

ATTACHMENT A

Network Neutrality Rules in Comparative Perspective: A Relatively Limited Intervention in the Market

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1. Executive Summary

This paper seeks to put the US network neutrality debate into the wider international regulatory context, and in particular to investigate the underpinnings of the differences in approach in different countries. From an international perspective, the US's Federal Communications Commission's (FCC) proposal to create enforceable non-discrimination rules for Internet access providers is a highly limited intervention. The rest of the developed world generally has imposed much more significant interventions to regulate telecoms bottlenecks, and many consider these regulations as providing important checks on discriminatory behaviour by access providers. In this way, the current US debate is very narrowly framed, even though the objectives and market context of the US authorities are not fundamentally different from elsewhere in the world.

In chapter 2, we consider the objectives of regulators around the world. Our finding is that there is in fact great commonality in the stated objectives of NRAs¹, including in the US. Virtually all regulators seek to: promote universal access; foster competitive markets; protect consumer rights; encourage investment; optimise the use of scarce resources; and minimise the burden and costs of regulation. While there are also some examples of important differences, it is clear that the variation in telecoms regulatory actions around the world is not driven by having fundamentally different objectives.

In chapter 3, we turn our attention to the range of options available to regulators to achieve their objectives in the context of bottleneck assets. We consider the range, from the mildest intervention (for example, network neutrality regulations) through to the strongest (full structural separation of the access network), and look at the rationale for and risks of each.

In chapter 4, we look at the drivers of the different choices made by NRAs from amongst these intervention options. In particular, we consider the US environmental factors that are often used to argue against the need for any intervention in America. Our finding is that while these factors are not necessarily universal (such as the existence of inter-modal competition) outside the US, they are certainly present in very many member countries of the Organisation for Economic Co-operation and Development (OECD) and many of these countries have nonetheless gone down much more interventionist paths.

In chapter 5, we conclude that the US appears to be virtually unique amongst developed economies in its approach to bottleneck regulation, and that this uniqueness neither appears to be based on a fundamentally different set of regulatory objectives, nor on an exceptional set of market circumstances.

¹ National Regulatory Authorities

2. Regulatory objectives

There are a number of recurring objectives in US telecoms regulation, which drive decisions at both national and state levels. These objectives are to:

1. Promote universal service/ access
2. Foster competitive markets
3. Promote public confidence and protect consumer rights
4. Encourage investment and innovation
5. Optimise use of scarce resources
6. Minimise the burden and costs of regulation

These six objectives are not unique to the US. Indeed, they are remarkably consistent across international regulators, although they may be implemented in very different ways. There is of course variation in the articulation and weighting of the objectives – some countries focus more on constraining significant market power (SMP) alongside competition objectives, while others are explicitly charged to secure international competitiveness or security of supply. Yet all subscribe at root to the above six objectives.

In this chapter, we discuss each of the six in turn – considering the specifics of both US and international objectives – and then consider briefly the additional objectives seen amongst some international regulators.

Promote universal service/ access

Given the public value of telecoms, a key regulatory objective is to ensure efficient and affordable widespread supply. A particular area of focus is ensuring services are provided in high cost areas and to low income subscribers.

In the US, the Telecommunications Act of 1996 states:

*“Quality services should be available at just, reasonable, and affordable rates.... Access to advanced telecommunications and information services should be provided in all regions of the Nation.... Consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services”.*²

This objective of universal service is mirrored in PUC statements such as that from California:

*“Universal service, a concept that basic telephone service be affordable and ubiquitously available to all members of society, is a longstanding cornerstone of the California Legislature and the PUC’s telecommunications policy”.*³

² US Telecommunications Act of 1996 (“US Telecoms Act 1996”): Section 254b, para 1-3

³ California Public Utilities Commission, available at: <http://www.cpuc.ca.gov/PUC/Telco/Public+Programs/>

Internationally, the message is the same. For example, Australia's ACCC aims to:

*“ensure that standard telephone services, payphones and other carriage services of social importance are reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business”.*⁴

The UK's Communications Act 2003 requires Ofcom to secure the:

*“availability throughout the United Kingdom of a wide range of electronic communications services”.*⁵

Japan's regulator's goals include broadband coverage. Japan aims to:

*“eliminate the digital divide as soon as possible ... establishing broadband in all regions lacking broadband capability by the end of 2010”.*⁶

Foster competitive markets

It is widely accepted in OECD countries that market mechanisms are likely to lead to the best outcomes, and to this end regulators seek to ensure healthily competitive markets. This is expected to ensure efficient supply of telecommunications services, good quality of service, innovation and advanced services, and efficient prices. Regulating competition involves the effective enforcement of fair and equitable competitive market objectives including:

- Creating opportunities for new companies and investors to enter the market by implementing appropriate authorisation and licensing frameworks
- Removing barriers to market entry by new operators, and levelling the playing field for them
- Restraining the power of dominant players by, for example, overseeing the interconnection of new entrants with incumbent operators with transparent rules and associated cost-based payments

In the US, the purpose of the Telecommunications Act of 1996 is:

*“To promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid deployment of new telecommunications technologies”.*⁷

This commitment to stimulating competition is mirrored by the states' Public Utilities Commissions (PUC). For example, the Texas PUC states:

⁴ Australian Telecommunications Act 1997: P31-34, available at: [http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/B15477A1113368D2CA2576780001E8D2/\\$file/Tele1997_WD02.pdf](http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/B15477A1113368D2CA2576780001E8D2/$file/Tele1997_WD02.pdf)

⁵ UK Communications Act 2003: Part 1, para 3.2.b

⁶ Japan Telecoms Bureau, available at: <http://www.soumu.go.jp/english/ib/index.html>

⁷ US Telecommunications Act of 1996 : Introduction to the Act

*“To promote competition in the telecommunications markets in Texas, the Commission has participated in a number of activities.... these include approval of interconnection agreements developed through negotiations or arbitrations, monitoring of a dominant certificated telecommunications utility’s performance with respect to each allowing access to its network by competitors, and deregulation of incumbent local exchange carrier (incumbent) markets”.*⁸

Internationally, the message is similar. Japan’s Telecoms Bureau for example aims to *“promote competition and secure benefits for users in telecommunications markets”*.⁹ In Germany the second objective of the main telecoms act is to:

“ensure equal opportunity in competition and promote sustainable competitive markets for telecommunications”.¹⁰

The Swedish regulator also has effective competition as an objective, but with a greater emphasis on the constraint of SMP:

“PTS supervises telecom operators in order to ensure that competition is functioning.... SMP decisions define the rules in the electronic communications market to ensure long-term competition. Work to identify these operators and impose these obligations is PTS’s strongest tool for increasing competition in the electronic communications market”.¹¹

While some international markets have experimented with relying on such ex-post control, administered by competition authorities relying on general anti-trust legislation (New Zealand being a well known historic example), this approach is now little used.

Promote public confidence and protect consumer rights

An important role for regulators is also to promote public confidence in telecommunications markets through transparent regulatory and licensing processes and to protect consumer rights, including privacy rights.

For instance, *“the FCC must ... protect and inform consumers about their rights”*.¹²

PUCs also focus on consumer rights. Oregon’s Commission, for example, states that: *“the focus of regulation ... is service quality and assisting consumers in resolving problems”*.¹³

Internationally, the sentiment is the same. In Australia, for example, the aim of the regulator is *“to provide appropriate community safeguards in relation to telecommunications activities”*.¹⁴

⁸ Report to the 81st Texas Legislature - Scope of Competition in Telecommunications Markets of Texas, Jan 2009, Texas PUC: P46

⁹ Japan Telecoms Bureau, available at: <http://www.soumu.go.jp/english/ib/index.html>

¹⁰ Telekommunikationsgesetz 2004: § 2, available at: http://bundesrecht.juris.de/tkg_2004/_2.html (in German)

¹¹ SMP – Market Reviews, PTS, available at: <http://www.pts.se/en-gb/Industry/Telephony/SMP---Market-reviews/>

¹² FCC Strategic Plan 2009-14

¹³ Oregon Public Utilities Commission, available at: <http://www.puc.state.or.us/PUC/telecom/abouttelecom.shtml>

And Japan's Telecoms Bureau also adheres to the IT Basic Law, which requires the NRA to:

*“guarantee [the] safety and reliability of advanced information and telecommunications networks, protect personal information data and implement other necessary measures to ensure that the public can use advanced information and telecommunications networks with a sense of security”.*¹⁵

However, beyond these specifics, some countries give the consumer interest a more central importance in guiding regulation. For instance, in Sweden *“PTS must always base its activities on the best interests of consumers”*¹⁶ and in Australia the ACCC considers *“the long-term interests of end-users”*.¹⁷

Encourage investment and innovation

A key role of regulators is to create a favourable climate to promote investment in network and service innovation. Regulators do this by, for example, being technology neutral and providing reasonable regulatory certainty.

Investment takes centre stage in FCC regulation:

*“The Commission and each State commission ... shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans ... [using] regulating methods that remove barriers to infrastructure investment”.*¹⁸

And specifically related to broadband investment, the FCC aims to:

*“Encourage and facilitate an environment that stimulates investment and innovation in broadband technologies and services”.*¹⁹

Some PUCs, such as Oregon, specifically note the aim of driving innovation:

*“responsible for implementing a balanced program of regulation and competition aimed at encouraging innovation in the telecommunications industry”.*²⁰

Internationally, the focus is also on innovation, research and investment. Ofcom in the UK must have regard to *“the desirability of encouraging investment and innovation in relevant Markets”*.²¹ Japan's Telecoms Bureau for example, is charged to:

¹⁴ Australian Telecommunications Act 1997: P31-34, available at: [http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/B15477A1113368D2CA2576780001E8D2/\\$file/Tele1997_WD02.pdf](http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/B15477A1113368D2CA2576780001E8D2/$file/Tele1997_WD02.pdf)

¹⁵ Information Security Policies in Japan, Jun 2005, Yoshida, MIC

¹⁶ Introducing the Swedish Post and Telecom Agency, Dec 2008, PTS

¹⁷ Trade Practices Act 1974 - Sect 152AL, http://www.austlii.edu.au/au/legis/cth/consol_act/tpa1974149/s152al.html

¹⁸ US Telecommunications Act of 1996 :Section 706a

¹⁹ FCC website: <http://www.fcc.gov/broadband/>

²⁰ Oregon Public Utilities Commission, available at: <http://www.puc.state.or.us/PUC/telecom/abouttelecom.shtml>

²¹ Communications Act 2003, Part 1, para 3.4.d

*“[promote] research and development of use environments for more advanced new systems that use radio waves, including next-generation mobile phone systems that will be faster”.*²²

In Singapore, particular emphasis is placed on encouraging investment and innovation. The Info-communications Development Authority (IDA) is required *“to further the advancement of technology and research and development relating to information and communications technology”.*²³

Optimise use of scarce resources

A key focus for regulators is managing scarce resources, such as radio spectrum, phone numbers and infrastructure (for example, ducts). For the sake of brevity, we will focus on spectrum here.

The FCC recognises the centrality of spectrum, stating that it will:

*“Advance spectrum reform by developing and implementing market-oriented allocation and assignment reform policies Vigorously protect against harmful interference Conduct effective and timely licensing activities that encourage efficient use of the spectrum Provide adequate spectrum and improve interoperability”.*²⁴

Internationally, spectrum is a core responsibility for regulators, with efficiency of use being a priority. The Framework Directive of the EU, for example, states that NRAs should be *“encouraging efficient use and ensuring the effective management of radio frequencies and numbering resources”.*²⁵ In many advanced markets such as Japan, focus is also placed on innovation in spectrum use: *“[t]he Telecommunications Bureau works toward further expanding the use of radio waves”.*²⁶

Minimise the burden and costs of regulation

The concept of regulatory forbearance (i.e. minimising the burden and cost of regulation) has two elements:

- A regulator may refrain from applying certain regulatory conditions or from intervening in certain markets
- A regulator may reduce the scope of regulation or withdraw entirely from regulating specified markets

²² Japan Telecoms Bureau, available at: <http://www.soumu.go.jp/english/ib/index.html>

²³ Info-Communications Development Authority of Singapore, available at: http://statutes.agc.gov.sg/non_version/cgi-bin/cgi_retrieve.pl?actno=REVED-137A&doctitle=INFO-COMMUNICATIONS%20DEVELOPMENT%20AUTHORITY%20OF%20SINGAPORE%20ACT%0A&date=latest&method=part

²⁴ FCC, available at: <http://www.fcc.gov/spectrum/>

²⁵ EU Framework Directive, available at : <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:108:0033:0050:EN:PDF>

²⁶ Japan Telecoms Bureau, available at: <http://www.soumu.go.jp/english/ib/index.html>

Forbearance forms a key part of regulatory policy in the US and internationally. In the US, the Telecommunications Act of 1996 requires the FCC to:

*“forbear from applying any regulation or any provision of this Act to a telecommunications carrier or telecommunications service, or class of telecommunications carriers or telecommunications services, in any or some of its or their geographic markets, if the Commission determines that: (1) enforcement of such regulation or provision is not necessary to ensure that the charges, practices, classifications, or regulations by, for, or in connection with that telecommunications carrier or telecommunications service are just and reasonable and are not unjustly or unreasonably discriminatory; (2) enforcement of such regulation or provision is not necessary for the protection of consumers; and (3) forbearance from applying such provision or regulation is consistent with the public interest”.*²⁷

Internationally the message is similar. For example, in Australia:

*“The Parliament intends that telecommunications be regulated in a manner that: (a) promotes the greatest practicable use of industry self-regulation; and (b) does not impose undue financial and administrative burdens on participants in the Australian telecommunications industry; but does not compromise the effectiveness of regulation”.*²⁸

Singapore also advocates the importance of self-regulation, stating that the IDA is “to encourage, facilitate and promote the greatest practicable use of industry self-regulation by the information and communications industry in Singapore”.²⁹

Ensure security of supply

Given its fundamental importance to modern societies and economies, the security of telecoms networks is a focus of regulators. The FCC’s Strategic Goals include:

*“The Nation’s critical communications infrastructure must be reliable, interoperable, redundant and rapidly restorable”.*³⁰

In Sweden, the PTS is “working continuously to improve network robustness, as well as supporting the work of society as regards protection against IT incidents”.³¹ In Germany, the telecoms act has as an objective “safeguarding the interests of public safety”.³²

²⁷ US Telecommunications Act of 1996 : Section 401a

²⁸ Australian Telecommunications Act 1997: P31-34, available at:

[http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/B15477A1113368D2CA2576780001E8D2/\\$file/Tele1997_WD02.pdf](http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/B15477A1113368D2CA2576780001E8D2/$file/Tele1997_WD02.pdf)

²⁹ Info-Communications Development Authority of Singapore

³⁰ FCC Strategic Plan 2009-14

³¹ PTS, available at: <http://www.pts.se/en-gb/Internet/>

³² Telekommunikationsgesetz 2004: § 2, available at: http://bundesrecht.juris.de/tkg_2004/_2.html (in German)

Non-US regulatory objectives

There are certain cases where overseas NRAs have objectives that do not appear explicitly in the US. One example is ensuring global competitiveness. This can take the form of either a well-functioning telecoms market that helps to strengthen the international competitiveness of the national economy, or the fostering of telco 'national champions' for a global stage. Global competitiveness is not specifically part of the FCC's mandate, although it has been much discussed³³. By contrast, Australia's Telecoms Act states the importance of the *"international competitiveness of the Australian telecommunications industry"*.³⁴ Japan's Telecoms Bureau focuses on *"global competitiveness strengthening in the wireless field ... progressing Japan's advanced technology and know-how to other countr[ies]"*³⁵, whilst OFTA in Hong Kong is given the objective *"to enable Hong Kong to be recognised as a world-class telecommunications centre for doing business"*.³⁶

Conclusion

In conclusion, the FCC's key regulatory objectives are very much in line with those of international comparators. Whatever else may drive differences in regulation (which we will discuss in Chapter 4), it is not that overseas regulators are aiming at fundamentally different goals.

³³ For instance the *American Recovery and Reinvestment Act of 2009*, Pub.L. No.111-5 directed the FCC to develop a National Broadband Plan for job creation, economic growth and "other national purposes", which the FCC has interpreted to include "the impact that ensuring access to broadband capability for all Americans will have with respect to America's competitiveness in the global economy". (A National Broadband Plan for our Future, FCC GN-Dkt 09-51, NOI 24 FCC Rcd (2009)). FCC Chairman Julius Genachowski, referring to spectrum and US broadband strategy, noted that there was "no greater spur to America's global competitiveness than getting this right" (available at: <http://www.broadcastingcable.com/article/440707-FCC-Chairman-Puts-Focus-On-Spectrum.php>). The Open Internet Coalition, writing about the FCC's NPRM on Preserving the Open Internet noted that "we believe a process that results in common sense baseline rules is critical to ensuring that the Internet remains a key engine of economic growth, innovation, and global competitiveness" (available at: <http://www.openinternetcoalition.org/index.cfm?objectID=69276766-1D09-317F-BBF53036A246B403>)

³⁴ *Australian Telecommunications Act 1997*: P31-34, available at: [http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/B15477A1113368D2CA2576780001E8D2/\\$file/Tele1997WD02.pdf](http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/B15477A1113368D2CA2576780001E8D2/$file/Tele1997WD02.pdf)

³⁵ Japan Telecoms Bureau, available at: <http://www.soumu.go.jp/english/ib/index.html>

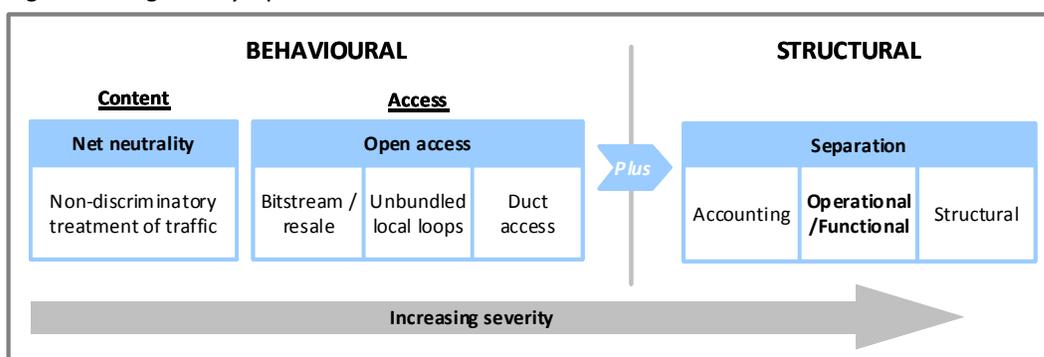
³⁶ OFTA, available at: <http://www.ofta.gov.hk/en/aboutofta/wiofta.html>

3. Regulatory approaches to bottlenecks

To accomplish the objectives outlined above (particularly to foster competitive markets and to encourage investment and innovation), a key area of focus for NRAs has been bottleneck assets, in particular the last mile connections to individual households or businesses. This access bottleneck has been perceived to be a major barrier to competition in many countries, and NRAs have intervened in a variety of ways to secure competitor investment and consumer choice.

The range of potential interventions is wide (see Figure 1), and in different countries different regulators have made quite different choices. This chapter details the access and separation intervention options, and examines their pros and cons.

Figure 1: Regulatory options to address the bottleneck



Currently in the US the focus of regulatory debate is on the merits of network neutrality requirements. At heart, network neutrality seeks to prevent providers of internet access from abusing that bottleneck position. For instance, the FCC’s Notice of Proposed Rulemaking (NPRM) proposes creating a requirement that “a broadband Internet access service provider... treat lawful content, applications, and services in a nondiscriminatory manner”.³⁷

The pros and cons of the FCC’s proposal are beyond the scope of this paper, but we note that outside the US, regulators have already made much more significant interventions regarding access bottlenecks. For instance, throughout Europe there has been unbundling of local loops, and an increasing number of countries are combining this with some form of separation.

As a side effect of these interventions, the network neutrality debate in these non-US markets has proceeded differently. In Europe, at the pan-European level, this debate has been gaining momentum and received a further boost when the Commission decided in late 2009 to give NRAs “the powers to set minimum quality levels for network transmission services so as to promote ‘net neutrality’ and ‘net freedoms’”.³⁸ Whilst acknowledging that some traffic management procedures (TMPs) are necessary, the new rules nonetheless require operators to disclose the details of any TMPs to consumers. Indeed, it was claimed that “under the reformed

³⁷ FCC Notice Of Proposed Rulemaking: Preserving the Open Internet, Oct 2009

³⁸ Agreement on EU Telecoms Reform Paves Way for Stronger Consumer Rights, An Open Internet, A Single European Telecoms Market and High-Speed Internet Connections for All Citizens, Nov 2009, EC

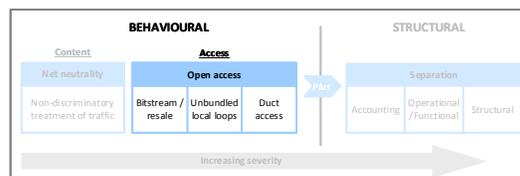
rules, the Commission will be Europe's first line of defence when it comes to net neutrality".³⁹ As a further sign of developments to come, in early 2009, operators in Norway also voluntarily adopted self-regulatory guidelines "intended to ensure that the Internet remains an open and non-discriminatory platform for all types of communication and content distribution".⁴⁰

On the other hand, other Europeans point out that regulations already exist that enable competition in the Internet access market, and consumers' ability to switch providers can curb discriminatory behaviour. For instance, in the UK, Ofcom's previous Director of Policy Development Dougal Scott has stated that "partly as a result of regulation, we have a situation where we can rely on competition to make [network neutrality] less of an issue".⁴¹ According to Jacques Champeaux (EVP, Regulatory Affairs for Orange), "[There is no need for specific] net neutrality regulation in Europe ... [since] competition in broadband markets effectively disciplines network providers".⁴² Note that it is implicit in both statements (rightly or wrongly) that Europe has more intense broadband retail competition than the US. Underlying this perception are the significant moves made in Europe to open up the access bottleneck at the wholesale level.

Closer to the US, proponents of network neutrality have also made headway in Canada. The NRA, CRTC, recently introduced a new framework for guiding the TMPs of internet service providers.⁴³ Like the new EU regulations, Canada's rules also require operators to describe to retail customers the service impact of their TMPs. The framework also calls for operators to give preference to TMPs based on economic measures (e.g. using different tiers of tariffs) rather than technical methods (e.g. traffic shaping).⁴⁴

Open access interventions

Outside of areas with very high population density, it has been an unattractive investment for new entrants to replicate the access networks of incumbents (and, in some areas, the access network of the cable operator). The cost is high and fixed, and therefore a parallel build by a new entrant is likely to have a much higher unit cost than the incumbent's network, which starts with a very high utilization.



Thus in practice, the incumbent's copper has been a bottleneck asset. Without intervention, consumers would face a monopoly supplier of broadband (or possibly a duopoly of the incumbent and the cable operator). Therefore virtually all OECD regulators have put in place 'behavioural' open access remedies, requiring incumbents to make elements of their access networks available to third party operators. The objective of this wholesale intervention has

³⁹ Agreement on EU Telecoms Reform Paves Way for Stronger Consumer Rights, An Open Internet, A Single European Telecoms Market and High-Speed Internet Connections for All Citizens, Nov 2009, EC

⁴⁰ Network Neutrality: Guidelines for Internet Neutrality, Feb 2009, NPT

⁴¹ Regulating the Internet: Speech at Westminster eForum, Mar 2007, Scott, available at: <http://www.ofcom.org.uk/media/speeches/2007/03/regulate>

⁴³ Canadian Telecoms Regulatory Policy CRTC 2009-657

⁴⁴ CRTC requires Internet service providers to be more transparent about their internet management practices, Oct 2009, CRTC

been to stimulate broadband competition at the retail level, thereby spurring innovation and investment.

In Europe, the Commission's Recommendation of 2003 identifies those markets in which intervention may be warranted⁴⁵:

"The first criterion is the presence of high and non-transitory entry barriers whether of structural, legal or regulatory nature...Structural barriers to entry result from original cost or demand conditions that create asymmetric conditions between incumbents and new entrants impeding or preventing market entry of the latter. For instance, high structural barriers may be found to exist when the market is characterised by substantial economies of scale and/or economies of scope and high sunk cost".⁴⁶

The non-replicability of the access network makes it one such market and NRAs in Europe and other non-US markets have therefore sought to mandate wholesale access to it. Such access can take various forms, including local loop unbundling (LLU - equivalent to UNE-P in the US), duct access and bitstream products (which offer loops bundled with DSL to new entrants).

Such offers have not generally been seen as alternative to investment by new entrants, but rather an intermediary step to it. This concept is known as the 'ladder of investment'.⁴⁷ New entrants initially rely on simple resale products, and then as they build scale they step up to bitstream products, then to unbundled local loops (ULL) and ultimately to their own parallel infrastructure. This allows them to build appropriate scale at a given level (in a lower risk but lower return manner) before making the otherwise highly risky investment to move to the next step. Certainly many firms have travelled up the ladder as far as ULLs, and this has enabled NRAs to start deregulating bitstream products. (For example, in the UK, 'IPStream', the local bitstream offering, is no longer regulated in the 70% of the country served by 4 or more users of LLU.) However, fewer firms have moved on to building their own access networks.

We can consider open access requirements as separated into two generations, which are dealt with in turn below:

- Broadband proliferation: bitstream and ULL
- Broadband to NGN transition: duct access and fibre bitstream

⁴⁵ Note: the European Parliament has recently cautioned that any "ex-ante, sector-specific regulation should be progressively reduced as competition in the electronic communications markets develop and the telecoms market should eventually be governed by competition law only" (see *Telecoms Package - Strengthening Consumer Rights and Competition*, Nov 2009, European Parliament); however, open access regulation is still currently seen as being crucial for ensuring competition in many parts of the EU and there has been little mention of revoking the current regulatory regime.

⁴⁶ Commission Recommendation of 11 February 2003 on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation, recitals (9)–(11), available at:

http://ec.europa.eu/information_society/policy/ecomm/doc/implementation_enforcement/article_7/recom_11022003.pdf

⁴⁷ See for instance M Cave *Encouraging infrastructure investment via the ladder of investment*, Telecommunications Policy, 2007: P223-237

Broadband proliferation: bitstream and ULL

These are products introduced by regulators to facilitate access to the copper local loop and promote competition for ADSL broadband. Most important are wholesale bitstream access and LLU. Figure 2 shows these two products situated in a ladder of investment for alternative broadband providers – bitstream products offer a relatively low investment option with some potential for service differentiation, whilst LLU requires a higher level of investment for the competitor but gives more potential for differentiation. Below bitstream is simple broadband resale and above LLU are new build options, either with or without access to the incumbent’s duct infrastructure.

Figure 2: Ladder of investment options for non-incumbent broadband providers

Investment type	Description	Example
Independent new build	Total control over network build including duct installation	Fastweb in Italy – altnet fibre roll-out, offering IPTV and internet services independent of incumbent
Duct access new build	Access to passive infrastructure – altnet must install all active equipment including fibre	Iliad in France – altnet roll-out of fibre in France Telecom ducts. High degree of freedom over infrastructure build
LLU (or sub-loop for fibre)	Passive product – competitor operator must install DSLAM and active electronics at the exchange	O2 in the UK – differentiated equipment in the exchange allows for ADSL2+ increased speeds of 24Mbps
Bitstream (copper or fibre)	Active product, but different POIs possible, giving different options for differentiation/investment	Belgium – the NRA (BIPT) requires Belgacom to offer “naked” DSL
Resale (copper or fibre)	Active, fully managed product – no possibility for service differentiation, only marketing	Introduced in 2004 in Germany and has contributed significantly to increase in broadband penetration

Wholesale bitstream is defined by the European Regulators Group (ERG) – an advisory body to the EC comprised of the chairs of the various European national regulators – as “the provision of transmission capacity ... between an end-user connected to a telephone connection and the point of interconnection (POI) available to the new entrant”.⁴⁸ This POI can be at various different points, corresponding to different levels of investment for the new entrant. The highest investment option is to hand over directly after the DSLAM⁴⁹, meaning the competitor provides its own backhaul. Alternatively, the incumbent may provide the access link plus backhaul.

The unifying aspect of these options is that they all give the competitor the ability to manage the access service and provide differentiation through value added features, as distinct from simple resale products where the ISP merely provides marketing for a technically identical product. Bitstream products have proven internationally popular and are available in 87% of OECD countries.

⁴⁸ Bitstream Access, Apr 2004, ERG (03) 3rev1: P3

⁴⁹ DSLAM – Digital Subscriber Line Access Multiplexer. A network device located in the exchange which connects multiple DSLs to internet backhaul

Wholesale LLU allows a new entrant full or shared access to the copper pair between a telephone exchange and customer premises (shared if the incumbent is still providing the voice service). Unlike bitstream access, LLU requires a competitor to install its own DSLAM equipment at the exchange. This results in a much higher degree of investment but also lower variable costs and an increased potential for service differentiation, for instance through ADSL2+ compatible equipment capable of up to 24Mbps download speeds. LLU regulation is always accompanied by collocation requirements so that LLU operators can access space in the telephone exchange.

Local loop unbundling – Japan

Japan has been at the forefront of unbundling, establishing LLU in 1999 and collocation requirements in 2000. These requirements enabled competing operators to emerge, most notably KDDI, Yahoo! BB and K-Opticom. The government set prices for incumbent NTT's local loops very low, resulting in a steep drop in retail prices and rapid uptake. This in turn encouraged NTT to invest heavily in fibre in order to regain market share and profitability. The Japanese government regards its policy as having been successful, stating in its response to a Notice of Inquiry from the FCC that "[t]hese policies accelerated the spread of DSL services and led to the rapid start up of FTTH services".⁵⁰

LLU wholesale products are now widely available around the world: All OECD countries except the US and Mexico have such regulation in place. Outside the US, it is regarded as a success by most national governments and regulators. The UK regulator Ofcom, for example, has stated:

"Ofcom's approach focuses on enabling providers to invest and compete because we believe competition is the best way of ensuring that the benefits of next generation access are passed on to customers. This view is supported by the UK's experience in current generation broadband: in 2002 UK broadband penetration stood at 7%, and six years later penetration has reached 57%, driven in part by fierce competition from local loop unbundling operators".⁵¹

While LLU was put in place originally as a mechanism to foster copper-based broadband, it remains in place even as attention begins to turn to fibre. Hong Kong is the only market to have pushed LLU hard and then moved on from it. It was first introduced in 1995, but rescinded in 2008, since it was decided that competitive pressure from facilities networks was significant enough that LLU was no longer necessary. However, Hong Kong's facilities-based competition is unique – as of March 2008, 58%⁵² of homes in Hong Kong were passed by at least three fixed PSTN networks, in addition to ubiquitous high-speed wireless services.

Moreover, many NRAs are confident enough of the value of unbundled copper loops that they are now turning their attention to applying a similar approach to fibre networks. (Whether LLU regulation has in fact been a success is beyond the scope of this paper. Outside the US most

⁵⁰ *Comments of the Government of Japan in Response to the FCC's Notice of Inquiry Regarding a National Broadband Plan*, available at: <http://fjallfoss.fcc.gov/ecfs/document/view?id=6520219438>

⁵¹ *Next Generation New Build* (Consultation document), Apr 2008, Ofcom: P1, available at: <http://www.ofcom.org.uk/consult/condocs/newbuild/summary/exe.pdf>

⁵² OFTA Press release, 3 July 2008

NRAs do regard LLU as a success, but this view is not shared by all market observers. See for instance Boyle, Howell and Zhang (2008)⁵³, Spiller and Ulset (2002).⁵⁴

Broadband to NGN transition: duct access and unbundled fibre

The transition from a copper to a fibre access network has the potential to recreate the access bottleneck that existed prior to local loop unbundling. With this in mind, NRAs are considering how to ensure that economic parallel build is possible, and/or how to make unbundled fibre available. Indeed, many regulators have already acted. This said, international regulators have been acutely conscious of the need to balance these objectives against the requirement to avoid discouraging investment in new infrastructure through overly harsh regulation.

A prime example of a step already taken by a number of regulators is mandatory duct sharing⁵⁵. Several NRAs have recently intervened to ensure incumbents offer access to their duct infrastructure at reasonable prices. Mandatory duct access is in place in countries such as Italy, Portugal and Spain, whilst France's duct sharing regulation is helping it become a Next Generation Access (NGA) leader in Western Europe, with Iliad and NeufCegetel using France Telecom ducts to roll out FTTH networks. Recently, the EC's latest telecoms package also gives NRAs the powers to require operators to share "*network elements and associated facilities*" in certain cases by mid-2011, thereby paving the way for duct sharing across the whole of Europe.⁵⁶

Duct access – Spain

The Spanish NRA, CMT, has announced mandatory duct sharing⁵⁷, on the grounds that replicating this civil works infrastructure would make up 60% of an alternative fibre operator's network investment and it therefore constitutes a non-replicable asset. Having found the incumbent Telefonica to have SMP in broadband markets, in November 2009, CMT published the reference access offer for duct access, which includes prices, terms and services. The regulated prices have been calculated taking into account Telefonica's cost accounting, and benchmark rates in France and Portugal, where similar regimes are in place already.

Several NRAs have also required incumbents to offer unbundled fibre products to support competition in the retail market without excessive new entrant investment. For practical reasons, this has been more common in markets with point-to-point network topology. For instance, even though there are now competitor fibre roll-outs in Japan, NTT is still required to offer wholesale fibre loops. The prices have been set at a level intended to ensure that NTT is able to achieve a reasonable rate of return for its fibre investment⁵⁸. A similar situation has

⁵³ *Catching Up in Broadband Regressions – Does Local Loop Unbundling Really Lead to Material Increases in OECD Broadband Uptake*, Jul 2008, Boyle, Howell and Zhang

⁵⁴ *Why Local Loop Unbundling Fails?*, 2002, Spiller and Ulset

⁵⁵ See *High wire acts : Negotiating pole attachment agreements under the 1996 Telecom Act*, July 1999, Saporonov, Gerry and Kropp for a discussion of the US approach

⁵⁶ *Telecoms Package: Strengthening Consumer Rights and Competition*, Nov 2009, European Parliament

⁵⁷ CMT, available at:

http://www.cmt.es/cmt_ptl_ext/SelectOption.do?nav=comunicados_prensa&detalles=090027198008c123&hcomboAnio=2009&hcomboMes=11&pagina=1

⁵⁸ *Explaining International Broadband Leadership*, 2008, ITIF

developed in the Netherlands, where access to the incumbent’s fibre network⁵⁹ has been mandated by OPTA, the NRA. However, this has been done with a view to striking a balance between fostering competition and encouraging investment:

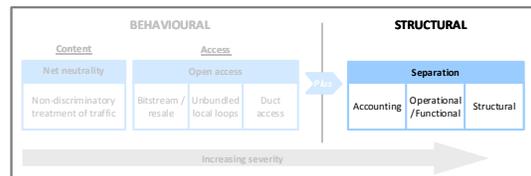
*“At the very core of these policy rules is a price cap on access tariffs established on a long-term basis by OPTA. While providing for a maximum tariff for access for entrants to the new fibre network, such a price cap would give long-term certainty for investments in fibre networks”.*⁶⁰

In particular, the cost of capital used to calculate the tariff explicitly includes a ‘fibre risk premium’, to recognize and compensate for the forward looking risk in a current fibre investment. Thus, as the above examples show, many NRAs around the world believe open access regulation remains relevant in a fibre world.

In many territories, however, regulation has already moved beyond the sort of behavioural interventions discussed above. Underlying these interventions designed to secure access is the notion of equivalence. This means that an incumbent telco, when providing a wholesale service, must provide in a similar or identical way to its own retail arm and to third parties. This concept has become fashionable amongst many regulators. A number of NRAs have found that such regulation has not, in practice, been enough to ensure fair, reasonable and non-discriminatory behaviour by the wholesale arm of integrated incumbents. In such circumstances, in order to ensure equal treatment of internal and external purchasers, many OECD countries have moved further along the intervention spectrum to separation options, such as those discussed in the next section.

Separation interventions

In situations where open access requirements have not delivered the desired results, many NRAs have undertaken structural interventions to vertically separate the incumbent.⁶¹ Different degrees of separation have been employed in different territories, but they each retain as their aim the limitation or elimination of the incumbent’s ability and incentives to discriminate against external purchasers of wholesale products, both on price and non-price grounds. As such, separation is primarily a means to enforce fair, reasonable and non-discriminatory behaviour, not an end in itself.



Nevertheless, such measures have proved popular, and 73% of OECD countries now have some sort of separation regime in place. Peter Waters of Gilbert + Tobin, a law firm, sees this as a beneficial consolidation of telecoms regulation and competition law:

⁵⁹ Note: KPN, the Dutch incumbent, is rolling out fibre via a joint venture with Reggefiber

⁶⁰ Progress Report on the Single European Electronic Communications Market 2008, EC

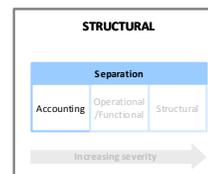
⁶¹ Initially, separation tended to be undertaken as a response to open access regulation not achieving the desired results, for example in the UK and in Sweden. However, recently some NRAs have modeled themselves on these early separation examples and moved directly to structural interventions, for example in New Zealand.

*“On the whole, competition lawyers and policy makers have greater confidence in structural remedies and the shift to operational separation may reflect a closer alignment between telecommunications regulation and competition law”.*⁶²

Such structural interventions can, however, be extremely costly and disruptive, so this must be weighed up against the potential benefits. As a result, different degrees of separation have been deployed in different territories, beginning with accounting separation, moving through operational⁶³ separation and finally to structural separation. This section outlines the advantages and disadvantages of each.

Accounting separation

To eliminate price-based discrimination, many NRAs require incumbents to prepare a separate set of financial statements for the part of the operation holding the bottleneck asset. This enables full transparency over intra-company transactions involving that asset, and is referred to as accounting separation. This form of intervention has been employed and seen as sufficient in several European markets, such as France, Austria and Belgium.



Accounting separation – France

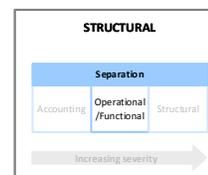
LLU products have been offered in France since 2001. In order to ensure that external purchasers are not discriminated against on price terms, the French regulator, ARCEP, requires France Telecom to produce separate accounts for its wholesale division. ARCEP describes the regime as follows⁶⁴:

“The regulator requires France Telecom to provide separate accounts for its various operations, broken down in accordance with the definition of the relevant markets, and to ensure that its retail operations have recourse to its wholesale services under “equivalent conditions” to those offered to alternative operators entering the retail markets. The provision of such services is based, in particular, on the internal use of commercial transfer agreements which can be controlled by the regulator”

Accounting separation can also be accompanied by the establishment of a distinct wholesale division within the incumbent with a dedicated management team. However, whilst this can guard against price discrimination, non-price discrimination is more complex. To counter this, NRAs in some countries have enforced greater degrees of separation, which split the wholesale and retail divisions of the incumbent such that their incentives are no longer so closely aligned.

Operational separation

Operational separation (also known as functional separation) is a significantly greater intervention. In this case the operations of the access network are moved into a separate organisation, with its own management and incentives, albeit still owned 100% by the incumbent. Given the



⁶² *Operational Separation – A New Style of Regulation?* Sep 2006, Peter Waters and Albert Yuen: P2, available at: <http://www.gtlaw.com.au/gt/site/articleIDs/CE235B41D5A1B72DCA25716B0016575E?open&ui=dom&template=domGT>

⁶³ Note: in this document we treat the terms functional and operational separation as interchangeable

⁶⁴ *La Lettre De L’authorité De Régulation Des Communications Électroniques Et Des Postes*, Mar/Apr 2007: P8, ARCEP

significant transitional costs involved, it is not a decision to be taken lightly. The ERG, for example, advises caution:

*“The decision to impose functional separation needs to be considered by the NRAs after a careful analysis and based on the nature of the problem identified, proportionate and justified in the light of the objectives of the Directives. Functional Separation should only be implemented when it can be shown that other mechanisms or remedies (Accounting Separation, non-discrimination, etc.) cannot ensure non-discriminatory access”.*⁶⁵

If an NRA does decide to separate a vertically integrated incumbent further, there are several different options available, since the firm’s assets can be separated to different degrees. These assets include premises, operational support systems, labour force, brand, management information systems and corporate strategy⁶⁶. This flexibility allows for differentiated levels of severity and, as a result, operational separation regimes around the world vary considerably. For instance, New Zealand’s regime is regarded as more intrusive than most, since unlike the UK’s model it contains measures such as a complete ban on cross-divisional staffing, a requirement that the entire asset-holding division is housed in separate premises from the rest of the company, and a restriction on the group legal and regulatory services that the subsidiary division can access.

Operational separation – Sweden

Sweden provides a typical example of the move to operational separation. Although LLU was established in 2001, take-up was not as high as the regulator (PTS) had hoped. The incumbent, TeliaSonera, was thought to be partly to blame, since it allegedly *“made every effort to obstruct new entrants’ access to its network, causing headaches for the regulator.”*⁶⁷ Examples of this non-price discrimination included, according to the PTS, applying a longer delivery period (10 working days) for a copper access line ordered by an external purchaser than for one ordered by an internal purchaser (5 to 7 working days). Faced with the threat of operational separation modeled on the UK’s being imposed by the PTS, TeliaSonera announced that it would voluntarily split off its access network from the rest of the business. The resulting subsidiary, Skanova Access, was established in January 2008. It is wholly owned by TeliaSonera but independently operated, has its own management structure and is overseen by an independent body, the Equality Access Board.

Operational separation brings several important advantages. It applies a greater degree of transparency to the incumbent’s internal processes, encourages efficient pricing at the wholesale level, and retains a degree of flexibility such that the boundaries of the separation can be changed over time to adapt to market conditions. Whereas operational separation regimes in Sweden, Italy, Australia and New Zealand are still fairly recent and therefore difficult to assess, as the first country to have its incumbent separated, the UK provides several years of evidence

⁶⁵ *Opinion on Functional Separation*, 2007: P2, ERG, available at:

http://erg.ec.europa.eu/doc/publications/erg07_44_cp_on_functional_separation.pdf

⁶⁶ See Martin Cave, *Six Degrees of Separation, Communications & Strategies* (no. 64, 4th quarter 2006), p.8 for more on the different degrees of severity within an operational separation regime

⁶⁷ *TeliaSonera’s Functional Separation Gamble*, Oct 2007, GLG, available at <http://www.glggroup.com/News/TeliaSoneras-functional-separation-gamble-17498.html>

for the success or failure of separation. CEO of Ofcom, Ed Richards, argues that it has been a success, and that the policy has worked “very well”⁶⁸:

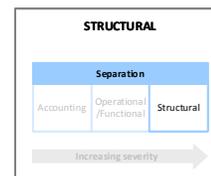
*“Openreach [the asset-holding company] went from a theory to a practical reality in six months. Its creation has prompted a new wave of investment in the UK telecoms market which in turn has triggered a major price war in the broadband market. Importantly, there have been big benefits for BT itself – we have been able to deregulate retail markets and BT’s share price has risen partly because of confidence that there is a new stability in the relationship with the regulator”.*⁶⁹

Recognizing the potential benefits of adopting an operational separation model, many NRAs such as those in Poland and Ireland are starting to consider the measure as a viable option. Indeed, the European Parliament, although acknowledging that operational separation should only be used as an “exceptional measure”⁷⁰, has nonetheless reaffirmed its validity “where any other regulatory tools have failed to achieve effective competition and if there is little prospect of future infrastructure-based competition”.⁷¹

However, operational separation is not without its problems, and certainly there were significant teething problems in the UK. It is necessarily time-consuming and expensive to establish, so the benefits must be significant to outweigh these costs. It also does not remove the need for a strong and involved regulator, since elements of the newly created business still require regulation, such as quality of service and tariff levels. In addition, the boundaries between the separated network company and the incumbent may need to be flexible enough to change, particularly in a dynamic technology environment such as the transition to fibre NGN.

Structural separation

A theoretical step beyond operational separation is full structural separation, which sees the access business spun out of the incumbent, into separate ownership. This has the greatest chance of removing discriminatory behaviour, but is clearly an even harsher and more irreversible intervention.



In practice, only one country, Mongolia, has so far split an incumbent in this way (aside from the 1984 split of AT&T into the long distance business and the RBOCs, though in that case the dividing line was between long distance and local exchange services, rather than between the local loop and the rest of the network).

⁶⁸ La Lettre De L’Autorité De Régulation Des Communications Électroniques Et Des Postes, Mar/Apr 2007: P8, ARCEP

⁶⁹ Ibid.

⁷⁰ Telecoms Package: Strengthening Consumer Rights and Competition, Nov 2009, European Parliament

⁷¹ Ibid

Structural separation – Mongolia

In 2004, the incumbent Mongolian Telecommunications Company (MTC) was separated into two entities: the partially private Telecom Mongolia operating retail services; and the government-owned Information and Communication Networking Company (ICNC) operating the wholesale network business. However, as of June 2008, ICNC was being heavily subsidized by the government as the tariff structure did not allow it to meet its costs and Telecom Mongolia had received the better share of MTC assets.⁷²

Structural separation has currently only been applied to the copper access network in Mongolia. However, it is being planned or seriously considered in many markets for NGN. This is taking two distinct forms.

In the first, the incumbent is being required to divest all of its infrastructure assets into a new company. This is taking place in Singapore, where SingTel, the incumbent, is being required to move its ducts and passive assets into a separate company by 2011, and sell down its stake in this company by 2014. This NetCo company will then lease these assets to another company, OpenNet, which will install and own the fibre optics. This structure has been designed to provide a vehicle for the government to subsidise NGN roll-out, providing a SGD 750m (US\$ 537m) grant to OpenNet to achieve a stipulated roll-out target.

The second form of structural separation is a de facto split via fibre overlay, pre-empting the incumbent-owned fibre bottleneck problem by creating a new NetCo from scratch using a combination of public and private funding.

The National Broadband Network in Australia is an example of this de facto structural separation. The government has committed AUD 43bn (US\$39.3bn) to build an open access FTTH network connecting 90% of premises. It will sell infrastructure bonds to allow private investment capped at 49%, and will then sell down its 51% share after operating the network for five years. The result will create a structural separation, whereby the incumbent, Telstra, becomes a customer of the open access NetCo. New Zealand is considering similar structures, having established Crown Fibre Holdings to manage the government’s NZD 1.5bn (US\$ 1.1bn) investment in NGN.

In some European countries, smaller scale models for investment in NGN have led to similar situations in which the incumbent as a retailer is separated from the open access network. In the Netherlands, community-owned municipal networks such as OnsNet in Nuenen and Eindhoven have built out open access FTTH networks independent of the incumbent by relying on the support of residents. Similarly in Sweden, the municipality of Vasteras formed its own commercial company in 2000 to build and operate an open FTTH network, separating the wholesaling functions of network operator from the retailing of services.

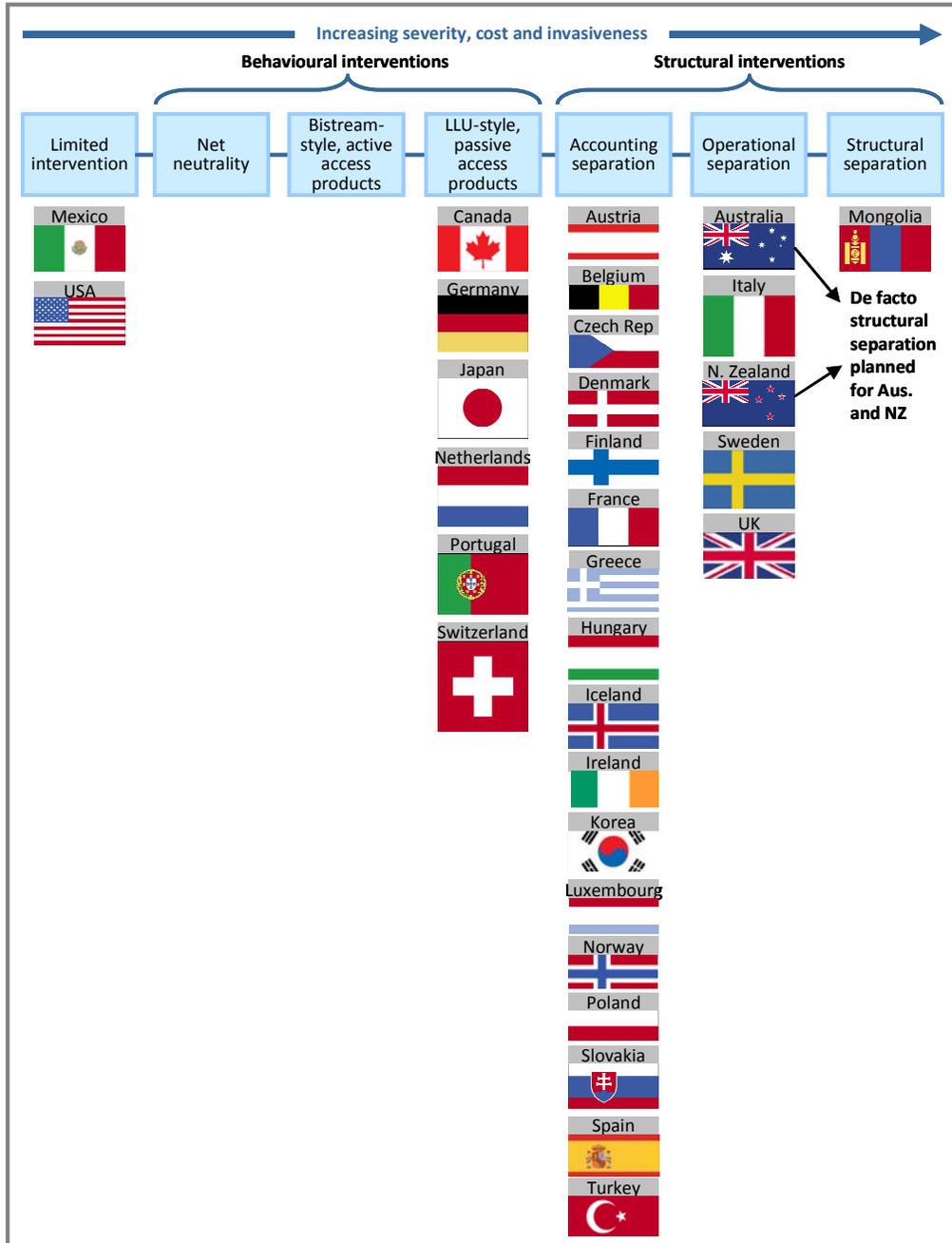
⁷² *ICT Regulation Tool Kit*, ITU, available at: <http://www.ictregulationtoolkit.org/en/PracticeNote.3149.html>

Thus, in many markets around the world, governments and NRAs are seeing a need for greater, not lesser, intervention in the fibre era, driven by a desire to pre-empt the bottlenecks that existed in the copper network, and by the need to find appropriate vehicles for the substantial sums that national and regional governments are putting to work to subsidize fibre roll-out.

4. National regulatory choices

As we have seen, there are multiple intervention options available to regulators, and NRAs in different markets have made quite different choices, as shown in Figure 3.

Figure 3: Intervention status by OECD country (plus Mongolia)



The vast majority of OECD countries have regulated bitstream and LLU products, and of those, most also have some form of separation regime in place. Only the US and Mexico have limited interventions in place.

A host of factors drive these different choices, and we will not seek to consider them exhaustively. However, in this chapter we will consider the reasons most often offered for the unusually non-interventionist approach taken in the US. These are:

1. Strong existing inter-modal competition
2. Competition from new technologies
3. Low and falling broadband prices

It should be noted that other countries with similar, or even more competitive, market conditions have adopted more stringent regulation in the form of LLU or separation. Although no single country is a perfect comparator for the US, we will examine those that are similar on the above factors and show that regulators have nonetheless intervened with perceived positive results.

Strong existing inter-modal competition

Many observers cite the US's high inter-modal competition as an argument against further regulatory intervention in the broadband market. For instance, a recent paper by Crandall, Eisenach and Litan (2009) argues:

*"[T]he case for mandatory unbundling is weaker in the United States than in most other OECD countries due to the presence of multiple competing broadband infrastructures in the US. In contrast to most OECD countries, which rely primarily on xDSL services provided over the last-mile copper networks of telephone company incumbents, the leading broadband modality in the U.S. is cable modem service ..."*⁷³

Cable broadband share is indeed high in the US – accounting for 53% of broadband connections in the US in 2008⁷⁴, compared to an average of 29% across OECD countries⁷⁵. However, the US is not the country with the highest cable broadband share – Canada's share is 54%, and they nonetheless have unbundled both copper and cable loops⁷⁶ (See Figure 4 overleaf).

Moreover, the argument that a high cable share removes the need for intervention is somewhat circular – absent effective unbundling, ADSL will be much less common, and therefore cable is likely to be a more important modality. Conversely, the impact of effective unbundling would be to reduce cable share of broadband connections (although not necessarily the absolute number). Precisely this effect has been seen in a number of European countries following the introduction of LLU.

One way to correct for this circularity is to consider cable's share at the point when LLU was implemented. For example, in Austria, Belgium and the Netherlands, when LLU was

⁷³ *Vertical Separation of Telecommunications Networks*, Sep 2009, Crandall, Eisenach and Litan

⁷⁴ OECD Broadband Portal & *OECD Communications Outlook 2009*: penetration of each technology type is defined as the number of subscriber lines of each technology type divided by total population

⁷⁵ OECD Broadband Portal & *OECD Communications Outlook 2009*

⁷⁶ *Explaining International Broadband Leadership*, 2008, ITIF

implemented, cable represented 72% (1999), 45% (2001) and 96% (2000) of total broadband connections respectively.⁷⁷ In other words, cable was at least as or more important than cable in the US today, and nonetheless local regulators felt it appropriate to introduce unbundling.

Figure 4: DSL and cable as a % of broadband connections in 2008 (OECD countries)⁷⁸

Country	Broadband Penetration by Technology Platform				Cable (% of Total Connections)	Cable Homes Passed (Selected Countries) ⁷⁹
	DSL	Cable	Other ⁸⁰	Total		
Canada	12.9%	15.4%	0.4%	28.7%	53.7%	97.2%
United States	10.1%	13.5%	1.9%	25.5%	52.9%	96.3%
Hungary	7.9%	7.6%	1.4%	16.9%	45.0%	77.2%
Belgium	16.2%	11.2%	0.2%	27.6%	40.6%	97.4%
Portugal	9.4%	6.3%	0.2%	15.9%	39.6%	73.2%
Netherlands	21.7%	13.3%	0.6%	35.6%	37.4%	98.0%
Austria	13.8%	7.1%	0.6%	21.5%	33.0%	58.0%
Korea	7.6%	10.5%	13.7%	31.8%	33.0%	70.0%
Poland	7.2%	3.1%	0.1%	10.4%	29.8%	42.9%
OECD	13.2%	6.4%	2.6%	22.2%	28.8%	
Switzerland	23.0%	9.5%	0.7%	33.2%	28.6%	93.3%
Denmark	22.3%	9.8%	4.6%	36.7%	26.7%	73.0%
Mexico	5.1%	1.9%	0.2%	7.2%	26.4%	
Czech Republic	6.7%	3.7%	6.6%	17.0%	21.8%	37.0%
United Kingdom	22.1%	6.0%	0.1%	28.2%	21.3%	50.0%
Norway	23.3%	6.7%	3.7%	33.7%	19.9%	60.1%
Sweden	18.8%	6.1%	6.6%	31.5%	19.4%	55.0%
Spain	16.0%	3.9%	0.3%	20.2%	19.3%	59.1%
Australia	19.6%	4.3%	1.1%	25.0%	17.2%	
Luxembourg	25.0%	4.1%	0.1%	29.2%	14.0%	83.3%
Japan	9.1%	3.2%	11.3%	23.6%	13.6%	58.0%
Finland	25.7%	4.0%	0.7%	30.4%	13.2%	79.7%
Ireland	14.9%	2.4%	3.0%	20.3%	11.8%	82.7%
Slovak Republic	6.5%	1.2%	3.7%	11.4%	10.5%	
Germany	25.4%	1.9%	0.0%	27.3%	7.0%	22.4%
New Zealand	19.1%	1.3%	1.0%	21.4%	6.1%	
France	27.0%	1.4%	0.1%	28.5%	4.9%	
Turkey	7.6%	0.1%	0.0%	7.7%	1.3%	45.0%
Iceland	30.1%	0.0%	1.2%	31.3%	0.0%	33.0%
Italy	18.4%	0.0%	0.6%	19.0%	0.0%	
Greece	13.4%	0.0%	0.0%	13.4%	0.0%	

⁷⁷ OECD Communications Outlook 2007

⁷⁸ OECD Broadband Portal & OECD Communications Outlook 2009

⁷⁹ OECD Communications Outlook 2009: data is based on the highest percentage of homes passed between 2000-2007

⁸⁰ Note: includes mostly in-home broadband provided via satellite and fixed wireless broadband

Inherent in the idea that inter-modal competition obviates the need for LLU is the concept that the cableco plus incumbent represent sufficient competition. However, while share is an important measure of competition, so in this context is coverage. While the success of DSL may reduce cable's share, the cableco's broadband offer will nonetheless remain an important competitive constraint. Numerous markets with cable coverage equivalent to the US, such as Canada, Belgium, the Netherlands and Switzerland, have nevertheless elected to operate LLU regimes. Moreover, cable's share is not trivial in any of these markets, exceeding 25% in each case. Again, despite substantial competitive constraint from cable, these countries have not felt able to do without LLU.

Indeed, some of these countries have gone even further and mandated the unbundling of not just copper but also cable. In the Netherlands⁸¹, cable unbundling already exists and in Belgium the NRA is in the process of implementing it.⁸²

A note on the number of competitors

Underlying the debate about inter-modal competition is a set of assumptions about what number of players represents robust competition at the retail layer. Many regulators believe that the type of competition, whether inter- or intramodal, is less important than the number of competitors at the retail layer.

NRAs outside the US have taken steps to maximize the number of competitors in the broadband market, regardless of whether local competition is primarily inter- or intramodal. In the UK, for instance, the regulator, Ofcom, suggests that a key reason behind the growth of broadband penetration in the UK over the last few years is that the market *"has been opened up to as many competitors as possible, each offering attractive prices and new services"*.⁸³ Recently, Ofcom has begun to consider deregulating certain geographic markets within the UK where consumers have the choice of four or more DSL providers⁸⁴ (plus, in many areas, cable broadband).

The Korean NRA, MIC, has similarly worked to increase the number of competitors in the retail broadband market. The incumbent, KT, started providing broadband services via ADSL in 1999, shortly after Thrunet began offering broadband services via cable in 1998. In order to further stimulate competition, the Korean government licensed a new telecommunications provider and this resulted in the formation of Hanaro Telecom.⁸⁵ Furthermore, the South Korean government also *"effectively forced cable providers KT and Powercomm to open their networks to competitors via a law that—until 2000—prevented them from offering broadband content over their existing cable infrastructure"*.⁸⁶ This policy was in fact analogous to mandating cable unbundling in the cable market. As a result of these developments, inter-modal competition in

⁸¹ *Explaining International Broadband Leadership, 2008*, ITIF

⁸² *Progress Report on the Single European Electronic Communications Market 2008*, EC

⁸³ *Next Generation Broadband for New-Build Homes, 2008*, Ofcom Consultation, available at: <http://www.ofcom.org.uk/consult/condocs/newbuild/pe/>

⁸⁴ *Commission Approves Ofcom Proposal to De-regulate Part of UK Broadband Market*, Feb 2008

⁸⁵ *Explaining International Broadband Leadership, 2008*, ITIF

⁸⁶ *Explaining International Broadband Leadership, 2008*, ITIF

Korea was already a reality in the early 2000s. Nonetheless, the Korean government believed that further retail competition was important and introduced copper loop unbundling in 2002.⁸⁷

In the Netherlands, the regulator has explicitly rejected the idea that two competitors are enough. Cable coverage is over 90%, but the NRA, OPTA, has stated that “[t]wo infrastructures (cable and KPN) are not enough – access [regulation is] required”.⁸⁸

As discussed above, Hong Kong only felt able to abandon LLU when more than 80% of households were served by three or more PSTN operators, plus the cable operator, plus multiple mobile data providers.

Thus NRAs in a number of overseas markets have evidently sought a much greater degree of competition than would appear to satisfy those who claim cableco/incumbent retail competition obviates the need for unbundling.

Competition from new technologies

Whilst DSL and cable are the dominant technologies for broadband in many markets, pockets of new technologies such as fibre, WiMax and pseudo-fixed wireless services (where 3G is used in-home as a substitute for fixed-line broadband) are increasingly available as well. It is unclear how much these technologies will give rise to increased competition with incumbents from new entrants. In the US, fibre and other non-DSL, non-cable broadband technologies accounted for approximately 8% of total broadband connections in 2008,⁸⁹ though much of the fibre deployment was by Verizon, the incumbent DSL provider in its operating areas.⁹⁰

Some have argued that these emerging technologies obviate the need for unbundled copper, and moreover that these technologies should not themselves be regulated since this could discourage investment. In the US, the FCC has withdrawn unbundling requirements for new fibre projects.⁹¹ This was in response to Verizon, among others, indicating that jobs and investment could be threatened should regulation become more stringent:

*“In reliance on the light-touch regulatory approach designed to encourage network investment, broadband providers have invested hundreds of billions of dollars – and employed hundreds of thousands of employees – to deploy wireline and wireless broadband networks widely throughout the vast majority of the country”.*⁹²

Elsewhere new technologies have also been emerging, but NRAs overseas have seen fit to continue (or begin) regulation of copper and cable loops. New broadband technologies, including fibre, 3G and other non-DSL, non-cable technologies, are being rolled-out in all OECD

⁸⁷ *Explaining International Broadband Leadership*, 2008, ITIF

⁸⁸ *Access Pricing - A Key Element in Effective NGA Access Regulation*, Mar 2009, OPTA

⁸⁹ OECD Broadband Portal & *OECD Communications Outlook 2009*

⁹⁰ Verizon represents approximately ¾ of fibre homes connected. See *FTTH Markets*, May/June 2009, Broadband Properties,

⁹¹ *Unbundling Policy in the US: Players, Outcomes and Effects*, 2005, Bauer

⁹² *ERG Opinion on Regulatory Principles of NGA*, 2007, ERG

countries.⁹³ All of these countries, with the exception of the US and Mexico⁹⁴, have nonetheless decided to implement or maintain LLU in their copper markets.

In Italy for instance, WiMax was launched by two operators in early 2009 to cover rural communities. Fixed wireless is also being rolled-out in Germany, where O2 offers broadband under the name Geniom Homezone; and in the Netherlands, WorldMax launched a similar service in Amsterdam.⁹⁵

Switzerland has implemented mandatory copper LLU as recently as 2007, despite new broadband technologies being rolled out across the country. The Swiss NRA, ComCom made the following comments regarding its decision:

“Swisscom remains the master of the copper network and continues to impose its conditions regarding prices and speeds on its competitors in the ADSL market; moreover, this means that it is always able to stay ahead of the game. It is therefore all the more important for unbundling of the local loop to become a reality in Switzerland if we wish to keep a number of providers, and with them competition, in the market.”⁹⁶

Moreover, several NRAs that have implemented unbundling for copper have started to regulate fibre access as well. In Spain for instance, where fibre and other ‘new’ technologies accounted for around 21% of total broadband connections in 2008⁹⁷, the NRA, CMT, has imposed provisional access obligations on the incumbent’s fibre infrastructure at cost-based prices.⁹⁸ Likewise, the Netherlands’ regulator, OPTA, imposed unbundling on fibre access in Jan 2009.⁹⁹

The EC also favours the regulation of fibre. For example, Viviane Reding, the previous European Commissioner for Information Society and Media, noted that:

“The move to Next Generation Access Networks does certainly not change the logic when assessing the need for regulation in order to ensure effective competition. The rationale underpinning the Commission’s approach has been the following: if telephony and broadband are the basic products sought by end users, then whether they are delivered over metallic or fibre loops is largely irrelevant to the analysis because the framework is based on the principle of technological neutrality. In the Commission’s view, it would be a fatal mistake to deviate from the pro-competitive approach of the current framework”.¹⁰⁰

The ERG echoes this sentiment:

⁹³ Note: we have excluded Korea and Japan from this analysis because they are much further ahead of the rest of the OECD in terms of technological development

⁹⁴ Note: whilst the US withdrew requirements for incumbents to provide unbundled broadband access in 2005, Mexico has never before introduced any sort of mandatory unbundling

⁹⁵ *Global Entertainment and Media Outlook 2009-2013*, PwC

⁹⁶ *ComCom Annual Report 2007*

⁹⁷ *OECD Broadband Portal & OECD Communications Outlook 2009*

⁹⁸ *Progress Report on the Single European Electronic Communications Market 2008*, EC

⁹⁹ *Progress Report on the Single European Electronic Communications Market 2008*, EC

¹⁰⁰ *Europe’s Way to the High Speed Internet: Why Effective Network Competition is the Freeway to the Future*, Jun 2008, Reding

*“NGA investments are likely to reinforce the importance of scale and scope economies, thereby reducing the degree of replicability, potentially leading to an enduring economic bottleneck. Scale economies may lead to a natural monopoly in certain areas of the electronic communications value chain. Given that next generation access networks may be more likely to reinforce rather than fundamentally change the economics of local access networks, NGA may be likely to, at least, provide the same competition challenges to regulators as current wireline access networks”.*¹⁰¹

Given its support for unbundling as a remedy for bottlenecks in ‘current wireline access networks’, it seems likely that the ERG will also sponsor wholesale regulation for next generation (fibre) networks.

In Japan and Korea¹⁰², fibre and other ‘new’ technologies already account for more than 40% of broadband connections (as of 2008)¹⁰³ and therefore provide useful examples of how NRAs have approached competition from these ‘new’ technologies.

Japan’s regulator, the Ministry of Internal Affairs and Communications (MIC), implemented local loop unbundling for both copper and fibre in 2000, before fibre had been significantly rolled out¹⁰⁴:

*“Japan has been working on opening essential facilities for broadband services to encourage broadband development in a fair competition environment. In 1999, local loop unbundling was ensured”.*¹⁰⁵

Either despite or because of fibre unbundling, Japan has achieved fibre penetration of 11%, the second highest in the world behind Korea; and fibre accounts for 48% of all broadband connections.¹⁰⁶ One of the reasons behind this success is the relatively high prices set for unbundled fibre loops, thus allowing the incumbent, NTT to obtain an adequate rate of return on its investment.¹⁰⁷ Consequently, as of 2008, NTT had promised to provide Fibre-to-the-Home (FTTH) service to 30m users by 2010 and had already invested US\$200bn in optical fibre installations.¹⁰⁸ Admittedly, market conditions in Japan are different from the US – for instance, the government required the Bank of Japan to guarantee the debts of Japanese companies therefore reducing the latter’s cost of borrowing on capital markets.¹⁰⁹

However, as can be seen from the above examples, numerous other markets operate unbundling regimes, notwithstanding having equal or greater availability of non-cable/copper connectivity.

¹⁰¹ ERG Opinion on Regulatory Principles of NGA, 2007, ERG

¹⁰² Note: although fibre and other non-DSL, non-cable technologies account for a substantial proportion of total broadband connections in 2008 in both the Czech Republic and Slovak Republic, their low broadband penetration indicates that such technologies should still be considered “emerging” rather than being mainstream

¹⁰³ OECD Broadband Portal & OECD Communications Outlook 2009

¹⁰⁴ Unbundling Local Loops: Global Experiences, Dec 2007, LINK Centre

¹⁰⁵ Comments from the Government of Japan in Response to a Notice of Inquiry by the FCC Regarding the National Broadband Strategy, available at: <http://fjallfoss.fcc.gov/ecfs/document/view?id=6520219438>

¹⁰⁶ OECD Broadband Portal & OECD Communications Outlook 2009

¹⁰⁷ Explaining International Broadband Leadership, 2008, ITIF

¹⁰⁸ Explaining International Broadband Leadership, 2008, ITIF

¹⁰⁹ Explaining International Broadband Leadership, 2008, ITIF

Figure 5: Emerging technologies as a % of broadband connections in 2008 (OECD countries)¹¹⁰

Country	Broadband Penetration by Technology Platform					Fibre & Other (% of Total Connections)
	DSL	Cable	Fibre	Other	Total	
Japan	9.1%	3.2%	11.3%	0.0%	23.6%	47.9%
Korea	7.6%	10.5%	13.7%	0.0%	31.8%	43.1%
Czech Republic	6.7%	3.7%	0.7%	5.9%	17.0%	38.8%
Slovakia Republic	6.5%	1.2%	2.1%	1.6%	11.4%	32.5%
Sweden	18.8%	6.1%	6.4%	0.2%	31.5%	21.0%
Ireland	14.9%	2.4%	0.1%	2.9%	20.3%	14.8%
Denmark	22.3%	9.8%	3.5%	1.1%	36.7%	12.5%
OECD	13.2%	6.4%	2.2%	0.4%	22.2%	11.7%
Norway	23.3%	6.7%	3.0%	0.7%	33.7%	11.0%
Hungary	7.9%	7.6%	0.5%	0.9%	16.9%	8.3%
United States	10.1%	13.5%	1.0%	0.9%	25.5%	7.5%
New Zealand	19.1%	1.3%	0.0%	1.0%	21.4%	4.7%
Australia	19.6%	4.3%	0.0%	1.1%	25.0%	4.4%
Iceland	30.1%	0.0%	0.6%	0.6%	31.3%	3.8%
Italy	18.4%	0.0%	0.5%	0.1%	19.0%	3.2%
Austria	13.8%	7.1%	0.1%	0.5%	21.5%	2.8%
Mexico	5.1%	1.9%	0.0%	0.2%	7.2%	2.8%
Finland	25.7%	4.0%	0.0%	0.7%	30.4%	2.3%
Switzerland	23.0%	9.5%	0.4%	0.3%	33.2%	2.1%
Netherlands	21.7%	13.3%	0.6%	0.0%	35.6%	1.7%
Spain	16.0%	3.9%	0.1%	0.2%	20.2%	1.5%
Canada	12.9%	15.4%	0.0%	0.4%	28.7%	1.4%
Portugal	9.4%	6.3%	0.0%	0.2%	15.9%	1.3%
Poland	7.2%	3.1%	0.0%	0.1%	10.4%	1.0%
Belgium	16.2%	11.2%	0.0%	0.2%	27.6%	0.7%
United Kingdom	22.1%	6.0%	0.0%	0.1%	28.2%	0.4%
France	27.0%	1.4%	0.1%	0.0%	28.5%	0.4%
Luxembourg	25.0%	4.1%	0.1%	0.0%	29.2%	0.3%
Germany	25.4%	1.9%	0.0%	0.0%	27.3%	0.0%
Turkey	7.6%	0.1%	0.0%	0.0%	7.7%	0.0%
Greece	13.4%	0.0%	0.0%	0.0%	13.4%	0.0%

Low and falling broadband prices

With the rapid advancement of technology, and increasing inter- and intramodal competition, broadband prices have been falling in most parts of the world. Figure 6 shows declining DSL

¹¹⁰ OECD Broadband Portal & OECD Communications Outlook 2009

broadband prices in 22 of 27 OECD countries for which data is available¹¹¹, and declining cable prices in 20 of the countries. This is set against strongly positive growth for broadband speeds, so that the price per Mbps has declined over time.¹¹² The US has also seen a fall in average broadband prices and an increase in speeds (although its absolute price per Mbps was still higher than the OECD average in 2007).

Some contend that falling broadband prices in the US combined with low absolute broadband prices imply that no further regulation is needed. For instance, Thomas Hazlett, a professor at George Mason University, believes that *“new regulations, such as net neutrality or network-sharing rules, aren't needed, because broadband prices are low and there's stiff competition between major broadband providers”*.¹¹³

This contrasts with the approach taken by many other countries that have equivalent or lower broadband prices (at US\$ PPP). In 2007, 17 OECD countries had lower absolute broadband prices than the US.¹¹⁴ All of these countries had implemented mandatory copper LLU. A few, namely Italy, New Zealand, Sweden, and the UK, have (before or after) also seen operational separation of the incumbent, either voluntary or imposed.

These interventions are perceived to have been important in lowering prices. A spokeswoman for Ofcom commented on this success:

“[Local loop unbundling and operational separation] has led to over six million [unbundled] lines to date [2009] in the UK [from 123,000 in Sep 2005], more competition and choice for consumers as well as lower prices ... Competition has nearly halved the average consumer DSL bill”.¹¹⁵

In summary, low and falling broadband prices have not precluded regulatory intervention in international markets, with perceived positive results. While US prices have been falling, they remain in the middle range of international comparators, suggesting that greater retail competition has the potential for further pricing benefit.

¹¹¹ OECD Broadband Portal: data for evolution of price and speed of a representative broadband subscription over time is only available for 27 of the 30 OECD countries

¹¹² *Explaining International Broadband Leadership*, 2008, ITIF: the ITIF's metric for broadband price is based on the lowest available price per Mbps

¹¹³ *FCC Chair Nominee: Broadband Deployment a Major Priority*, Jun 2009, IDG News Service

¹¹⁴ Note: we recognise that broadband price comparison is a contentious topic. Moreover, the pricing data used in Figure 6 is somewhat dated. However, more recent (although less comprehensive) data from Ofcom (available at: <http://www.ofcom.org.uk/research/cm/icmr09/cip09.pdf>) tells a similar story. While US prices have been falling, they are still far from the lowest.

¹¹⁵ Ofcom Spokesperson in *BT: Functional Separation was a Success*, Nov 2009, IT News

Figure 6: Broadband speed and prices CAGR 2005-2008¹¹⁶ and broadband prices in 2007¹¹⁷

Country	DSL (2005-2008)		Cable (2005-2008)		Lowest Price per Mbps in 2007 (US\$ PPP)
	Speed	Prices	Speed	Prices	
Japan	11%	2%	0%	0%	0.13
France	1%	-4%	45%	-14%	0.33
Sweden	25%	-16%	8%	-8%	0.35
Korea	14%	-18%	171%	0%	0.37
Finland	1%	-29%	20%	0%	0.42
Australia	0%	-19%	91%	14%	0.94
New Zealand	72%	-4%	0%	-8%	1.05
Germany	1%	5%	0%	-13%	1.1
Portugal	131%	5%	30%	-17%	1.24
United Kingdom	0%	-5%	35%	-22%	1.24
Greece	N/A	N/A	N/A	N/A	1.41
Denmark	0%	-27%	0%	-22%	1.65
Luxembourg	72%	-16%	96%	-16%	1.85
Netherlands	0%	-2%	6%	-9%	1.9
Italy	N/A	N/A	N/A	N/A	1.97
Spain	0%	-28%	43%	-2%	2.27
Norway	0%	0%	0%	-11%	2.74
United States	28%	-21%	25%	-14%	2.83
Switzerland	26%	-37%	36%	-16%	3.4
Belgium	0%	1%	26%	1%	3.58
Canada	13%	-1%	0%	-10%	3.81
Austria	0%	-10%	0%	-33%	4.48
Hungary	0%	-21%	25%	-37%	4.67
Ireland	59%	-44%	49%	-13%	4.72
Iceland	N/A	N/A	N/A	N/A	4.93
Poland	36%	-13%	20%	-21%	6.47
Slovak Republic	15%	-3%	49%	-35%	9.38
Czech Republic	100%	-46%	14%	-22%	9.7
Turkey	0%	-9%	0%	-36%	15.75
Mexico	0%	-7%	26%	-35%	18.41

¹¹⁶ OECD Broadband Portal: based on the price and speed evolution of a representative broadband subscription over time in each country

¹¹⁷ *Explaining International Broadband Leadership*, 2008, ITIF

5. Conclusions

Network Neutrality is amongst the mildest regulatory interventions to address the access bottleneck, and the US is highly unusual in not having adopted more significant measures. Mexico is the only other OECD country not to have local loop unbundling in place, and many countries have gone much further than this, for instance to operational separation.

A number of arguments have been offered as to why the US situation is supposedly unique to justify this exceptionalism. However, on closer examination, the circumstances of the US market are not in fact that unusual. The regulatory objectives in the US are similar to those of NRAs around the world, and features such as cable competition, falling broadband prices and imminent deployment of new technologies are present to an even greater extent in many markets that have adopted unbundling.

Moreover, other markets are confident enough in the value of unbundling that they are actively seeking to extend the same principles to next generation networks.

None of this proves that the US has taken an incorrect approach – it is perfectly possible that the minority view is correct. However, it does suggest taking a careful look at some of the arguments typically advanced to justify why the US should be on so different a path.

6. Appendix

Countries	Broadband Unbundling Requirements ⁽¹¹⁸⁾					Separation Type	Broadband Penetration 2008 (%) ⁽¹⁵⁾⁽³⁹⁾⁽⁴⁰⁾					Price (Lowest monthly price per Mbps, US\$PPP) ⁽¹⁾
	Copper			Cable	Fibre		DSL	Cable	Fibre	Other	Total	
OECD Countries	LLU	Start (Year)	Bitstream		LLU/ National Fibre Co.							
Denmark	✓ ⁽¹⁰⁾	1998 ⁽²⁰⁾	✓ ⁽¹⁰⁾	× (35)	× (34)	Accounting ⁽²²⁾	22.3%	9.8%	3.5%	1.1%	36.7%	1.65
Netherlands	✓ ⁽¹⁾	2000 ⁽²⁰⁾	✓ ⁽¹⁾	✓ ⁽¹⁾	✓ ⁽¹⁰⁾⁽²⁾	None ⁽²⁾	21.7%	13.3%	0.6%	0.0%	35.6%	1.9
Norway	✓ ⁽²⁾	2001 ⁽¹⁹⁾	✓ ⁽²⁾	× (2)	× (2)	Accounting ⁽²⁾	23.3%	6.7%	3.0%	0.7%	33.7%	2.74
Switzerland	✓ ⁽¹⁵⁾	2007 ⁽¹⁵⁾	✓ ⁽¹⁵⁾	× (2)	× (2)	None ⁽²⁾	23.0%	9.5%	0.4%	0.3%	33.2%	3.4
Korea	✓ ⁽¹⁾	2002 ⁽¹⁹⁾	✓ ⁽¹⁾	✓ ⁽²⁾	× (1)	Accounting ⁽²⁾	7.6%	10.5%	13.7%	0.0%	31.8%	0.37
Sweden	✓ ⁽¹⁾	2000 ⁽²⁰⁾	× (4)	× (1)	× (1)	Operational ⁽¹⁸⁾	18.8%	6.1%	6.4%	0.2%	31.5%	0.35
Iceland	✓ ⁽¹⁴⁾	2000 ⁽¹⁹⁾	✓ ⁽²⁸⁾	-	-	Accounting ⁽²⁸⁾	30.1%	0.0%	0.6%	0.6%	31.3%	4.93
Finland	✓ ⁽²⁾	1998 ⁽²⁰⁾	✓ ⁽⁸⁾	× (8)	× (2)	Accounting ⁽²⁾	25.7%	4.0%	0.0%	0.7%	30.4%	0.42
Luxembourg	✓ ⁽⁴⁾	2001 ⁽¹⁹⁾	✓ ⁽¹²⁾	-	× (4)	Accounting ⁽⁴⁾	25.0%	4.1%	0.1%	0.0%	29.2%	1.85
Canada	✓ ⁽¹⁾	1997 ⁽¹⁹⁾	✓ ⁽¹⁾	✓ ⁽¹⁾	× (2)	None ⁽²⁾	12.9%	15.4%	0.0%	0.4%	28.7%	3.81
France	✓ ⁽¹⁾	2001 ⁽²⁰⁾	✓ ⁽¹⁾	× (1)	× (1)	Accounting ⁽¹¹⁾	27.0%	1.4%	0.1%	0.0%	28.5%	0.33
United Kingdom	✓ ⁽²⁾	2001 ⁽²⁰⁾	✓ ⁽⁷⁾	× (2)	× (2)	Operational	22.1%	6.0%	0.0%	0.1%	28.2%	1.24
Belgium	✓ ⁽²⁾	2001 ⁽²⁰⁾	✓ ⁽²⁾	✓ ⁽²⁾	✓ ⁽²⁾⁽⁴⁾	Accounting ⁽²⁾	16.2%	11.2%	0.0%	0.2%	27.6%	6.58
Germany	✓ ⁽¹⁾	1998 ⁽²⁰⁾	✓ ⁽¹⁾	× (1)	× (1)	None ⁽²⁾	25.4%	1.9%	0.0%	0.0%	27.3%	1.1
United States	× (16)	Revoked	×(16)	× (2)	× (2)	None ⁽²⁾	10.1%	13.5%	1.0%	0.9%	25.5%	2.83
Australia	✓ ⁽²⁾	2000 ⁽¹⁹⁾	✓ ⁽⁴¹⁾	× (2)	✓ ⁽²⁾	Operational ⁽²⁾	19.6%	4.3%	0.0%	1.1%	25.0%	0.94
Japan	✓ ⁽¹⁾	2000 ⁽¹⁹⁾	✓ ⁽¹⁾	× (1)	✓ ⁽¹⁾	None ⁽²⁾	9.1%	3.2%	11.3%	0.0%	23.6%	0.13
Austria	✓ ⁽²⁾	1999 ⁽²⁰⁾	✓ ⁽⁹⁾	× (2)	× (2)(4)	Accounting ⁽²⁾	13.8%	7.1%	0.1%	0.5%	21.5%	4.48
New Zealand	✓ ⁽²⁾	2008 ⁽¹⁸⁾	✓ ⁽²⁾	× (2)	✓ ⁽²⁾	Operational	19.1%	1.3%	0.0%	1.0%	21.4%	1.05
Ireland	✓ ⁽²⁾	2001 ⁽²⁰⁾	✓ ⁽⁶⁾	× (2)	× (2)	Accounting ⁽²⁾	14.9%	2.4%	0.1%	2.9%	20.3%	4.72

¹¹⁸ Sources: indicated in brackets. A dash (“-”) indicates that no evidence of any discussion of unbundling could be found, in most cases because the technology in question is either absent or in a nascent state

Countries	Broadband Unbundling Requirements ⁽¹¹⁹⁾					Separation Type	Broadband Penetration 2008 (%) ⁽¹⁵⁾⁽³⁹⁾⁽⁴⁰⁾					Price (Lowest monthly price per Mbps, US\$PPP) ⁽¹⁾
	Copper			Cable	Fibre		DSL	Cable	Fibre	Other	Total	
OECD Countries	LLU	Start (Year)	Bitstream		LLU/ National Fibre Co.							
Spain	✓ ⁽⁵⁾	2001 ⁽²⁰⁾	✓ ⁽¹⁵⁾	-	✓ ⁽⁴⁾	Accounting ⁽³²⁾	16.0%	3.9%	0.1%	0.2%	20.2%	2.27
Italy	✓ ⁽⁵⁾	2000 ⁽²⁰⁾	✓ ⁽¹³⁾	-	✗ (4)(33)	Operational ⁽¹³⁾	18.4%	0.0%	0.5%	0.1%	19.0%	1.97
Czech Republic	✓ ⁽²⁾	2003 ⁽¹⁹⁾	✓ ⁽⁴⁾	✗ (2)	✗ (2)	Accounting ⁽²⁾	6.7%	3.7%	0.7%	5.9%	17.0%	9.7
Hungary	✓ ⁽⁵⁾	2002 ⁽¹⁹⁾	✓ ⁽²⁶⁾	✗	✗ (4)	Accounting ⁽²⁷⁾	7.9%	7.6%	0.5%	0.9%	16.9%	4.67
Portugal	✓ ⁽²⁾⁽⁴⁾	2001 ⁽²⁰⁾	✓ ⁽²⁹⁾	-	✗ (4)	None ⁽²⁾	9.4%	6.3%	0.0%	0.2%	15.9%	1.24
Greece	✓ ⁽⁵⁾	2001 ⁽¹⁹⁾	✓ ⁽²⁴⁾	✗ (23)	-	Accounting ⁽²⁵⁾	13.4%	0.0%	0.0%	0.0%	13.4%	1.41
Slovakia	✓ ⁽²⁾	2005 ⁽²⁰⁾	✗ (4)	✗ (2)	✗ (2)	Accounting ⁽²⁾	6.5%	1.2%	2.1%	1.6%	11.4%	9.38
Poland	✓ ⁽⁴⁾	2005 ⁽¹⁹⁾	✓ ⁽⁴⁾	-	✗ (4)	Accounting ⁽²⁸⁾	7.2%	3.1%	0.0%	0.1%	10.4%	6.47
Turkey	✓ ⁽³⁰⁾	2005 ⁽³⁰⁾	✓ ⁽³¹⁾	-	-	Accounting ⁽³¹⁾	7.6%	0.1%	0.0%	0.0%	7.7%	15.75
Mexico	✗ (15)	N/A	✗ (15)	✗ (15)	✗ (15)	None ⁽¹⁵⁾	5.1%	1.9%	0.0%	0.2%	7.2%	18.41
Non-OECD												
Hong Kong	✗ (2)	Revoked	✗ (2)	✗ (37)	✗ (2)	Accounting ⁽²⁾					28.1%	
Singapore	✓ ⁽²⁾	2002 ⁽³⁸⁾	✓ ⁽³⁸⁾	✓ ⁽³⁶⁾⁽³⁸⁾	✓ ⁽³⁾	Acc. sep but struc. sep planned ⁽³¹⁾					21.7%	

¹¹⁹ Sources: indicated in brackets. A dash (“-”) indicates that no evidence of any discussion of unbundling could be found, in most cases because the technology in question is either absent or in a nascent state

Notes to table (per cited sources)

Notes on copper unbundling:

European Union: Regulation (EC) No 2887/2000 of the European Parliament and of the Council of 18 December 2000 on unbundled access to the local loop introduces compulsory unbundling of and shared access to the local copper loop controlled by the incumbent operators.⁽⁵⁾

Hong Kong: the withdrawal of the Mandatory Type II Interconnection Policy applicable to telephone exchanges for individual buildings which began in July 2004 was completed on 30 June 2008; the incumbent fixed network operator, PCCW, is no longer mandated to provide such interconnection upon request; however Mandatory Type II interconnection at street level and at the in-building level has been maintained; whilst interconnection terms (and charges) for telephone exchanges are now to be commercially negotiated, the TA retains the power under s.36A TO to make determinations as to the terms of such arrangements and also to order unbundling for essential facilities.⁽²⁾

Mexico: Mexico remains the last country in the OECD not to have implemented some form of LLU in either the narrowband or broadband markets.⁽¹⁵⁾

Poland: new reference offers for interconnection, bitstream access and local loop unbundling (LLU) were approved in 2008; however these have traditionally not been effective in Poland and the regulator is now pursuing a separation option against the incumbent.⁽⁴⁾

Singapore: in 2002, the regulator, IDA introduced the Open Access Policy; this policy enabled other ISPs using SingTel's ADSL network or SCV's cable network to provide broadband service to customers.⁽³⁸⁾

Sweden: PTS's binding opinions, ordering that bitstream products be offered to all competitors on an equal basis, were suspended when the incumbent contested the content of the reference broadband offer (RBO) before the Swedish Courts in the summer of 2008.⁽⁴⁾

Switzerland: unbundling and bitstream access only has to be provided for twisted metallic pairs; bitstream unbundling is only required for a period of 4 years following the changes to the Telecommunications Law that came into effect in Apr 2007.⁽¹⁵⁾

Notes on cable unbundling:

Belgium: in Jan 2008, BIPT excluded cable networks from the scope of the unbundling and bitstream regulation; however the Brussels Court of appeal partly annulled the Jan 2008 decision, indicating that BIPT insufficiently examined the competitive constraints exerted by cable TV operators on the broadband markets; a new process to reinstate the old decision and a new forward looking market analysis are being conducted by BIPT.⁽²⁾

Denmark: the Danish regulator, NIRA has recently submitted a proposal to oblige the largest cable operator to open wholesale access to its cable broadband network to competitors.⁽³⁵⁾

Finland: there is an obligation to provide cable wholesale broadband access but no requirements for cable loop unbundling.⁽⁸⁾

Slovak Republic: although no cable operators are currently held to unbundling requirements, theoretically, such an operator may be also obliged to unbundle its facilities if the regulator identifies it as SMP undertaking on the relevant market.⁽²⁾

Korea: unbundling requirements do not apply to cable TV operators unless they are telecommunication service providers owning local loop infrastructure.⁽²⁾

Notes on fibre unbundling:

Australia: in Apr 2009, the Government committed up to \$22 billion in public funding, and to make any necessary regulatory changes to facilitate rollout; it is intended that the NBN will operate on a wholesale-only, open access basis.⁽²⁾

Austria: although there are no specific regulations regarding unbundling for fibre, a recent amendment of the Telecoms Act aims at facilitating the building of an optical fibre network by shortening procedures to obtain rights of way for building purposes and by offering easy access to already existing ducts and cables (in particular in-house ducts); furthermore, there are no published regulatory decisions on next generation network interconnection/access but the wording of the Telecoms Act is technologically neutral.⁽²⁾

Belgium: BIPT imposed specific measures addressing what it considered to be the problems raised by the planned replacement of the incumbent's ATM/DSL network by an NGN/NGA network; he incumbent, Belgacom must share the ducts, lease dark fibre or provide a backhaul option from every co-location space in local loops or sub-loops. Access tariffs must be cost-oriented; Belgacom must provide access to the remote optical platform to permit collocation at street cabinet level; for new sites or in the case of deployment of fibre optics ducts on existing sites, Belgacom must follow a coordination procedure allowing other operators to share the work for the placement of ducts on parts useful for access.⁽²⁾

Czech Republic: with regards to regulation of fibre networks, the CTO is awaiting the outcome of the consultation on the draft Commission Recommendation on regulated access to Next Generation Access Network; once adopted, the CTO will be obliged to make a review of its analysis of the respective wholesale markets as required by the Commission.⁽²⁾

Denmark: recently the incumbent, TDC, announced in its press release that it chooses a form of open access which allows access to service providers; TDC's choice of words seems to exclude unbundling (ODF access, at Ethernet level); that gives the Danish regulator the choice between not regulating, imposing unbundling (ODF) as a obligatory service or regulating TDC's wholesale broadband access; the choice by the regulator will be highly anticipated because of the effect on any further regulation in Europe.⁽³⁴⁾

European Union: in its Public Consultation regarding the regulation of Next Generation Access, the Commission has recommended that facilitation of infrastructure competition as the preferred regulatory option; according to the EC, with civil works representing up to 80% of the total rollout costs of NGA, an efficient remedy would be to ensure a cost orientated non-discriminatory sharing of legacy physical infrastructure; access to other passive elements (unbundling of the fibre loop) or access to active elements - service based competition ("bitstream") - should also be mandated, according to the draft Recommendation.⁽¹⁷⁾

France: although there are no requirements for fibre unbundling in place, ARCEP has mandated duct sharing for fibre roll-out.⁽⁴⁾

Hong Kong: the Regulatory Affairs Advisory Committee met in April 2009 to discuss the need to assess regulatory challenges brought on by NGN and have yet to publish their findings.⁽²⁾

Hungary: as of early 2009, the incumbent planned to introduce a fibre-to-the-home (FTTH) network based upon GPON technology; however the NCAH (National Communications Authority of Hungary) is only at an early stage of its reflection on this regulatory challenge.⁽⁴⁾

Ireland: in 2008 the Irish government issued a consultation paper on next generation broadband, setting out a vision and a framework for investment by the communications industry in next generation broadband networks, and looking at ways in which the government could contribute to

the success of the process; the policy actions suggested include requiring open access fibre connections in new buildings and better use of public infrastructure for backhaul connections, as well as public funding.⁽⁴⁾

Italy: there is currently no evidence of any regulatory requirements for fibre unbundling although these have been discussed in conjunction with Telecom Italia's voluntary operational separation; however Telecom Italia's legally-binding functional separation undertakings oblige the incumbent to provide a reference offer for its passive fibre infrastructure.⁽⁴⁾

New Zealand: New Zealand Telecom's Separation Undertakings include a commitment that Telecom's Wholesale Unit will provide a FTTP access service to service providers in areas where Telecom has deployed an FTTP access network architecture.⁽²⁾

Norway: with respect to access to infrastructure which is based on access media other than copper, PT is of the opinion that in the short run it will not be suitable to impose obligations in the LLU market; this is primarily based on the anticipated negative effect that such obligations might have on investment incentives, especially in relation to investments in new fibre and radio access infrastructure.⁽²⁾

Portugal: the public debate about next generation access (NGA) networks has started with the launch by ICP-ANACOM of a public consultation on NGA networks in June 2008 in order to enhance regulatory certainty.⁽⁴⁾

Spain: following a public consultation, in Jan 2008 the CMT published its regulatory position on NGA in the form of a Guidelines document; in Jul 2008, the regulator adopted provisional measures imposing an access obligation in regard to the incumbent's physical infrastructure at cost-oriented prices; in Nov 2008, following verification of the implementation of that obligation, the CMT authorised the incumbent to launch the first commercial offers based on FTTH.⁽⁴⁾

Switzerland: currently there are ongoing political discussions about requiring a more intensive regulation of the access to NGN; as a result of this political debate the incumbent (Swisscom) started to negotiate cooperation-agreements (financial or construction cooperation) with regard to the enrolment of its multi-fibre FTTH network.⁽²⁾

United Kingdom: Ofcom is still currently reviewing its position with regards to Next Generation Access; it has however, under the Digital Britain Report, proposed a fund to finance next generation access - presumably any subsidies for BT should also come with some form of unbundling.⁽²⁾

United States: regarding fibre roll-out, incumbents building out a fibre to the home (FTTH) or fibre to the curb (FTTC) in previously un-served areas are not required to provide access to such networks on an unbundled basis; in areas previously served, if an incumbent retires the copper loop and replaces it with FTTH or FTTC, it must provide non-discriminatory access to the next generation network for voice grade service on an unbundled basis.⁽²⁾

Notes on separation:

Hong Kong: some operators providing fixed telecommunication network services (FTNS) including unified carrier licensees are subject to stringent accounting separation rules which require the maintenance of accounts for different services or business activities or types thereof to allow the TA to monitor the operator's power in the market, in particular any cross-subsidisation and unfair pricing practices.⁽²⁾

Italy: Telecom Italia voluntarily established Open Access in Feb 2008 to oversee all operations regarding the development and maintenance of access network technology infrastructure as well as

all processes regarding the provision of access services to internal Telecom Italia clients and to other operators, including associated technical backup; AGCOM approved the decision in Dec 2008.⁽¹³⁾

Japan: although no accounting, operational or structural separation requirements are required, there are a few other minor requirements on incumbents.⁽²⁾

Korea: all Facilities-based Telecommunications Service Providers (FSP) are required to undergo accounting separation.⁽²⁾

Singapore: the regulator, IDA, currently has accounting separation requirements; structural separation has been planned solely with regards to the fibre infrastructure.⁽²⁾⁽³⁾

Spain: following the most recent market analysis in 2008, CMT concluded that the incumbent, Telefonica still possesses SMP and the market is not competitive enough without regulations; as a result, CMT imposed more obligations on Telefonica; accounting separation was one of these measures.⁽⁴⁾

Sweden: according to KPMG, the regulator believed that its previous ex ante regulation had proved ineffective in eliminating the main causes of competition problems (including the incumbent's edge over alternative operators in terms of access to essential information regarding customers' information and investment plans; the discriminatory behaviour of TeliaSonera against alternative operators; and lack of incentive for the incumbent to comply with the regulations in Dec 2007 TeliaSonera voluntarily undertook a functional separation, however the PTS is still nonetheless pursuing further measures and in Jun 2009, the new provisions empowering the NRA to impose functional separation on the incumbent entered into force; this suggests that the final model of functional separation in Sweden is yet to be known.⁽¹⁸⁾

United States: Section 272 of the Telecommunications Act of 1996 required the Bell Operating Companies (BOCs) to provide in-region, interstate, long-distance services through structural, transactional and accounting separations; the majority of these restrictions sunset at the end of 2006; the FCC recently adopted a new regulatory framework to replace the structural separation requirements with certain targeted safeguards to enable the FCC to monitor BOC provisioning of these services; incumbents are subject to accounting rules at both the federal and state levels, including requirements for allocating costs between interstate and intrastate services, which bear on interconnection charges.⁽²⁾

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Prior to joining Ingenious, he was Chief Policy Partner at Ofcom (the UK telecoms regulator). He also chaired the European Regulators Group. While at Ofcom he led the team negotiating the Undertakings which resulted in the 'functional separation' of Openreach from BT. Before joining Ofcom, he was Managing Director of Spectrum Strategy Consultants.

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Rob leads the strategy practice of Ingenious Consulting Network. He has significant telecoms experience, both as a consultant and in industry. Prior to joining Ingenious he co-led the M&A team at Level 3. Rob previously was Commercial Director at Reach (Asia's largest international operator) and Director of Corporate Development and Strategy at Hongkong Telecom.

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