust, nation-wide wireless Internet'.
- New entrant Google: ensuring inter-operability of their business model in both the traditional Internet platforms, and mobile Internet

Concern: if mobile carriers carried over their application-discrimination practices, the 'new' mobile Internet would be significantly more constrained than current Internet practices: carriers would in principle have the power to control what devices and what applications consumers use. That could have a negative impact on innovation, while providing carriers with a lock on a highly lucrative bandwidth. The equivalent for Google, open networks would be that the ISPs can selectively disable Dell and IBM PCs from accessing YouTube on its PCs.

Google responded with a drastic move, by pledging $4.6bln to bidding in the 700MHz auction if the four license conditions are met: open applications, open devices, open services (Google, 2007).

Outcome: The impact of Google's move was that the cost of entry in the 700MHZ spectrum for mobile players has increased substantially, as Google has provided an entry price for the incumbents to participate in the auction[57]. In addition the FCC agreed to adopt two of the four Google aims (consistent with the FCC's own Net Neutrality principles). The incumbents AT&T and Verizon ended up the highest bidders for the 700Mhz spectrum at bid levels significantly higher than those initially anticipated. The third broadband pipe is now controlled by the incumbents, reducing its competitive effect on the existing duopoly.

It does not appear that the US is moving towards the type of service-independent approach to spectrum that is envisaged by the EU. Rather, parts of the spectrum have been reserved for certain purposes, including the licence-free spectrum. The newest development has been the auctioning off of 700Mhz spectrum that was freed by analogue TV stations that were moved to other spectrum for digital transmission. This auction was seen as a strategic opportunity by the FCC and the industry to provide the basis for a third broadband 'pipe' into the home. For new players such as Google, and for consumer groups, this was seen as an important opportunity to break up the broadband duopoly and to provide better broadband services for rural and remote areas. However, it was also an important chance to stop the restrictive practices of mobile service providers: such as feature disabling and

[57] See the following blog entry covering the events
http://machinist.salon.com/blog/2007/07/20/google_fcc/index.html

'walled garden' content practices. For mobile telephony incumbents, this represented an important opportunity to extend the geographical coverage of high-band with lines, opening up new opportunities for value-added services, and further entrenching their market leadership.

In the 1990s, the FCC had instated spectrum caps, thereby effectively limiting the market power of winning bidders. This was the only federal regulation of market power for mobile telephone providers and was ended in the early 2000s. As a consequence, the national oligopoly that had emerged was allowed to grow tighter so that, effectively, only two market leaders and two followers survived: Verizon, AT&T, T-Mobile and Sprint Nextel. With convergence and the prospects for quadruple play (ie the provision of Internet, video, telephone and mobile services as a single package) the position of the two market leaders may actually be strengthened so that a *de facto* duopoly cannot be ruled out.

US mobile carriers have used various user restrictions to gain additional revenues or avoid losing usage, for example, to VoIP. There is a heated debate on whether oligopolistic competition neutralises the undesirable effects of such restrictions or whether it induces mobile providers to give up the restrictions altogether. The controversy is increasing with the opening up of mobile operators to Internet usage, as the rules applicable in the Internet are in conflict with some of the usage rules in the 'old' mobile world. The prospects for regulatory oversight here are unclear. In principle, the FTC and DoJ are likely to become involved in any extreme (and visible) form of anticompetitive behaviour. However, the FTC may take a stronger position if it (or the courts) interprets the net neutrality principles as requiring FTC to make rules on:

- how mobile service providers and cable companies provide access to application and hardware developers
- fair access of third-party 'bandwidth-hungry' services.

In the case of the 700Mhz auction, two highly significant developments took place.

1. Google became a major player by pledging $4.6 billion to the auction process on condition that the FCC adopted the four open-platform conditions that Google had put forward for this auction. In the end, two of the proposals were adopted by the FCC:
    - open applications
    - open devices.
2. Not surprisingly, the big winners of the auction were Verizon and AT&T.

However, it is still striking that Google participated as a 'dark horse' entrant, arguably pushing up the prices that Verizon and AT&T paid in the end. This virtually assures that the 4G platform envisaged for this spectrum will not be an independent third broadband 'pipe'. That may also be the reason why these incumbents paid more than expected for these spectrum rights, even though they had argued that Google's 'open-platform' conditions would make the 4G platform unattractive. While these auctions are history, the fight about openness and new auctions is likely to continue.

Except for the administrative move of TV stations from the 700Mhz band to their new digital band, all new recent spectrum allocations have been by auction. As a consequence, administrative charges play a minor role, largely restricted to licences acquired outside auctions. In contrast to licences auctioned in many countries, US spectrum licences can be and usually are renewed at the expiration date. This results in a higher value of the licence to the bidders, while the increased certainty of a long exploitation period increases the incentives for complementary infrastructure investments. In cases where the FCC needed spectrum to be cleared for new uses, the FCC used re-allocation methods that usually made the old licence holders financially whole or compensated them with other spectrum. Licensing of spectrum involving many small licence holders is often farmed out by the FCC to private non profit making organisations called 'certified frequency coordinators'.

Re-allocation through trading of spectrum rights became common during the 1980s, when mobile network providers tried to accumulate contiguous networks. The trade occurred by transfer of the licence that had to be permitted by the FCC. Such permission was usually given if the acquirer was in good standing and the spectrum caps (that were valid at the time) were not exceeded. In the current decade, spectrum leasing from current licence holders has also become possible, both on a short-term and on a long-term basis. Nevertheless, the liquidity of the spectrum trading market remains limited due to cumbersome rules, as well as the heterogeneity of quality and dispersed location of spectrum blocks.

4.1.7 Net neutrality; regulation of ISPs

Although the net neutrality debate originated in the US and continues to be most heated there, it has significance for other countries as well. A fully converged set of networks will have to be able to deal simultaneously with the requirements of telephony, TV/broadcasting and all the current and future services provided by the current Internet. For an economist it seems natural that such networks will exhibit quality differences and heterogeneity, but it is not clear what the best approaches will be. A strict net neutrality regulation that *ex ante* forbids certain practices that could be either efficiency enhancing or anti-competitive would then necessarily restrict future options. In contrast, a rule-of-reason approach that considers behaviour as it evolves would leave all options open.

In 2005, the FCC published four principles of consumer rights that could deal with a set of net neutrality violations that had inherently bad outcomes. In order to encourage broadband deployment and to preserve and promote the open and interconnected nature of the public Internet, consumers are entitled to:

1. Access the lawful Internet content of their choice
2. Run applications and use services of their choice, subject to the needs of law enforcement
3. Connect their choice of legal devices that do not harm the network competition among network providers, application and service providers, and content providers
4. Competition among network providers, application and service providers, and content providers.

These principles have not legally been tested yet but, at the time of this writing, FCC Chairman Kevin Martin announced that he would be charging Comcast with a violation of these principles in the BitTorrent case.

Text box 5: Comcast vs. BitTorrent case: a net neutrality example

The Case: Comcast was accused by BitTorrent to selectively slowing down BitTorrent application users allegedly due to heavy traffic usage. BitTorrent is a bandwidth-hungry file-sharing method, used for the sharing of large files over the Internet. Consequently, BitTorrent applications consume a large amount of broadband. Comcast, a major cable TV and broadband provider, sought to deal with this problem by delaying or blocking people's BitTorrent sessions. This led to an outcry among consumer groups and regulators: the key issue was *not* the bandwidth 'discrimination', but that Comcast was violating the principles of network neutrality by penalising one application over another[58].

In regulatory terms, at issue is the FCC's statement of principle in 2005 that permits Internet service providers to engage in "reasonable network management". Both sides of the debate are vociferously arguing about what the definition of reasonable is, and to what extent it should protect the net neutrality principles. An additional issue is the need for transparency: the ISPs advertise their services as 'unlimited'; argument is that there are easier ways of discriminating between users, by using prices, rather than focusing on content and application discrimination.

The outcome:

The subsequent backlash threatened to spill over into regulatory action against Comcast (and its peers in the industry). As a result, Comcast recently entered into a collaboration with BitTorrent to:

- Manage broadband usage peaks in a 'protocol agnostic' manner[59].
- Comcast will now slow down access for people consuming the most network bandwidth, and will not target specific applications (such as BitTorrent).
- Comcast is to accelerate the migration of its clients to wideband Internet services.
- Finally, both Comcast and BitTorrent will be working with other ISPs, other technology companies and the Internet Engineering Task Force[60].

The outcome is still unclear. The dilemma is well explained by the Chief Executive of Vuze, who said: *"the problem is that the network operator is our competitor… We compete with Comcast with delivery of content over the Internet… What we have here is a horse race and in this contest, Comcast owns the race track, in fact, the only track in town. They also own a horse. We are being told they are only slowing down our horse by a few seconds."*

Interestingly, the main stumbling block to net neutrality at this time appears to be the traditionally more competitive wireless industry, where openness of 2G networks to devices and services has been slow. Advocates of net neutrality are concerned that, as the Internet's traffic and usage becomes increasingly mobile in a 3G/4G world, the balance of power will

[58] See the following online sources for background on the dispute: http://machinist.salon.com/blog/2008/03/27/comcast_bittorrent/ ; and describing Comcast and BitTorrent's partnership: http://www.prnewswire.com/cgi-bin/stories.pl?ACCT=104&STORY=/www/story/03-27-2008/0004781055&EDATE=.

[59] http://www.prnewswire.com/cgi-bin/stories.pl?ACCT=104&STORY=/www/story/03-27-2008/0004781055&EDATE=

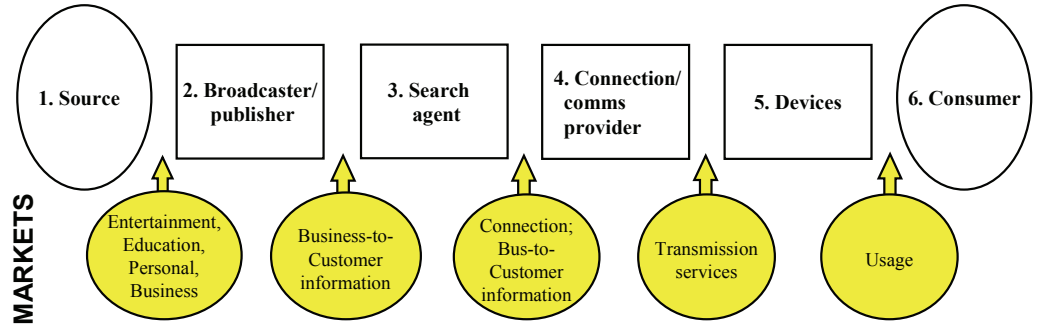
[60] See the IETF's mission statement for more detail: http://www.ietf.org/overview.html

shift to mobile internet service providers and hardware manufacturers. That could have the effect of undermining the independent and decentralised content production and distribution principles that have underpinned the Internet media economy. On the other hand, mobile Internet service providers and hardware providers see this new medium as a new economy that allows the recouping of large investments in R&D and spectrum acquisition. This is likely to be a strong area of future contest between the various stakeholders. It should be of additional interest to observers in Europe, as the outcomes will determine the types of technologies that come to market, thus having an impact on consumer choice in the EU.

Due to the limited regulatory power that the FCC has over the Internet and over the partially deregulated broadband services, the FTC is apparently positioning itself to fill part of this void. Since the FTC is not only in charge of antitrust violations (arising from market power or collusion) but also consumer protection, it may be able to play a larger role here.

4.1.8 Conclusions

Figure 9 gives an overview of the shared and unique competencies of different regulators and actors along the delivery chain. It illustrates how FCC only covers certain sections of the chain; whilst others are de-regulated; self-regulated or under control of other regulators like the FTC and DoJ.



Illustrative overview of public intervention

T=Tech	-	-	Cyber security; (DHS, DoJ)	Spectrum; hardware access; ntw sec.	Information security, self- regulation
E=Econ	DoJ, FTC	Fair acess; Media ownership	FTC	FCC in Telco, FTC in cable	DoJ, FTC
S=Soc	DoJ (e.g. child pornography)	(very limited) Indecency rules	-	Universal service policy	Self-regulation

= FCC = Other = Shared

Figure 9 Indicative overview of allocation of tasks across the delivery chain in the US

The US approach, with its various checks and balances, gives the potential losers of the new developments ample opportunities to make their case heard through regulatory proceedings, court cases and legislative lobbying. At the same time, newcomers can challenge incumbents' blocking practices, and seek to level the playing field. The result is what can be called a 'muddling through' approach, where new developments may be

slowed down or blocked. Whether the long-term benefits of such an approach outweigh the costs is an open matter. What is clear, however, is that without the strong US judicial system, the market may be significantly more biased or unstable. Therefore, other economies where the judiciary has a less central role may find the US system less attractive.

The FCC's reactive policy towards convergence may have the chance of being more successful than a regulatory master plan that may well anticipate future developments wrongly: picking the 'wrong winners' at an early stage of the paradigm shift in technologies and business models, and contributing to technology lock-in thereafter. The US approach towards content regulation reflects a similar belief in the forces of market competition, where intervention should take place only if it can be shown that market failure *has* occurred.

The net neutrality debate may be part of the natural birth pangs of convergence. Telephony, cable TV/broadcasting and the Internet all have different traditional governance structures and quality requirements. If these network-service combinations converge, it is not *a priori* clear, what the common governance structure should be. It can therefore be expected that the debate will continue, and the role of regulators will evolve simultaneously. An FCC respondent summarised the FCC's role in facilitating convergence as follows:

> "It is fair to say that we are always looking to reduce entry barriers and encourage competition and the efficient allocation of resources. We want to avoid centralised control, so by and large there is preference for competition [over regulatory control]. Convergence [helps our aims as it] breaks down barriers to entry between sectors that are running in parallel. In the real world, the technology pushes us; we have a limited capability to push technology. [Therefore] our challenge is to keep up our regulatory apparatus with *technology development" [FCC interviewee nr1].

CLOT Analysis

Table 5: CLOT analysis US

	Capabilities	Limitations
Appropriateness		
• Explicit analysis and awareness	Awareness and Analysis: judicial review, civil society and pressure by new entrants have led to adjustments in the regulatory system, accommodating convergence. Thus there is an effective combination of top-down and bottom-up dynamics shaping the regulatory environment.	Awareness & Analysis: reactive nature of the US regulatory system may have contributed to a lag in identifying market failures or non-competitive practices.
	Capabilities	Limitations

Appropriateness		
• Strategy	Specific Government Strategy: the positive side of no 'grand strategy' reduces the risk of 'picking winners' that turn out not to be the best technologies.	Government Strategy: 1996 Act was not explicitly focused on convergence issues; hence lack of a single coherent framework to deal with convergence. Consequently, unclear obligation for FCC to focus on protecting competition in the Internet 'space'. Slow and heavy-handed legislative process means institutional duplications/overlaps remain unsolved.
• Focus	Focus of Approach: Social: judiciary a strong defender of new entrants & consumers against incumbent interests; focus on Universal Service Provision provides a channel for extending access to disadvantaged communities Technical, Economic: Internet & Web business models have developed largely without regulatory interference.	Focus (Technical/Economic/Social): • Social: Universal Service Provision requirements not yet extended to broadband & convergence access; major urban-rural divide remains: lower levels of competition on rural & peri-urban areas Technical/Economic: non-intervention approach to mobile regulation has allowed incumbents to block/discourage innovation & new technology adoption.
Coherence		
• Institutions	Coherence: C-Band spectrum allocation illustrated how principles and social pressures can rapidly lead to modification of policies through consultation.	Institutions: decentralised and multifaceted FCC organisation: no single clearing point for co-ordination of policy & views; dual-track regulatory system for cable and telephone networks has discouraged a convergence in regulatory approaches.
Coherence		

• Regulation:	Regulatory: very strong congressional oversight leads to FCC implementation of objectives provided by Congress.	Regulatory Alignment: The 'alignment' of regulatory practices to technical, economic & social practices are 'forced' onto the FCC and other institutions by the reactions of market players and civil society, through judicial and lobbying action.
• Instruments	Instruments: spectrum allocation policy has recently been expanded to accommodate elements of net neutrality.	Instruments: 2G and 3G spectrum allocation was not accompanied by strong competitive/access-to-market requirements, with negative consequences for consumers.
Impact on Administration, Business (market), Consumers (citizens) – ABC		
• A: regulatory activity; position of government in the market	Administration: increased rulemaking and federal powers of FCC have allowed it to address obstacles posed by municipalities.	Administration: Congress & social pressures have led FCC to adopt net neutrality principles and launch inquiry on broadband practice.
• B: economic activity	Business: mergers across industry boundaries (AOL–TimesWarner; Google–YouTube; E-bay–Skype; Newscorp–MySpace suggesting an actively converging market place	Business: over-reliance on judicial/legal processes increasing cost of entry for new entrants; multiple institutions involved in overlapping policy areas; judicial or FCC rulings can 'kill' a budding industry.
• C: protection, access	Citizens/consumers: due to proximity to Internet and media innovative clusters *first and early* access to latest innovative offerings; the liberal legal system allows access to consumer benefits *before* these have been tested in court (eg P2P technology).	Citizens/consumers: rural & peri-urban customers have limited broadband choice; relatively low broadband penetration
	Opportunities	**Threats**

Robustness		
• Net neutrality	Extension of Carterfone principles to broadband. Strengthening interpretation of net neutrality may open up wireless net & converged content space.	
	Depending on the outcome, these can be classified as Threat or Opportunity: • Rulemaking following outcome of Notice of Inquiry into broadband industry practices • FCC implementation of net neutrality principles & judicial interpretation. Extension of Universal Service Provision to broadband & converged media.	
• Absorb changes	Slow legislative process and federal-level FCC mandate means regulatory system is fairly stable. Despite shortcomings, the US system has survived for 70+ years with two major Acts only, and remained a technological leader. Engagement of New Economy players in the regulatory system.	The lag in system reaction to a challenge may mean that the 'damage' to a new market or new players is done by the time regulators identify a problem and take corrective action. FCC's self-limitation of role to that proscribed by 1996 Act may mean it does not take advantage of opportunities to influence convergence favorably. Short-term focus in congressional policy agenda
Flexibility		
• Ability to change	Evolutionary and reactive nature of US regulatory system and strong role of judiciary imply a strong flexibility in the interpretation of rules. C-Band and further spectrum release can lead to emergence of wireless broadband as a genuine alternative.	Constrained interpretation of FCC mandate may limit attention to fair trade practices of broadband providers: content and service.

Flexibility		
• Openness to new instruments (eg self-regulation)	Funding and support for new technology ventures (through venture capital) & rapid uptake on novel technologies; ensures that gaps are exploited quickly. Tolerance of the system of borderline 'legal' practices allows technologies to be proven before incumbents challenge them in courts.	

4.2 The UK case: a fully converged regulator wanting to be ahead of the game

4.2.1 Introduction

The UK communications market is one of the more competitive in Europe (see Table 6 and **Error! Reference source not found.** Figure 12), characterised by a complex industry structure with a dominant telecom incumbent (British Telecom – BT) facing significant competition in all but the local loop markets), a mix of good (uptake of digital television, content diversity) and bad (broadband penetration, price and quality) performance, a content industry strongly affected by a public sector incumbent, the BBC and a converged regulator employing highly sophisticated tools and closely engaged with industry, community and academic communities. The UK stands out in its commitment to a market-led and liberalised regime, via the Better Regulation Agenda (flexible, light touch and incentive-compatible regulation), self-and co-regulation, and the placing of eg sectoral regulatory objectives in a 'whole economy' perspective.

Table 6: Business Deals 2006-2008, demonstrating a dynamically converging market

Date	Participants	Deal
Dec 2007	EMI UK, BiBC	EMI signs a deal with BiBC to make its latest music videos available through BiBC's digital store, www.boxoffice365.com
Nov 2007	Netflix, NBC Universal	Netflix and NBC announce an agreement through which current episodes of *Heroes* can be watched online by Netflix subscribers the day after the network airing.
Oct 2007	3, Skype	Skype and 3 to launch a handsest that lets customers make Skype to Skype calls and send Skype instant messages from their mobile phone to other Skype users
Sep 2007	Tiscali, Setanta	Tiscali UK signs a distribution agreement with Setanta Sports to offer three of its premium sports channels on Tiscali TV to its subscribers
Aug 2007	Nokia, Microsoft	Nokia installs Microsoft's new content access technology into certain handset series. The two companies also agree to collaborate in efforts to improve consumer access to and experience of digital content
Aug 2007	3, Google	3 UK offers Google Search and Google Maps on the Planet 3 mobile portal
July 2007	BSkyB, Amstrad	Sky and Amstrad announce the terms of a recommended cash offer to be made by Sky Digital Supplies for Amstrad
July 2007	The Football League, Virgin Media	Virgin puts Football League match highlights on its broadband and mobile platforms
June 2007	EMI Music, HMV	HMV offers EMI's DRM-free catalogue for download
June 2007	BSkyB, Tiscali	Tiscali to add the full set of Sky basic channels to its line-up
Apr 2007	ITN, 3, Rhythm New Media	ITN launches free news and entertainment content on 3's video service, with advertising delivered by Rhythm New Media
Mar 2007	Bebo, Orange	Bebo and Orange launch a social networking service on the Orange network
Mar 2007	Channel 4, BSkyB, Emap, UTV, UBC Media Group, Carphone Warehouse	The 4Digital Group, led by majority shareholder Channel 4 Radio, submits a bid for the new DAB national radio multiplex licence. The licence was awarded to the group in July 2007
Feb 2007	EMI, Last.fm	EMI makes its artists' music available to Last.fm users
Dec 2006	BSkyB, Google	Sky and Google agree to collaborate on Video, Communications and Search and Advertising on Sky's broadband services

Ofcom (2008). What is convergence?

	AOL	Be (O2)	BSkyB	BT	Orange	Pipex	PlusNet	TalkTalk	Tesco	Tiscali	Toucan	Virgin Media	Vodafone
Standalone broadband	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fixed and broadband	Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y
Broadband, fixed and TV			Y	Y						Y		Y	
Broadband, fixed, TV and mobile				Y								Y	
Broadband and mobile				Y	Y				Y		Y	Y	Y
Broadband, mobile and TV				Y								Y	
Broadband, fixed and mobile				Y					Y		Y	Y	Y
Fixed and mobile				Y					Y		Y	Y	Y
Fixed and TV			Y	Y						Y		Y	
Fixed, TV and mobile				Y								Y	
Converged offers				Y	Y								

Source: Ofcom (2007), Communications Market 2007

Figure 10 Bundled service offers from major suppliers, June 2007

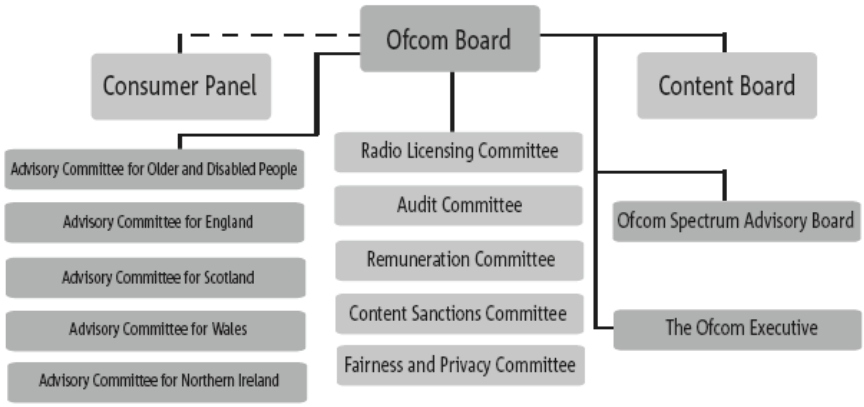
The UK case represents the strongest example of a converged independent regulator with a mandate to make policy, supervise and regulate. It is therefore expected that Ofcom will affect the speed and nature of convergence in various ways. The case study generated a number of relevant findings that shed light on the general approach taken in the UK and its advantages, disadvantages and peculiarities in relation to convergence.

4.2.2 Regulatory design, supervision and market governance

Ofcom was formed by merger of five different regulators: the Radiocommunications Agency (RA); the Radio Authority (RAu); the Office of Telecommunications (OFTEL); the Broadcasting Standards Commission (BSC); and the Independent Television Commission (ITC). The responsibilities are divided up within Ofcom into separate divisions for telecommunications, TV, Radio and Spectrum, mirrored by policy groups concerned with: Strategy & Market Developments; Content & Standards; Competition; and Spectrum Policy. External governance is organised along the lines shown in Figure 11. Ofcom bears primary responsibility for the regulation of all sectors of the electronic communications industry. As a unitary body, it is meant to provide a comprehensive, coherent and joined up approach to regulation, promote greater clarity and certainty and thus to avoid inefficiencies associated with the jurisdictional overlap of multiple regulators.

Ofcom's duties fall under separate government departments and thus separate Commons Select Committees. There is no single structured House of Lords system of oversight of Ofcom. Ofcom's accounts and performance are subject to scrutiny by the National Audit Office. While Ofcom is independent of the government, the Secretaries of State for the Department for Business Enterprise and Regulatory Reform (BERR)[61] and the Department for Culture, Media and Sport (DCMS) are answerable to Parliament for its performance.

[61]BERR has been formed in June 2007 and brings together functions formerly with the Department of Trade and Industry and the Better Regulation Executive, formerly with the Cabinet Office.



Source: http://www.ofcom.org.uk/about/accoun/case_study/case_study.pdf

Figure 11 Committees and advisory bodies of Ofcom

The UK case study primarily focussed on the way Ofcom has engaged with convergence in the content and spectrum domains. However, Ofcom does not serve as a comprehensive and independent regulator of all aspects of the information delivery chain. It is more appropriate to think of it as a central platform on which converging issues, tools and styles of analysis can be integrated and through which the activities of key policy stakeholders can be coordinated.

4.2.3 Dealing with convergence

The UK has taken a strongly proactive stance in relation to convergence. Ofcom was conceived in anticipation of convergence as reflected in the breadth of its charter (Text box 6), statutory duties spanning the communications policy portfolios of the component legacy regulators), independence from industry and direct policy (ministerial) control, and its latitude to exercise a broad range of policy tools and engagements and to initiate policy changes. It was positioned as more than an executive agency from the outset. Its activities range over: responsive mode investigation and enforcement based on stakeholder complaints; a very active 'discourse-centric' consultation programme; the design of innovative (even experimental) *ex ante* policy instruments (notably spectrum auctions); conventional *ex post* regulatory activities and the design and evaluation of new rules, regulations and forms of governance engagement.

Text box 6: Ofcom's specific duties fall into six areas

1. Ensuring the optimal use of the electro-magnetic spectrum
2. Ensuring that a wide range of electronic communications services – including high speed data services – is available throughout the UK
3. Ensuring a wide range of TV and radio services of high quality and wide appeal[62]
4. Maintaining plurality in the provision of broadcasting
5. Applying adequate protection for audiences against offensive or harmful material

[62] Please note that there has been a serious debate about the technology/channel specificity of this; i.e. does it mean making sure that a range of services is available, or that they are available via free-to-air broadcast channels (terrestrial or otherwise?).

6. Applying adequate protection for audiences against unfairness or the infringement of privacy

In managing this mix of activities and responsibilities, it has articulated overarching principles. While expressed in different ways in policy documents[63], they certainly include:

- A commitment to liberalisation – in effect, to letting markets make as many governance decisions as possible, subject only to potential sources of market failure (eg interference, monopoly, etc.) and existing obligations (eg at EU level).
- Implementing the Better Regulation principles of flexibility, minimising burdens and maximised accountability and transparency
- Engaging with better-informed parties whenever and wherever possible. This implies liberalisation in areas where market participants are deemed to know more than Ofcom, and partnership where different parties have different (but valuable) information.

Ofcom has also sought to encourage and remain centrally involved in regulatory analysis (especially economics) by sponsoring research, hosting workshops, and actively participating in both national and international regulatory scholarship. In this way, it seeks to benefit from the latest thinking and to circumvent or pre-empt criticism by ensuring that the basis for initiatives is clearly discussed and analysed and that its mistakes are a basis for future learning. In December 2007, BERR and DCMS set up a Convergence Think Tank (CTT), intended to shape future policy development in relation to eg TV, radio, mobile and fixed telecoms and online services.

Beyond this, Ofcom's 2007-8 Annual Plan pioneered a three year strategic framework to guide work towards an objective of "regulating *for* convergence" to ensure that everyone can benefit from convergence. This concentrated work on five key areas[64]:

- market-based approach to spectrum to ensure optimal use by reducing use restrictions, facilitating spectrum trading and making more spectrum available;
- promoting competition and innovation in converging markets by effective implementation of the fixed telecoms strategy, encouraging efficient next generation network investment and examining potential new sources of market power;
- ensuring delivery of public interest objectives by ensuring availability of high-quality content on a range of platforms, promoting access in all parts of the UK and reviewing the approach to content regulation;
- empowering citizens and consumers and improving regulatory compliance by promoting media literacy, consumer access to necessary information, consumer protection rules, simplifying rules and reviewing enforcement; and
- considering how legal and economic communication regulation frameworks need to evolve in response to convergence.

[63] See eg http://www.ofcom.org.uk/about/sdrp/

[64] Adapted from 2008/9 Annual Plan: http://www.ofcom.org.uk/about/accoun/reports_plans/annual_plan0809/statement/annplan0809.pdf

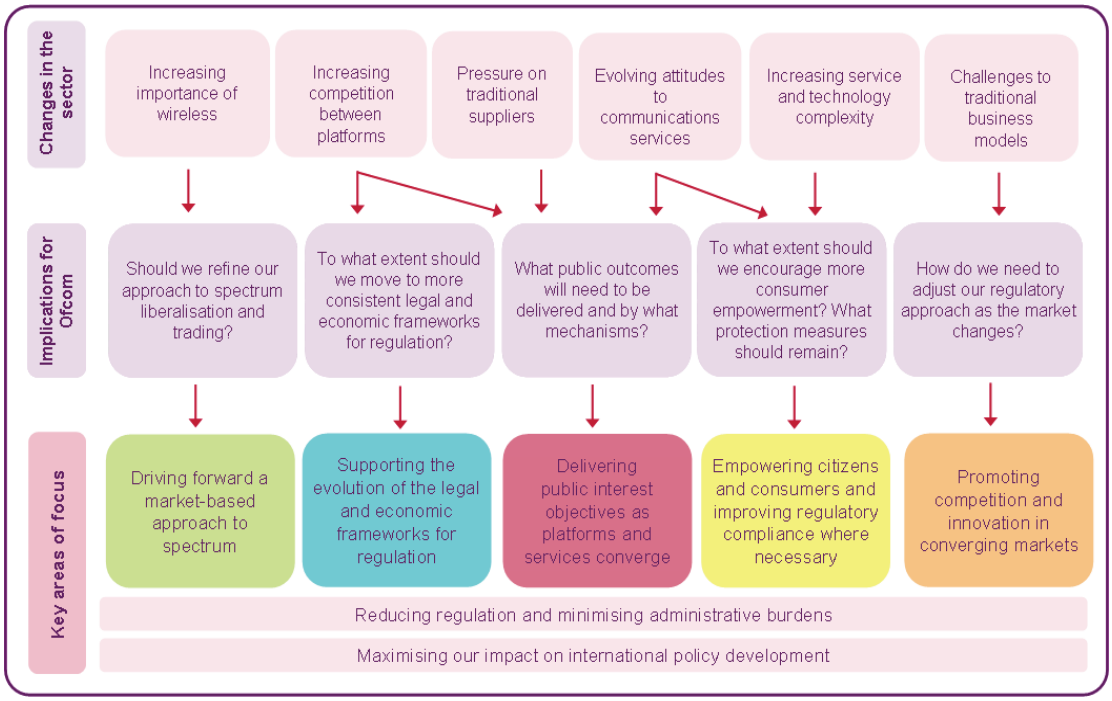


Figure 12 Ofcom's plan to 'regulate for convergence'

In addition, the strategy provides for "Better Regulation" action to minimise regulation and its burdens and to maximise influence on international policy development.

The case study identified five major shifts in methods. (1) Compliance shifted from telecommunications licensing towards authorisation, requiring companies to certify compliance with 'conditions of entitlement' (eg must carry rule, network access for rival suppliers, significant market power conditions, etc) – facilitating entry and flexibility while minimising the need to extend regulation to 'converged in' outsiders. (2) Spectrum management shifted towards a market-based approach opening the way for spectrum trading among licensed and unlicensed spectrum users and increasing unlicensed use where technically feasible. (3) Licensing moved from detailed and prescriptive terms towards a more transparent and liberal regime with greater co- and self-regulation. (4) Content regulation moved to a 3-tier regulatory structure to rationalise gaps and overlaps. (5) Media ownership is being extensively liberalised (highly controversial).

4.2.4 Policy coherence

From its inception Ofcom incorporated different regulatory cultures and sought to balance broad technical, economic, societal, and cultural policy interests of government, business and citizens. However these often conflict: promoting competition for consumers vs. ensuring access for citizens; providing development and investment stimulus (through regulatory certainty) vs. the need to invite innovation and new technologies; providing incentives to build/operate infrastructures vs. protecting broad access and use rights.

The formation of the regulator did not eliminate all 'stovepipes.' Interviews suggest that many old divisions remain; content, spectrum and competition policy are not fully joined up (as we will discuss in next section on audiovisual content policy). While the case study does not fully evaluate effectiveness, it is worth reflecting on whether greater (full)

integration is desirable or feasible on *a priori* grounds. Too broad an integration may dilute the regulator's effectiveness if it undermines close and mutual relations between the regulator and key stakeholders[65]. Tradeoffs and balance among different regulatory objectives may work best if there are, within the regulator or across separate regulators, specific communities of interest (eg spectrum managers, broadcast regulators) capable of articulating policy impacts that might otherwise be overlooked, and able to test alternatives in a market-like or negotiated (rather than administrative) framework. Also, specific regulatory functions within the overall policy portfolio (eg control of interference, enforcement of public interest content and access rules) are inescapably tied to specific market segments. In consequence, even a unitary regulator will face continuing divisive pressures from the market/regulated parties' side.

4.2.5 Regulating a running target: audiovisual (AV) content policy

Over the last 5 years, the local media and communications markets in the UK have been driven by a variety of technological advances: the rapid take-up of broadband[66], the success of (especially free-to-air) digital terrestrial television (DTT), the introduction of video on demand, the exploitation of TV formats, and consolidation of the independent production sector into a number of major international businesses.

Many of the changes have taken hold because of both regulatory intervention and the actions of the publicly owned broadcasters. In the process, UK television has emerged as a market, but one significantly shaped by regulatory intervention[67].

Text box 7: Key stakeholders in the UK's audiovisual content policy arena

- *Those operating entirely within the public sector*: Department of Culture, Media and Sport (DCMS); Department for Business, Enterprise & Regulatory Reform (BERR); Ofcom; Information Commissioner's Office; Competition Commission; Office of Fair Trading (OFT);the Home Office – and the overarching influence of EU Directives and those responsible for shaping and transposing them;
- *Public servants who span the public and private domains*: Ofcom Content and Consumer Boards; the BBC Trust; specific self-regulatory bodies (eg Internet Watch Foundation (IWF) and the Pan-European Game Information (PEGI) initiative); and civil society watchdogs like the National Consumer Council[68];
- *Those operating entirely within the private sector*: commercial broadcasters (with public service obligations); content and device producers; communications service providers like BT; and industry-based self-regulatory organisations such as Cleanfeed.

[65] It has been suggested that Ofcom was able to exert leverage on BT via its long-term relationship, and used its broadcast regulation powers to leverage changes that would have been hard to achieve via regulatory tools based on egalitarian competition policy applied to non-broadcast as well as broadcast operators.

[66] Note that the perception by Ofcom and the dominant telecommunications service provider is subject to qualification –penetration rates and service levels lag those in many other EU Member States, although both market performance and the competition that drives it are generally healthier than in eg the US.

[67] Gradam *et al*. 2008

[68] NCC's new technology work currently focuses on End User Licence Agreements (EULAs), children's use of the internet, as well as Intellectual Property, Digital Rights Management (DRM), privacy and data protection.

Note that both governments and industry played dual roles in relation to societal objectives for eg content provision. They are both content providers (government as a public broadcaster; industry in its 'normal business') and regulators in the public interest (government in its 'normal role', industry through self-regulation, corporate social responsibility, etc.) Thus, the groundwork is already laid for a rebalancing of roles and responsibilities – but so, too, are the pre-conditions for destructive turf battles.

Ofcom's first reviewed UK public service broadcasting immediately after its creation in 2003 and is currently revisiting it on the threshold of the 2012 digital switchover. This is a first step towards a new Communications Act intended to be in place by digital switchover. It addresses a variety of complex issues and policy questions:

- How can we deliver high levels of original content which meets the public purposes of public service broadcasting? Also, what new forms of public service content are now possible?
- What is the role of new platforms and technologies in delivering the public purposes?
- What is the appropriate level of plurality in the system to complement and to compete with the BBC? How do we capitalise on the wide range of providers?

Ofcom's powers and remit are not sufficient to handle all such profound issues[69].

Ofcom was born in anticipation of convergence and has evolved in parallel with a converging market environment. But convergence is not complete in the market (continuing struggle between public and private broadcast, impending digital switchover, increased availability of streamed and shared content) let alone on the governance side, which (for AV) depends largely on self and co-regulation (eg Cleanfeed, PEGI, London Internet Action Plan, etc.) by fragmented, overlapping and competing entities from specific domains (eg video game and online content, IPR enforcement) and government initiatives to rearrange responsibility and create new cooperative and coercive tools.

Therefore, it is not surprising that AV regulatory policy is not fully 'joined-up'. This has been evident since 2003; content and broadcast policies were only partially transferred to Ofcom and remain the least-integrated parts of its portfolio. This fragmentation may be appropriate given the need for broad societal engagement with and endorsement of content policy and a desire to avoid an overly centralised approach to media regulation. However, there is little analytic basis for concluding that either convergence or compartmentalisation are particularly effective ways of addressing policy needs from inside the market. Neither will fragmentation support engagement with EU-level developments like the AVMS Directive and its reconciliation with eg the e-Commerce Directive.

Ofcom has interpreted its statutory duties as broadly as convergence requires, taking a leading role in relation to (esp. societal) issues where the communications industry and/or the regulator's tools have powerful (if indirect) influence: eg alcohol consumption, healthy eating (especially for children), exposure to violent or otherwise harmful or illegal content

[69] Ofcom does not have the power to implement the decision reached through consultation (or as a result of its own analysis). At most, Ofcom can formulate suggestions for Parliamentary action.

(websites and video games[70]) and the powerful role of the media in providing educational material and facilitating public discourse.

However, most aspects of content policy are handled by the Department of Culture, Media and Sport (often in partnership with Ofcom) and most competition policy enforcement is handled by the Competition Commission (on referral from the Office of Fair Trading – to which Ofcom can itself refer complaints); this includes cross-ownership restrictions (eg between broadcasters and service providers, or in relation to premium content like football games).

The medium term tendency towards self- and co-regulation is likely to continue, driven both by participation of those most affected and/or in a position most effectively to develop and enforce standards in the middle of the value chain and by the regulator (eg the recent Ofcom consultation on self-regulation and the possibility of extending *ex ante* evaluation and public interest testing to cope with such hybrid regulators).

In the long run, however, the increasing penetration of technical and economic interests should align progress in this area with that in other policy areas, providing the need for effective lay representation, the inevitable reliance on private market actors to implement both technical and economic sanctions against transgressive behaviour and the increased cross-linking of AV objectives *per se* with eg spectrum policy can be managed.

4.2.6 Policy instruments: spectrum policy, stakeholder involvement

Ofcom seeks a *primes inter pares* (first among equals) role. As mentioned, it has taken steps to facilitate engagement with and among a broad constituency, in effect playing a multilayered game, enforcing statute law and regulations while at the same time seeking evidence of emergent patterns or superior alternatives. This two-way function (perhaps characteristic of common-law regimes) may limit the applicability of the Ofcom experience in civil;-law countries. Neither enforcing existing rules nor driving regulatory evolution and reform is played according to a single set of rules. For instance, in attacking ISP attempts to inhibit consumer switching, Ofcom moved rapidly from accepting complaints to supporting an essentially co-regulatory approach to obliging ISPs to make Migration Access Codes (MACs) available. At the same time it developed and analysed changes in the rules to improve compliance and effective competition. In terms of rule changes, Ofcom's active programme of consultation, scholarship and discourse helps move issues up the political agenda and trigger potential enforcement activity and/or legal changes elsewhere[71],

Spectrum policy

The planned (and now delayed) 2.6 GHz spectrum auction exemplifies Ofcom's attitude towards sophisticated market intervention (for a detailed description the UK case study). The 2.6 GHz spectrum auction has the potential to spur development of the next

[70] These are not in themselves communications services, but which overlap with them via online gaming and online game distribution

[71] Examples include recent 'public-facing' enforcement cases involving It has engaged piloting trading friendly Spectrum usage rights (SURs). The proof of these outreach activities is the participation as bidders in recent auctions of WiMax and mobile network providers and hardware manufacturers (in the US, content providers Google and Yahoo! have also played active roles).

generation of high-speed wireless broadband technologies and services. However, it faces serious challenges: the spectrum involved is suitable for use by more than one technology (essentially, 'unpaired' (TDD) uses derived from current broadband technologies, like WiMax and 'paired' (FDD) uses derived from mobile telephony). It is not yet clear how much spectrum should be devoted to each technology; let alone how many MHz of bandwidth a licence should have or which specific frequencies to assign. The tasks the auction must therefore accomplish are:

1. Encourage wide participation by many bidders from different technologies;
2. Elicit from bidders information about the value of different possible allocations;
3. Choose the proportion of spectrum to allocate to paired and TDD uses;
4. Choose the size(s) of licences in each class of use;
5. Determine which (if any) TDD licence blocks will be contiguous;
6. Choose an allocation (decide who gets which licence); and
7. Collect corresponding payments.

The design is intended to let the (auction) market make decisions that would otherwise be left to administrative procedures The Ofcom design combines three stages. These are briefly described in Table 7.

Table 7: Structure of 2.6 GHz Auction

Stage	*Type*	*Tasks*	*Price*
Primary rounds, Principal Stage	Ascending package auction with generic lots, clock prices and allocation scheme derived from theory (Vickery rule)	Paired-TDD split Initial licence sizes	Base price per 5 MHz lot
Supplemental Round, Principal Stage	Sealed-bid generic package auction with bidder-set prices and second-price final price rule	Adjust licence sizes, set split-contiguous TDD awards	Adjusted for different user valuations; premium for contiguous TDD lot
Assignment stage	Sealed-bid package auction with bid prices and second-price rule.	Allocation to specific frequencies	Adjustment for specific spectrum preferences

Ofcom's recent spectrum initiatives make explicit and extensive commitments to the principles of liberalisation and neutrality. This provides both the promise of more efficient and effective policy and exposure to new types of risk. Text box 8 lists some key dangers associated with the use of such a complex and novel device for a high-profile allocation at a time of substantial technical, market and policy uncertainty.

Text box 8: Risks of the 2.6GHz auction design

Insufficient revenues: Ofcom explicitly eschews a revenue maximisation objective, but disappointing revenues can lead to political pressure,

Inefficient allocation: if assumptions regarding underlying values of different uses are not justified, the resulting allocation *could* be inefficient.

Unduly asymmetric allocation: generous spectrum caps might threaten downstream competition in service markets or secondary spectrum markets. A technology/service neutral procedure does not ensure a neutral outcome.

Price distortion: technological neutrality can enable an efficient division between FDD and TDD uses; this should in theory cut price overall, but could raise prices for FDD spectrum.

Entry deterrence: due to fundamental market uncertainties, uncertainty and resulting adverse patterns or conditions of financing, the timing and apparent complexity of the auction design, and behaviour by dominant players.

Spectrum hoarding: Mobile operators may try to corner the TDD spectrum in order to foreclose competition from WiMAX operators in the future.

Distortions hanging over the secondary spectrum market: the design is predicated on spectrum trading, but substantial uncertainties remain as to how secondary markets can handle the issues that determined the auction design.

'Complexity failure': bidders may 'over-strategise' and submit overly-complicated or strategic bids with adverse consequences for themselves and the auction as a whole.

Legal risk: any high-stakes auction offers the potential for litigation. Such challenges have been used to derail auctions in progress or change outcomes.

Referring to the example, competition in the 2.6 GHz auction itself, the spectrum resale market and/or markets for goods and services is only guaranteed to produce efficient outcomes if all markets are workably competitive. Otherwise, standard 'second-best' arguments show that improving efficiency in one these linked markets may damage overall efficiency. Moreover the literature is undecided as to whether competition or a modest amount of market power most favours innovation. The issue is particularly complex for so-called 'Web 2.0' innovation, which may originate with end-users.

Stakeholder involvement

Ofcom has engaged in more than 400 public consultations on a wide variety of topics since 2003, providing a public record of original documents, individual and synopsised responses and (often) a point by pint response to issues raised. These fulfil various roles: clarifying rules and the basis for decisions to increase buy-in, compliance and understanding, gathering input and support for proposed changes (eg to broadcasting codes, etc.) and building political support and discussion around areas where Ofcom foresees the need for external policy change. Of course, this also opens some difficult questions in relation to convergence:

- Does consultation adequately engage all stakeholders (including those newly affected by convergence)?
- Do consultations give too much power to specific stakeholders (either legacy incumbents or those 'converging-in' from outside)?

- How can the pace of consultation be balanced against the need for efficiency in policy-making, the commitment power of the regulator and the need to have serious and sincere engagement with the consultation process?
- To what extent does consultation substitute for or complement more formal regulatory contact or self-regulation?

Ofcom has other forms of formal and *ad hoc* engagements with public and market players. It has acted to establish hotlines and other mechanisms for fielding complaints and analysed patterns and emerging issues to change implementation practices, formal rules and even governance structures. This is particularly important because convergence redraws lines of responsibility, making such changes inevitable if regulatory effectiveness is to be preserved. In addition, Ofcom often works 'through' the public by raising issues of public concern (eg recent strategic cases involving phone-in lines and programme ethics) and by supporting civil society initiatives.

4.2.7 Net neutrality and regulation of ISPs

Compared to the US, net neutrality has drawn far less attention in the UK and the rest of Europe. Net Neutrality raises security as well as economic issues, and affects various markets including hardware and software, where it sparks both competition and regional development concerns (eg in relation to the Bristol 'game developer cluster' etc). The UK engagement with net neutrality is a hybrid; the UK mixes US dynamism and venture capital availability with some of Europe's success in forcing bottleneck service providers to open up their systems to upstream and downstream 'rivals.' These issues are discussed in Sec. 2.5; here, they lead to the following conclusions:

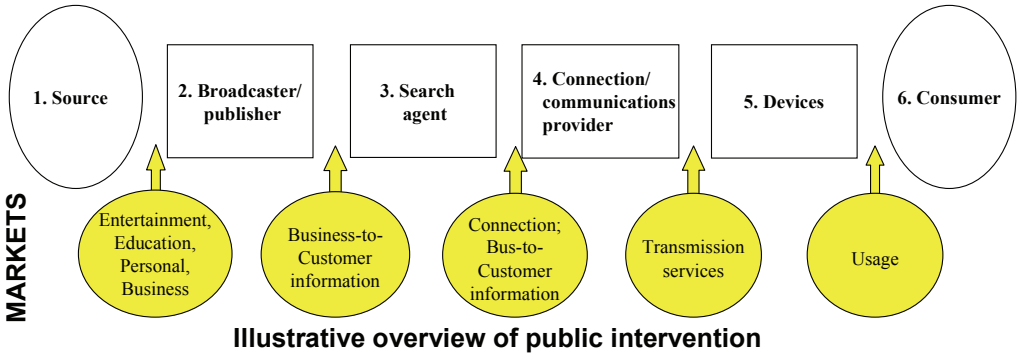
- Europe is probably still a bit complacent regarding the dangers on non-neutrality and neutrality alike;
- The (UK implementation of the) European Regulatory Framework for Electronic Communications Services can deal with US-style net neutrality problems
- To date, UK ISPs are not behaving in the way that neutrality proponents warn against; this is not necessarily a good thing
- The framework is being used appropriately but not effectively in dealing with vertical market power and collective dominance
- Europe (and the US) may face a problem coming 'from behind' (from content provider dominance and exclusionary behaviour)

The convergence challenge is that Net Neutrality problems may require more active partnership:

- between telecom and competition authorities; and
- (to deal with the attack from behind) between the telecom/spectrum and the broadcast/content 'silos' in the regulator

4.2.8 Conclusion and CLOT analysis

Figure 13 gives an overview of the shared and unique competencies of different regulators and actors along the delivery chain. It illustrates how Ofcom covers many sections of the chain.



Illustrative overview of public intervention

T=Tech	-	Personal Information, network security	Communications network security	Spectrum, device neutrality;	Encryption, Info security, Self-regulation
E=Econ	OFT, CC	Public value test; Media ownership	Telecom group, BT undertakings	Regulation	OFT, CC
S=Soc	DCMS, self regulation	Public interest test	-	Universal service policy; digital dividend	Awareness raising; privacy; ICO

= Ofcom = Other = Shared

Figure 13 Indicative overview of allocation of tasks across the delivery chain in the UK

CLOT analysis

Capabilities

From a summative perspective, Ofcom's strengths are active engagement with a very wide spectrum of stakeholders (not just those named in legislation); innovative tools based on cutting-edge analysis; and a clear balance of *ex ante* and *ex post instruments*. Its coherence is reflected in its ample and wide consultations, its willingness to incorporate eg consumer protection, competition and social protection concerns and in its willingness to work in partnership with or hand off to other government and non-government organisations when circumstances warrant (eg data protection being passed to the Home Office, video game content to PEGI and DCMS, telecom mergers to OFT). Ofcom points the way to a potentially sustainable model of a converged regulator in a continually converging environment. In this sense, we acknowledge Ofcom's leadership in innovation and analysis and associate this with the UK's vigorous and competitive industry (especially compared to the pre-Ofcom state of affairs). In addition, Ofcom has facilitated novel collaborative forms of public- private engagement with shared societal responsibilities (eg promoting codes of conduct, self-regulation and co-regulation). Continuing evolution in, for example, spectrum policy[72] underlines its strategic robustness. Ofcom is very flexible in its mechanisms, less flexible in its objectives and methods and relatively inflexible in its

[72] Through the development of most sophisticated and novel auction design and spectrum management tools (eg Spectrum Usage Rights.)

commitment to pursuing its statutory duties via liberalisation and a light-touch approach to greatest possible extent.

Limitations

We also note several limitations: Ofcom may not always mediate well between industry and European (especially Commission) interests and may be unduly influenced by political or theoretical agendas, Ofcom's historically close relation with the dominant telecom provider, a possible overemphasis of economic analysis over technology, commercial and/or legal argumentation, an ambivalent attitude towards international harmonisation and explicit objectives of minimising regulation and influencing international policy. The coherence of Ofcom's policies has been contested by the Competition Commission and DCMS and its very openness to industry input (and consequent close relations with the dominant telecom provider and co-regulatory bodies) raise questions of independence and neutrality[73]. Industry and academic stakeholders perceive Ofcom to be more joined-up across policy areas and market segments than it is internally, where policy area segmentation survives and where, in consequence, some innovative initiatives are less certain than they might be. Ofcom seems very much attracted to novel theoretical concepts, which seems to have led to a slightly defensive position. For instance, issues raised in consultations are generally dealt with selectively on a point-by-point basis, so the 'convergent' implications of the portfolio of concerns are not always fully addressed. On the other hand, the discussion does generally identify the major issues and provide explicit responses to most of them, so that any preference for theory over evidence or precedent or any inconsistencies in logic are at least open. Overall, it is not always clear whether initiatives and consultations are seeking to develop the thinking behind regulation or specific policy.

Threats

In its pursuit of forward-looking tools and mechanisms, Ofcom has a history of regulatory entrepreneurialism and a willingness to take risks that some (especially in industry) see as a risk in itself or at least a reduction of regulatory certainty. In the case of the 2.6 GHz spectrum auction, Ofcom decided to endorse technology and service neutrality and liberalisation despite the risk that divergence from EU harmonisation guidelines might produce incompatibilities across EU markets and the resulting dependence on spectrum trading to sustain efficiency of spectrum allocation. The resulting auction design, generally acknowledged to be one of the most complex ever used in practice, runs additional risks of complexity failure if potential participants misunderstand the design or if underlying assumptions are not met. Also, in the hotly-contested commercial environment where Ofcom's activism finds expression, legal threats to specific activities and the overall coherence of the strategy are increasing[74]. In the longer run, convergence of regulatory

[73] This can be seen in the slow introduction of ADSL and local loop unbundling and contestable decisions, such as those leading to the current lawsuit over the 2.6GHz auction. On the other hand, Ofcom did raise the possibility of structural separation of BT during its last strategic review, leading to

[74] The 2.6 GHz auction, originally scheduled for the spring of 2008, was delayed first until August and now indefinitely by lawsuits.

cultures might trigger a major clash of perspectives; market-led regulation may lead to market failure or compromise societal regulation.

Opportunities

A great opportunity for Ofcom lies in finding new ways to let markets handle old regulatory problems and establishing mechanisms for identifying new ones. Both functions are essential in a world of convergence, where existing problems may either cease to be important or may move beyond solution by traditional approaches, and where new problems may produce long-term structural damage unless recognised and dealt with early on. Exploring new market-based methods should continue to enhance Ofcom's ability to learn and make tradeoffs, leading the way in new areas especially in the context of technology and service neutrality. Ofcom also has a particularly interesting opportunity in relation to the basis of 'convergence-friendly' future policy; its independence from government lest it play the role of an 'honest broker' among economic, societal, security and other peripheral policy interests in ways not available to the US of SK regulators. In addition, it is in a position to influence (if not control) the future direction of EU policy. This can let it produce an even more innovation-friendly environment for future convergence, by providing proof of concept for new approaches that would never be tried in countries with smaller or more vulnerable sectors or a less-developed history of trusting market mechanisms. The positive outcome would be a strong harmonisation at EU level on the *mechanisms* by which regulatory decisions are made (eg auctions, spectrum trading, self-regulation) in place of potentially-inefficient harmonisation that pre-empts such decisions and the engagement they invite.

4.3 The South Korean case: a dynamic market waiting for a response

4.3.1 Introduction

The reason for including South Korea as a case study is its dynamic market environment; high broadband penetration; apparent leadership in the development of converged services; current reform process; and the lessons that emerge from this for other countries still looking to face up to the realities of convergence. Finally, South Korea has a tradition of balancing societal, technical and economic objectives.

Growth in the IT industry provided 40 per cent of South Korea's GDP growth in 2000. A total of 90% of households in Korea have access to broadband internet at home and, in 2007, every individual had a mobile phone. This high utilization rate of internet and broadband pushes the demand for newer and more convenient services. Service providers are responding by continuously developing new converged services and new entrants are attracted by the growing opportunities.

4.3.2 Dealing with a converging market

The importance that South Korea attaches to investment in ICT is apparent in its overarching ICT promotion strategy, u-IT839, which began in 2004 (Figure 14). In this strategy, convergence is acknowledged and actively supported (the bold entries in Figure **Error! Reference source not found.**14) represent convergence-enabling technologies). As a result, service-level convergence has happened through telecommunication companies providing broadcasting services. Korea Telecom (KT) started providing broadband internet and bundled products with Korea Digital Broadcasting (SkyLife) in 2004; and SK Telecom launched a satellite DMB service with TU media. Three major telecommunication companies – KT, Hanaro Telecom and LG Telecom – provide IPTV services. Dacom started a triple play service in 2004; and Hanaro Telecom started their triple play service in 2005. Market expansion from the broadcasting companies, on the other hand, seems to have begun only recently; KCT, in which Korean SO companies jointly invested, is to launch VoIP and MVNO (Mobile Virtual Network Operator) services in the future[75].

[75] Digital Daily, A techno-economic research for convergence services policy of telecommunications

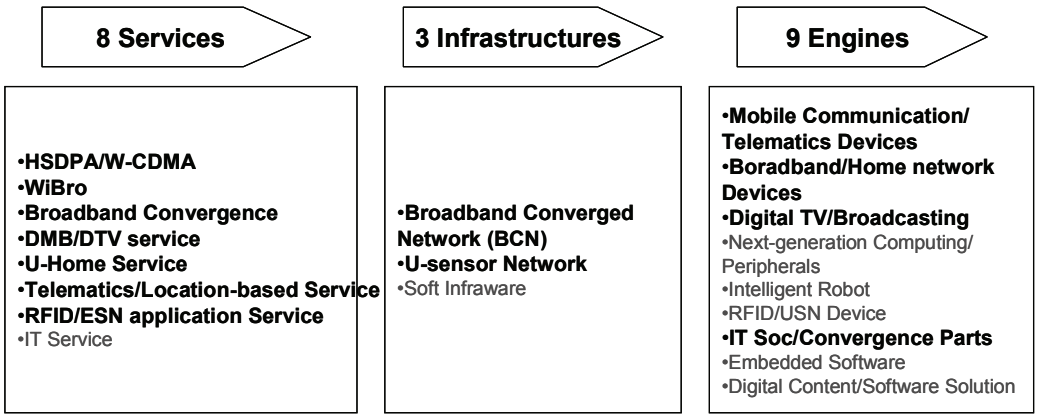


Figure 14 IT839 Strategy in South Korea

While the two traditionally different markets of telecommunication and broadcasting (audiovisual content) were converging, the regulatory bodies in each sector were slow to follow with policies and regulatory objectives. It became apparent that none of the regulators were suitably equipped to deal with converged services, facing overlapping and sometimes contradictory regulations, wasted resources – and even hindering the development of converged services. Both KBC (Korean Broadcasting Commission) and MIC (Ministry of Information and Communication), for example, were reviewing the contents of web-casting by broadcasting companies. Also, the converged service providers were required to obtain both KBC's recommendations and MIC's licenses for their technology. Each agency had its own promotion programmes for R&D and training[76] and, at the same time, its own level of regulation for converged services due to different policy objectives – MIC pursued fair competition and market efficiency through less regulation, while KBC gave public interest priority over efficiency.

In order to respond to market convergence efficiently, on March 2008, KBC and part of MIC merged to form the KCC (Korea Communications Commission) under the Korea Communications Commission Act. The policy objective of KCC is to enhance the quality of life and develop new economic growth engines by promoting the public interest and telecommunication and broadcasting convergence, invigorating its content, and forming a foundation for the digital information society. The KCC presents itself as a policy and regulatory agency, with high ambitions for developing economic growth, innovation, technological advances, and the improvement of the quality of life.

[76] *"MCT and KBC compete with each other in supporting surveys and policy research on media business and market. MIC and MCT compete with each other in R&D for game software and digital content development, and DRM(Digital Rights Management)"* Restructuring Ministerial Organizations for the Contents and Media Convergence, 2007, Dongwook Kim

Text box 9: Specific policies of the newly converged regulator, KCC

Policy objectives KCC:

- to promote the digital transition of terrestrial broadcasting
- to expand market entry opportunities for new services
- to strengthen the universal service
- to foster broadcasting and digital contents development
- to upgrade the broadcasting and telecommunications network
- to enhance cyber security.

The formation of KCC is still in progress and the legacy system is still effective. As can be observed in Table , both the broadcasting act and the telecommunication business act co-exist; while one converged entity regulates both systems under the auspices of the KCC Act.

Table 8: Current law relating to the KCC

Service	Law
Teleco/Broadcasting Convergence	Korea Communications Commission Act (2008.2.29) Internet Multimedia Broadcasting Act (IPTV Act, 2008.2.29, Modified)
Broadcasting	Broadcasting Act Digitalization of Terrestrial TV Broadcasting Special Act (2008.3.28) Education Broadcasting Act Foundation for Broadcaster Culture Act
Telecommunication	Telecommunications Business Act Information Network Promotion and Information Security Act Informatization Act Positioning Information Security and Utilization Act (2005.1.27) Basic Electric Communications Act IP Address Act (2004.1.29) Information and Communication Company Act Communications Privacy Protection Act
Radio	Radio Act

A 'Broadcasting/Communication Business Act' is now being drafted by the KCC[77], in order to integrate the currently distinct regulations for broadcasting and telecommunications.

4.3.3 Summary of KCC and governance set up

The KCC consists of five Permanent Commissioners including the Chairman, of which two are appointed by the President. The Chairman's position is equivalent to a Minister. The other three members are recommended by the National Assembly. The KCC has two Offices (Planning and Coordination Office, Broadcasting and Communications Convergence Policy Office) and three Bureaus (Broadcasting Policy Bureau, Telecommunications Policy Bureau, User Network Bureau). In addition, there are two

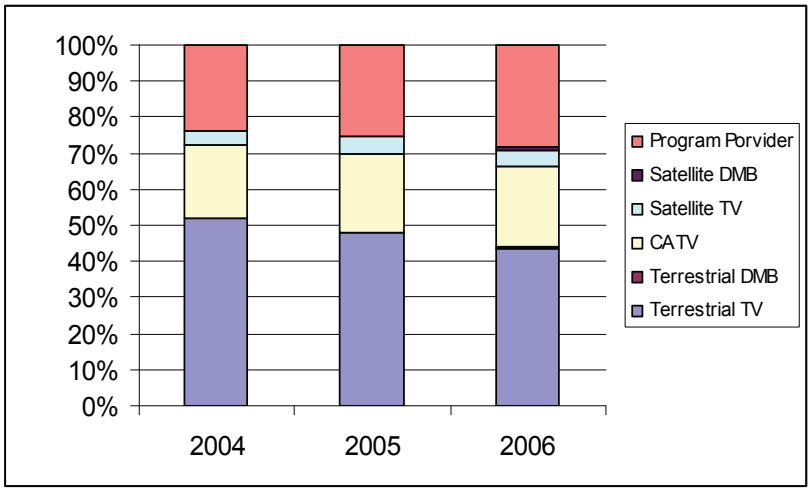
[77] ETNEWS (http://www.etnews.co.kr), 2008.5.20

subsidiary organizations, namely, the Radio Research Laboratory and the Central Radio Management Office.

4.3.4 Regulating a highly dynamic audiovisual (AV) content market

In the meantime, the AV content market in South Korea exploded. Cable TV (CATV) entered the South Korean market late – in 1995. Prior to 1995, traditional incumbents (terrestrial TV broadcasters KBS, MBC, SBS, and EBS) produced the programmes and delivered them directly to consumers. Since then, MPP[78] (multiple program provider), MSO (multiple system operator) and MSP (multiple system operator and programme provider) have emerged. Figures for December 2006 show that South Korea has 46 terrestrial broadcasters (including TV, radio and DMB); 256 CATV companies; two satellites TV companies; and 187 programme providers participating in the market (KBC, 2006 and 2007).

Total revenue for the broadcasting industry in 2006 was 9,719,862 million won[79] – a 12.6% increase on 2005. For terrestrial TV broadcasters, the market share was 39.6% in terms of total revenue but its share has kept decreasing since 2003. However the total revenue of CATV and satellite TV companies in 2006 increased by 14.2% and 11.8% respectively, compared to 2005 (**Error! Reference source not found.**Figure 15).



Source: KBC, 2007

Figure 15 Changes in market share in the broadcasting industry

Since the abolition of the investment limit in 2004, vertical and horizontal integration between system operators and programme providers has occurred. As a result, the share of MSO (multiple system operators) in terms of total revenue in the cable TV businesses increased from 78.1% in 2005 to 81.1% in 2007. Integration between program providers is also generating an increasing market share for the MPP (multiple program providers). Along with horizontal integrations within SOs and PPs, vertical integration between MPP and MSO has occurred steadily for several years. For example, CJ is both the top MPP and MSO in this market, and its market share increased from 9% in 2004 to 14.9% in 2007. In terms of ratings, CATV rating is rising while terrestrial TV rating is decreasing;

[78] Program provider which uses multiple channels
[79] Exchange rate:1 USD : 1056 won in 2008-06-26

terrestrial TV rating was 25.66 in 2002 and 21 in 2006, and CATV rating was 10.63 in 2002 and 13.7 in 2006.

4.3.5 Policy coherence

Discussions on changes to the regulatory system on audiovisual content started in 2000, with the objective of establishing a coherent regulatory approach towards converging media and telecommunication markets. All parties agreed that the vertical regulatory system is no longer appropriate for the current market situation; and a horizontal regulatory system is still being discussed, based on the principles of network neutrality and technology neutrality. Both KBC and MIC came up with different agendas for a regulatory system for the telecommunication/broadcasting industry. Both seem to agree on the need to introduce a horizontal regulatory system but differ on their approach to each platform layer.

In order to keep up with industry convergence, KBC (currently KCC) suggested a three-tier regulatory system comprising content, platform, and network. Content regulation would focus on societal, cultural and economic values, such as protecting minorities; promoting production and distribution; protecting property rights; and so on. Platform regulation would protect the consumer, promote fair competition and regulate the entry/exit of businesses. The network, on the other hand, is considered to be neutral; so the main objectives would be to regulate technical standards, price and market power. Table 9 shows KBC/KCC's proposed horizontal approach to dealing with convergence.

Table 9: KBC/KCC's proposed horizontal approach to dealing with convergence

	Contents (Production, Creation)	Platform (Packaging, Distribution)	Network (Infrastructure)
Business	Multimedia contents producer – Independent producer, PP, CP	Program Distributor – SO, satellite TV, IPTV, DMB, Internet Portal, etc.	Network operator – Common carrier, satellite network, CATV network operator
Objective of Regulation	Cultural and Societal diversity Protecting Property rights	Consumer protection Fair competition	Ubiquitous service Protecting private information
Entry Regulation	Report	License/Registration	License
Objects	Diversity of contents Contents (obscenity)	Unfair competition Must carry	Price regulation

Source: KBC, 2006

MIC (current KCC) suggested a two-tier system comprising contents and carriage (Table 10). MIC viewed the carriage layer as dealing with subscriber and contents management and imposing price. The carriage layer would then be further divided into those businesses owning a network and those without; and a license would be required for any network operator handling contents business. Platform has the role of distributing contents; therefore it should belong to the carriage layer in the KISDI report in 2006[80].

[80] KISDI, 2006, Horizontal regulatory system: EU and OECD case

Table 10: MIC/KCC suggested horizontal approach to dealing with convergence

	Carriage	Contents
Business	Communication Network, Internet Network, Cable Network, Satellite Network, Terrestrial Transmission Network, etc.	Business providing broadcasting programmes and information
Objective of Regulation	Focusing on economic value Societal and cultural values being secondary	Focusing on Societal and Cultural values Economic value being secondary
Entry regulation	Competition	Different regulation level depending on influence of contents
Objects	Regulating leading incumbents' anti-competition Securing equal accessibility to network Efficient spectrum use regulating price to protect consumer	Diversifying contents Protecting property rights

Source: MIC, December 2007, "Changes in Broadcasting Law and contents regulation"

The main difference between the two systems suggested by KBC and MIC is their view on the platform. On one hand, KBC viewed the platform as business entities not only distributing the content but also restructuring the programmes and content, hence it should be regulated with societal and cultural consideration. On the other hand, MIC considered the platform to be a carriage which has neutral value. Whilst the KBC and MIC were integrated to form the KCC, the dispute over the two differently tiered systems suggested by the legacy regulators has yet to be settled.

4.3.6 Spectrum policy: allocation and use

One of the stated policies of KCC (Korea Communications Commission) is to expand the market entry opportunity for new services and technologies. Technological innovation is explicitly promoted by allocating specific spectrum to certain services and providers who meet the technical standards, as well as by market-based frequency retrieval and reassignment[81] (Table 11). Traditionally, radio is strictly regulated and controlled by the South Korean government. However, since 2000, the South Korean government has been reviewing market-based spectrum policy, such as spectrum refarming and administrative pricing, to improve its management. Previously, MIC was in charge of spectrum allocation and licensing radio (wireless) stations, but its spectrum policy was taken over by Korea Communications Commissions (KCC) in March 2008. Under KCC, a spectrum policy council now deliberates on a long-term spectrum utilisation and promotion plan, spectrum allocation, and spectrum retrieval and reassignment[82].

[81] http://eng.kcc.go.kr/html/policy.html
[82] Radio Law, Article 8.

Table 11: Spectrum policy and relevant service

Services	Spectrum Policy
4G	Spectrum license for portable internet service
3G	Spectrum allocation for IMT-2000 service
W-LAN	5GHz band allocation responding to market demand 60GHz band allocation for home networking
Terrestrial	UHF band allocation for trial broadcasting use Spectrum utilisation policy for A-TV frequency after D-TV transfer
Terrestrial DMB	VHF TV band allocation
Satellite DMB	25MHz BW (2605-2630 MHz) at WRC-2003
U-wireless sensor	UWB, RFID band allocation
Telematics	Efficient spectrum management for telematics infrastructure
PPDR (public protection and disaster rescue)	Reallocation of existing TRS bands for narrowband service 4/5GHz band allocation in accordance with international trends for broadband service

Source: Strategies and policies for wireless IT promotion in Korea, 2004, Oh, Sung Kon

The KCC allocates spectrum according to the needs of national security; current domestic and international spectrum utilisation; and environment; development trends in radio technology; and the demand on services using the spectrum[83]. KCC allocates spectrum to common carriers (communication service operators), CATV providers, and network operators (NO), and must announce these allocations publicly. In the case of assignment, the KCC also has to predetermine its usage and the technology; that is, it does not adhere to the principle of service and technology neutrality.

Radio law has separate provisions for assignment of spectrum with charge from that with no charge. During the early 2000s, the government tried to adopt an auction system as a mechanism for spectrum allocation. However, due to the excess demand on certain spectrums and the possibility of transferring high auction prices to the customer, an auction system has only just been introduced. Instead, other spectrum assignment mechanisms such as administrative pricing and retrieval and reassignment were introduced. Administrative pricing was first applied to IMT-2000 in 2000. In 2005, the Radio Act was revised to specify a retrieval and reassignment system[84]. The KCC employs spectrum charge assignment if economic value and demand for an announced spectrum is large or it is necessary for the spectrum to be promoted. Spectrum assignment is based on a 'beauty contest'.

The general opinion in South Korea is that the current spectrum management regime has not been flexible enough to reallocate inefficiently utilised spectrum or to trade it in the secondary market. It is felt that scarce spectrum resources are being wasted. Three wireless broadband service providers have been allocated the licenses for 2.3GHz bands. One of the providers, Hanaro Telecom, recalled its Wibro service business license and its allocated spectrum is not being used. Furthermore, recent disputes over 800MHz bands utilised exclusively by SK Telecom have meant that the government is urged to redeploy the valuable bands previously assigned to incumbents to ensure fair competition. However, the KCC in South Korea is trying to improve its spectrum management by defining the

[83] Radio Law, Article 9 (spectrum allocation)
[84] KISDI, 2005

regulation of spectrum trading, especially for the spectrum which was distributed for free without trading rights,[85] and by planning for the refarming of spectrum. Also, there has been policy debate on whether to have auctions.

On a more positive note, the government's spectrum policy encourages the development of innovative spectrum technologies. For example, in 2006, MIC allocated the 60Ghz spectrum for the flexible access common spectrum (FACS) in order to promote privately driven service development[86]. In 2008, ETRI[87] announced the successful development of radio transmission technology with 3Gbps in the 60GHz bands. Currently, research into CR (Cognitive Radio) technology is progressing thanks to the government-funded research institute, KISDI, but it is felt that the service needs to be developed in order to utilise CR technology and review the multi-use spectrum assignment system[88].

4.3.7 Net neutrality

Net neutrality has not lead to public debate in South Korea. The principle is endorsed in the draft IPTV law, though enforcement in practice is openly questioned by the IPTV service provider (Text box 10).

Text box 10: A Korean example of the Net Neutrality dilemma

> The South Korean IPTV Act[89] states the principle of net neutrality[90], however the enforcement decree of the IPTV act has not yet been approved. Currently, even if the IPTV Act states net neutrality, it has been reported[91] that the new IPTV company (Open IPTV) faces difficulties in accessing the network. Since Open IPTV has to rent the high-speed internet network from the incumbent KT, Open IPTV and KT are negotiating the network interworking point, and Open IPTV have reported that network accessibility is mainly dependent on the negotiation between the parties even if the law actively endorses net neutrality.

Supporters argue that i) regulation on net neutrality will generate welfare improvements for the consumer, ii) net neutrality can be used as an instrument for guaranteeing the diversity of contents and that, without net neutrality, the large size multi-media telecommunication group would distort the contents production. One researcher suggested the way to proceed with net neutrality is to mention the US 700MHz auction case, which required net neutrality (eg first, require the net neutrality in the wireless internet services and second, apply it to other network services).

Those against net neutrality claim that i) net neutrality would discourage innovative activity on network technology, ii) the argument that large companies would have a negative effect on the publicity and fairness of broadcasting is questionable and, even if there is a negative effect, the law on fair competition and regulation on contents and

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[85] MIC report, 2007

[86] Spectrum policy on commons: focusing on CR, KISDI, 2008

[87] ETRI (Electronics and Telecommunications Research Institutes) is non-profit government-funded research institute under the office of the prime minister. ETRI developed information technologies such as TDX-Exchange, High Density Semiconductor Microchips, Mini-Super Computer (TiCOM), and Digital Mobile Telecommunication System (CDMA).

[88] KISDI is a government-funded research institute for IT policy under the office of the prime minister.

[89] Enforcement decree of IPTV Act has not been established yet.

[90] Article 14: equal access to the network

[91] ETNEWS, 2008-6-18

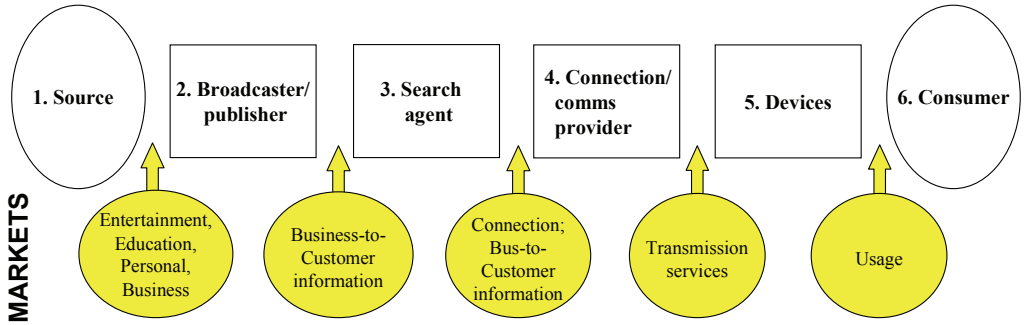
broadcasting are more appropriate instruments to deal with this issue, and finally, iii) IPTV is the only multimedia service based on IP technology and it is not appropriate to apply net neutrality on a service which is not a broadband company.

One study[92], based on the simulation model, found that it is very difficult to conclude whether there is any net gain to be had from introducing regulation on net neutrality in South Korea since there will be both a welfare loss, from discouraging innovative activity, and a welfare gain, for the consumer, and there are too few cases to identify the effects on their welfare.

Overall, there is no consensus on whether to introduce or regulate net neutrality but there are general concerns about network accessibility and the need to address the issue of fair competition; as demonstrated in the IPTV case.

4.3.8 Conclusion and CLOT analysis

Figure 16 gives an overview of the shared and unique competencies of different regulators and actors along the delivery chain. It illustrates how KCC is established to cover a broad section of the chain, without spanning to completely.



Illustrative overview of public intervention

T=Tech	-	-	Enhance Cyber security; Network upgrades	Spectrum; hardware access	KISA; Information security
E=Econ	Competition, innovation, access	eg IPTV law Media ownership	Competition; KFTC	Regulation, Competition	Competition policy, KFTC
S=Soc	Policing of eg bullying, pornography	Active content policy	-	Universal service policy; digital dividend	Privacy, Consumer rights

= KCC = Other = Shared

Figure 16 Indicative overview of allocation of tasks to KCC and other agencies across information delivery chain

South Korea has one of the world's most dynamic and converged ICT markets. At the time of writing this case study, the market trend has been acknowledged by policy makers and a review of the market governance and regulatory system is ongoing. Therefore it may be too early to draw definite conclusions about the effectiveness of the South Korean approach.

[92] S.W. Seo, "Regulatory Issues in Network Neutrality Debates", ETRI, 2007.

What can be stated is that even if the South Korean government has played an important role in technological innovation through its broad development policy on the IT industry, such as u-IT839, government regulation has been slow and lagged developments in the market, which were flagged as early as 2000 by industry and private and government research organisations. This led to a bias towards telecommunication companies, which are relatively large, compared to broadcasters, as broadcasters and telcos sought to exploit each others' networks to deliver new converged services. The legacy of a segregated approach to telecommunication and other information services and infrastructures is still felt today in the disputes over regulatory reform, the perceived level of convergence, and the governance/reporting set-up of the new (converged) regulator KCC.

Overall, South Korea demonstrates the ability and drive to balance the Technological, Economical and Societal (TES) objectives. This balance is influenced by the regulatory legacy – with content being driven largely by societal concerns; and telecommunication by the market and technology.

It will be interesting to follow the debate about the design of the new horizontal regulation. The tiered approach may provide a basis for addressing the complexity of converging markets in a structured and coherent manner, in which the TES objectives can be balanced effectively.

CLOT Analysis

Below is a CLOT analysis of the case in South Korea.

Table 12: Capabilities, Limitations, Opportunities and Threats

	Capabilities	Limitations
	Appropriateness	
• Explicit analysis and awareness	Realised and addressed the convergence in the market Responded by integrating two separate entities into one regulator (KCC)	No systematic responding mechanism yet Slow to respond to findings of public and private research institutes; market knowledge; and emerging technology and market trends
• Strategy	The 2004 u-IT939 strategy provides a single and focused basis for developing coherent IT policy; focused on developing new economic growth engines by promoting public interest and Telco/broadcasting convergence, invigorating contents, and making the foundation for digital information society	Implementation of the strategy and especially the bureaucratic transformation proves difficult
• Focus	Balanced focus on delivering Societal, Technical, and Economic value	No arbitration mechanism or organisation, to deal with conflicting interests/objectives

	Capabilities	Limitations
Coherence		
• Institutions	One converged regulator (KCC)	Still in process of development; governance and oversight of KCC still divided along old segregated market lines
• Regulation:	Effective process of involving, reflecting and accepting public and market players' opinion on new regulation	
• Instruments	Modifications of Radio Law responding to market convergence or promoting technical innovation since 2000 Recently revised Radio law expecting to create secondary spectrum market Policy making and regulatory competence	No effective spectrum strategy to create a liquid secondary spectrum market; or reallocation of spectrum; 'beauty contests' no longer effective while auction approach still untested
Impact on Administration, Business (market), Consumers (citizens) – ABC		
• A: regulatory activity	Establishment of Broadcasting/Communication Business Act (tentatively) by the KCC	Auction approach still untested
• A: position of government in the market	Leading in terms of promoting technical innovation and public interest Actively seeking to support innovation, development of new services, and technological advance	Responsive since regulation policy tends to lag. Convergence already happened in the market, and then each legacy regulator tried to catch up with the market trend and establish the new law for the emerged services (eg IPTV act)
• B: economic activity	Overall IT policy induced/facilitated service-level convergence by telecommunication companies providing broadcasting service; Broadcasting companies started responding to market convergence through joint investment	Market expansion is biased towards (large) telecommunication companies Barriers to access to networks and spectrum by new entrants and smaller sized firms
• B: burden reduction	Reduction in the administrative wastes and inefficiency caused by two legacy regulators Actively avoiding costly spectrum auction to prevent liquidity problems, which negatively impact ability for large players to invest in innovation of networks; and to avoid prohibitive entry barriers for new players	Burdens to private players for negotiating network accessibility due to the lack of net neutrality policy Active content policy, based on decency and societal values, gives rise to complaints and ex-post interventions/rulings.

	Capabilities	Limitations
• C: protection	Strong concern about protection of citizens, particularly in content area	No independent data protection supervisor; risks of mission creep
• C: access	Public investment in broadband ensuring close to full connectivity of South Korean homes; strong public support for competitive broadband and wider IT market	Dominance of large telecommunication providers; access to networks and spectrum not always easy for new entrants
	Opportunities	**Threats**
	Robustness	
• Net neutrality	Net neutrality principles adopted and stated in IPTV Act	Net neutrality is not seriously considered yet IPTV Act states the Net neutrality but its enforcement has not been approved yet
• Absorb changes	Availability of high quality public and private research institutes specialised in IT Solid performance of South Korean IT market; proving ability to integrate, apply and commercialise new technologies and develop new services	Market convergence preceded regulatory convergence, demonstrating the ineffectiveness of regulatory response mechanisms, but also the ability of the market to transform irrespective of the unaccommodating regulatory environment partly due to the general public's interest in IT and overall IT policy of South Korean government
	Flexibility	
• Ability to change	Expecting the coherent response on market convergence by one agency Bias towards telcos	Bureaucratic legacy; Administrative wastes due to the conflict of interest Limited ability to integrate available knowledge of (own public) research institutions and signals from the market

• Openness to new instruments (eg self-regulation)	Accepting the suggestions offered by the multiple sectors, as expressed in public hearings, and modifying the Laws accordingly	Limited openness to self-regulatory initiatives and multi-stakeholder governance, as there's a strong tradition and reliance on public-sector intervention Self-regulation is not an established factor yet in shaping regulation (weak institutions and limited enforcement and control mechanisms); Inadequate checks and balances, with the KCC still under dual supervision.

In general, the South Korean government acknowledged market convergence and the importance of a concerted and efficient regulatory response to market changes. Since the South Korean government employ IT policy to boost economic growth, regulatory follow-up would have been important as well. Also, many government-funded research institutes[93] and private research institutes have been aware of market changes and opportunities, hence they suggested that regulatory reform was a necessity. The push from the private sector, consultations with research institutes, and government willingness to promote the IT industry have gone into creating the new regulatory body – but there are also obstacles, such as net neutrality, on which discussions have just begun, and new entrants realise there a big barriers to network accessibility and to them entering the market and providing a service.

[93] There are 4 major government-funded IT specialised research institutes. Each of institute has its own specialty and it provides a technology progress, policy suggestion and implication. Also, major IT private companies also own the research institute which provides the market trend and consultation. Followings arethe list of government funded IT research institute: KISDI (www.kisdi.re.kr,) ETRI (www.etri.re.kr), KORPA (www.kora.or.kr), and Korea IT industry promotion agency(www.kipa.or.kr).

4.4 A comparison of cases

4.4.1 Overview of the three cases

Table 13: Comparing cases: context, appropriateness, coherence, Impact robustness and flexibility

	US	UK	South Korea
		Contextual factors	
Ownership	Break up of AT&T, led to facility-based competition; recent broadband duopoly (cable vs. telco)	Strong incumbents in telecommunication and public broadcasting; 67% of broadband from new entrants	Public investments in infrastructure; highly dynamic IT and AV markets
Broadcast market	Mostly commercial broadcasting; public broadcasting largely privately financed	BBC was state monopoly, gradual penetration of commercial channels (Channels 4/5 allocated by auction), cable and (esp.) satellite, with Sky and converged offerings via Sky+) dominating development.	Rapid change from traditional broadcasting to many new service providers
Governance (ABC balance)	Strong and active Civil Society involvement (C)	Open marker (EU influence) (B)	ICT is generally seen as key to South Korea's economic success; and is actively supported by policy (A)
Regulator	FFC: partially converged politically-appointed body under heavy scrutiny	Ofcom: fully converged independent body with statutory duties (policy and regulatory), limited oversight	Recent overhaul of regulatory and governance system; dual oversight of KCC not yet 'converged'; policy and regulatory function
		Appropriateness (TES)	
Legal, economic, technical mix	Emphasis on legal considerations	Emphasis on economics, less on legal and technical	Explicit mix of TES objectives; legal legacy
Convergence strategy	No grand strategy or specific response to convergence	Sound convergence-based overall strategy; external (incl. Gov.) engagement	National IT strategy (2004) intended to stimulate and respond to convergence

	US	UK	South Korea
Regulatory initiative, autonomy	Reactive approach; reliance on Courts; slow (can balance issues *ex post)*; had supported new entrants[94]; responds to civil society, political pressure; *laissez-faire* mobile regulation approach let incumbents block/discourage innovation and new technology adoption	Strong analytical capability; mix of *ex post* and *ex ante*; seeks to anticipate/pre-empt shifts; pro-entry stance; risk of over-analysing, complexity; tries simultaneously to regulate and to influence domestic and European market and policy evolution	Policy making mandate; Lack of public leadership to ensure alignment of policy objectives; limited ability to integrate available public/private technology and market research into policy; the market is leading;
Cross-ownership, content regulation	Cross-ownership addressed early; telco was regulated and ISP/cable was not, giving a competitive advantage to cable. Unclear obligation on FCC to focus on protecting competition in the internet 'space' (unregulated 'information services'). Limited content regulation, trusting market to deliver diversity; some 'decency' regulation based on moral considerations. Transmission of proscribed content is illegal	External cross-ownership rules (Competition Commission); actively monitors public service broadcasting, by public value and public interest tests; changes by regulatory intervention and governance of publicly owned broadcasters. Content, broadcast policy only partially transferred to Ofcom; least-integrated part of the regulatory portfolio. Active in social content issues, eg alcohol, diet, harmful/illegal content. Possession of proscribed content is illegal. *Strategic* engagement with EU Directives. Growing emphasis on self- and co-regulation	Cross-ownership rules relaxed, leading to strong development in AV content market

[94] Recent changes have weakened this: "In the United States, by contrast, an ambiguous and increasingly irrelevant communications law, coupled with an FCC that is increasingly politicised and progressively more responsive to lobbying dollars, have resulted in the effective abandonment of the FCC's historic procompetitive regulatory philosophy in favour of a deregulatory, pro-incumbent stance." (Marcus (2008) p. 36.)

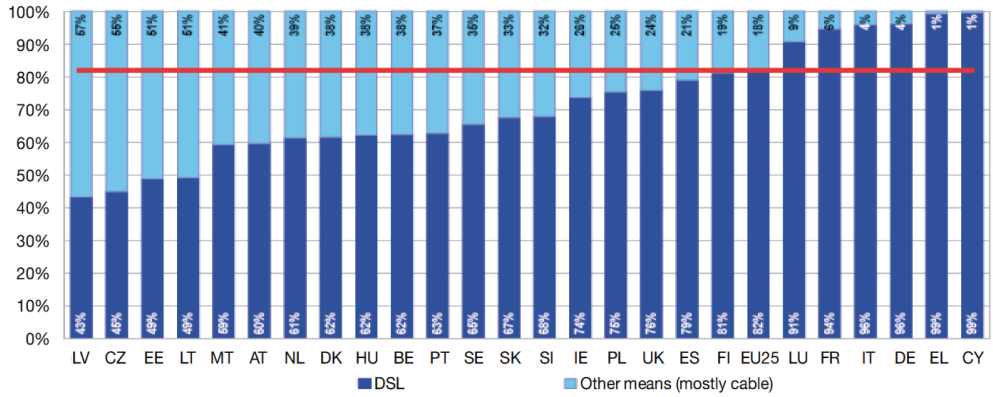
	US	UK	South Korea
		Coherence	
Governance	Strong regulator but decentralised, multi-faceted organisation; no single point of policy co-ordination; legacy of dual-track regulatory approach; weak internal coordination. Coherence through Congressional overall FCC policy objectives, risk of political 'short-termism'	Fully converged regulator but legacy 'stovepipes' with competing cultures (though many steps taken to minimise); new divisions may emerge from interaction with specific sectors, issues and markets	Merged regulator retains dual governance, leading to clashing visions and stalemates over horizontal legislations
Policy/rulings	Alignment of regulatory practices to TES: practices 'forced' onto FCC by market, civil society reactions, judicial action, lobbying. Competition authorities (Department of Justice, Federal Trade Commission) have been very active, especially in consumer protection. Formation of Joint Boards and Conferences; active stakeholder involvement through lobbying, court rulings and consultation through Notices of Proposed Rule Making (NPRM)	Ofcom is the main actor, meeting statutory duties by responding to complaints and initiating regulatory change; Competition Commission acts on (rare) Office of Fair Trading referrals (competition only). Very active consultation raises major issues in public discourse, validates Ofcom decisions, co-opts stakeholders in providing information and/or supporting rules	Strong presence of public and private ICT research organisations, involving stakeholders; however, influence of these organisations remains limited
Use of instruments	Innovative and pioneering in spectrum auctions; trial and error (both failure and success); did not manage to establish 3rd broadband pipe into the home; created *de facto* broadband duopoly (between dominant cable, telco suppliers)	Extensive use of co-regulation, incentive-based regulation. Auction mechanisms designed to match developments on the technical, market and policy fronts; auctions seen as part of a broader joined-up policy set, shift to market, unregulated spectrum management	Legacy of vertically structured system remains dominant; separate Broadcast and Telecommunications Acts. Spectrum approach remains technically inclined with focus on innovation

	US	UK	South Korea
Impact (ABC)			
Structure	De facto telecommunication duopoly (AT&T and Verizon); infrastructure competition from strong cable penetration, limited by failure to force infrastructure providers to grant open access to competing services/applications. Universal Service not yet extended to broadband, converged access; major urban–rural divide; less competition on rural and peri-urban areas. Reliance on courts increases entry cost; multiple institutions; judicial, FCC rulings can 'kill' a budding industry. Very dynamic market for 'convergence lead' M&A activity	Competitive broadband market; limited infrastructure competition; low cable penetration, but high satellite and terrestrial digital (with strong interactivity and convergence on eg free and subscription platforms); strong open access enforcement (hence many broadband providers in almost all markets, multiple ULL providers of fully unbundled telephony services)	Competitive broadband market; competing infrastructures; full broadband coverage. Dynamic market seeing emergence of horizontally and vertically integrated operators. Share of MSO (multiple system operators) in terms of total revenue in the cable TV businesses increased to 81.1% in 2007 from 78.1% in 2005
Spectrum trading	World's most active spectrum trading, esp. at local level	Relatively little spectrum trading	There is an inactive secondary spectrum market

	US	UK	South Korea
Robustness and flexibility			
Robustness	Unchanged system, proven ability to absorb changes, though slow and costly; rigorous checks and balances	Analytical capability, political independence to anticipate developments; risk of being 'too theoretical'. Oversight and accountability slightly complex. Independence creates minor political risk – strong commitment to harmonisation and market opening creates risk from market development, potential inconsistency of objectives; cross- and external dependencies for competition and content policy (enforcement)	New challenges (IPTV) not handled within existing regulatory system, requiring a specific law; the market developed very dynamically independent of the market governance
Flexibility	Accommodated early net neutrality discussion and actively developed policy principles; tolerance of borderline 'legal' practices allows technologies to be proven before legal challenges by incumbents; FCC self-limitation of role to boundaries set by 1996 Act may miss opportunities to influence convergence	Highly flexible; able to work pro-actively with market and civil players; Net neutrality originally seen as US problem (price discrimination by ISPs against content providers), given European spin as NGN access to content and how to guard 2-sided and converging markets against inappropriate discrimination.	System is not tested yet; spectrum policy not flexible enough to reallocate inefficiently utilised spectrum or stimulate trade in the secondary market; research not easily integrated into policy

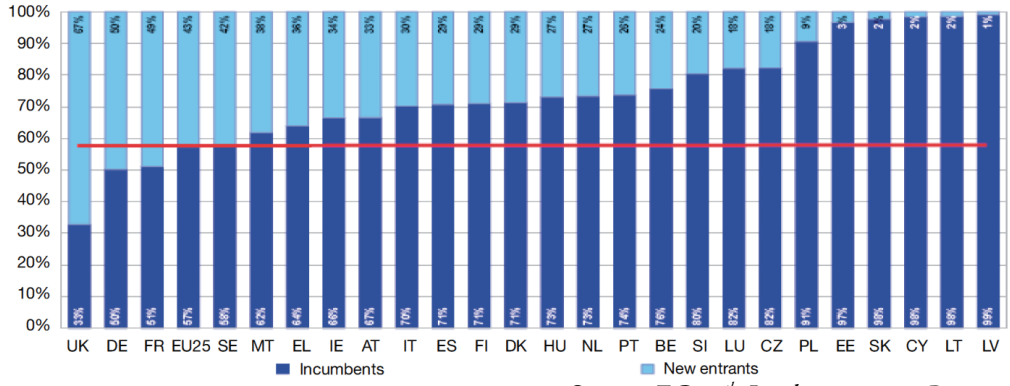
4.4.2 More specific comparison of US-EU/UK differences

On the competition angle: European policy has not succeeded in forcing a "second wire to the home", while US policy has not succeeded in forcing a "third wire to the home" – nonetheless, competition is stronger in Europe; despite the very different rates of e.g. cable penetration, etc. European customers have a greater choice of alternative ISPs and therefore of services, applications and content.



Source: EC 12th Implementation Report

Figure 17 Broadband accesses by technology, 2006



Source: EC 12th Implementation Report

Figure 18 DSL access by ISP type, 2006

In terms of mobile access, Europe's 2G offering is almost entirely based on GSM; while the US remains fragmented (45% GSM). US mobile therefore derives less benefit from scale economies, and customers in non-GSM segments have handsets locked to service providers (they lack SIM cards). On the other hand, because the provision of wholesale mobile transport is more efficient in the US, there are far lower levels (and expectations) of handset subsidies there than in Europe[95].

From a regulation perspective both the US and the UK are committed to minimal regulation where required by SMP, and to deregulation where possible. In the UK, the separation of enforcement powers and Ofcom's independence have helped put this principle on a firm and objective analytic footing. In the US, the ambiguities and increasingly-outdated provisions of the 1996 Telecommunications Act have left the FCC vulnerable to politicisation and lobbying and have, as a result, led to a retreat from a pro-competitive philosophy towards a form of deregulation closely aligned with incumbents' interests.

[97] Littlechild, S. (2006) "Mobile Termination Charges: Calling Party Pays vs Receiving Party Pays" in *Telecommunications Policy* 30:242-277.

We can therefore anticipate that the market and regulatory situations will continue to diverge; the UK (and by extension Europe) will likely see a richer diversity of alternatives – and thus more 'convergence' in the richer sense – through increasing unbundling and facility-based competition. However, unlike the US situation, infrastructure competition will be introduced in an environment where service, content and application competition and weakening of vertical constraints have already taken hold. By contrast, the US duopoly situation seems likely to continue and strengthen. The most important feature at present is the reciprocal influence of markets and regulators. Ofcom and other European NRAs have powers to enforce non-discrimination, interconnection and consumer protection, even on non-SMP players. The need to exercise these powers is likely to enhance regulatory convergence – regulating non-SMP players in the same way as SMP ones, and addressing consumer protection issues in the communications domain, limits possible incompatibilities between sector-specific regulation and general competition or consumer protection policy.[96]

In addition, the linkage between competition and societal policy domains driven by convergence (and exemplified by the European perspective on net neutrality) should help to eliminate stovepipes and improve coordination both within converged European telecom regulators and among telecom, consumer and competition regulators. Note also that, in the exercise of these powers, Ofcom has been able (or been compelled) to rely more heavily on market forces, from both the supply (eg spectrum trading, interconnection rules) and demand (informed consumer choice, enhanced mobility and information) perspectives. The inevitable result is that the effective convergence patterns in the market and the regulator will remain consistent with each other even as the market continues to evolve. Note that this does not mean that market and regulatory convergence will follow the same pattern. It just means that, given continued independence and analytic input to policy, they will remain (positively) linked in relation to common societal objectives.

By contrast, the US regulator does not have explicit powers to regulate the internet. While the FCC could seek to develop such rules using its overall (but vague) jurisdiction over electronic communications (Title I of the 1996 Act), it could only do so by, in effect, shifting from an executive to a legislative body, but one without the formal checks and balances to which Congress is subject. While we have found that Ofcom has acted to 'change the rules' to fit evolving situations, it always does so within its explicit statutory duties and the overall Framework; any further change would automatically trigger normal Parliamentary processes. Indeed, Ofcom has been scrupulous in engaging with both UK and European legislative and standards bodies.

These differences in the market context throw into relief the underlying policy differences, as illustrated by the case of net neutrality.

Net Neutrality – US concerns include fears that integrated ISPs might offer better performance to some internet sites; or might overcharge for or block altogether all of the following:

[96] As Marcus (2008, p. 37) notes, in the US, Communications Regulation and competition law are mutually-exclusive tools, and thus cannot be used in complementary fashion.

- access to unaffiliated sites
- use of specific applications or devices (especially those competing with services for which the integrated ISP charges)
- connections between unaffiliated content providers and the integrated ISP's customers.

These general issues have sharpened with the spread of converged wireless connections. In the unconverged world, it was generally accepted that service providers would limit the devices that could be connected; cripple or limit the development of desired handset features; restrict broadband services both in terms of bandwidth (eg to P2P) and applications (eg VoIP); and create barriers to the entry of new applications. These limit the potential of convergence, and suggested remedies in the US context include: "Carterfone" rules to force open device interconnection; "net neutrality" rules to allow customers free choice of applications and content; full disclosure of service limitations to enhance competition; and standardisation of application development to minimise 'compatibility' limitations. Many of these problems are not high on the European convergence agenda, since device interconnection is not a problem, standardisation is well underway and other aspects are handled (at least in principle) through the European Framework for Electronic Communications Services Regulation.

Thus, the convergence-spawned issues facing the UK and US differ in severity, detail and the capacity to handle the problems within the existing framework. The chances of disruptive rather than evolutionary change are therefore probably greater in the US where competition is weaker and the legal framework less clear, and less clearly adaptable to the particular challenges of convergence.

CHAPTER 5 Conclusions and recommendations

5.1 Conclusions

Common challenges

All cases acknowledge convergence of markets and services as a relevant trend that needs to be addressed by the regulatory system. The converged 'information/communication' regulator is the preferred approach though two out of three cases still retain separate supervisory structures for telecom and (other) information services. The converged 'information/communication' regulator co-exists with strong competition authorities.

A major problem of convergence arises from the sunk nature of past network investments going along with associated business models and regulatory institutions. A "greenfield" approach to convergence might lead to homogenous, up-to-date infrastructures but would, against a real-world perspective destroy large amounts of valuable assets ("stranded investments"), and may carry its own path-dependency and technology lock-in risks. The art of a convergence policy therefore is to facilitate the naturally arising technological and market developments without imposing too high costs.

In all cases legacy rules and conditions still have an important impact of market developments. In South Korea the system seems biased towards the (large) telecommunication firms and different cultures for broadcasting and telecommunications are still dominant. The US traditionally has low intervention in content and retains a familiar duopoly in the market for telecommunication and broadband. The UK has been most active to address legacy divisions and ensure consistency. However it is apparent that also within the Ofcom organisation the legacy persists (even though all possible measures have been taken to install a new business oriented culture and hiring new staff).

It is worth reflecting on whether such full integration is desirable or feasible on *a priori* grounds. Too broad an integration may dilute the effectiveness of a regulator if it means the loss of close and mutual relations between the regulator and key stakeholders[97]. In addition, the need for tradeoffs and balance among different regulatory objectives may

[97] It has been suggested, for instance, that Ofcom was able to exert particular leverage on BT via its long-term relationship, and was able to use its broadcast regulation powers to leverage structural behaviour changes that would have been hard to achieve via regulatory tools based on egalitarian competition policy applied to non-broadcast as well as broadcast operators.

work best if there are, within the regulator, specific communities of interest (eg spectrum managers, broadcast regulators) capable of articulating policy impacts that might otherwise be overlooked, and testing alternatives in a market-like or negotiated (rather than administrative) framework. On the other hand, the geometry of market convergence is constantly-changing; not only is it hard for a regulator to keep pace with these changes, it may give away a vital aspect of pre-commitment. Also, there will remain specific regulatory functions within the overall policy portfolio (eg control of interference, enforcement of public interest content and access rules) that are inescapably tied to specific market segments. In consequence, even a unitary regulator will face continuing divisive pressures from the market/regulated parties' side. Finally, separate regulators – or regulatory divisions within a converged regulator – may help to make the inevitable conflicts between specialists in different communications sectors more transparent.

Effective handling of converging markets and new offerings requires a consistent approach across the information delivery chain, in which the governance model is capable of arbitrating between TES objectives. It may be expected that technical interventions will become less prominent whereas first economic and then societal concerns are likely to be leading the public intervention logic.

Spectrum policy is generally perceived as strategic given its important impact on market development and innovation. Segregation of the regulator and spectrum allocation functions is deemed undesirable and problematic. In all cases the spectrum allocation functions is dealt with by the regulator; whereby increasingly sophisticated auctions are the preferred allocation mechanism to arbitrate between TES objectives. Differences occur in the views on the need to ensure technological and service neutrality, and mechanisms on reuse, and extending licences. Also new developments like White Space Devices are being assessed and treated differently, reflecting entrenched market positions and policy cultures. Key issue is how to provide for new entrants and new technologies and to overcome expected failures of the market when applying auctions. Also, with the possible exception of the US, cases experience difficulty in establishing effective secondary spectrum markets.

Responses

Change is on-going and cannot be pinned down by a single approach. Even the most integrated and coherent approach adopted in the UK still faces difficulty in responding to uncertainty and change. Therefore any approach needs to be sufficiently robust to withstand and respond to most new developments by combining ex ante and ex post tools, in an authoritative manner. The cases differ in their ability to do this, where Ofcom is particularly concerned with pre-empting change, and by some is judged more as a think tank than a regulator, the FCC follows trends and relies on the courts and active stakeholders and civil society to direct and achieve change. The advantage of the former approach is to be close to the market and intervene where markets fail – at the risk of making the wrong choices; whereas the latter allows a steady reflective response – at the cost expensive legal rulings and long delays which can kill off new entrants.

This points at the need for a balanced set of ex post and ex ante policy tools. Ex post rulings can be slow to react to changes in the market and due to their costliness prejudice in favour of large incumbents and punish new entrants. New technologies may be blocked unduly to avoid disruption of obsolete business models. On the other hand ex post

approaches make sure that rulings are limited to areas that have real relevance; and the risk of misjudging the trend is very small. Ex ante tools like spectrum policy and active public interventions; based on market and technology assessments are able to support favourable developments and outcomes more directly. They risk picking the wrong 'winners' and supporting interventions at the 'wrong' stage in the technological development and deployment cycle. Active deregulation of the broadband market in the US by the FCC is felt to have come too early, leading to a de facto duopoly. Also, active ex ante involvement raises questions about the appropriateness of having regulators shaping the market. In all cases of active intervention, sufficient research capabilities need to be available to policy makers, including the mechanisms for integrating research findings into the policy domain. South Korea demonstrates that availability of research is not enough; if the ability to integrate research into real policies is poor the relevance of research diminishes.

Beside being robust – meaning that the system can deal with future challenges without changing itself – there is also a need for flexibility to try new approaches and to avoid costly and possibly counter-innovative ex post control through the courts. In all cases awareness is evident that consultation of stakeholders is essential to support market developments and to allow for flexible and effective interventions. The way these are organised differs from case to case; with very intensive consultations in the UK, active stakeholder and civil society lobbying and court cases in the US, and more traditional involvement and influence of market players in South Korea.

The issue of net neutrality poses a new challenge for regulators as they seek to ensure the effective functioning of the emerging 'information markets'. Only in the US has there been a public debate and highly publicised court rulings. In the UK (and Europe in general) and South Korea the issue is still treated as an interesting academic problem. A few things may be concluded:

- Europe is probably still a bit complacent regarding the dangers on non-neutrality and neutrality alike;
- Europe has the right framework to deal with US-style of net neutrality problems
- To date, ISPs are not behaving in the way that of net neutrality proponents warn against; this is not necessarily a good thing
- The framework is being used appropriately, but not effectively in dealing with vertical market power and collective dominance
- Europe (and the US) may face a problem coming 'from behind' (from content provider dominance and exclusionary behaviour)

The conclusion to the convergence challenge is that dealing with net neutrality problems may require more active partnership:

- between telecom and competition authorities; and
- (to deal with the attack from behind) between the telecom/spectrum and the broadcast/content 'silos' in and between the regulator (-s)

5.2 Recommendations

- Convergence needs a regulatory/policy response across the information delivery chain. This does not mean that all functions have to be accrued in one organization, but it requires that there is:
    - an alignment of objectives, structures, processes and policies;
    - a coordinated application of tools/instruments
    - a central coordinating mechanism (governance structure) where different TES and ABC objectives can be arbitrated and coherent decisions can be made;
    - a system which has the ability to identify, acknowledge and adjust to change.
- It also requires establishing overall public value objectives at the political level, to ensure that all instruments and organizations are aware of the need to achieve achieve/defend a balanced application of TES for all ABC.
- Convergence is ongoing and considerable flexibility and stakeholder involvement is required to respond effectively to evolving market realities. The challenge to any ex-ante approach is to identify and be open to new unknown entrants and emerging technologies and services. Ex post approaches need to be aware of the barriers to entry that may be created by the lobby requirements, the legal expenses and the significant opportunity provided to incumbents to use their power and financial resources to quash innovative entrants and potentially disruptive business models.
- To deal with convergence, regulation is not enough, as enforcement becomes more difficult and more direct impact can be achieved by applying other instruments:
    - self- and co-regulation
    - ex ante instruments lie spectrum management
    - consultations
    - general competition policy
- With regard to self-regulation, in developing and implementing either a reactive or a proactive response to convergence, regulators must consider:
    - How to evaluate existing and proposed self-regulation
    - How to develop strategies of cooperation, support and even deferral to suitable arrangements
    - The implementation of a clear and coherent strategy for ensuring that self-regulation preserves accountability and transparency maintains regulatory effectiveness and does not produce additional problems of eg collusion, exclusion or predation.

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APPENDICES

Appendix A: Methodology

Approach/methodology

Preliminary phase: The subject of convergence means different things to different people. Thus the study started by a scoping exercise to delineate the boundaries and objectives. Desk research and conversations with the client lead to the selection of topics and appropriate case studies.

First phase: Then a factual basis was laid by reviewing scientific literature and policy documents on the technical, economic and societal aspects of convergence in telecommunications and audiovisual markets. Specific focus has been on spectrum related issues – with an emphasis on recent and on-going auctions (2.6GHz frequencies in the UK) - and net neutrality.

The findings of the literature were applied to a model of the changing information delivery chain. Which was subsequently validated though a limited set of interviews with experts in convergence, regulatory oversight, spectrum policy, media trends etc.

The second phase: To allow a better understanding of regulatory approaches and governance model three case studies of United Kingdom, United States, South Korea, were undertaken. Based on the questions raised in the literature review and in regular meetings with OPTA, a case study protocol, with questions (Appendix B), sources and potential interviewees, was developed, as well as a uniform report outline. Authors were requested to keep to the format as much as possible to allow comparison between the cases. However they were given the freedom to elaborate in areas where case provided specifically relevant insights. For every case study relevant policy reports, evaluations, annual reports, and existing case studies were reviewed.

In addition semi-structured key informant interviews were conducted with a selection of stakeholders, representing as much as possible:

- Experts from research community
- Staff from Telco regulators
- Government policy staff
- Representative from incumbent operator
- Representative from public broadcaster
- Representative from new media firm

- Other stakeholder

Finally the capabilities and limitations of the case were assessed, in an analysis of Capabilities, Limitations, Opportunities and Threats (CLOT); based on a number of questions:

- Appropriateness: How has the governance system and regulation adjusted to converging markets? Note indicators of success/failure:
  - Explicit analysis and awareness of changing markets
  - Specific government strategy on dealing with convergence?
  - Focus of the approach to change: technological, societal, economic, or all 3
  - ….
- Coherence: How is policy coherence achieved (especially between audiovisual and telecommunications sectors, and technical, economic and societal (TES) objectives? Note indicators of success and failure:
  - Institutions: Coordination mechanisms; integrated and merged regulators; overarching governance structure
  - Regulation: Alignment of regulatory objectives (TES) to
  - Instruments: Use of spectrum allocation as ex ante policy instrument. Is spectrum policy a coherent part of the overall AV and telecommunications policies? Is it applied to achieve the same objectives (TES)
  - ….
- Impact: How has the regulatory approach impacted ABC? (to what degree can this be attributed to path dependency?)
  - **A**: regulatory activity, e.g. Nr of interventions, court rulings, amendments to existing regulation
  - **A**: position of government in the market, e.g. initiating, guiding, leading, responsive
  - **B:** economic activity, e.g. mergers across sectors, FDI (due to positive regulatory climate), growth of ICT and AV sectors, support for content production
  - **B:** burden reduction, e.g.
  - **C:** protection, e.g. minorities, minors, security
  - **C:** access, e.g. plurality, connectivity, affordability

The opportunities and threats will be assessed by the case' robustness and flexibility: i.e. the ability to address future challenges in an effective manner; and to review the possible exogenous risks, and those that are endogenous to the chosen set up.

- Incorporating and facilitating self- and co-regulation
- Ability to identify, and acknowledge change across the delivery chain; and the agility to respond in a concerted, coherent manner
- Respond to new complex issues like net neutrality

The outcome of the case analysis has been be compared across cases to draw more general conclusions on way to deal with converging telecommunications and audiovisual markets and issues around spectrum allocation and net neutrality.

The structure of the Case Study reports is as follows.

- Chapter 2: Provides an overview of the institutional set up, to acquaint the reader with the existing regulatory and governance context and to describe what response was given to issues raised by convergence of the audiovisual and telecommunications markets. In doing so particular attention will be given to determining how coherence was achieved among different policy objectives (technical, economic, societal) and possibly different regulatory institutions.
- Chapter 3: Delves deeper into the specifics of the audiovisual and communications markets, and assesses the responses of the regulatory and supervisory institutions (initiatives and instruments) to the challenges raised by convergence of these markets and the changes in the delivery chain. Subsequently the impacts (on ABC) of these regulatory actions are assessed.
- Chapter 4: Discusses allocation of radio spectrum in more detail, as a specific ex ante policy instrument. Different allocation instruments have been used and the allocation of spectrum has also served different purposes. This chapter discusses the underlying objectives and the appropriateness of the chosen approach(es).
- Chapter 5: Net neutrality is defined by OPTA as a subject that is likely to present future challenges for regulators. Net neutrality has been dealt with at different levels and in different ways in different countries, thus possibly presenting interesting learning opportunities for the development of appropriate policy responses.
- Conclusion: Where the main points of the case will be reiterated and its strengths and weaknesses will be summed up, including assessments of the case's ability to address future challenges.

Appendix B: Case protocol

Case Framework				
		Questions	**Comments**	**Indicative Statistics/indicators/ sources**
Section I: General: dealing with convergence				
Starting point snapshot	1.	Last regulatory/legislative overhaul		
		a. Who are the players (focus on content, spectrum, audiovisual)?	Government departments/agencies in charge; regulators (Telco, media, radio frequency, general competition authorities);	Resources: budget, headcount, skill distribution
		b. Path dependency: how did it evolve; what are their internal values? (including culture and legacy)	Lawyers, economists, engineers, politicians (relative influence)	Stats: employees by profession (overall, in key positions); Annual reports; evaluations
			Mission segregation: mapping ministries against issues, tools	Org charts of administration
			Issue segregation: are spectrum, content, pricing, standards, etc. handled by separated, coordinating or unified bodies	Annual report of regulator; evaluations

c. What are their external obligations?	Statutory and other external duties	Statutes; legal base
d. What instruments do they use?(focus on content, spectrum, audiovisual; ex ante/ex post)	Instruments: what ones, to whom applied, how decided (eg hearings, administrative law proceedings, statute law, etc.)	Annual report of regulator, statutes
e. Who do they regulate?	What sectors, what players within the sector;	Annual report of regulator, statutes
f. What issues have they been dealing with?	Path dependency II – what are the issues that have been coming up; Evolution (if any) of issue agenda	Annual report of regulator; evaluations, studies
g. Vertical control; migration of power?	Have major market shifts changed the importance of the regulator (to be documented)?	Interviews; reviews of institutional set up and amendments to constituent legislative document (statutes); court cases and rulings
h. How do regulatory bodies coordinate among themselves?	Key overlaps: shared responsibilities; overlapping jurisdiction (by issue); overlapping engagement (both regulate same firm(s); coordination arrangements; how are they (jointly) evaluated?	Interviews, existing case studies, evaluations
i. Relationships with other stakeholders (market players, incumbent operators, etc)?	Relationships with non-regulators (ministries, firms, overseas counterparts, etc.) Formal and informal	Statutes; Interviews

	2.	Key changes in type of regulations	Changes: Convergence, splitting, innovation in issues, tools, and institutions; Were communications and media regulated independently from each other before (if so, how) and are they now regulated in a uniform approach (or will this happen in the coming years)?	Interviews, studies
	3.	Market dynamics	List recent mergers and acquisitions (cross sector/cross market)	M&A tables (see Ofcom – What is convergence p. 12 Company deals and partnerships); Interviews; economist publications; telecom analyst market reports
	4.	Decision-making/ policy-making process	Top-down/ bottom-up Key legal base and organisational reforms Key functional base (market failure, safety, competitiveness, welfare…); nominal justification Better Regulation – type developments Joined-up and/or transformational government Self- and co-regulation	Rulings; policy documents
Strategy	5.	Institutional reorganisation or 'joined-up governance' by coordination	Organisational changes and plans (past-present-future);	Annual plans; strategies

	6.	Key objectives: a. Technology b. Economy c. Society	(past-present-future)	
	7.	Market of other 'failure' as leading argument for intervention?	(present-future)	Interviews; policy documents; rulings
	8.	Level of integrated consistent policymaking across 3 thematic areas: AV, Spectrum, Net Neutrality	Policy coherence: alignment of objectives, processes and organisations;	Interviews, Rulings, stated policy objectives
	9.	Issues (optional)	Idea here is to compile a checklist of issues that may have arisen, maybe a sense of when – or whether the case leads or follows the world. To be extracted from regulatory institution's mission statements, policy programmes, media and press sections etc. Using 'top level' headings for past 5 years (say). Ideally, 5-10 issues	OFCOM media and analyst section: http://ofcom.org.uk/media/mofaq/bdc/
Section II: Audio Visual Content provisions				
Context	10.	Description of market characteristics, development, and performance, and key stakeholders	Apply Delivery chain to order players, markets and services	Delivery chain Interviews, Market research; Analyst Reports from Investment banks

	11.	Key contextual factors (cultural, legacy, policy tradition, roles of stakeholders, etc)		Interviews; Market research, benchmarks, OECD Studies
Strategic Objectives	12.	What was the dominant policy perspective (Technology, Society, Economy)?	Avoiding technical interference; ensuring(cheap) access; Supporting types of content; protection of specific interests/vulnerable groups; supporting and attracting new business; increasing innovation; protecting vested interest; increasing competition;	Interviews; Policy documents; existing Case studies; Benchmark studies
	13.	What are stated policy objectives and how have these perspectives been balanced?		
	14.	Have these changed over time?		
	15.	Recent activities (how has focus moved along the delivery chain ())?	What has been done against illegal content, etc. Have search engines or EPG (electronic programming guides) received additional attention? What is needed for each thematic area (spectrum, content, neutrality) is something more area-specific. For content, this would be things like riders in licences that compel granting access to different points of view or mandate public service/educational	

			content; liability for infringements of IPR and/or facilitating access to harmful or illegal content; notify and takedown regulations, etc. But we should not prescribe this – rather, case study folks should collect interesting examples of types of regulatory activity in each area.	
	16.	Alternative activities	What forms of alternative activities are taking place (private party activities, code of conduct, self-regulation); motives/motivation for ABC	Interviews
Impacts	17.	How has the value chain been affected (Link to value chain models – Chapter 2)?	Does this description fit how things are; and are they becoming more or less likely?	Interviews
	18.	How has the regulatory approach affected:	Who has benefited from this?	
		a. Administration: efficiency, speed of response, coordination mechanisms, remit		World Economic Forum, OECD reports, benchmarks
		b. Business: changing business models; effects on incumbents; entry of new businesses, emergence of new technologies, overall supply of AV services; regulatory burden		World Economic Forum, OECD reports, benchmarks; Interviews, analyst reports Investment banks
		c. Citizens: price of e-communication services, up take of such converged/bundled services, multi-purpose	affordability and availability	World Economic Forum, OECD reports, benchmarks; Interviews, analyst reports Investment

		devices…		banks
	19.	What stakeholders have benefited and how?	if possible	Interviews, Analyst reports Investment Banks
	20.	Market developments?	if possible	Interviews, Analyst reports Investment Banks
Section III: Spectrum Allocation and Use				
Focus	21.	Technology, Economic, Societal?		Case studies; comparative research
Strategic Objectives	22.	What are the main objectives of Spectrum policy:	First assess against TES framework.	
		a. Raising money		Public consultations; policy documents, auction specs, interviews
		b. Reinforcing downstream competition		Public consultations; policy documents, auction specs, interviews
		c. Maximising technological flexibility		Public consultations; policy documents, auction specs, interviews
		d. Encouraging investment in pursuit of societal and/or technological goals		Public consultations; policy documents, auction specs, interviews
		e. Maximising long-term economic value-added		Public consultations; policy documents, auction specs, interviews
		f. Preserving diversity (as a societal objective or as a way of implementing an innovation objective)		Public consultations; policy documents, auction specs, interviews

		g. Security and control; ensuring key services	Public consultations; policy documents, auction specs, interviews
Guiding Principles	23.	Technology neutrality?	Auction specifications
	24.	other?	
Tools/mechanisms	25.	What allocation mechanisms have been applied?	Policy documents; News articles; interviews; comparative studies, OECD, UN, WEF
		a. Auction type x, y, z b. Beauty contest c. Other	
	26.	What were the experiences with these mechanisms?	Ex post evaluations; Comparative analysis, case studies
	27.	What other forms of spectrum or spectrum-related regulation are used? (power limits, planning procedures for mast location, collocation rules, device type approval controls, etc.	Interviews; Policy documents, Annual report regulator
	28.	How are these rules enforced (statute law, regulatory hearings, administrative law, self-regulation	Interviews; Policy documents, Annual report regulator
	29.	At what layer are these controls exercised (local, national, sectoral)?	Interviews; Policy documents, Annual report regulator

	30.	To what extent are spectrum utilisation etc. harmonised externally?		Interviews; Policy documents, Annual report regulator
	31.	What are the duration, bandwidth and tradability aspects of licenses?		Licensing agreements; auction prospectus; interviews
	32.	To what other regulatory obligations are licence holders subject?	eg related to telephony universal service provision, interconnect, settlement, roaming charges, consumer protection	Licensing agreements; auction prospectus; interviews
Impacts	33.	Administration, Business, Consumer/citizen		Auction revenues; Nr of new suppliers getting licences; incumbent operator's response; Cost of access; nr of infringement cases/rulings; interviews; evaluation reports, market research, reports consumer associations; benchmarking
	34.	Technology, Economics, Society		supply and up take of new technologies
Section IV: Net Neutrality ? QoS?				
	35.	Discussions on Quality of Service/ Net Neutrality?		
	36.	Is there a policy or regulatory response to Net Neutrality issues? (special monitoring committee, (self-)regulation,		Briefings, speeches of ministers, formal communications
	37.	What is position taken by key stakeholders?		Interviews, briefing papers, conference presentations,

Appendix C: List of interviewees

Dr. Valeria Baiamonte, OFCOM

Professor Yale Braunstein, University of California, Berkeley

Professor Martin Cave, Warwick University UK

Professor Chris Doyle, Warwick University UK

Professor Yongkyu Kim, Hanyang University

Sungho Lee, SERI

Spartak Kabakchiev, CEO, Webgate

Jean Kaplan, Telecoms Analyst, Lehman Brothers

Chris Marsden, University of Essex

Kishik Park, ETRI

Senior FCC Staff #1 (requested anonymity)

Senior FCC Staff #2 (requested anonymity)

Senior FCC Staff #3 (requested anonymity)