

# Regulatory trends in service convergence

Section 1	Introduction	1
Section 2	The genesis of the regulatory challenge	3
Section 3	Framework for analysis	5
Section 4	Regulatory issues: Experience and expectations	9
Section 5	Regulatory responses: Lessons and practices	21
Section 6	Next steps and future considerations	32
Index	Countries in this report	33
Annex A	Convergence: Definitions, drivers, and implications	34
Annex B	Regulatory asymmetry across the communications industry	37

Policy Division  
Global Information and Communication Technologies department  
The World Bank

Washington, D.C.: June 29, 2007

## 1. Introduction

- 1.1 Convergence in a most general sense is the trend within the information and communications industries towards a merging of networks, services, firms, and devices. Although convergence represents different trends in the communications industry, **this report specifically considers services convergence, that is, the arrangement where multiple services use the same medium or network facility.**<sup>a</sup> Such a focus is warranted because the convergence of many services onto one network brings up very specific and complex regulatory challenges.
- 1.2 A number of technology and market drivers have contributed to the rise of convergence. On the technological front, digitization combined with the reducing cost and increasing computing power, and the development of the universal IP standard, has made it possible to have almost ubiquitous low-cost multimedia devices. In addition, convergence offers service providers a chance to reduce costs and increase revenues while offering multimedia services. These and other factors come together to drive the take-up of convergence across different markets. Further details regarding the drivers and implications of convergence are in Annex A.
- 1.3 As convergence takes a firm hold in the communications industry, the process raises specific regulatory challenges given the merging of firms, sub-sectors, and facilities. **This report proposes a framework to analyze different countries' responses to regulatory challenges posed by convergence.**
- 1.4 The fundamental source of this challenge is the need to reconcile different regulatory philosophies in the sub-sectors of the communications industry. On the one hand, broadcasting is heavily regulated, is less competitive, and often has a merged content-carriage setup. Telecom services, on the other hand, are regulated to a lesser extent, with little to no control exerted over content, a greater emphasis on carriage regulation, and with competition in most markets. Within this general framework, specific issues such as authorization and licensing, management of scarce resources, competition policy, and service regulation are dealt with very differently in the different sub-sectors (Annex B) and in different countries.

### Purpose and organization of this report

- 1.5 Today, **convergence is a reality that will need regulatory attention.** Service convergence raises specific challenges to traditional regulatory frameworks. The central questions service convergence raises is: what should governments do to respond? It is important to recognize that **there is no single ideal response to convergence.** As governments and regulators around the world grapple with the regulatory issues surrounding convergence, it thus becomes necessary to have a comparative framework within which the different key issues are accounted for, in order that some typology of best practices or successful strategies might be identified. This report seeks to present such a framework.
- 1.6 This report proposes an analytical framework within which to consider the specific issues related to service convergence. First, it discusses the **genesis of the regulatory challenge** due to convergence and then **proposes a framework for the comparative analysis** of the regulatory responses to convergence in different countries and discusses

the different issues identified within this framework. Finally, it **discusses regulatory responses** to convergence regulation in specific areas such as the institutional framework, service licensing, interconnection, universal service, and spectrum management.

## 2. The genesis of the regulatory challenge

- 2.1 **Traditionally, each type of content had one dedicated network infrastructure.** Television carried unidirectional video and audio; the print media transmitted text-based content, while voice used the telephone system. With the digitization of information, and the advent of packet switching, and then the growth of IP-based networking, it became possible to use one network for multiple services. Initial growth in this field was around data communication over the telephone network. These developments have led to the presence of multiple play networks today that include voice, video, and data communication traveling over one facility. These services are posing fundamental challenges to the organization of regulation around the world.
- 2.2 **Traditional regulatory approaches depended on the clear division between the different services and a one-to-one mapping of service to network.** However, with the new arrangement, this clean distinction and specific regulation is breaking down. The already accelerating diffusion of services such as voice over IP (VoIP) and television over IP (IPTV) means that regulators have to respond sooner rather than later to service convergence. One example of such convergence, triple play, where voice telephony, data communication, and video use one infrastructure network, is already available in 23 OECD countries.<sup>1</sup> Hence, we focus on this set of immediate regulatory challenges.
- 2.3 It will be essential in the era of convergence, even more than it is now, to ensure that policy and regulation enables free and fair competition and supports the full play of market forces. As the Director-General of Hong Kong's telecoms regulator OFTA pointed out in a recent article, "the role of the regulator is not to promote or 'accelerate' convergence. However, the regulator has the responsibilities to establish an environment for fair competition, i.e. the so-called 'level playing field' so that if (I repeat 'if') there is a demand for convergent services, such services can develop in the market and compete fairly with one another, so as to bring to consumers the benefits of innovation, convenience and choice."<sup>2</sup>
- 2.4 The example of VoIP regulation is telling. Across the world, governments have struggled with how they should respond to this service, which can allow non-telephony operators to offer voice services. The European Union, for example, is currently regulating VoIP as an Internet service, although this may change as consumer protection issues arise. On the other hand, Canada has temporarily chosen to regulate VoIP according to existing rules for telephones, which creates a heavy burden for VoIP providers. At least twenty-seven countries, including Cuba, Egypt, Israel, South Africa, Mexico, Pakistan, and Panama, have banned VoIP or have no VoIP policy because of possible losses of revenue to incumbent telecom companies. The United States regulatory landscape is currently more analogous to the EU's than Canada's: VoIP is currently being regulated similarly to information services, but this may change as social issues are addressed. There is also uncertainty in US federal regulation, and different states have regulated VoIP differently.<sup>3</sup> The result, as one commentator suggests, "has

---

<sup>1</sup> OECD, Multiple play: Pricing and policy trends, April 2006, p. 6

<sup>2</sup> M H Au, Director-General of Telecommunications OFTA, On "Fixed-Mobile Convergence" Again, November 2006

<sup>3</sup> R. Alex DuFour, Voice over Internet Protocol: Ending uncertainty and promoting innovation through a regulatory framework, *CommLaw Conspectus*, Vol. 13, 2005, p. 477-479

been regulatory arbitrage, which only adds to the uncertainty for VoIP providers.”<sup>4</sup> While some states, like Colorado, have abstained from regulating VoIP providers until there is clarification from Congress or the FCC, other states, like Minnesota, have imposed telephone regulations on VoIP providers.<sup>5</sup>

- 2.5 At present, 22 per cent of countries worldwide have adopted a new policy to address the convergence of telecommunications, IT, and broadcasting, while 50 per cent of the countries that have not adopted such a policy are planning to do so in the future.<sup>6</sup> Thus, it is clear that regulatory frameworks, for the most part, have not yet responded to convergence. In this report, we will focus on the regulatory challenges and implications in detail. In order to undertake this analysis, we now propose a framework within which different countries’ responses to convergence can be compared and contrasted.

---

<sup>4</sup> Voice Over IP: Hearing Before the Senate Comm. on Commerce, Sci. & Tech., 108th Cong. (2004) (statement of Kevin Werbach)

<sup>5</sup> Chérie R. Kiser & Angela F. Collins, Regulatory Considerations For Cable Provided Voice Over Internet Protocol Services, in Practising Law Institute Patents, Copyrights, Trademarks, and Literary Property Course Handbook Series (2004), p. 751-752

<sup>6</sup> ITU World Telecommunication Regulatory Database, 2006

### 3. Framework for analysis

#### Basis for the analytical framework

- 3.1 Traditionally, regulatory frameworks for communications are for where clear functional differences existed between services and between infrastructures, but these regulations are increasingly inadequate for dealing with today's communication systems. Analysts and regulators around the world accept that convergence challenges the foundations of licensing and regulation of ICT providers. The challenge arises from three main differences between current regulation involving telecom and broadcasting technologies.
- 3.2 First, there is a fundamental **difference in the objectives** of broadcasting versus telecommunications regulation. Convergence requires a re-evaluation of the fundamental basis of regulation if one considers the convergence across broadcasting and telecommunications. A converged framework will have to reconcile the different aspects of both these sub-sectors, the main of which are as below:<sup>7,8</sup>

Telecommunication policy basics	Broadcasting policy basics
Universal service/access	Universal availability
Control over interference	Impact on public/society/morality
Strong competition is common	Competition is typically less
Regulation is comparatively less severe	Regulation is comparatively more severe
Control over carriage is primarily sought	Control over content is typically sought

*Table 1: Differing philosophies in regulating telecom and broadcasting*

- 3.3 Second, there is a significant difference in the **manner and extent of regulation** of circuit-switched telecommunications technologies such as the telephone as opposed to packet-switched technologies like the Internet.
- 3.4 Finally, there are **different regulatory defaults** for one medium (for example, free-to-air television channels, or emergency communications services) that might not be available as easily on a converged or alternate medium. This might lead to public interest concerns.

#### Asymmetric regulation

- 3.5 As an underlying problem, then, the fundamental regulatory concern that arises because of convergence is **asymmetric regulation across services**. Simply put, this is the condition where different services are regulated differently (see Annex B for an account of the range of regulatory control over different services).<sup>9</sup> Asymmetric regulation worked in an environment where each service had a one-to-one mapping with a specific facility. However, in a converged environment, this asymmetry leads to the possibility for regulatory confusion, arbitrage, and does not clearly define jurisdictions in case

<sup>7</sup> OECD, Policy Considerations For Audio-Visual Content Distribution In A Multiplatform Environment, December 2006

<sup>8</sup> Nihoul, P., Competition or regulation for multimedia? Telecommunications Policy, Vol. 22, No. 3, 1998, pp. 207-218

<sup>9</sup> Perrucci, A. & Cimattoribus, M., Competition, convergence and asymmetry in telecommunications regulation, Telecommunications Policy, Vol. 21, Issue 6, July 1997, pp. 493-512

different agencies are responsible for regulating different aspects of the communications industry.

- 3.6 Different countries have responded to regulation in different ways and this report provides an account of some of these changes around the world. **The framework for this account and for a comparative analysis follows the principle that asymmetry in regulation will be resisted by those parties that have to undergo transformations in political economic organization because of it.**
- 3.7 If one focuses on the convergence of different telecommunications and broadcasting services onto one facility, the different players include ISPs, telcos, broadcasters (more television than radio), and cable television companies. Also affected are content providers - especially if they are tied to one medium, for example, television broadcasters. Each of these players faces very different regulatory environments (Annex B). Based on the principle that asymmetric regulation should be reduced to the greatest extent possible, the first step towards developing a framework to analyze convergence and the regulatory responses around the world is to consider the situations where this asymmetry might manifest itself. This requires consideration of the systems that one group might begin to provide which causes it to enter a new regulatory domain where there are different regulatory requirements.
- 3.8 In order to identify some of the regulatory issues related to service convergence, this report considers two existing convergent systems and their implications. These systems are VoIP<sup>b</sup> and IPTV<sup>c</sup>, which are already deployed and in commercial use around the world. The table below shows the status of these systems in different countries around the world.

Converged services in market	U.S.A.	U.K.	Australia	India	Singapore	Malaysia	Hong Kong (SAR)	Korea	South Africa	Brazil	Estonia
IPTV	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓
VoIP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- 3.9 While VoIP allows a cable television operator or ISP to enter the voice telephony market, which traditionally has been the mainstay of telcos, IPTV allows telcos or ISPs to begin television-broadcasting services. Convergence can thus enable the entry of telecom firms into broadcasting or broadcasters into telecom service provision.
- 3.10 In each case, the firm making the entry will be subject to different regulations if they are regulated on the basis of the service they intend to provide. For example, if a telco starts to offer IPTV based television broadcasting, it might have to follow content regulation guidelines that otherwise are usually absent in telecom services. On the other hand, if a cable operator begins to offer VoIP based telephony, it might have to offer emergency services connectivity (e.g. 911 service in the United States). However, these rules are not entirely clarified for such new entrants because these entrants do not fall squarely into the traditional categories.

- 3.11 The introduction of convergence thus could result in possible confusion or even avoidance of rules that might have to be followed in a specific communications service. In order to overcome such problems, regulators around the world have responded with specific regulatory and policy moves that take convergence into account.

### **Comparisons: Issues of relevance**

- 3.12 Annex B gives the different approaches to regulating a range of telecommunications and broadcasting services. It is apparent that there is a significant difference in the approaches to regulating telecom services and broadcasting services, as with the philosophies (see Table 1). New systems like VoIP and IPTV now bring up regulatory issues that challenge these frameworks along their different dimensions.
- 3.13 It is clear that there are asymmetries along different dimensions that might become unfair competitive advantages when converged services such as VoIP and IPTV diffuse. Instead of considering each of these separately, it will be useful to group them into areas of general regulatory concern. In general, communication regulation focuses on five themes, which are authorizations and licensing, competition policy, management of scarce resources such as number plans and spectrum, and service regulation.
- 3.14 This general framework is useful as a starting point in designing a more detailed framework to help in analysis. Thus, we use the challenges posed by the introduction of IPTV and VoIP to develop a basic and more detailed framework to enable a comparison of approaches across different countries. These dimensions include different sub-issues, as below:
- **Authorizations and licensing:** Traditionally, the number of licensed voice telephony or broadcasting operators is limited. The entry of new operators that use VoIP or IPTV changes established market structures. A related issue is licensing, specifically, that in many cases, the extant licensing regime is unable to reconcile the entry of the license holder into new service areas. One of the key notions of convergence is that licensees can offer different services using different access networks. Hence, the ideas of technology and service neutrality in licensing might also need consideration.
  - **Competition policy:** There are a number of competition related issues that will need to be addressed. There are very different rules and regulations for telecommunications and broadcasting markets related to mergers and acquisitions, foreign investment, and entry conditions. Service convergence poses problems because new entrants in these markets can upset service-specific competition policy. Another related issue that arises from the preliminary analysis is interconnection. This is more a telecommunications problem, but it is also an issue in cable television since this is also a facility network separated from content producers. Further, interconnection to the PSTN for non-traditional telephony providers such as cable television providers, and interconnection to content generators or other broadcasting networks for non-traditional broadcasters will need consideration.
  - **Numbering issues:** Numbering issues span almost all the sections of the industry – from IP addresses for ISPs to channel numbers in television or cable networks. The introduction of IPTV, provision of data services over broadcasting networks, and VoIP telephony will require attention to these issues.

- **Spectrum licensing:** Around the world, market mechanisms are far more prevalent in telecom spectrum bands (e.g. 3G spectrum or broadband wireless access bands), while broadcasting networks still tend to use administratively licensed spectrum. VoIP, IPTV, and other systems like digital audio or video broadcasting (DAB/DVB) change the efficiencies and usage of spectrum, and hence might lead to a need for review of spectrum licensing systems. Similar to authorizations, a technology- or service-neutral approach to spectrum use might also have to be considered to be in line with convergence.
- **Service regulation:** Broadcasting networks are not the focus of quality of service regulation as often as telecoms networks. However, if cable operators begin to offer IP-based services, they might need to heed to QoS regulations. Hence, QoS regulation will need attention. On the other hand, barring law enforcement exceptions, telecom service providers are typically not regulated for content. However, if a service like IPTV is offered over a telephone company's network, it might need to follow content guidelines – which will need a review of content regulation principles as well. Another service regulation issue is universal service. Telcos have traditionally had to satisfy universal service obligations and contribute to funds in support of service. On the broadcasting side, public service or public access television and radio are types of universal service obligations. Questions about the obligations for IPTV, VoIP or other converged service providers will need resolution to ensure that the task is shared equally. Convergence also brings about the possibility of offering a number of new and potentially more appealing services in rural or high-cost areas, which might help in spurring demand.

3.15 One issue that is not directly identified through this preliminary analysis, but yet, is of tremendous importance as an over-arching problematic is about the setup and structure of regulatory institutions. As converging services travel over the same access infrastructures, it might be necessary to converge **regulators and the legal framework** as well, in order to promote efficient regulatory decision-making, and minimize possibilities for arbitrage and forum shopping.

3.16 Given this basic structure, and with an identification of some of the more detailed issues embedded within them, we now necessary to proceed to an examination of the issues.

## 4. Regulatory issues: Experience and expectations

4.1 This section describes the types of challenges to the traditional regulatory schemes due to these and other possible converged technologies. Specifically, we concern ourselves with licensing and authorization issues, competition policy, resource management, and service regulation.

### Authorizations and licensing

4.2 In traditional regimes, authorization and licensing of service providers could be based on the type of service (voice, data, and video) or technology (cellular, fixed telephony, terrestrial broadcasting). However, in a converged setting, it is difficult to maintain these boundaries because of the overlaps that arise: broadcasters (e.g. cable companies) are offering telecom services (Internet, voice), while telecom services (e.g. phone companies) are offering broadcasting services (IPTV). Further, cellular operators are providing mobile television services.

4.3 A case in point for approach is the development of IPTV in India. Since telecom service providers own these networks, and not broadcasters or cable companies, this raises fundamental problems for the licensing structure. The Cable Television (Regulation) Act of 1995 does not allow non-standard broadcasting systems, and the Unified Access Service License allows “triple-play,” confusion arose about which set of rules applied to IPTV service.<sup>10</sup> Additional concern related to the introduction of IPTV by incumbent MTNL, which was subsequently clarified a ‘value-added service’ for broadband and hence falling under the purview of MTNL’s license.<sup>11</sup>

4.4 A similar situation also came about in South Korea, where IPTV has not been introduced yet. The telecoms regulator MIC and broadcasting regulator KBC had a difference of opinion about their jurisdictions with respect to IPTV, with the MIC positioning IPTV as an extension of telecommunications services. While IPTV has been introduced in India, and there are plans to introduce it in South Korea too, this type of regulatory uncertainty is typical of the approach where each new technology or service requires a negotiated entry into the market. Not only is the situation uncertain, but the introduction of newer services is hindered.

### Competition policy

4.5 There are a number of challenges to traditional methods of managing competition with the introduction of convergence. In this section, we will consider the following:

- **Interconnection:** Connecting new and legacy telecommunications networks; connecting broadcasting and telecommunications networks; fixed-mobile convergence,
- **Ownership:** What share of a market and its service providers can one entity own,
- **Market access:** The entry of new players into traditionally protected markets,

---

<sup>10</sup> <http://www.thehindubusinessline.com/2006/06/07/stories/2006060704900100.htm>

<sup>11</sup> <http://www.dmaran.nic.in/presscovdetail.php?dd=407>

- **Access to content and services:** How different service providers might gain access to content and services, which might otherwise be taken for granted.

### *Interconnection*

- 4.6 Put simply, traditional models of interconnection worked within the same facilities, which were integrated with services. In a converged environment, especially in the transition period where both legacy and IP-networks exist, the question of interconnection is especially complex because conventional approaches to interconnection charging are unsustainable. **If interconnection cannot be managed in the new environment, then competition cannot take hold.** The question of interconnection regulation becomes more diversified with the many different forms of interconnection agreements regarding the different layers in the communications processes.<sup>12</sup> Put another way, different services can travel over the same facilities; this will alter the profiles of interconnecting parties since broadcasters and telcos might require interconnecting in cases such as IPTV provision.
- 4.7 One case where interconnection is going to play a major role in converged systems is the VoIP-PSTN point. The United States' FCC in March 2007 responded to a petition by Time Warner Cable to allow interconnection with the PSTN for their VoIP service.<sup>13</sup> In a press statement, FCC Chairman Kevin Martin noted that the decision increased competition in the telephone sector, encouraging the deployment of broadband facilities, enhanced competition and hence lowered prices and improved customer choice.<sup>14</sup>
- 4.8 VoIP traffic can readily enter the Internet without traversing the PSTN, terminate without traversing the PSTN, or through undetected transit of the PSTN. Even when a PSTN operator is able to detect VoIP traffic, it may not be able to differentiate between local, domestic, and international VoIP calls for billing purposes. Once this happens, Internet interconnection and pricing models may replace the current arrangements, creating opportunities for arbitrage.<sup>15</sup>
- 4.9 VoIP is also relevant as an example given the cost-based pricing schemes for interconnection in place around the world. The change in technology from circuit-switched to IP-based networks affects the cost of providing and running networks. Consequently, regulators must be aware of new cost structures. They will need, to move to capacity-based interconnection rules, or otherwise will have to revise the figures they determine, and the basis of their determinations, to take into account the change in the nature of the networks.<sup>16</sup>
- 4.10 Another issue of relevance is about call termination and hand-off. In current networks, there might be specific locations where calls from the originating or carriage networks terminate. However, these specifications might not be optimal for IP-based or converged networks such as next-generation networks, as other more convenient and efficient

---

<sup>12</sup> Bezzina, J. & Terrab, M., Impacts of New Technologies on Regulatory Regimes, Communications & Strategies, Special issue, Nov. 2005, pp. 15-30

<sup>13</sup> [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DA-07-709A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-07-709A1.pdf)

<sup>14</sup> [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-270985A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-270985A1.pdf)

<sup>15</sup> <http://www.ictregulationtoolkit.org/en/Section.2186.html>

<sup>16</sup> Bezzina, J. & Terrab, M., Impacts of New Technologies on Regulatory Regimes

points of interconnection might exist. Such a change might need a revision of license or interconnect agreements.

### *Ownership*

- 4.11 Traditional broadcasting industry rules about media ownership have restrictions on the monopoly of one owner on both different media (known as concentration limits) and across different media (cross-ownership limits). These limits are in place to enable diversity in the content and ideas presented by the media. Some countries have regulations in place that do not allow firms to have both telecommunication and broadcasting operations. Japan's incumbent operators NTT East and NTT West are not allowed to enter the broadcasting market. At the same time, Japan's sole public broadcasting entity, NHK (Japan Broadcasting Corporation) is not allowed to enter the telecommunication market.
- 4.12 The efficacy of these line-of-business restrictions is dependent on how services are defined in the context of multiple play. For example, regulators would need to decide if video provided to mobile terminals is considered broadcasting or whether VoIP is a complete substitute for analogue voice services.
- 4.13 Additionally, regulators must also ensure that convergence in terms of mergers and acquisitions does not hamper competition.<sup>17</sup> As evident now, markets may have very intense consolidation activity throughout the media industry, and in the near future, in the telecom industry as well. As firms merge, it is important that convergence across sectors, such as cable television and mobile telephony, or in one sector, such as content production and distribution, does not result in a monopolistic market structure. In Australia, for example, the Competition and Consumer Commission (ACCC), noted in 2006 that "it is important for us to keep a close eye on the technological developments redefining the telecommunications and media sectors... to [ensure] that control of the communications 'pipes' being used to deliver future media services cannot be exploited to stymie competition in downstream media markets."<sup>18</sup>

### *Market access*

- 4.14 Convergence allows new entrants the means to enter into protected markets. In provision of TV over IP, for example, cable and terrestrial broadcasters will spar with telcos about whether their heavily regulated and restricted sector should be opened up.<sup>19</sup> Similarly, the bundling of video, voice, and data in packages by cable companies will mean another threat to telecoms providers who are used to a monopoly over voice, and have had to deal with Internet telephony.

---

<sup>17</sup> As analysis in the Economist records, "In America SBC paid \$16 billion for AT&T, took its name, and then swallowed BellSouth for a further \$67 billion. Its rival Verizon, meanwhile, bought MCI for \$8.4 billion. In Europe Telefónica, Spain's national incumbent operator, bought O2, a wireless firm with networks in several European countries, for £17.7 billion (\$31.3 billion). NTL, Britain's cable operator, bought Virgin Mobile, a mobile operator, for £962m. Vodafone, the world's biggest mobile operator by revenue, signaled a retreat from its global ambitions and sold its Japanese arm to Softbank, a local wireline broadband operator, for \$15.4 billion." Economist, Your television is ringing, October 14, 2006, Vol. 381 Issue 8499, p. 3

<sup>18</sup> <http://www.accc.gov.au/content/index.phtml/itemId/734509>

<sup>19</sup> [http://www.infoworld.com/article/05/07/20/HNtvoverip\\_1.html](http://www.infoworld.com/article/05/07/20/HNtvoverip_1.html)

- 4.15 Such a shift changes the competitive environment and radically alters existing revenue streams and sector economics. For example, in the U.S.A. in 2005, the number of Verizon's fixed telephone subscribers declined the most in the New York metropolitan area, where it faces the most competition from cable operators offering voice services.<sup>20</sup> In a shifting environment, it is essential that governments reduce regulatory risk and the possibility of discretion.
- 4.16 Convergence opens up the possibility of greater competition that will benefit consumers with aggressive pricing, increased availability, and competitive service packages. However, it also opens up closed or restricted markets to new entrants. Market access has typically been heavily regulated, with governments often charging high licensing fees or taxes to traditional service providers. Hence, with increased competition, returns on investments that were made with the assumption of restricted competition will change. This adjustment is significant for the investors and requires a clear and transparent introduction.
- 4.17 Introduction of technologies such as digital broadcasting will further increase the available capacity and different broadcasters may be able to use freed up spectrum or cable capacity to offer new services. This could mark the entry of broadcasters into VoIP or Internet provision markets, making competition more severe.
- 4.18 An issue of some relevance to market access in general is unbundling of network elements. This is relevant to convergence as a market phenomenon because unbundling allows competition in service provision – say between the local cable network operator and telephone company over the local loop owned by the latter. However, given that on average, fixed local loop is not widespread in developing countries, and since there is significant facilities competition in terms of multiple cellular telephony or broadband wireless operators in a number of these countries, we do not see unbundling as a problem of significant concern in developing country markets.

*Access to content and services*

- 4.19 Different users have differing expectations about content and service. In order that new technologies have a fair chance of providing these and hence attracting consumers, it is essential that they be provided through interconnections with their default carriers.
- 4.20 **Must-carry and must-list program guides:** Many countries apply some form of “must-carry” regulation for television broadcasters. Must-carry channels often include local, regional and public service channels. Some countries have “must-list” rules for Electronic Programming Guides imposed on ‘data licensees’ (Australia), ‘electronic communication network operators’ (Belgium) or ‘cable operators’, operating an EPG (Switzerland).<sup>21</sup> Such services might not be required from IPTV providers. Along similar lines, VoIP service providers might not offer directory assistance.
- 4.21 **Emergency services:** Given that IP telephones work on networks that might not interconnect with the PSTN, it is possible that emergency services might not be accessible. In some cases, users of United States’ VoIP provider Vonage charged the

---

<sup>20</sup> Economist, Your television is ringing, October 14, 2006, Vol. 381 Issue 8499, p. 3

<sup>21</sup> OECD, Policy considerations for audio-visual content distribution in a multiplatform environment, January 12, 2007, p. 22

company with not being able to correctly connect them to emergency services via the '911' number. As a consequence, the FCC ruled that VoIP providers must provide E911 services which not only connect to emergency services, but also provide the caller's telephone number and hence address to the emergency response center.<sup>22</sup>

- 4.22 **Accessibility:** In countries where telecommunications services are required to be accessible to people with disabilities, VoIP or IPTV might not be subject to obligations such as teletype relay or closed captioning. Interconnection to relay services is required in Australia, for example, for those VoIP operators who wish interconnection with the PSTN.<sup>23</sup>
- 4.23 **Access to content:** The success of services like IPTV will depend on providers' ability to deliver content that potential subscribers want. Often, cable companies have an advantage when it comes to acquiring video rights given their existing and often exclusive relationships with content providers. Telecommunication operators are now trying to match cable video offerings with varying degrees of success. Satellite television operators who are themselves moving towards offering integrated multiple-play services also enjoy cable's competitive advantage for video. Companies such as BSkyB in the United Kingdom have been able to leverage their existing video content relationships with the purchase of an existing ISP in order to complete a triple-play offering. Regulation has also addressed access to content in some OECD countries. In the United States, the FCC's program access regulations prohibit vertically integrated, satellite delivered service companies from entering into exclusive programming agreements. However, some telecommunication operators have had less success offering video. For example, South Korean telecommunication firms must obtain a broadcasting license and acquire content from their potential competitors before they can sell video. In the United States, telecommunication firms typically must make arrangements with thousands of franchising authorities to secure the ability to sell video services in each municipality. However, recent legislation passed in Texas, and a proposed national bill, aims to streamline the licensing process for the U.S.A. telecommunication firms, allowing them to apply for either a state-wide or national license to provide video services.<sup>24</sup>
- 4.24 On the other side, telecommunications service providers can restrict access to content from outside their network, creating what is called a '**walled garden**', opened only if they have agreements with the content provider. This is the origin of the current debate on net neutrality as well, where specific content where the content provider and facilities owner agree to prefer their content to others. Such arrangements might prove detrimental to the principle of free speech enshrined to varying degrees in constitutional structures around the world.

---

<sup>22</sup> <http://www.pcworld.com/printable/article/id,120918/printable.html>

<sup>23</sup> [http://www.acma.gov.au/WEB/STANDARD//pc=PC\\_310067](http://www.acma.gov.au/WEB/STANDARD//pc=PC_310067)

<sup>24</sup> OECD, Multiple play: Pricing and policy trends, April 2006, p. 30

## Managing scarce resources

### *Spectrum management*

- 4.25 As a conceptual model, spectrum management focuses on mitigating three types of conflicts – between uses (e.g. television versus cellular telephony), users (e.g. public safety versus service providers), and technologies (e.g. 3G versus broadband wireless). The traditional approach to managing these conflicts was for countries to allocate spectrum in accordance with the ITU frequency allocation table, assigning specific frequencies for use by particular wireless services, such as mobile cellular, fixed wireless, television broadcasting, and radio broadcasting. Thus, spectrum is typically allocated specific to each service: examples are VHF/UHF for television broadcasting, the UMTS 2.1 GHz for 3G cellular telephony.
- 4.26 Broadcasting is quickly moving into the era of digitalization as digital audio broadcasting (DAB) and digital video broadcasting (DVB) to replace traditional analogue broadcasting technologies.<sup>25</sup> The introduction of DVB/DAB also changes the dynamics of spectrum management in a similar fashion to the introduction of digital cellular technologies like GSM or CDMA. The increased efficiencies due to digital broadcasting significantly reduce the quantum of spectrum used by the traditional providers of these services. For example, UK's Ofcom wanted to examine the options arising from the release of spectrum afforded by their program to switch over to digital broadcasting. Ofcom noted that:
- “Five terrestrial television channels that currently broadcast in analogue (BBC1, BBC2, ITV, Channel 4 and five) use nearly half of the most valuable bands of spectrum below 1GHz. Digital broadcasting is roughly six times more efficient than analogue, allowing more channels to be carried across fewer airwaves. The plans for digital switchover will therefore allow for an increase in the efficiency with which the spectrum is used - including the potential for a large amount of spectrum to be released for wholly new services. This cleared spectrum – the Digital Dividend – offers real opportunities for wireless innovation. The Digital Dividend could enable the launch of a wide range of different services.”<sup>26</sup>
- 4.27 Such developments gives rise to the issue as to whether there should be flexibility in spectrum allocation to take full advantage of new services and new technologies for existing services that may evolve with time. As service licensing has moved towards technology and now service neutrality, the abovementioned conflicts will come into full play since there will be less control over licensing according to the service and technology parameters. It will thus become necessary to revise spectrum management to respond to convergence – where different portions of spectrum can now host new services and technologies.

---

<sup>25</sup> Tadayoni, R. & Skouby, K. E., Terrestrial digital broadcasting: convergence and its regulatory implications, Telecommunications Policy Vol. 23, 1999, pp. 175-199

<sup>26</sup> [http://www.ofcom.org.uk/media/news/2005/11/nr\\_20051117](http://www.ofcom.org.uk/media/news/2005/11/nr_20051117)

## *Numbering plans and portability*<sup>27</sup>

- 4.28 Numbering policies and regulations were developed to address voice telephony services. As a result, numbering plans established different ranges for voice services and within fixed telephony, numbering was divided into geographic areas. This differentiation had a twofold function of informing end users of the charges of the calls and maintaining the interconnection cost structure based on services (i.e., mobile voice service vis-à-vis fixed voice service) and distance. Since this allowed subscribers to be reached by a unique combination of digits, numbering became an essential resource for telecommunications networks operators. However, with the advent of convergence, regulators are finding that modifications to such policies and regulations are necessary.
- 4.29 **Assignment of numbering resources to new technologies service operators:** One of the significant impacts on numbering regulation relates to the proliferation of VoIP services. This has raised questions among regulators as to whether numbering resources should be assigned for VoIP and whether traditional telephone service operator obligations should be imposed on VoIP providers. Regulators have adopted a variety of solutions. For example, in some jurisdictions, providers are allowed to use geographic numbers provided they offer service under the traditional voice service regime, which imposes various obligations (e.g., quality of service, access to emergency services, and lawful interception). In addition, countries such as Singapore, Japan, South Korea and some EU Member states (e.g., Ireland, France, Germany, and Austria), have created a specific numbering range for VoIP services, due to the special characteristics of the service, most notably its nomadic use. Some countries, such as Japan, Spain, and the United Kingdom, have combined both measures, and grant geographic numbers to VoIP providers if they operate under the voice service regime (i.e., voice quality of service, lawful interception obligations, access to emergency services), and specific number ranges if VoIP providers operate under the “information service” regime. The implementation of this differentiation has the additional intention of highlighting to consumers that these services are not equal and that VoIP specific range service providers do not necessarily provide the same set of features commonly associated with public voice service.
- 4.30 **Inter-modal portability:** A second modification on numbering regulation has been the introduction of inter-modality portability. Number portability is the ability of a consumer to maintain the same telephone number when changing service providers. Number portability may be inter-modal (e.g., porting a number from a fixed to a mobile network or vice versa) or restricted to one type of network. The United States has included a geographically restricted inter-modal portability, meaning that a consumer may port among different types of networks within a limited geographical area. In Argentina, the telecommunications law allows inter-modal portability to be implemented by the regulator although it has not been adopted yet. Hong Kong (SAR) is currently discussing whether to introduce inter-modality portability to address fixed to mobile convergence. However, there are signs that number portability could potentially be expanded to other services, such as VoIP. In Denmark, the regulator has implemented a non-geographic numbering plan (i.e., a consumer may be reached at a telephone number that does not correspond to its geographical location) where numbers

---

<sup>27</sup> This material is taken from the ITU-InfoDev ICT regulation toolkit. Source: <http://www.ictregulationtoolkit.org/en/Section.2096.html>

are not attached to a specific service, and consequently, there are no portability restrictions among services. However, the implementation of inter-modal portability is currently limited to few jurisdictions. Geographical restrictions on inter-modal portability often respond to the potential effects on traditional numbering plans that are based on distance, services, and interconnection cost structures and for this reason, inter-modality portability may require a numbering policy restructure to be implemented.

- 4.31 **ENUM:** ENUM is an international initiative on electronic numbering, a protocol that converts a telephone number of the public telephone network (“PSTN”) into an IP address. The ENUM initiative has established the possibility of introducing a fully neutral approach to numbering, simplifying numbering regulations and addressing complexities resulting from convergence. Essentially, by translating a PSTN number to an IP address, ENUM would make it easier to contact people through electronic means (e.g., linking users’ email, telephone number, fax and instant messenger address allowing them to be reached by any of these means through a single number). ENUM developments may potentially define the future direction of numbering policies. In addition, ENUM may address some of the transparency concerns with VoIP, due to the mapping of PSTN numbers to “uniform resource locators” (URLs). ITU-T Study Group 2 and the Internet Architecture Board are working together in the implementation of ENUM. An interim procedure to administer the delegation of ENUM resources has been approved by the ITU-T Study Group 2 and several countries including Australia, China, France, Japan, South Korea, and Sweden, have started ENUM trials.
- 4.32 **Domain Names:** As numbering policies continue to be influenced by the development of IP networks, the management of country-code top-level Internet domain names (“ccTLDs”) have become another regulatory issue. Several countries have given their telecommunications regulators the responsibility to manage ccTLDs, yet some regulators may not have the necessary resources to take on this task. Although regulators maintain the control and legal responsibilities, they may rely on others for the domain names management including other government agencies, private companies, academic institutions and non-profit organizations. Furthermore, some governments have even commercialized the ccTLDs that correspond to their jurisdictions in order to obtain an additional source of revenues.
- 4.33 **Television channel numbering:** Another issue, which is especially relevant to television broadcasting, is channel numbering. Some television stations, especially in competitive markets, have significant local recall based on channel numbers. When these channels move to IPTV networks, it might be possible to rearrange these channel numbers, or have conflicts between same numbered channels because IPTV allows service providers to offer channels from different geographic areas. As a result, this scarce and valuable resource might also need management. In October 2004, the FCC moved to manage the conversion of over-the-air television broadcasting from analog to digital broadcasting in the U.S.A. As part of this move, the Commission also addressed the final channel lineup for stations during the digital era and proposed the use of a channel election process to allow station licensees to choose which channel they prefer, subject to FCC evaluation of

interference protection for all stations.<sup>28</sup> Such attention might also need to be paid to IPTV to ensure that channel numbers of value are retained in the new environment.

## **Service regulation**

### *Quality of service*

- 4.34 One of the main functions of a telecom regulator is to ensure a specific level of QoS. This is mainly because of the point-to-point nature of a telecom network where networks allocate and distribute limited resources dynamically across multiple subscribers. Broadcasting networks, on the other hand, have different QoS standards because they traditionally have not allocated resources dynamically. Instead, broadcasting towers, satellite networks, and older cable networks serve customers in a static fashion since signal transmission is independent of the usage. While more recent broadcasting networks that offer on-demand or interactive services do face some QoS stipulations, it is still the case that these are less intense than telecom services.
- 4.35 When telecom providers begin broadcasting services, they will also need to adhere to different standards in terms of the resolution of video available over their networks. In terms of audio broadcasting as well, there is need to assure a certain level of quality. This is relevant because telecom networks are typically capacity limited – as opposed to broadcasting networks, which are coverage limited. An example of this is Internet streaming radio or television, where capacity considerations require significant network planning to prevent congestion and reduce jitter or latency.
- 4.36 Consequently, in the converged environment, broadcasting companies will have to be especially sensitive to QoS requirements if they begin to offer telecom services such as voice telephony or Internet service. It is essential that QoS criteria are specified independent of infrastructure and for types of service.

### *Privacy and law enforcement*

- 4.37 If VoIP calls travel over public Internet or other publicly accessible networks, it is possible that the privacy of telephone calls, which is a legal guarantee in most countries, will be compromised. On the other hand, VoIP might be a security threat in case government or law enforcement agencies want to survey voice conversations. Since these calls do not travel over a circuit switched network, and do not have constant telephone numbers associated with the caller or receiver, they might be able to escape surveillance. Governments will thus have to balance privacy rights with law enforcement or surveillance objectives.

### *Content regulation*<sup>29</sup>

- 4.38 With converged content delivery mechanism, content formerly dedicated to specific networks now can be conveyed on different infrastructures and delivery platforms. This poses a potential conflict in regulation as governments usually apply different standards of content regulation to telephony, sound and television broadcasting, print media and the Internet. With convergence, policies may need to be changed to achieve the common

---

<sup>28</sup> <http://broadcastengineering.com/news/fcc-channel-allotments-20040809/>

<sup>29</sup> <http://www.ictregulationtoolkit.org/en/Section.2105.html>

social objectives of promoting and protecting cultural traditions, public service, and protecting citizens from harmful material across all types of networks and delivery platforms.

- 4.39 While convergence poses challenges to the regulatory framework, it is recognized that differences in the expectations, context and intrusiveness of different services exist, and could justify the differentiation in regulatory approaches. Therefore, while Internet content remains mostly unregulated, regulation requiring a minimum level of domestic content on television is still a feature of broadcasting regulation and licensing in many countries. For instance, the 2002 National Trade Estimate Report on Foreign Trade Barriers by the United States' Trade Representative states that approximately 30 trade partners have local content restrictions in the audio-visual sector.
- 4.40 Additionally, an ITU survey regarding broadcasting and Internet content demonstrates that broadcasting content is regulated more than Internet content in the majority of countries. Of the approximately 125 countries surveyed by the ITU, almost all of the countries had some form of regulatory entity responsible for broadcasting content, except for Bahrain, Nicaragua, Paraguay, Peru, St. Vincent and the Grenadines, and Spain. On the other hand, the majority of the countries surveyed had no regulatory entity responsible for Internet content. Of the regions surveyed, Internet content seems to be more heavily regulated in the Asia Pacific region and Europe and least regulated in the Americas and Africa.
- 4.41 Some of the issues regulators face regarding content regulation are:
- Applicability of public service provisions
  - Cultural diversity, local content quotas and local production of content
  - Programming standards associated with accuracy and impartiality in the reporting of new and current affairs
  - Intellectual property rights
  - Role and means of supporting public broadcasting
  - Programming standards associated with decency, censorship, and freedom of speech

#### *Universal service goals and funding*

- 4.42 Convergence is challenging traditional universal service policies and the means by which universal service objectives are currently met. Universal service for broadcasting is part must-carry and part terrestrial broadcast reach. The challenges for telecommunications arise from three sources: changes in the meaning of basic service, in the market structure, and in the possible goals of such programs.
- 4.43 **Changes in the meaning of "basic service":** With the development of new and advanced bundles of communications services, it might no longer be sufficient to consider only basic telephony as a universal service obligation (USO).
- 4.44 **Older fund contributors in an expanded market:** In markets as diverse as Brazil, South Africa, and the U.S.A., universal service fund collections are from telecommunications service providers, an artifact of the erstwhile monopoly market organization. However, it is now relevant to ask if operators offering converged services such as VoIP, should

have universal service obligations, and whether they should contribute on the same basis as traditionally established operators.

- 4.45 The problem is also significant because IP telephony is more common in urban areas or in use by business users, from where subsidies typically flow out to rural areas or other consumers. Another related problem is that VoIP providers might be outside the realm of universal service regulation, and might not be required to ensure that their services are available to rural or high-cost communities. The result is that while urban areas benefit from broadband penetration and the use of cheaper communication technologies, the rural areas lose their support – both in rollout and monetary support.
- 4.46 **Changes in the desirable outcomes of universal service obligations:** While one of the goals of most universal service programs was to encourage network facilities deployment to support telecommunication services (typically voice), with the advent of convergence, this outcome is only part of a possible new picture. In India, for example, cable television is available in 10 per cent of rural households. Converged services such as cable internet or VoIP can increase the penetration of telephony in rural households from 6 per cent and Internet from less than 0.5 per cent.<sup>30</sup> Hence, facilities deployment might not be as urgently required as say encouraging innovation or subsidizing use of these services. Developing countries will thus have to consider multiple facility-service combinations and can optimize fund allocation to achieve universal service faster.

### Legal frameworks

- 4.47 As services converged onto the same medium, it might be difficult for traditionally separate regulators dealing with different services to assert their jurisdictions in the converged environment. For example, if a cable television operator starts offering VoIP services, the telecom regulator in that jurisdiction might not have the ability to regulate the cable operator directly. The more common problem is, however, overlapping jurisdictions – in the case above, both the telecom and broadcasting regulator might assert their rule overwhelms the others. In such a scenario, the possibilities of forum shopping or regulatory arbitrage increase substantially – both of which worsen the efficiency of regulation, and impose burdens and costs on service providers.
- 4.48 The ITU T-Reg website lists 131 countries with a separate regulatory authority for the communication sector. Some of these agencies fall into what are generally called “converged” regulatory authorities. Still, the majority focus primarily on the telecommunications sector. A convergence in the regulatory institutions thus might help the cause of convergence further and improve the rate of deployment of advanced communication services – while simultaneously reducing regulatory uncertainty. Simultaneously, it should be noted that there is no direct relationship between changes in policy directions and organizational structures. It is possible that convergence issues can be dealt with by separate institutions or by one converged institution. In some cases, such as in Estonia, the growth in broadband penetration has proceeded because of high demand for such service – and has been accompanied by little government oversight. However, for countries seeking to have a legal framework in place for their ICT industries, there may be efficiency gains in dealing with converging industries in one or

---

<sup>30</sup> [http://www.mospi.nic.in/nss\\_58round\\_press\\_note\\_6june05.htm](http://www.mospi.nic.in/nss_58round_press_note_6june05.htm)

a limited number of policy and regulatory institutions instead of spreading activities across agencies.<sup>31</sup>

- 4.49 The other question regarding institutional frameworks is whether content regulators should be integrated with, or separate from carriage regulators. In the United States, for example, the FCC handles both content and carriage regulation. A similar situation exists in the UK with Ofcom. On the other hand, countries like India, Estonia, and to some extent in Singapore, carriage and content regulation in broadcasting is handled by different agencies or ministries. Since content and carriage are easily distinguishable, the separation of regulatory oversight is not an overwhelming obstacle to convergence. Hence, we do not examine the possibility of integrating the carriage and content regulators in detail here.
- 4.50 In addition to convergence in regulatory institutions, it is also important to consider the law regulating communications. Many countries instituted the laws governing telecommunications and broadcasting well before convergence, or for that matter, even digital media were reality. Hence, some of these legal frameworks and acts might not be sufficient to deal with converged services. One example is in the case of India, where as described, there continues to be confusion about which set of laws – cable or telecom – applies to IPTV provision. As the technologies develop, and the rate of innovation continues to accelerate, it is necessary to have a set of laws that can provide stability and a long-term direction to the communication industry, yet offer both service providers and users the flexibility to deploy and use new technologies.

---

<sup>31</sup> Anders Henten, Morten Falch & Reza Tadayoni, Some Implications for Regulation of ICT and Media Convergence, World Dialogue on Regulation Discussion Paper #0202, January 30, 2002

## 5. Regulatory responses: Lessons and practices

- 5.1 Every government has to make decisions about how to react to convergence. For many, the choice is between continuing with the status quo and modifying their regulatory regimes to respond to convergence. However, given the almost certain migration of networks towards IP-based convergence in the next few years, the question becomes – how should governments pace themselves to respond to convergence. Local cultural, political, and economic realities play a role in the decision-making process and timing of regulatory reform. Yet, best practices from other countries can provide guidance and direction to countries seeking to respond service convergence.
- 5.2 The framework of issues to be analyzed as presented in the preceding section gives rise to a method of breaking down the broad issue of converge-regulation into smaller and more specific sub-issues. In this section, we will outline some of the best practices followed in countries that have embraced convergence in their regulatory frameworks in some of the most important issues that relate to developing countries. Hence, this section focuses on how institutional frameworks might be established, the licensing of services, interconnection, universal service, and spectrum management.

### Institutional framework

- 5.3 The growing force of convergence has prompted a new and growing trend towards creating converged regulators. This can be either through the creation of fully converged regulators (U.S.A., U.K., Malaysia, and South Africa) or through converged carriage regulators (Singapore, Brazil, and Estonia). The justification is that a converged regulator is better suited to respond to new technologies and the interdependency of different communications services. Some countries have taken a different approach by including the regulation of the telecommunications sector in the mandate of a multi-sector utilities regulator, or by opting for an approach that veers away from sector-specific regulation and relies on the application of competition and antitrust rules to the communications sector.<sup>32</sup>
- 5.4 Most OECD countries have separate regulators for broadcasting and for telecommunications. The nine exceptions are Australia, Canada, Finland, Iceland, Italy, Japan, Luxembourg, United Kingdom, and the United States. In 23 OECD member countries, the regulatory bodies for telecommunications are also involved with broadcast spectrum allocation (sometimes together with other parties). In 15 countries regulatory bodies for spectrum allocation are also charged with content regulation, while in only 8 countries broadcasting carriage regulation has been ‘merged’ with spectrum regulation. Regulating tasks for broadcasting carriage regulation are divided over more than one body in 13 countries, for spectrum allocation in 6 countries and in 7 countries for content regulation.<sup>33</sup> The table below gives examples of regulatory institutional setups in different countries around the world.

---

<sup>32</sup> <http://www.ictregulationtoolkit.org/en/Section.1267.html>

<sup>33</sup> OECD, Policy considerations for audio-visual content distribution in a multiplatform environment, January 2007, p. 21

	Telecoms carriage	Telecoms spectrum	Broadcasting carriage	Broadcasting spectrum	Content
Australia	ACMA	ACMA	ACMA	ACMA	ACMA
Brazil	ANATEL	ANATEL	ANATEL	ANATEL	
Estonia	NCB	NCB	NCB	NCB, Ministry of Culture	EBC
Hong Kong (SAR)	OFTA	OFTA	BA, OFTA	BA, OFTA	BA
India	TRAI, DoT (for licensing)	WPC (part of DoT)	TRAI, MI&B (for licensing)	WPC (part of DoT)	MI&B
Japan	MIC, Telecom Business Dispute Settlement Commission	MIC	MIC	MIC	MIC
Korea	MIC, KCC	MIC	MIC, KBC, Ministry of Culture and Tourism	MIC	KBC, MCT
Malaysia	MCMC		MCMC		MSTI/MCMC
Singapore	iDA	iDA	iDA, MDA	iDA	MDA
South Africa	ICASA	ICASA	ICASA	ICASA	ICASA
U.K.	Ofcom	Ofcom	Ofcom & Department for Culture, Media, and Sport	Ofcom	Ofcom
U.S.A.	FCC, PUCs	FCC	FCC, local bodies (cable TV)	FCC	FCC, FTC, DoJ

5.5 Each of these arrangements has advantages and disadvantages.<sup>34</sup> A key advantage of a telecoms only regulator is that it can be focused on the complex technical challenges of the telecommunications sector, including network and service development. One disadvantage of sector-specific regulators is that sufficient resources may not be available to staff the different regulator agencies and there may be duplication for regulatory activities that are common to different industries.

5.6 With a converged institutional design, all communications services i.e., telecommunications including radiocommunications, broadcasting and media (and in some instances postal services), are under the umbrella of one agency. Like the single-sector telecommunications regulator, the converged communications regulator tends to be strong in specialized engineering skills in the communications sector, which is an important core expertise in dealing with complex network issues. In addition, the

<sup>34</sup> <http://www.ictregulationtoolkit.org/en/Section.2033.html>

converged communications regulator also meets the challenges posed by service convergence by bringing in related skills, and therefore overcomes what is generally viewed as being one of the main disadvantages of a single-sector regulator (e.g., a telecommunications regulator overly focused on the telecommunications sector).

*Case: Singapore's unified carriage regulator*<sup>35</sup>

- 5.7 The Infocomm Development Authority of Singapore (IDA) is a statutory board of the Singapore Government. The IDA was formed in December 1999 from the merger of the Telecommunications Authority of Singapore and the National Computer Board. The Government of Singapore's intention in forming the IDA was to create a single agency for integrated planning, policy formulation, regulation, and industry development in the information technology and telecommunications sectors. In December 2001, in anticipation of the next phase of convergence between IT, telecommunications and broadcasting, the IDA was transferred from the former Ministry of Communications and Information Technology to the new Ministry of Information, Communications and the Arts (MITA). In addition to the IDA, MITA oversees operation of the Singapore Broadcasting Authority.
- 5.8 The IDA operates under the Info-communications Development Authority of Singapore Act (Cap 137A) and the Telecommunications Act (Cap 323). In discharging its functions and duties under the IDA Act, the IDA is specifically required to have regard to the convergence between broadcasting services and other communications technology services.
- 5.9 The Media Development Authority (MDA) is also a statutory board of the Singapore Government. The MDA was formed by the merger in January 2003 of the Singapore Broadcasting Authority, the Films and Publications Department, and the Singapore Film Commission. The MDA was created in response to Government concerns about the increasing convergence of different media, and the need for a new and consistent approach to regulation and development of the media sector. The MDA resides under the jurisdiction of MITA, and operates alongside the IDA.

*Case: U.K.'s Ofcom as a super-regulator*

- 5.10 The Office of Communications (Ofcom) was established by the Office of Communications Act 2002 (the "OFCOM Act"). The Act was intended to anticipate and pave the way for the Communications Act 2003 (the "Communications Act"). The Communications Act redefines the regulation of telecommunications and broadcasting in the United Kingdom, and assigns regulatory responsibility for these sectors to the unified regulator Ofcom.
- 5.11 A major reason for the creation of Ofcom was the difficulty of coordinating the activities of the previously distinct UK regulators. The need for co-ordination was increased by the introduction of the new EU regulatory framework, and the obligation on the UK as a member state to ensure that all regulation of the communications sector complied with the new EU requirements. Ofcom replaces and assumes the responsibilities of the following five regulatory bodies:

---

<sup>35</sup> <http://www.ictregulationtoolkit.org/en/PracticeNote.1223.html>

- Office of Telecommunications (Ofotel), previously responsible for regulating the telecommunications sector;
  - Radiocommunications Agency (RA), previously responsible for the allocation and management of non-military radio-frequency spectrum;
  - Independent Television Commission (ITC), previously responsible for licensing and overseeing independent (non-public) television services;
  - Broadcasting Standards Commission (BSC), previously responsible for generally applicable standards in broadcasting; and
  - Radio Authority (Radio Authority), previously responsible for licensing and overseeing independent radio broadcasting services.
- 5.12 The British Broadcasting Corporation (BBC) continues to be governed by the BBC Board of Governors and its Charter. However, Ofcom is given the responsibility of overseeing the BBC's compliance with its Charter and generally applicable broadcasting standards. Ofcom also has powers over the communications sector under the Competition Act 1998 and the Enterprise Act 2002, the competition laws of general application in the U.K.

### **Service licensing**

- 5.13 Governments traditionally awarded licenses for different service categories and based on the type of technology. Convergence has had an impact on this categorization and made it complicated for regulators to continue to grant licenses in this manner. For example, a cable television operator intending to provide "triple play" services generally would require three different licenses, one for each of the bundled services (i.e., broadcasting, voice and data), instead of one single license. Countries have been modifying their licensing frameworks to address this new situation by simplifying their licensing regimes. This has been primarily implemented by using the following methods:
- 5.14 **Introducing technology-neutral licenses with broader service categories:** The first trend in licensing reform is to introduce technology-neutral licenses that combine converged services or broaden the types of services that fall within one license. The first trend in licensing reform is to introduce technology-neutral licenses that combine converged services or broaden the types of services that fall within one license. Such a trend is visible in the Caribbean and Malaysia.
- 5.15 **Establishing a unified and technology-neutral license:** A second trend is the introduction of a unified licensing regime, in which licenses evolve into a single license covering a wide range of services. This approach has been or is being adopted by various countries, including Kenya and India.
- 5.16 **De-licensing:** Typically, the operator must submit to the regulator a notification containing minimal information before, or within a short time after, initiating service. However, operators do not have to wait for approval before commencing service. This system is in place in Japan and in EU countries. Exceptions are made, however, if scarce resource such as numbers or spectrum are involved or used.
- 5.17 **Forbearance:** A fourth trend to address convergence is to eliminate filing requirements with the regulator on the basis that the services fall outside of the regulator's authority

or because the regulator has decided to forbear from regulating a particular service. This approach has been followed in the United States for ISPs and the services they provide (e.g., e-mail, Internet access, and VoIP). To date, services provided by ISPs have been treated as unregulated “information services” in order to promote the continued development of the Internet.

- 5.18 However, these modifications may not be sufficient to fully address convergence if they are not accompanied by related measures in the regulatory framework to introduce competition and non-discrimination. For example, in many jurisdictions, cable television operators, which were initially licensed to provide broadcasting services, can provide voice and data services without any specific restriction. On the other hand, traditional telecommunications operators may not be allowed to compete with cable operators if broadcasting service licenses are restricted. In this case, the lack of reform in broadcasting legislation becomes a bottleneck that restricts competition and discriminates against telecommunication operators.

*Case: Brazil’s move towards converged licensing*<sup>36</sup>

- 5.19 In August 2001, Brazil’s ANATEL issued Resolution No. 272. This resolution established a new licensing category for Multimedia Communication Services, or *Serviços de Comunicação Multimídia (SCM)*. According to the resolution, SCM refers to “audio, video, data, voice (corporate voice) and other sound, image, text and related signals, conveyed, sent, and received through fixed telecommunication services rendered by the private sector in the collective interest, on a domestic or international basis and in any format, to subscribers within a certain service area.” SCM licenses, however, do not authorize holders to provide public fixed telephone services, free-to-air television and radio broadcasting, or paid TV services.
- 5.20 The new classification was established to avoid having multiple authorizations for a wide range of information transmission modes. It replaced the previous licensing classification system, which was based on specific service types, including “specialized limited services” categories of network and circuit services, telecommunication transport network services, packaged commuted network services, and circuit commuted network services.
- 5.21 SCM licenses are granted for an indefinite term, without bidding. The interested party simply submits an application, and if certain minimum requirements are met, the license is granted. SCM licenses are non-exclusive, and licensees are obliged to comply with regulations applicable to all telecommunication operators. In addition, the SCM provider must comply with terms that clarify the conditions under which SCM providers can transmit video, voice, and data. These terms differentiate SCM services from those of pay TV operators. There is no limit to the number of SCM licenses that ANATEL may issue. However, if the SCM provider uses radio frequencies to render its services, it must pay an additional spectrum fee.

---

<sup>36</sup> <http://icttoolkit.infodev.org/en/PracticeNote.890.html>

*Case: Malaysia's converged licensing regime*<sup>37,38</sup>

- 5.22 Enacted in 1999, Malaysia's Communications and Multimedia Act (CMA) established a regulatory framework explicitly designed to reflect and accommodate the phenomenon of convergence. The CMA introduced a technology- and service-neutral licensing regime for telecommunications and broadcasting that abandoned conventional service-specific classifications for four generic classifications:
- **Network Facility Providers (NFPs)**, which include owners of satellite earth stations, fibre optic cables, communications lines and exchanges, radio communication and transmission equipment, mobile communication base stations and broadcasting towers and equipment;
  - **Network Service Providers (NSPs)** for entities that provide basic connectivity and bandwidth to support a variety of applications;
  - **Application Service Providers (ASPs)** for licensees that provide particular functions such as voice services, data services, Internet access services, IP telephony, and other transmission services; and
  - **Content Applications Service Providers (CASPs)**, a special subset of applications service providers - including traditional broadcast services and services such as online publishing and information services.
- 5.23 The services falling under these categories are further subdivided into services requiring individual licenses, services requiring class licenses, and exempt services. The process for obtaining class licenses involves a lower level of regulation than individual licenses, which require ministerial approval. Class licenses require registration. Licensees are allowed to hold more than one type of license at a time.
- 5.24 The national regulatory authority, the Malaysian Commission for Multimedia and Communications (MCMC), began migrating telecommunications and broadcasting providers to the new regime in 1999. A total of 56 categories of licensed services and 24 categories of licensed facilities were reorganized into the four generic licensing classifications established by the CMA. Legacy licensees were given an option to migrate by re-applying for licenses or continuing with their instant license. The migration process was completed in 2002.

### **Interconnection**

- 5.25 With the advent of converged networks connecting legacy and new operators, we need a new approach to interconnection pricing. Any new approach to interconnection pricing should:
- Encourage efficient competition and the efficient use of, and investment in, telecommunications networks

---

<sup>37</sup> <http://www.ictregulationtoolkit.org/en/PracticeNote.aspx?id=889>

<sup>38</sup> MCMC, Convergence and policy, regulation and promotion, ITU Workshop: The Internet in South East Asia, November 2001, available at [www.itu.int/asean2001/documents/pdf/Document-22.pdf](http://www.itu.int/asean2001/documents/pdf/Document-22.pdf)

- Preserve the financial viability of universal service mechanisms. Thus any proposal that would result in significant reductions in inter-carrier payments should include a proposal to address the shortfall
  - Treat technologies and competitors neutrally
  - Allow innovation
  - Minimize regulatory intervention and enforcement, consistent with the general trend toward less regulation wherever possible
- 5.26 In the case of voice telephony, this implies treating VoIP providers that provide service over the PSTN in the same way as other telecommunications service providers. VoIP providers should face the same payment obligations as other service providers that use equivalent facilities and services. Similarly, VoIP providers should be entitled to the same reciprocal termination payments from PSTN operators.

*Case: Hong Kong (SAR) interconnection regime for VoIP<sup>39</sup>*

- 5.27 Hong Kong's OFTA has adopted a two-class licensing approach for IP Telephony services:
- **Class 1 services** have all the attributes of the conventional telephone services. Class 1 services are required to fulfill the licensing conditions of either the Fixed Telecommunications Network Service (FTNS) or Fixed Carrier (FC) licenses for the provision of local voice telephony services,
  - **Class 2 services** do not have all the attributes of conventional telephone services, and are only subject to minimal licensing conditions to protect consumer interests and safeguard fair competition. In offering Class 2 services, operators should declare in their marketing materials (for example advertisements, tariffs, and so on) that the service is a Class 2 service and inform customers about the capabilities and limitations of the Class 2 service it offers.
- 5.28 In January 2006, the TA created a new service-based operator (SBO) license for the provision of Class 1 and/or Class 2 IP Telephony services.
- 5.29 All Class 1 and Class 2 services using numbers from the Hong Kong Numbering Plan are required to:
- Provide Calling Line Identification (CLI)
  - Provide any-to-any connectivity. This means any calling party must be able to reach any called party by dialing the appropriate number or code, even if the called party is the customer of a different operator.
- 5.30 To facilitate any-to-any connectivity, all SBO licensees providing IP Telephony operators must be allowed to gain access to the Public Switched Telephone Network (PSTN). These operators will need to obtain a commercial agreement with one or more FTNS or FC licensee(s) for a hosting connection with other circuit-switched networks. The FTNS or FC licensee will then be responsible for routing the IP Telephony operator's traffic to and from the networks of other FTNS or FC licensees. As there are numerous local fixed

---

<sup>39</sup> <http://www.ictregulationtoolkit.org/en/PracticeNote.2654.html>

networks, the TA considers that market forces should ensure that the SBOs have fair access to the networks. The hosting FTNS or FC licensee will be responsible for handling interconnection charges due to the IP Telephony traffic of SBO hosted on its network in accordance with existing charging principles for interconnection.

*Case: U.K.'s Ofcom regulates market power to manage competition*<sup>40</sup>

- 5.31 Ofcom has the authority to determine additional requirements applicable to operators that are designated as having “Significant Market Power” (SMP). The permitted SMP conditions include additional interconnection and network access obligations, price controls and the implementation of cost separation or other cost accounting systems; and additional requirements regarding the supply of leased lines. An operator has SMP if it (alone or with others) has a dominant position in the relevant market.<sup>41</sup>
- 5.32 In exercising its powers regarding SMP, the Act requires Ofcom to:
- Identify and define the relevant communications markets
  - Review those markets
  - Determine the extent to which those markets are effectively competitive
  - Identify any market players which are determined to have SMP
  - Set appropriate SMP conditions
- 5.33 The Act also requires Ofcom to review its market assessments periodically with a view to revisiting any SMP determinations made and deciding whether to add, modify, or revoke SMP conditions. If it finds that an operator to whom SMP conditions are applied (based on earlier reviews and analyses) no longer has SMP, those conditions must be revoked. Where a market is identified by the European Commission as transnational, Ofcom has to work together with the relevant other national regulators to review that market, identify any SMP operators and set appropriate SMP conditions.
- 5.34 Ofcom has conducted a number of specific market reviews. Previously, it has concluded that British Telecom has SMP in markets such as leased lines, business and residential local and national calls, calls to mobiles and international calls in the residential market (all grouped under the “fixed narrowband retail services market”). Similarly, Ofcom has found that each of the major mobile network operators in the U.K. has SMP in the mobile call termination market. As a result of these determinations, Ofcom has imposed additional price controls and other SMP conditions.

### **Universal service**

- 5.35 The primary question confronting regulators in jurisdictions where a universal service contribution system exists, is whether operators offering converged services such as VoIP, should have universal service obligations, and whether they should contribute on the same basis as traditionally established operators.

---

<sup>40</sup> <http://www.ictregulationtoolkit.org/en/PracticeNote.1221.html>

<sup>41</sup> In this context, “dominance” means “a position of economic strength affording the person the power to behave to an appreciable extent independently of competitors, customers, and ultimately consumers.” This definition brings the UK and EU approach to regulation of dominant firms more closely in line with the approach traditionally used in North American competition and telecommunications law.

- 5.36 Governments also now include other services such as broadband. For example, of the 93 countries that responded to the ITU's annual regulatory survey, 27 included narrowband Internet service in the universal service definition and 11 included high-speed Internet.
- 5.37 Most countries have not imposed universal service obligations on service operators using new technologies due to concerns that such obligations would inhibit their development and the development of new technologies and new market players. However, this trend seems to be shifting as more traffic shifts from public switched telephone networks to IP-protocol networks. In Canada, for example, universal service requirements have been imposed on all service providers, including VoIP providers. Canada's approach is consistent with its technology-neutral policy to VoIP, equating such providers to traditional voice operators, provided the service is offered through access to the public switched telephone network (therefore, excluding PC-to-PC VoIP).<sup>42</sup> Even Malaysia has begun to collect funds from all licensees except content application service providers and those with revenues less than RM 500,000.

*Case: Australia's universal service*<sup>43</sup>

- 5.38 For Australia, the universal service obligation (USO) is the obligation placed on universal service providers to ensure that standard telephone services, payphones, and prescribed carriage services are reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business. Telstra is currently the sole universal service provider, but additional universal service providers may be declared in the future. VoIP providers may be considered Carriage Service Providers (CSP), and hence can be asked to contribute through USO levies. USO levies are based on the previous years' Eligible Revenue Assessment. For example, the Universal Service Assessment (which is the instrument that specifies the USO levies) for 2005-06 was based on the 2004-05 Eligible Revenue Assessment.
- 5.39 A separate obligation related to the USO is the digital data service obligation (DDSO). The DDSO is the obligation placed on a digital data service provider to ensure that digital data services are accessible to all people in Australia on an equitable basis, wherever they reside or carry on business. The DDSO consists of two obligations - the general DDSO for people in general digital data service areas (approximately 96% of the population) and the special DDSO for people in special digital data service areas (approximately 4% of the population, usually living or working at a distance of more than 4.5 kilometres from their local telephone exchange). A special and general digital data service provider is obliged to have in place a special and a general digital data service plan that sets out how it will fulfil its obligations as the digital data service provider within each area.

*Case: South African universal service*

- 5.40 The Government of South Africa has a universal service policy ensuring that all people should have access to basic telecommunications services at affordable prices. The role of regulator ICASA is to promote the attainment of universal service and access by putting

---

<sup>42</sup> <http://www.ictregulationtoolkit.org/en/Section.2097.html>

<sup>43</sup> [http://www.acma.gov.au/WEB/STANDARD//pc=PC\\_2491](http://www.acma.gov.au/WEB/STANDARD//pc=PC_2491)

requirements in operators' licenses to roll out services in under-serviced areas and ensuring that licensees contribute to the Universal Service Fund. ICASA does not administer the Universal Service Fund. Instead it receives monies on behalf of the Universal Service Agency. However, ICASA is also responsible for ensuring that relevant and appropriate broadcasting services are extended to all citizens.<sup>44</sup>

- 5.41 The Universal Service Agency was established by the Telecommunication Act No. 103 of 1996, as amended to fund projects striving to provide universal access to ICT. The money in the Universal Service Fund goes, *inter alia*, to the payment of subsidies for individual "needy persons," to license holders who satisfy obligations, to public schools and tele-centers. Currently operators (i.e. Telkom, MTN, Vodacom and Cellc) are contributing 0.5 per cent of their annual turnover to the Fund.

### **Spectrum management**

- 5.42 Policy-makers and regulators are beginning to introduce changes within spectrum regulations to address the challenges of convergence.
- 5.43 First, regulators are starting to grant the right to use spectrum without regard to the type of technology being used (i.e., technology-neutral approach). Australia, New Zealand and Guatemala have taken steps to improve their regulations to be more technology neutral. The United States has similar rules to Australia and generally takes a technology-neutral approach.
- 5.44 Second, regulators are allowing spectrum trading or in-band migration. In Australia, spectrum licences are tradable and technology neutral. Spectrum licences authorize the use of spectrum and licensees are free to use any device and technology within their spectrum, provided that such devices comply with the conditions of the licences and the advisory guidelines established for the corresponding bands.

#### *Case: Managing spectrum in Singapore<sup>45</sup>*

- 5.45 Subject to the availability and allocation of scarce resources such as radio-frequency spectrum, Singapore has maintained an open-ended approach to market entry and related licensing since April 2000. The Infocomm Development Authority (IDA) is responsible for the management, allocation, and use of the radio-frequency spectrum for radio-communications services in Singapore. These services include terrestrial mobile and fixed links, satellite, aeronautical and maritime radio, safety and distress communications, radio-navigation, amateur radio and broadcasting.
- 5.46 Applications for the use of frequencies go to the IDA's Spectrum and Numbering Management Department, which then assesses the requirements of the applicants and advises them of the feasibility of their request. Users also need to apply to the IDA's Licensing and Operations Department for a radio license to operate radiocommunications equipment, prior to the any assignment of the frequency.
- 5.47 Under the MDA Act, the IDA is required to consult with the MDA and allocate to the MDA specific radio frequencies and satellite orbital positions for broadcasting purposes.

---

<sup>44</sup> <http://www.icasa.org.za/Content.aspx?Page=17>

<sup>45</sup> <http://icttoolkit.infodev.org//en/PracticeNote.1223.html>

The MDA may then assign such frequencies and satellite positions to broadcasting applicants. If a licensee is granted a broadcasting license under the Broadcasting Act and the license includes the right to use a specified frequency or satellite position for the transmission of a broadcasting service, no other license is required in respect of the use of the frequency or satellite position for the purposes permitted by that license. However, in issuing such licenses, the MDA must have regard to the demand for spectrum for services other than broadcasting and any other matters it or the IDA considers appropriate.

*Case: Ofcom's Digital Dividend Review*

5.48 Ofcom published its proposals for the award of the spectrum freed up by the digital switchover process, the so-called digital dividend, in December 2006. Ofcom ran a public consultation on these proposals and is currently reviewing the responses to the consultation. However the UK regulator says that it is already clear that a wide range of issues have been raised and will require detailed consideration. These include representations about:

- Reserving spectrum for high-definition TV services on Freeview and/or for local TV services;
- The impact of the proposals on the program-making and special-events (PMSE) sector, principally users of wireless microphones;
- The timing of releasing channel 36 (590-598 MHz); and
- Holding spectrum back from the award for possible future innovations and/or for low-power applications.

## **6. Next steps and future considerations**

- 6.1 As a conclusion to this report, it is pertinent to point out some of the next steps that will help strengthen our understanding of the processes and regulatory responses to convergence. Here, we will briefly identify some of these topics for future consideration.

### **Timing of convergence regulation**

- 6.2 Since the mid 1990s, convergence has continued to take a hold on the media and telecom industries, and hence, the response to convergence is not so much to be decided in terms of whether, but when. At this time, a significant number of countries around the world have seen converged service offerings over network infrastructures, and it is likely that this trend will only continue to attract service providers in the next few years.
- 6.3 A consequence is that regulators have to begin considering serious responses to convergence. If timed well, convergence regulation will enable countries to enter the next era in communications services – improving both the performance and offerings of service providers, but also increasing access to services for the general population.
- 6.4 The exact time to introduce convergence will depend on local political and technical factors, but this issue needs to be debated and discussed in order that countries do not fall behind in adopting the means necessary to allow converged service offerings.

### **Sequencing of convergence**

- 6.5 Linked to the issue of timing the introduction of convergence into an economy, is the issue of how to sequence the introduction of convergence. An example of this is the Indian situation; the government has moved from a technology and service specific licensing regime to a technology neutral regime in their unified access service license. Since 2000, convergence legislation has been debated in India, and there have been regulatory attempts to begin unified service neutral licensing as well. Even though the process is not complete, this is an interesting example of how the government has chosen to go through steps to ensure that the market has the time to adapt to the new conditions.
- 6.6 Thus, the sequencing, or how the actual process of convergence will occur, is also important to ensure that all stakeholders have a clear path they have to follow over time and to ensure that the process of convergence is not thrust upon a market that is not ready for it.

### **Depth**

- 6.7 The last important consideration is about how ‘deep’ convergence should go. While it is generally assumed, as it is in this report, that technology- and service-neutrality will be needed for true convergence, governments will still have the latitude to choose the kinds of legal frameworks, institutional structures, and regulatory environment that is in place.
- 6.8 While the precise depth of convergence will depend on local economic, political, and market factors, it is nevertheless important as a discussion to ensure that the endpoint chosen is adequate to address the needs of the stakeholders.

## **Index: Countries in this report**

Argentina, 15  
Australia, 6, 11, 12, 13, 16, 21, 22, 29  
Austria, 15  
Bahrain, 18  
Belgium, 12  
Brazil, 6, 18, 21, 22, 25  
Britain, 11  
Canada, 3, 21, 29  
China, 16  
Cuba, 3  
Denmark, 15  
Egypt, 3  
Estonia, 6, 20, 21, 22  
European Union, 3  
Finland, 21  
France, 15, 16  
Germany, 15  
Hong Kong (SAR), 3, 6, 15, 22, 27  
Iceland, 21  
India, 6, 9, 19, 20, 22, 24  
Ireland, 15  
Israel, 3  
Italy, 21  
Japan, 11, 15, 16, 21, 22  
Luxembourg, 21  
Malaysia, 6, 21, 22, 26, 29  
Mexico, 3  
Nicaragua, 18  
OECD, 3, 5, 12, 13, 21, 35  
Pakistan, 3  
Panama, 3  
Paraguay, 18  
Peru, 18  
Singapore, 6, 15, 20, 21, 22, 23, 30  
South Africa, 3, 6, 18, 21, 22, 29  
South Korea, 9, 13, 15, 16  
Spain, 11, 15, 18  
St. Vincent and the Grenadines, 18  
Sweden, 16  
Switzerland, 12  
U.K.. *See* United Kingdom  
U.S.A.. *See* United States  
United Kingdom, 6, 13, 14, 15, 20, 21, 22, 23, 28, 31  
United States, 3, 6, 10, 12, 13, 15, 16, 18, 20, 21, 22, 25, 30, 38

## Annex A: Convergence: Definitions, drivers, and implications

Convergence is a broad term that the communications industry has been using since the late 1970s to describe a move towards the merging of data and telephone networks. Breaking away from the traditional one-to-one arrangement where every communications medium was associated with one form of content, we have now squarely entered an era where communication media are converged.

### Technology and market drivers

The most common attribution for the drive towards convergence is the migration of networks to IP-based technology.<sup>46</sup> However, this is not the only reason for the rise in the importance of convergence. A number of technological and market developments have allowed service convergence to take hold.

#### *Technological factors*

**Three main technological factors** are driving convergence. First is **digitization**, which began in the 1980s as a move away from analog to digital systems of data recording, processing, and transmission. Digitization allows us to represent any data in the same form, allowing content for mass distribution (e.g. movies) and personal consumption (e.g. photographs) to have the same form. Hence, both business and individual users have a use for digital products.

The second is the reducing cost and size alongside the increases in **computing power**. This allows powerful processing in small devices at costs that are reducing over time, allowing digital devices to proliferate at a rapid rate.

A consequence of both digital processing and increases in computing power is **data compression** and a subsequent increase in a channel's carrying capacity even if its bandwidth remains fixed. For example, the introduction of digital broadcasting is widely expected to lead to a reduction in the amount of spectrum used for broadcasting and hence open valuable spectrum to other services. This means increased competition in broadcasting, or deployment of new services by broadcasters using the freed up spectrum.

Third, and more recent, is the growth in the use and universality of **Internet Protocol (IP) based packet switching** data transmission. Using IP, it is possible for different devices and applications to use the same networks, sharply reducing costs, and significantly easing the process of designing and deploying access devices.

#### *Market factors*

Over the past two decades, there has been a significant shift towards digital media and the rise and spread of the Internet has driven significant investment and market involvement in the development of applications and services that use text, video, audio, and now increasingly, voice. The interest in convergence depends on these markets developments, but has found significant traction in the past few years because of **six market factors**.

One of the major market drivers is the interest of service providers to **reduce costs**. IP-based converged networks save costs because of three reasons:

---

<sup>46</sup> Economic Intelligence Unit, The next moves: Convergence in the communications and content industries, p. 2

- IP is an open platform, and this allows for strong competition in the development of network technology.
- The possibility of having one unified network for multiple types of content reduces redundancy.
- Uniformity in the design of the network and simplicity by employing end-user device oriented networks reduces the costs of deploying and managing networks.

Network operators also see convergence as a way to **shore up falling revenues**. As the OECD notes in a recent report on multi-media networks, “One of the driving forces behind the introduction of multiple-play services is the desire of telecommunication and cable operators to offset revenue losses from increased competition to their core services.”<sup>47</sup> Further, as ARPUs are falling in voice provision, service providers have realized that their service offerings have to diversify. Further, converged services consolidate billing, allow bundling, and increases possibilities for leveraging tariff. In 2005, IBM and the Economist Intelligence Unit (EIU) found in a survey that “more than 80 percent of the telecom executives polled agreed that it will be essential to embrace convergence within the next three years as a source of long term revenue growth.”<sup>48</sup> It should be noted that there is a risk of falling ARPUs given the possible bundling of services and offers to make such converged bundles attractive to customers.<sup>49</sup>

Another market factor is the availability of **significant broadband penetration**, and the availability of significant fiber capacity. On the supply side, the massive rollouts of the late 1990s and early in this decade resulted in a glut of capacity that remained unused because services had not matured or applications were not developed. Convergence offers a set of services that can utilize this capacity, which due to excess capacity and the competitive bankruptcies early in this decade have driven down prices. On the demand side, the availability of always on, always accessible broadband services allows consumers the chance to access high-bandwidth content such as CD-quality audio and streaming video at reasonable prices.

The fourth driver for convergence is the consolidation in the development and provision of **content and services**. Due to investments, mergers, and cross-holdings in the media and telecom industries, and there is an increase in instances of both content creators and network operators that have access to both the content and the delivery mechanisms.

The **development of online advertising** also has allowed a number of content providers to offer their services free, or at a significantly subsidized rate. Such an arrangement permits consumers to sample, even if only in a limited manner, the content and find uses for it. As a result, consumers create a demand for that or similar content, which results in higher demand for communication services that can support that content.

A final market factor that is driving convergence is the communication industry’s newfound **ability to offer new and possibly bundled services and deliver them over one access network to the consumer**. By being able to offer all types of communications services over one network, it is possible to enter previously closed markets and compete with incumbents. Given the right competitive environment, this could enable new forms of market organization, in the form of

---

<sup>47</sup> OECD, Multiple play: Pricing and policy trends, April 2006, p. 11

<sup>48</sup> IBM and Economist Intelligence Unit, Study indicates telecom industry is ready to embrace convergence, but opinions differ on best approach, Feb 10, 2005

<sup>49</sup> We expect such losses in revenues in the short-term, and given the reduced costs of converged network offerings, not damaging to long-term profit earning potential of any converged service provider

facilities competition based on the access network, e.g. copper, coax, wireless, open access networks, and unbundled networks.

### **Implications of convergence**

The advent of convergence has potential benefits for both consumers and operators: allowing greater choice and coverage, while reducing costs and complexity.





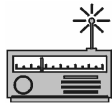

Convergence is a positive development for the communications industry because it **allows greater diffusion of communication services**. This is first because different services can now use a variety of facilities to reach consumers. Convergence, especially using IP networking, also helps **bring down the costs of service provision** because IP technology is standardized and relatively inexpensive. Further, convergence will reduce the costs of managing networks because operators can integrate different networks' order-entry, billing, and fault-reporting systems on the single IP-based network. For developing countries, embracing convergence offers them a chance both to provide advanced communication services but also to **attract significant investment**. For example, Verizon and British Telecom are each spending close to \$18 billion to develop converged networks.<sup>50</sup>

In this discussion, it is important to note that some of the instantiations of converged services have been around since the 1980s. For example, dial-up data services used telephone lines to carry data communications since the 1980s, and cable Internet services have also been commercial since the late 1990s. The excitement about convergence today focuses on a shift to multiple-play bundles – where one service provider can even offer a group of more than two services. Thus, if the earlier examples of convergence are in the first wave, multiple-play converged services are in the second wave. The third wave will likely be ushered in with the deployment and commercialization of all-IP next generation networks.

---

<sup>50</sup> Economist, Your television is ringing, October 14, 2006, Vol. 381 Issue 8499, p. 3

## Annex B: Regulatory asymmetry across the communications industry

<i>Regulatory features</i>	<i>Services</i>					
	<b>Data networks</b>	<b>Wireless telephony</b>	<b>Wireline telephony</b>	<b>Cable television</b>	<b>Broadcast radio</b>	<b>Broadcast television</b>
						
<b>Market entry</b>	Usually open entry is the norm	Difficult due to spectrum constraints	Depends from country to country	Depends on jurisdiction	Difficult due to spectrum constraints	Difficult due to spectrum constraints
<b>Focus of carriage regulation</b>	QoS	Spectrum and QoS	QoS	QoS	Spectrum	Spectrum
<b>Content regulation</b>	Typically absent	Typically absent	Typically absent	Variable: from mild to strict	Strict	Very strict
<b>Level of competition</b>	Typically competitive	Oligopolies	Monopolies or oligopolies	Monopolies or oligopolies	Monopolies or oligopolies	Monopolies or oligopolies
<b>Emergency service access</b>	No	Yes	Yes	In some countries, one-way information	In some countries, one-way information	In some countries, one-way information
<b>Numbering issues</b>	IP addresses	Phone numbers, portability	Phone numbers, portability	Channel numbering	-	Channel numbering
<b>Spectrum licensing</b>	Only in case of licensed broadband wireless, market oriented	Yes, with entry fees and annual charges, often through markets	None	None	Typically administered	Typically administered
<b>Interconnection management</b>	Market-driven	Regulated	Regulated	May be regulated	-	-
<b>Universal service goals</b>	Typically absent	Yes	Yes	Free-to-air channels	Public service broadcasting	Public service broadcasting

## Notes

- <sup>a</sup> Convergence also refers to the mergers and acquisitions of corporations. In many of these cases, both industries and corporations converge: NTL, Britain's cable operator, bought Virgin Mobile, a mobile operator, for £962m in 2006. An early example is the 2000 acquisition of media conglomerate Time Warner by ISP America OnLine (AOL). This acquisition represents the combination of a major movie studio, music label, and print media leader with what was once the largest ISP in the United States. Another mode of convergence is one where the user device is the same across different networks. An example of this is British Telecom's (BT) Fusion service, which has cellular phones with Wi-Fi capability – they can carry voice calls over both standard GSM and Wi-Fi networks with a seamless hand-off. Hence, one device can use different networks to provide service.
- <sup>b</sup> VoIP is a system where voice communication uses IP networks for transmission. This is a converged service because with VoIP it is possible to use any IP-based device to carry out a voice conversation. In a basic sense, this is only a change from traditional telephony, where instead of being restricted to using phone lines, voice communication can move over any IP network. In terms of VoIP minutes, service providers worldwide in 2006 carried an estimated 1,079 billion minutes of VoIP traffic. Of these minutes, 382.3 billion was local call volume, 614.4 billion was national long distance (NLD) call volume, and 82.6 billion was the international long distance (ILD) call volume. Source: <http://www.webwire.com/ViewPressRel.asp?aId=27988>
- <sup>c</sup> IPTV is typically a closed, geographically based video delivery system offered by telecommunication providers. It is meant to be a substitute for cable and satellite television. Video content will likely only be available while on the telecommunication company's own network. The major advantage of IPTV is its ability to provide a much richer television experience to the viewing audience through its addressability and interactive functionality. The simple premise of IPTV is that video can be offered over a telecommunications network using IP. However, this mix of a broadcasting service (television) carried over and offered through a telecommunications network (typical IP-networks like DSL or cellular) opens a variety of issues for regulatory reconciliation.