Module 1. Regulating the Telecommunications/ICT Sector: Overview

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The ICT Regulation Toolkit, produced by the Information for Development Program (*info*Dev) and the International Telecommunication Union (ITU), is a much expanded, practical web-based tool intended for ICT policy-makers and regulators in developing countries. Work on the toolkit began in 2004, as an update of *info*Dev's popular and influential Telecommunications Regulation Handbook of 2000 and as a support tool for ITU's annual Global Symposium for Regulators. The Toolkit is a living resource which is expanded and updated on an almost daily basis, including with inputs from users, with over 600 downloads by users each day.

The Toolkit is divided into seven modules clustered around key themes. It also provides access to more than 350 practice notes drawing from experiences across the globe and over 1000 relevant reference documents from both developed and developing countries. The Information and Communication Technologies (ICT) landscape has continued to evolve significantly since the publication of the Handbook, improving opportunities and raising new challenges. Many developments will promote greater access to ICTs, especially in developing countries. At the same time, these developments are disrupting the status quo for traditional telecommunications operators. The objective of the Toolkit is to help regulatory professionals and specialists, members of the ITU and clients of the World Bank to design effective and enabling regulatory frameworks that harness the latest technological and market advances while facing the challenges of a changing sector. The Toolkit is designed to better assist developing countries in using ICTs as a development tool. The World Summit on the Information Society (WSIS) recognized the key role that an effective regulatory framework plays in promoting widespread access to ICTs and the Information Society, which in turn is increasingly used as a tool in meeting the Millennium Development Goals.

The Toolkit is available at http://ictregulationtoolkit.org/.

The modules of the ICT Regulatory Toolkit are:
(1) Regulating the Telecommunications Sector: Overview
(2) Competition and Price Regulation (including Interconnection)
(3) Authorization of Telecommunications Services
(4) Universal Access
(5) Radio Spectrum Management
(6) Legal and Institutional Framework
(7) New Technologies and Their Impact on Regulation

These modules have been prepared by a distinguished list of contributors from academia, industry, *info*Dev, the ITU, the legal profession and the World Bank Group, with a structured peer review process that draws upon the resources of the wider ICT community. This module provides an overview of the Toolkit and some contextual background on one of the fastest developing and most transformational sectors of the global economy. The associated transformation impacts the way we live, work, play and interact. It even impacts the language we use. Additionally, developments in ICTs are dramatically affecting the way the sector is regulated, which is driving new thinking about a new regulatory paradigm in the context of the legacy of the existing body of ICT regulation.

SEE ALSO:

Virtual Training on Telecommunications Policy and Regulations (OFTA Virtual Training Centre)

1 Context

This chapter examines the evolving context of ICT Regulation and consists of the following six sections.

1.1 New Vocabulary, New Economy, New Regulation

Our vocabulary is evolving as existing words assume new meanings – app, burn, rip, text, game, cookie – or appear in new combinations, such as smart phone, cyber crime, file sharing, instant message, search engine and navigation bar. Some vocabulary is entirely new, including blog, podcast, googling, Web 2.0 and Wikipedia. The range of acronyms continues to expand – MP3, P2P, SMS, BPO, DRM, NGN, VoIP, VoBB, WiMAX, NGA, IP and LTE. This evolving vocabulary can even evoke the experience of an era, such as the "dotcom bubble." The field of ICTs reflects the growing and highly significant contribution of the Internet and other burgeoning technologies to a new landscape of economic and social activities and relations. The landscape is populated by innovative ways of performing existing and new activities. In terms of the evolving vocabulary, we have entered the "Information Society" and the "New Economy."

The infrastructure and services of electronic communications (previously known as telecommunications) are central components of ICTs and the associated networked landscape. The key characteristic of these components is that they are regulated by government administrative agencies. Consequently, there is a direct link between the performance and development of the New Economy/Information Society and the regulation of ICTs. Furthermore, government regulation of ICTs extends into many adjacent areas, such as content, copyright, privacy, culture, mergers, and market entry and exit, which extends the impact of regulation in the New Economy/Information Society.

Importantly, as the Toolkit demonstrates, the substance of ICT regulation has continued to evolve with the emerging technologies. The liberalization of ICT markets has stimulated cumulative interacting innovations in products, services and technologies with a general convergence or blurring of distinctions between platforms, products and services in an IP or Net-centric world. These developments necessitate some form of regulatory response either to support or impede them. The evolutionary nature of regulation is evident in the moving target of European Union (EU) regulation. There have been successive "packages" updating the framework from 1987 to 1998 and, most recently, to 2002. Increasing numbers of countries are adopting this framework as they accede to the European Union or become candidate members. The EU regulatory approach is also reaching outside of Europe and influencing the frameworks that other countries are adopting. Consultations and recommendations on a new framework with new subjects took place in 2006 with a continued shift to less sector-specific and more *ex post* regulation in the European Union. Significantly, these EU regulatory packages have been forcefully linked to broader policy objectives concerning inclusiveness, innovation, job creation, growth, energy and environmental issues in the New Economy or Information Society. The EU is not alone in this process; most ITU members have also implemented ICT strategies.[1]

ENDNOTES

[1] For example, Rwanda Information Technology Authority, National Information and Communications Infrastructure Plans, see http://www.rita.gov.rw/laws/nici_plans.html. Also see Info-communications Development Authority of Singapore, Infrastructure Programs at http://www.ida.gov.sg/Infrastructure/20060919171104.aspx.

RELATED CONTENT

Module 7, New Technologies and Impacts on Regulation

1.2 ICTs and the Transformational Opportunity and Risks

ICTs offer major transformational opportunities. They can contribute to enhanced productivity, competitiveness, growth, wealth creation, poverty reduction and can spur the knowledge-based economy. ICTs provide the means by which knowledge is developed, stored, aggregated, manipulated and diffused. ICTs also enable participation in the global economy.

In 2006, a report published by the U.S. National Academy of Sciences began by stating: "*The New Economy refers to a fundamental transformation in the United States economy as businesses and individuals capitalize on new technologies, new opportunities, and national investments in computing, information, and communications technologies. Use of this term reflects a growing conviction that widespread use of these technologies has made possible a sustained rise in the growth trajectory of the U.S. economy …. While the telecom sector accounts, by various measures, for about one percent of the U.S. economy, it is estimated to be responsible for generating about ten percent of the nation's economic growth.*"[1] The New Economy, the Information Society and associated transformations and opportunities reach out and engage all countries.

These opportunities are well known and are not just a developed country phenomenon. ICTs, particularly access to broadband Internet, are vital for developing nations as well. The ITU's *Build on Broadband* project is dedicated to promoting equitable, affordable broadband access to the Internet for all people, regardless of where they live or their financial circumstances.[2] In a speech on July 9, 2009, ITU Secretary-General Dr Hamadoun I. Touré stated: "*[I]n the 21st century, affordable broadband access to the Internet is becoming as vital to social and economic development as networks like transport, water and power. Broadband access – and the next generation broadband network infrastructure which underpins it – is a key enabler for economic and social growth… Broadband changes everything. It enables not just great new enabling applications, such as VoIP and IPTV, but also the delivery of essential services – from e-health to e-education to e-commerce to e-government. And broadband is helping us make great progress towards meeting the Millennium Development Goals – and improving the quality of life for countless people around the world.*"[3]

A new program focused on bringing ICTs to the developing world was introduced by the World Bank in 2008. This program, called New Economy Skills for Africa Program-Information and Communication Technologies (NESAP-ICT), supports the growth of Information Technology (IT) and IT Enabled Services (ITES) industry in Sub-Sahara African countries.[4] The NESAP-ICT program noted that ICTs transform the economy and peoples' lives and provided various examples, including:

- New jobs: In India, the expansion of the IT-ITES industry over the last 15 years has added more than 10 million direct and indirect jobs. In South Africa, the industry has employed 100,000 workers directly and indirectly by 2009. In the Philippines, a projected 900,000 people will be employed directly or indirectly by IT-ITES by 2010;
- Economic growth: In 2009, the Indian IT-ITES industry contributed an estimated US$ 70 billion to the GDP or six percent share of total GDP. In the Philippines, the industry's contribution in 2010 is expected to reach US$ 13 billion, or about eight percent of GDP.
- Increased productivity: The rapid spread of e-applications and digital tools to such diverse areas as manufacturing, transportation, logistics, finance, banking, governance, health, education and even in traditional sectors like agriculture is transforming the economies of developing countries. IT investments have been found to raise worker productivity three to five times that of non-IT capital. U.S. studies have shown that the IT-ITES industry was responsible for two-thirds of total factor productivity growth between 1995 and 2002 and for nearly all of the growth in labor productivity in that period.

Clearly, ICTs can have an impact on everyday lives and on general economic activity, but the opportunities only materialize fully to the extent that the regulatory framework, as implemented, supports and fosters both investment in and widespread diffusion of ICTs. Absent these conditions, the full promise of ICTs is unrealized. ICTs offer the prospects of rapid advancements, but if appropriate conditions are not in place, the outcome can be a rapid slide down the digital divide. And although the digital divide is narrowing, particularly due to the rise of Internet-enabled mobile phones and applications, a new broadband divide is growing that governments need to address.[5]

There are some stunning successes, particularly with regard to mobile services. In 2002, the total number of mobile subscribers in the world surpassed that of fixed customers. Between 2004 and 2009, mobile phone subscriptions worldwide grew from nearly 1.8 billion to an estimated 4.6 billon, translating into a growth in mobile penetration from less than 28 percent to 67 percent.[6][7]

The Asia-Pacific region is the largest mobile market in the world, and by 2013, Asia is expected to have almost three billion mobile subscribers. In 2008, China alone had 634 million mobile subscribers, which far exceeded the combined number of mobile subscribers in Japan and the United States at 110 million and 270.5 million subscribers, respectively.[8] Sub-Saharan Africa had a mobile penetration of rate of 32 subscribers per 100 people in 2008, this translated into over 246 million mobile customers.[9]

Mobile phone handsets are now turning into smart-phones equipped with digital cameras, Internet-enabled video, pre-installed social networking applications such as Facebook and music juke box payment terminals. "Billboard" magazine publishes a list of top 20 ring tones, a market that generates billions of dollars in revenue. These new functionalities are transformational. For example, as digital cameras, mobile devices provide benefits such as instant news gathering or create harmful effects like facilitating industrial espionage. Their Internet-enabled video, access to social networks and music capability brings them into the realm of media, copyright and Internet governance. As a component of the banking system, the mobile network can provide services where the financial network is weak,

but there is also the risk of banking fraud and identity theft. These widely used electronic consumer devices now straddle several regulatory jurisdictions, raise new legal issues, and present new challenges to existing regulatory frameworks. From a government standpoint, the challenge becomes how to sustain investment and promote widespread diffusion of technologies, while protecting the legitimate interests of all players, particularly consumers.

ICTs have significantly impacted business operations where a large number of new, non-OECD countries have successfully entered the market. This is particularly the case for software and ITES. Market entry is partly explained by the "death of distance" or the dramatic fall in the costs of international connectivity. The latest manifestation is the proliferation of broadband access networks. Broadband can carry huge quantities of data, at very high speeds. Although postal and courier services can deliver large quantities of data (*e.g.*, a truckload of CDs), they fail the speed test. To transfer the digital information contained in an average two-hour movie downloaded from Apple's iTunes takes about three days using a 56Kbps dial-up modem; two hours using a 1.5 Mbps connection; two minutes using a 100 Mbps connection; and 15 seconds using a 1000 Mbps (1 Gbps).[10]

In the broadband world, large volumes of data can be moved almost instantaneously to widely dispersed locations at low cost. Through the application of ICTs, many services once considered non-tradable are now tradable, such as back-office functions including the management of employee benefits or dental records. "Out-sourcing" and/or "business process off-shoring" (BPO) have seen massive increases, amounting to a total addressable market estimated at US$ 300 billion, of which US$ 100 billion will be off-shored by 2010.[11] In the BPO market, India is a tremendous success story. It has become the dominant player in the BPO market. Growth in India's BPO exports were 44.5 percent in 2005 and employment in the sector increased from 42,000 jobs in 2002 to an estimated 470,000 in 2006. The state of Andhra Pradesh increased its ITES exports from US$ 37 million in 2001 to US$ 714 million in 2005. Other countries like the Philippines, Brazil, Romania and Ireland have also been particularly successful in attracting investment and creating employment from BPO-related activities. But these successes have come about due to a commitment from the government to foster and support these activities by implementing necessary policies and developing the supporting regulatory framework. In the case of India, government policies and reforms, including telecommunications reforms implemented in 1999, established the foundations for these new activities.

The use of ICTs in e-government services is also transforming citizens' interactions with the public sector by improving efficiency, effectiveness and accountability of governments. In India, for example, a comparison of manual and e-government services found that computerized services substantially increased cost-savings and access to services.[12] The survey showed that e-services lowered travel costs, made delivery of services more predictable, decreased waiting times, reduced corruption and generally improved overall quality of service.

Although ubiquitous and open networks produce great gains for society as a whole, they also increase our vulnerability. Maximizing the connectivity and openness of networks requires regulators to create new laws in several areas, including privacy and data protection; protection of children online; and prevention of cyber crimes such as identity theft.[13] Regulators must also ensure that law enforcement techniques evolve with technology in order to continue protecting society against those who would take advantage of these vulnerabilities. This requires adequate provisions for emergency services and lawful interception (*i.e.*, "wiretapping").

ENDNOTES

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[2] ITU, *Build on Broadband*, at http://www.itu.int/en/broadband/Pages/default.aspx.

[3] ITU, Speech from Dr Hamadoun I. Touré, ITU Secretary-General, Conferencia Magistral "The Importance of ICTs and Broadband as Bital Enablers for Social and Economic Development", Dominican Republic (9 July 2009) at http://www.itu.int/osg/sg/speeches/2009/jul9.html.

[4] World Bank, New Economy Skills for Africa Program-Information and Communication Technologies at http://go.worldbank.org/XNDHZJTOZ0.

[5] OECD, The ICT4D 2.0 Manifesto: Where Next for ICTs and International Development?, Paper No. 42 at http://www.oecd.org/dataoecd/43/25/43602651.pdf and ITU, *Measuring the Information Society: The ICT Development Index* (Mar. 2009) at http://www.itu.int/ITU-D/ict/publications/idi/2009/index.html.

[6] ITU, Mobile Telephone Subscribers per 100 Inhabitants (1994-2004) at http://www.itu.int/wsis/tunis/newsroom/stats/charts/ChartA2_300dpi.jpg.

[7] ITU, The World in 2009: ICT Facts and Figures at http://www.itu.int/ITU-D/ict/material/Telecom09_flyer.pdf.

[8] ITU, ICT Statistics Database at http://www.itu.int/ITU-D/icteye/Indicators/Indicators.aspx#.

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[10] See Apple, iTunes FAQ for Purchased Movies at http://support.apple.com/kb/HT1906#faq5 and Arizona State University, Information Technology Instruction Support Group, Download Time Calculator at http://is.asu.edu/r&d/video/dltime.html.

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[12] World Bank, IC4D, How Do Manual and E-Government Services Compare? Experiences from India at http://siteresources.worldbank.org/ EXTIC4D/Resources/5870635-1242066347456/IC4D_2009_Chapter5.pdf

[13] GSR 2009 Discussion Paper, Rory Macmillan, Connectivity, Openness and Vulnerability: Challenges Facing Regulators at http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR09/doc/GSR09_Challenges-regulators_Macmillan.pdf.

1.3 Transition to Next Generation Networks

The ITU defines a Next-Generation Network (NGN) as a "*packet-based network able to provide Telecommunication Services to users and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent of the underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and services of their choice. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users.*"[1]

In short, NGNs are fully converged IP networks in which a single service provider offers every different type of communications services – fixed and mobile voice, video and Internet – using various technologies, such as DTH, digital cable, DSL, LTE, DVB-H and IPTV. Consumers benefit from new services and lower prices, as well as greater convenience through multifunction devices and through "triple" or "quadruple" play bundles that combine all communications services into one package.

NGNs, mainly based on fiber optics, continue to be deployed around the world with countries taking different regulatory and market approaches to promote deployment. The Asia-Pacific region is ahead of other regions in developing NGN infrastructure and access, which tend to be financed by the operator with strong governmental support and a strong preference for FTTH.[2] For example, the Japanese government directly subsidizes current providers, which has resulted in a 35 percent increase in deployment of fiber-to-the-home (FTTH) from 2007-2008 and an 83 percent increase in 3G mobile deployment between 2004 and 2007. Other Asia-Pacific countries, like New Zealand and Singapore, are seeking to implement a wholesale only network. Meanwhile, Australia has created a state-sponsored NGN company.

The European approach has been to promote competition through open access requirements.[3] This has resulted in relatively small and limited deployments rather than nationwide build-outs of FTTH. The French government, for instance, established a new framework for the regulation of NGNs in 2008, requiring operators with significant market power (SMP) to provide wholesale access to ducts in a transparent, non-discriminatory and cost-oriented manner. SMP obligations also require symmetrical regulation of the sharing of the last part of the fiber loop. French law further requires each operator rolling out fiber within a building to give other operators access to its fiber network. Other countries have favored direct state intervention.

In Latin America, there is a need for innovations in both infrastructure and business models to make deployments in rural regions with low ARPU users. Operators are considering how they can provide services to the consumer segment, offer seamless access to these services and also introduce new offerings in a quick and cost effective way. Not surprisingly, these service providers have begun the transition to NGN core networks. Regarding NGN access developments, wireless NGN access technologies seem more promising in this region. Some operators have initiated FTTx projects for NGN access networks. At this stage, however, the high costs and uncertain returns limit such projects to high population, high-income areas. Therefore, other types of technologies, such as WiMax, are gaining popularity.

ENDNOTES

[1] ITU-T, NGN Working Definition at http://www.itu.int/ITU-T/studygroups/com13/ngn2004/working_definition.html

[2] Vaiva Lazauskaite, RME/BDT, Developments of Next Generation Networks (NGN): Country Case Studies (2009).

[3] World Bank, Tim Kelly, Victor Mulas, Siddhartha Raja, Christine Zhen-Wei Qiang and Mark Williams, What Role Should Governments Play in Broadband Development? at http://www.oecd.org/dataoecd/40/47/43631862.pdf.

1.4 Innovative Technologies and Services

All ICT organizations have legacy assets, some more than others. The evolving regulatory frameworks have facilitated or even encouraged the introduction of new technologies and services. Ideally, ICT organizations would like to manage the transition to new technologies in a way that allows them to optimize their returns on legacy assets. The reason is that new technologies disrupt (or make obsolete) pre-existing business plans and thereby the value of legacy assets. In economic terms, this is an example of a "Wave of Creative Destruction" in which disruptive technologies can bring wider choices and lower prices for the consumer.

Innovative technologies and NGNs may offer substantial opportunities for incumbents with limited legacy assets, as is the case in many developing economies. But for those with significant legacy assets, innovative technologies and services could be very disruptive if the incumbents do not remain competitive and continue to innovate. Chief executive officers in many developed economies may be forced to choose between competing with their own businesses and having another company doing it. The threat of innovation may also cause some strong incumbents to adopt delaying tactics. The extent to which they can adopt such tactics depends largely on the effectiveness of implementing pro-competitive regulatory frameworks. However, innovative technologies and NGNs can benefit incumbent service providers through the lower costs of using more efficient technology. They also allow providers to compete in new service areas to offset declines in tradition lines of business.

Incumbents are also facing disruptive elements in cases where, frustrated by existing suppliers, local governments and municipalities are constructing their own networks, sometimes using the "open access" model and the "bottom up" development of applications. For example in Ottawa, Canada, local residents are able to purchase their fiber connections directly from the municipal government, which has built and continues to subsidize fiber network. Such "open access" models are also gaining currency in international networks.[1] These are the technological advances that gave rise to the ICT Regulation Toolkit.

The process of managed transition is becoming more difficult in the current ICT environment for at least two reasons. First, the rate of change in technology is increasing (see Module 5, Radio Spectrum Management and Module 7, New Technologies and Impacts on Regulation). Secondly, the organizations introducing the new technologies are not necessarily members of the traditional ICT/telecommunications community, but innovators that may not play by the same rules. Established organizations as well as new entrants are arming themselves with different business models like "triple/quad play," "always on," "flat charges," "all you can eat," or even "free." These business models differ from the more traditional models where a limited range of services or a single service are offered at prices based on distance and time. In some instances, the provision of voice services is ancillary to the main line of business of the new entrant. For example, the voice version of Yahoo! Instant Message service is not the core business of the company.

Voice over Internet Protocol (VoIP) is an example of an innovative and disruptive technology. VoIP demonstrates that the basic premise of traditional voice telephony – the network and voice services must be owned and operated by the same firm – is no longer relevant. VoIP is disrupting the pre-existing business plans of traditional telephone service providers and is being introduced by firms outside the traditional community.[2] For instance, Google launched its Google Voice service in March 2009. Rather than own or operate any part of the underlying network, Google simply offers an application that gives users one phone number for all of their phones, provides free long distance within the United States and has low international calling rates.

Another innovative and disrupting technology is Internet Protocol television (IPTV). By providing video services, such as live television channels and video-on-demand (VOD), as well as interactive services, over an IP platform, IPTV allows traditional telephone service providers to compete with terrestrial over-the-air broadcasters, cable television operators and satellite television providers.

ICTs have transformed many other activities, notably the media and the creative industries. Traditional broadcast media offer limited "mass fare" to mass audiences, due to the economics of the sector and radio spectrum restrictions. Cable and satellite platforms have expanded choice for television and radio by offering services such as video-on-demand. However, new technologies expand choice immensely and are able to cater to targeted audiences. The combination of broadband (wired or wireless), the digitalization of media content, and the falling costs of producing digital content herald an age of abundance. The falling costs of producing media has placed digital content production, including documentaries, entertainment, news, music, blogs, in the hands of many and has created a bottom-up trend.

The introduction of broadband and the switch to digital from analogue broadcasting will increase delivery capacity enormously in comparison to traditional broadcasting. New content producers have a means of distributing their creations instantly and globally. Content can be customized to the personal tastes of an individual rather than be defined for a mass audience. Many observers are focusing on the "long tail"[3] of digital content in which a large number of unique services, content or applications are sold in relatively small quantities. Although there are still services and items that large numbers of people will wish to purchase, many small providers and developers can

become successful by selling their products to niche markets. With broadband, this “long tail” of niche media content has found a highly receptive audience, for example, through the popularity of the video-sharing site “YouTube.” Apple’s iPhone App Store provides another example of how small developers are finding great success by targeting the “long tail.” After a developer completes a relatively simple process for developing and getting approval for a new application, iPhone subscribers are able to search through and download these specialized applications at fees set by the developer. By the end of 2009, there were more than 125,000 developers in Apple’s iPhone Developer Program and subscribers had downloaded over two billion of their applications.[4] This continued abundance of choices in existing and new digital content, produced and distributed at rapidly falling costs on converged platforms, presents new disruptive challenges to both existing players or “majors” (content producers and distributors) and regulators.

The rapid increase in content choices for consumers and the speed of delivery through broadband Internet are also transforming social and cultural landscapes. For example, broadband helps to reduce carbon emissions through environmentally-friendly business practices such as remote management of equipment, telecommuting and live video-conferencing and can result in a reduction of carbon emissions five times greater than the emissions that the ICT industry produces.[5] The growth of innovative technologies, NGNs and convergence promises to become a disruptive force for the way individuals interact with one another in society.

ENDNOTES

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[2] GSR 2009 Discussion Paper, Rudolf Van der Berg, The Future of VoIP Interconnection at http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR09/doc/GSR09_VoIP-interconnect_VanderBerg.pdf.

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[4] Apple, Press Release, Apple’s App Store Downloads Top Two Billion (2009) at http://www.apple.com/pr/library/2009/09/28appstore.html.

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RELATED CONTENT

Module 7, New Technologies and Impacts on Regulation

1.5 How Did We Get Here?

The ICT past was populated by Ministries of Post, Telegraph and Telecommunications (MPTTs), which set the policies; determined the technical standards; designed and certified equipment; controlled the radio spectrum; allocated numbers; managed assets; made investment decisions; set prices; operated businesses; granted privileges; and regulated these largely state-owned communications administrations.

In the 1980s and 1990s, the communications landscape in some countries started to change in large part due to changing technological development and business opportunities interacting with each other. In this period, there were also institutional developments. Telegraph lost its importance, while post and telecommunications generally became structurally separated regulators. As of the end of 2009, 153 countries and administrative regions had created a national regulatory authority for their ICT and telecommunication sectors. Ninety-three percent of African countries have a separate sector regulator, which is the highest percentage in the world.[1] Of the countries in the Americas, 89 percent have a separate sector regulator, followed by 80 percent in Europe, 66 percent in the Arab States and 62 percent in Asia-Pacific countries. Figure 1 below shows the growth in the number of ICT and telecommunications sector regulators since 1990.

Figure 1. Growth in the number of regulators worldwide

Source: ITU

In addition to changes to the regulators' functions and jurisdictions, there has been a substantial trend towards liberalization in which state-owned operators were partially or wholly transferred to the private sector. Most significantly, the telecommunications sectors were liberalized as new entrants were licensed in mobile, fixed and Internet markets. Postal services have also been liberalized, but this has usually been after telecommunications. By opening markets, the burden of investment was shared among multiple operators, which mitigated the potentially dangerous risks of misguided decisions by a single operator. For example, as noted in Module 2, the 2009 ITU World Telecommunication Regulatory Database lists that 171 countries around the world have opened their mobile cellular markets to competition by 2009.

Series of clusters of innovation were stimulated by liberalization. The Internet and other platforms have dramatically expanded the global market for electronic communications and applications so that the prefix "e" for "electronic" is now extremely commonplace in all jurisdictions. During this process the traditional telecommunications sector has been transformed in a radical manner to ICTs, which has become both more significant as an economic sector, as well as a major contributor to the competitiveness of firms, cities, regions and countries. Major institutional developments accompanied this transformation. Sector-specific, independent institutions were established to perform regulatory functions in the context of new ICT policy frameworks. Regulations continue to be amended and updated in response to market and technological changes. Some countries have moved from sector-specific *ex ante* regulation in certain markets to *ex post* regulation. Increasing numbers of countries have followed this path of change so that now the old MPTT model is a rarity.

More recently, governments have adapted to converging technologies, such as IPTV and mobile TV, by merging the telecommunications regulator with the broadcasting and content regulator. In Korea, for example, the Ministry of Communications and Information regulated the telecommunications sector while the Korean Broadcasting Commission regulated broadcasting and content until 2008 when the government established a converged regulator called the Korea Communications Commission.[2]

ENDNOTES

[1] ITU-D, Trends in Telecommunication Reform 2008: Six Degrees of Sharing at http://www.itu.int/ITU-D/treg/publications/trends08.html#1.

[2] See Korea Communications Commission Annual Report 2008 at http://eng.kcc.go.kr/user/ehpMain.do.

RELATED CONTENT

Module 6, Legal and Institutional Framework

1.6 Regulatory Sequencing

Once the decision to liberalize the market has been taken, the next step is to provide an appropriate regulatory framework and institution(s) to implement the decision. However, there is no simple sequencing for the drafting and adoption of the framework since several issues must be addressed simultaneously. Interconnection, universal access and service, regulatory processes, means of dispute resolution, market definition methodologies, licensing/authorization procedures and tariff-setting principles all need to be resolved in a fairly compressed period. Furthermore, most of these issues interact with, relate to, or rely on the other components of the body of regulations. The body can then be amended in light of market and technological developments.

The absence of a simple sequence also means there is no obvious order of topics addressed in this module or in the Toolkit as whole. Instead, the module starts with issues related to the regulatory agency, the characteristics that enhance its legitimacy, the functions performed by the regulator and others, as well as the supporting legal environment. The module then presents regulatory issues related to authorization and competition, interconnection, universal access, radio spectrum, and finally, the impact of new technologies.

2 The Regulator

This chapter examines the role, rationale, and requirements of the ICT regulator and consists of the following five sections

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Module 6, Legal and Institutional Framework

2.1 Rationale for an Effective and Independent Regulator

Effective regulators are normally associated with being independent to some degree. The rationale for establishing independent, often sector-specific, regulatory institutions is based on ensuring non-discriminatory treatment of all players in the liberalized market. At the outset of the transformation process the pre-existing monopoly structure allows for discriminatory behavior. The emphasis on non-discrimination arose from four sources which, in part, reflect different constituencies in the market. These four broad imperatives are to ensure that:

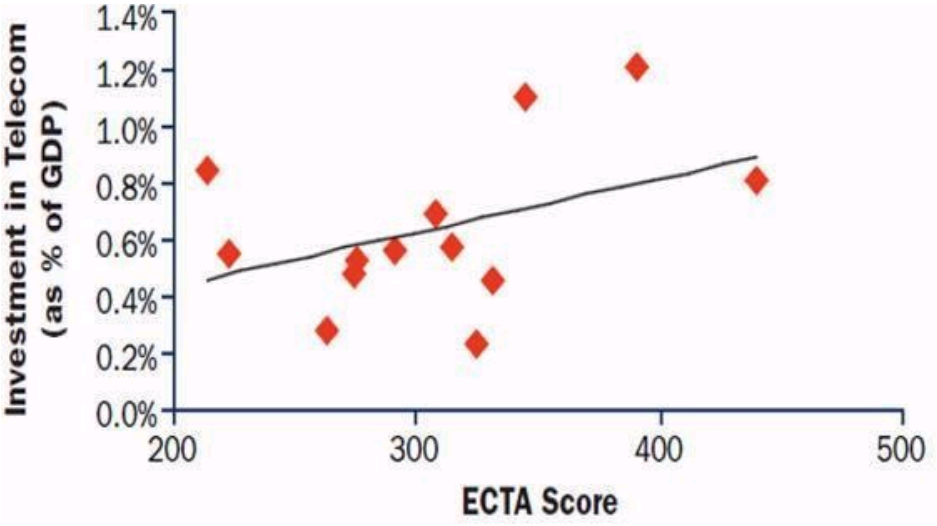
- Cooperation is enabled in a competitive environment to ensure that a level playing field exists between unequal entities in the marketplace;
- All equipment suppliers are treated equally where the market is dominated by a single buyer with strong pre-existing relationships with suppliers;
- All new entrants and investors in the telecommunications service sector are treated equally by the dominant competitor, who will be a supplier of inputs (*e.g.*, interconnection) to the businesses of the new entrants; and
- All customers have a "voice" and their complaints and interests receive an adequate response.

Addressing non-discrimination involves building confidence in and the legitimacy of an "independent" regulatory institution. The central issue is establishing a functioning, enabling environment consisting of the regulator(s) and regulations that will attract sufficient and sustainable investment to satisfy existing demand, expand supply and introduce new services. Independence stimulates investor confidence and reduces regulatory risk.

The UN Task Force on Financing ICT supports the introduction of independent regulators, linking such independence to growth in the market. The Task Force has observed that: *"The introduction and strengthening of independent, neutral sector regulation has helped to reinforce investor confidence and market performance, while enhancing consumer benefits."*[1]

Reinforcing investor confidence through an independent and effective regulator will attract private investment in the ICT sector. As detailed in the succeeding sections, independence, transparency of the regulatory process and regulatory policies that encourage competition are factors that influence the level of investment in ICTs.[2] An effective regulator results in less regulatory risk and increases the likelihood of investment in the sector. Figure 1 shows the relationship between effective regulations and investment. The higher score from the European Competitive Telecommunications Association (ECTA), the more effective the regulations are. As the figure below demonstrates, investments in telecommunications rise as the regulatory environment improves.

Figure 1. Relationship between Effective Regulation and Investment in Telecommunications



Source: Impact of Effective Regulation on Investment: an Investor's Perspective, Zain Group citing the European Competitive Telecommunications Association (ECTA) which annually publishes a regulatory scorecard on the link between effective regulation and investment

ENDNOTES

[1] ITU, World Summit on Information Society, The Report of the Task Force on Financial Mechanisms for ICT for Development at http://www.itu.int/wsis/tffm/final-report.pdf.

[2] GSR 2009 Discussion Paper, Lynne Dorward, Impact of Effective Regulation on Investment: an Investor's Perspective at http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR09/doc/GSR09_Regulation-Investment_Dorward.pdf.

RELATED CONTENT

Module 6, Section 5, "Elements for an Effective Regulator"

2.2 What is "Independence" and How is it Fostered?

Absolute independence of regulatory bodies is neither possible nor desirable. A regulator should not set and implement its own agenda. "Independent" regulators are expected to be subject to government oversight and a system of checks and balances.

Effective regulation that supports sustainable investment requires some independence from political influences, especially on a day-to-day or decision-by-decision basis. The regulatory body must be an impartial, transparent, objective and non-partisan enforcer of government-determined policies by means set out in controlling statutes of the regulator, free of transitory political influences. The regulator should also be independent from the industry that supplies ICT services.

The regulator should implement the policy of the government and only make decisions that are within its legal authority. However, regulators need insulation from political intervention, so that the regulatory process is not politicized, its decisions are not discredited and the policy of the government is implemented. As discussed in Module 6, Legal and Institutional Framework, a balance is needed to ensure that the regulator is both independent and responsive to the broad policies of the government. Several formal safeguards have been employed to achieve such a balance, such as:

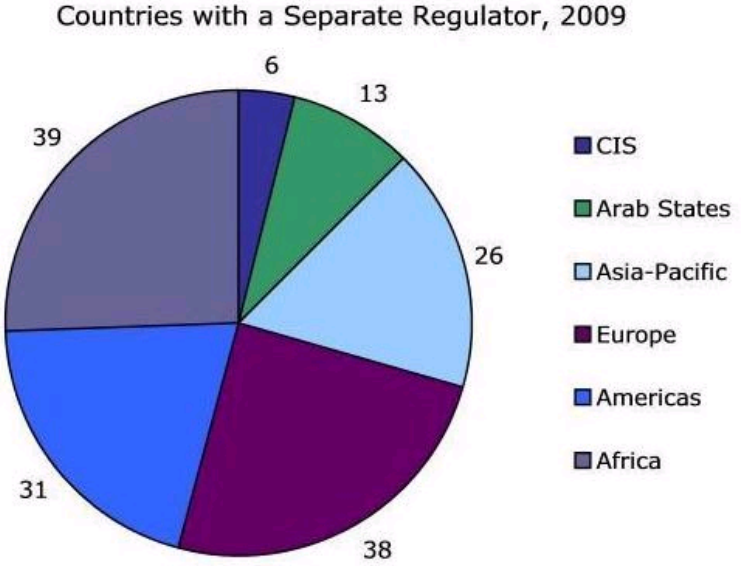
- Providing the regulator with a distinct statutory authority, free of ministerial control;
- Prescribing well-defined professional criteria for appointments;
- Involving both the executive and the legislative branches of government in the appointment process;
- Appointing regulators (the Director General or Board/Commission members) for a fixed period and prohibiting their removal (subject to formal review), except for clearly defined due cause;
- Where a collegiate (Board/Commission) structure has been chosen, staggering the terms of members so that they can be replaced only gradually by each successive government;
- Providing the agency with a reliable and adequate source of funding. Optimally, charges for specific services or levies on the sector can be used to fund the regulator to insulate it from political interference through the budget

process;

- Exempting the regulator from civil service salary limits to attract and retain the best qualified staff and to ensure adequate good governance incentives; and
- Prohibiting the executive from overturning the agency's decisions, except through carefully designed channels such as new legislation or appeals to the courts based on existing law.

There are currently far more regulatory authorities independent from ministerial control around the world than dependent regulators. 153 countries have established regulatory authorities that are separate from the ministries. As shown in Figure 1, Section 1.5, there has been a steady rise in the number of separate regulators over the last 20 years. 125 of these countries with separate regulators have also ensured that the regulator is autonomous – or independent – in the decision-making processes. The separate regulator in the remaining 28 countries must get approval from the relevant ministry or other official body prior to issuing decisions.[1]

Figure 1. Number of Countries with Separate Regulators around the World



Source: ITU

ENDNOTES

[1] ITU, ICT EYE, Regional Reports (2009).

2.3 Accountability, Transparency, and Predictability

In addition to independence, an effective regulator should demonstrate other characteristics, including accountability, transparency and predictability. These traits should be enhanced by a clear division of responsibilities between the ICT regulator, ministries and other regulatory agencies, such as the competition authority or radio spectrum management body where relevant.

The independence of the regulator must be balanced with accountability. The regulator's authority provides it with significant power to redistribute income among different constituents in the economy. Therefore, safeguards are required to ensure that the regulator does not become corrupt or inefficient. Citizens and regulated firms must know who is responsible for a decision and the reasoning behind the decision. Interested parties must be able to provide relevant input to a decision through consultation processes. They must be able to obtain redress easily and quickly when the regulator has acted arbitrarily or incompetently. These types of safeguards produce a balance between independence and accountability. Several formal safeguards have been employed to achieve this balance, such as:

- Publishing the statutes of the regulator that clearly specify the duties, responsibilities, rights and obligations of the regulator, as well as differentiating between primary and secondary regulatory goals where there are multiple goals;
- Ensuring that the decisions of the regulator are subject to review by the courts or some other non-political entity although some "threshold" should be established to deter frivolous challenges that simply delay the implementation of decisions;

- Requiring the regulator to publish annual reports on its activities and requiring a formal review of its performance by independent auditors or oversight committees of the legislature;
- Establishing rules for the removal of regulators if they show evidence of misconduct or incompetence;
- Allowing all interested parties to make submissions to the regulator on matters under review; and
- Mandating that the regulator publishes its reasoned decisions.

Transparency in interconnection, authorization and licensing practices, and universal service obligations is a specific requirement of the World Trade Organization (WTO) and a general requirement of the EU regulatory package. Transparency entails the regulator making available all relevant information in a timely fashion. Transparency enhances the confidence of interested parties in the effectiveness and independence of the regulator and strengthens the legitimacy of the regulator. Consequently, all regulatory rules and policies, the principles for making future regulations and all regulatory decisions and agreements should be a matter of public record. ICT regulation is an important policy issue, and all citizens need information about the policy to evaluate the performance of government.

Transparency is an important contributor to good governance in general. Importantly, transparency reduces the probability that interested parties, especially those adversely affected by a regulatory decision, will believe that decisions are biased, arbitrary or discriminatory. The reasoning behind regulatory decisions, including the principles and evidence that guided them, will be apparent when they are clearly presented in the public record. Discriminatory or corrupt decisions will become evident and more difficult to substantiate once transparent processes are in place.

A successful market that attracts investors requires a predictable regulatory process. Independent regulators are predictable if they adhere to the rule of law. The most important features of the rule of law are respect for precedent and the principle of *stare decisis*, particularly in common law jurisdictions. Respect for precedent means that regulators do not reverse policy decisions unless there is evidence that those decisions have led to significant problems or that new circumstances warrant a change in the rules. The principles of *stare decisis* require that cases with the same underlying facts be decided in the same way every time. This is of particular relevance in the resolution of disputes. Adherence to these principles enhances confidence in and the credibility of the regulator and reduces regulatory risk, which reverberates positively with investors.

2.4 What is the Role of Regulators?

Often there are sector-specific regulators, general regulators (such as competition authorities), and special agencies or ministries charged with specific tasks (such as spectrum management), that all share common duties. As noted by the UN Task Force on Financing ICT, this Toolkit and other sources, the most important duties of the regulator(s)[1] include:

- Implementing the authorization framework that provides opportunities for new companies and investors to establish ICT businesses. Simple authorization procedures tend to maximize new entry (see Module 3, Authorization of Telecommunication/ICT Services).
- Regulating competition (including tariffs) involving the effective enforcement of fair and equitable competitive market principles, restraining the power of dominant suppliers and leveling the playing field for new entrants (see Module 2, Competition and Price Regulation).
- Interconnecting networks and facilities. Normally transparent rules are established for interconnecting all types of traditional and new communications networks and associated cost-based payments (see Module 2, Competition and Price Regulation).
- Implementing universal service/access mechanisms to ensure the widespread (and affordable) diffusion of ICT (see Module 4, Universal Access and Service).
- Managing the radio spectrum effectively to facilitate new entrants and new technologies, which is particularly relevant to new broadband wireless opportunities such as Wi-Fi and wimax (see Module 5, Radio Spectrum Management).
- Establishing sufficient safeguards to ensure that consumers, particularly children, are protected against bad business practices, cyber crimes and violations of data privacy (see Module 6. Legal and Institutional Framework).
- Minimizing the burden and costs of regulation and contract enforcement (see Module 7, New Technologies and Impacts on Regulation).

All of the above continue to evolve and to present new challenges in the context of market and technological developments, especially the growing availability of broadband and the increasing prevalence of convergence. For example, many countries have adopted consumer protection regulations specifically designed for ICT customers, which are enforced by the ICT regulator and/or a designated consumer protection agency. The Australian Communications and Media Authority (ACMA) has instituted measures to protects consumers' interests in the Internet Age by investigating complaints about online content and gambling services; encouraging the development

of codes of practice for ISPs; and educating the public about Internet safety and privacy risks, particularly for children.[2]

To better adapt to the new converged landscape, governments have also been developing coherent national broadband strategies as a vital component of overall deployment and access to broadband services. For instance, those OECD countries leading in broadband penetration rates have typically established national broadband policies. These countries include Korea (Rep.), Denmark, the Netherlands, Sweden, Finland, and the United Kingdom.[3] As a step towards improving its ranking for broadband penetration among OECD countries, the United States is currently developing a National Broadband Plan to be presented to the U.S. Congress in February 2010. Rather than engage in broad regulatory intervention, the government's role in the provision of broadband should be based on sound economic principles limited to ensuring that markets function effectively and access is reasonably available to all.

The role of the regulator in broadcasting is similar to some of the functions of the ICT regulator such as allocating and managing the radio spectrum, licensing service providers and ensuring universal access. But broadcasting regulators have additional duties regarding the social and cultural impact of the sector. They are also charged with overseeing content and ensuring diversity, protecting minors, the right of reply, etc. Furthermore, if there is a Public Service Broadcaster (PSB), the regulator performs some form of oversight of it and private channels.

The proliferation of broadband and the digitalization of content are bringing about a profound and rapid transformation of the media/content landscape, which may change regulatory functions. Russia, for instance, has issued several Internet Protocol Television (IPTV) licenses. It is quite common for a radio "chat show" to take a call from someone living overseas and listening to the program on the Internet. Both the Russian TV and the chat show channels are licensed but many service providers are not. The aggregate audience for the unlicensed self-produced and "long tail" content exceeds that of traditional broadcasters in some countries. For example, in July 2009 alone, YouTube's audience exceeded 120 million people in the United States – or approximately one-third of U.S. population. The explosion in content provision is a huge challenge to content regulation (how does the regulator screen everything?), which is made even more difficult because a large proportion of the content may originate in other jurisdictions. As "mass markets" retreat, it will be necessary to reconsider the regulation of national broadcasting institutions and thereby the functions of the regulator.

Where PSBs, cable and satellite channels remain in a strong position, the regulator(s) will have a role to play in the application of competition policy, including merger control. This competition policy issue centers on the relationship between dominant/non-dominant access providers and dominant/non-dominant content providers.

In light of the recent global economic crisis, regulators can also play a key role in increasing confidence, reducing risk and encouraging investment in the ICT sector overall. In particular, regulators are able to play a role in investment by 1) lending financial support through "stimulus packages" and public private partnerships and 2) lowering the costs of doing business by deferring license fees and taxes, as well as implementing rules that enhance efficiency. [4]

ENDNOTES

[1] ITU, World Summit on Information Society, The Report of the Task Force on Financial Mechanisms for ICT for Development at http://www.itu.int/wsis/tffm/final-report.pdf.

[2] GSR 2009 Discussion Paper, Rosalind Stevens, Consumer Protection: Meeting the Expectations of the Connected at http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR09/doc/GSR09_Consumer-protection_Stevens.pdf.

[3] World Bank, Tim Kelly, Victor Mulas, Siddhartha Raja, Christine Zhen-Wei Qiang and Mark Williams, What Role Should Governments Play in Broadband Development? at OECD, http://www.oecd.org/dataoecd/40/47/43631862.pdf.

[4] GSR 2009 Discussion Paper, Mandla Msimang, Effective Regulation: The "Stimulus Plan" for the ICT Sector at http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR09/doc/GSR09_Regulation-Investment_Msimang.pdf.

RELATED CONTENT

Module 6, Legal and Institutional Framework

2.5 Convergence and Regulators

Platforms fulfilling different functions have traditionally been regulated differently for many reasons. For example, as illustrated in Module 6, telecommunications has been regulated in a different manner than broadcasting. In the context of convergence, where a single platform is capable of delivering all forms of electronic communications, should separate regulatory bodies merge or remain distinct institutions? Or should there be one regulator for platforms and another for content?

There remain many multi-utility regulators, which include telecommunications, although the number of “converged” regulators has grown over recent years,. In Malaysia, the issue of a converged regulator was addressed at an early date when the Communications and Multimedia Act 1998 established the Malaysian Communications and Multimedia Commission (MCMC) as the sole regulator of telecommunications, broadcasting, and computing industries. In 2008, the Korean government created the Korea Communications Commission (KCC) by consolidating the separate telecommunications regulator and broadcasting regulator, which were the Ministry of Information and Communications (MIC) and Korean Broadcasting Commission (KBC), respectively. The KCC merged telecommunications, spectrum allocation and broadcasting, including content, under a single regulatory authority in order to adapt to the rise of converged technologies, particularly Internet Protocol Television (IPTV). The introduction of IPTV in Korea had been delayed for several years due to disputes between the MIC and KBC over jurisdiction. Within a few months of the KCC’s creation, however, the converged regulator finalized the rules enabling operators to provide IPTV. By the end of 2009, Korea had over one million IPTV subscribers.[1]

Establishing converged regulators in the EU has been more challenging. Although EU Member States are implementing a “future-proof” single regulatory framework for electronic communications, only four out of 27 Member States (as of 31 December 2009) have what could be regarded as “converged” regulatory bodies.[2] These are Finland, Italy, Slovenia, and the United Kingdom.

It is not just the EU that lacks converged regulators since most OECD Members have not yet implemented laws to consolidate regulators. Only seven of the 30 OECD Members have single bodies dealing with all four regulatory forms of telecommunications; broadcasting carriage; broadcasting spectrum allocation; and content. These countries are Australia, Finland, Iceland, Japan, Korea (Rep.), the United Kingdom and the United States.[3] For each of the EU Member States listed above, at least one of the four regulatory functions lies outside the “converged” regulator.

Converged regulators – with responsibilities for media and content as well as ICT services – face a daunting challenge by taking on extensive, and often complicated, workloads. However, in a converged environment, traditional telecommunications regulators may struggle to resolve certain issues, such as consolidation between media content and telecommunications service providers.[4] Further, the absence of a converged regulator allows for the possibility of unequal regulatory treatment of different platforms delivering overlapping content or unequal regulatory treatment of different content delivered over any platform. Here there is the issue of technology-neutral regulation, meaning that the regulatory treatment of a particular service, regarding authorization, spectrum, interconnection, universal service, and numbering, is the same irrespective of the technology used to deliver it. Convergence poses challenges to both the structure of regulatory bodies and the instruments they use.

ENDNOTES

[1] Telecoms Korea, IPTV Subscribers Top 1 Million in Korea (2009) at http://www.telecomskorea.com/market-7674.html.

[2] European Commission, European Broadcasting Regulators Strengthen Their Cross-Border Cooperation under the Television Without Frontiers Directive at http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/374&format=HTML&aged=0&language=EN&guiLanguage=en.

[3] OECD, Telecommunication Regulatory Institutional Structures and Responsibilities (2006) at http://www.oecd.org/dataoecd/56/11/35954786.pdf.

[4] GSR 2009 Discussion Paper, Rory Macmillan, Connectivity, Openness and Vulnerability: Challenges Facing Regulators at http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR09/doc/GSR09_Challenges-regulators_Macmillan.pdf

RELATED CONTENT

Module 6, Section 4, "Impact of Convergence"

3 Authorization and Competition

This chapter outlines ICT regulation in the areas of authorization and competition and consists of the following two sections.

3.1 Authorization

Authorization is addressed in Module 3, Authorization of Telecommunication/ICT Services. It is a general term applied to all the legal instruments (such as licenses or concession agreements) used to facilitate entry to the electronic communications markets for services (including content) and networks. These legal instruments set out the rights and obligations of the authorized party as well as of the government in the case of concession agreements. The authorization process is the means of introducing and encouraging competition in the sector.

Granting an authorization can confer certain privileges on the grantee, especially where there are a limited number of authorizations. Consequently, the authorization process is best performed outside the political process. In circumstances where only a small number of operators are to be authorized, transparent competitive processes are considered best practice. While the use of radio spectrum is most frequently associated with limited market entry, there is a growing presence of “unlicensed spectrum” or “license-exempt” market entry. The rise of Wi-Fi is due, in large part, to the availability of unlicensed spectrum.

Unlicensed spectrum rules allow anyone to operate devices on a designated spectrum band without obtaining a specific authorization, provided that 1) they do not cause harmful interference to others operating in the same or adjacent bands; 2) they operate within range limits; and 3) they operate within certain technical parameters including maximum power outputs. For example, the Federal Communications Commission in the United States opened unused portions of the television broadcasting spectrum, called the “TV white spaces”, for the operation of unlicensed devices, subject to certain limitations. To protect incumbent services against harmful interference, the rules for the TV white spaces require unlicensed devices, which may be for fixed or mobile use, to include geolocation capability, spectrum-sensing technology and the ability to access a database of the incumbent services in order to detect at what frequencies incumbents such as TV broadcasters are using at that location.[1]

When competition was first introduced, the original licenses were hefty documents containing specific details regarding the technology to be used and behavior of a particular licensee. These documents represent the high point of *ex ante* regulation. Gradually the legacy of this practice is being superseded by issuing light-touch, general authorizations that apply across all sectors or in a particular sub-sector or “class.” In some instances, no authorization or formal approval is required. Market entry is unlimited and any regulation that takes place is *ex post* in the context of competition policy. General authorizations are well-suited to activities characterized by rapid technological change and dynamism. Nevertheless, the legacy of the original licensing practices lingers in many jurisdictions.

Many of the original service-specific and detailed licenses were issued around the time that the MPTTs and PTTs were being restructured and some assets were being privatized. At the time there was a very limited body of regulation, which led to the license being used as the primary regulatory instrument. Regulators have since implemented and updated a substantial body of regulations, which has eliminated the need to issue particular, detailed and specific authorizations. Instead, regulators can simply refer to the relevant regulations where necessary.

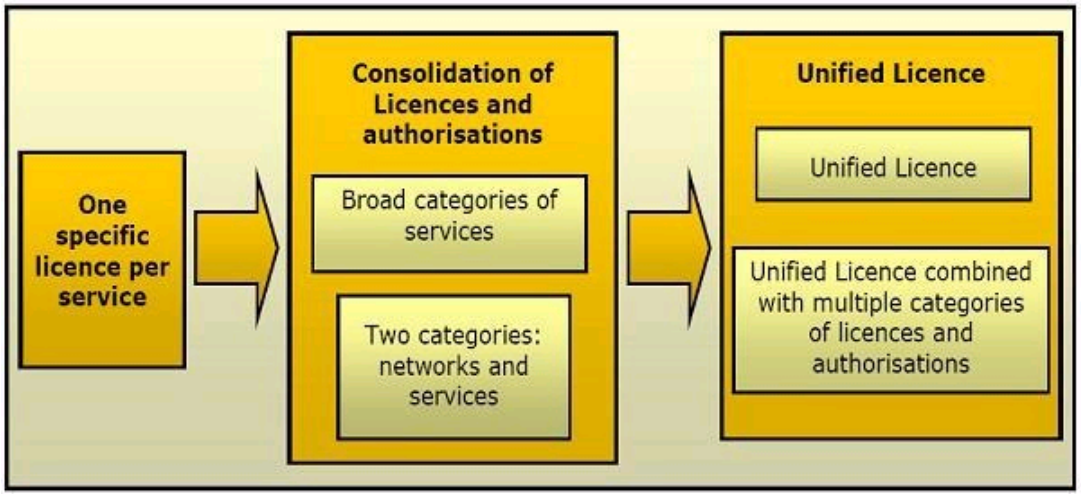
The early authorization methods also had an impact on the fees charged, the legacy of which is still present. Fees are frequently composed of different elements but generally entail an initial component and recurring charges. Many initial fees were established at auctions where particular privileges were for sale, often linked to a scarce national resource. By this means, governments were able to have early access to the future income streams of operators rather than waiting for their tax contributions over the life of the authorization. In the end it is usually the customer who pays the fees of the operator. One way of optimizing consumer welfare and promoting competition is to charge fees that enable the regulator to recover the costs of regulation. This also minimizes the costs of regulation. Though this is regarded as best practice numerous other methods have been adopted that tend to distort the functioning of the market.

Convergence introduces a new set of issues for the authorization agenda. Authorization has tended to follow a process that allows applicants to provide specific services with specific technologies. In a converged environment, such distinctions become irrelevant. Although service-specific authorizations remain, multi-service authorizations and unified (or global) authorizations are becoming more prevalent. The unified authorizations are technology- and

service- neutral and allow licensees to provide all types of services under a single authorization, using any type of communications infrastructure and technology capable of delivering the desired service. Like unified frameworks, multi-service authorizations are also technology-neutral and permit licensees to offer a broad set of services under one authorization. Like the service-specific framework, however, the multi-service authorization still prohibits the licensee from providing certain categories of service, such as television broadcasting.[2] Further, multi-service authorizations often remain separated into class and individual license categories, which is also similar to the service-specific framework.

In creating a regulatory environment that promotes convergence and NGNs, four inter-related authorization/licensing trends have emerged. These are neutrality, simplification, flexibility and reduction of the administrative burden. Authorizations are increasingly becoming service-neutral and technologically neutral by allowing licensees to offer a wide range of services over the technological infrastructure of the licensee's choice. Frameworks are becoming more simplified through the introduction of unified licenses in which many different service-specific licenses are combined under a single authorization. Unified licenses are appearing in some jurisdictions, such as Kenya, and work in tandem with technology and service neutrality to allow the licensee to use any platform to deliver nearly any service. The shift to a flexible authorization framework helps to attract investment in ICTs, for example, by allowing licensees to provide 3G services over the spectrum bands assigned to them in their 2G authorizations. Finally, regulators can attract investment and encourage competition in the ICT sector by reducing administrative burdens, which is particularly helpful for allowing new entrants to enter the market. Figure 1 below shows the process by which a service-specific licensing regime may be reformed into a unified licensing framework.

Figure 1. Process for Simplification of the Licensing Regime



Clearly, there will be restrictions on the number of licenses issued where resources like the radio spectrum are limited. Consequently, special obligations will continue to be placed on authorizations for scarce resources, as well as for dominant operators or operators with significant market power. However, these obligations should not preclude various arrangements that would facilitate, for example, fixed mobile integration. Existing restrictions on, or unequal treatment of, authorized operators offering similar services may impede convergence. Regulators should reexamine certain policies that discriminate against providers and services, such as rules that allow cable TV operators to enter the voice and data markets, but exclude telecommunications operators from the video market.

ENDNOTES

[1] FCC, FCC Adopts Rules for Unlicensed Use of Television White Spaces (2008) at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-286566A1.pdf.

[2] GSR 2009 Discussion Paper, Mindel De La Torre, Report from ITU-D Study Group 1, Question 10-2/1 Regulation for Licensing and Authorization of Converging Services at http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR09/doc/STudyGroup_draftreportQ10.pdf

RELATED CONTENT

Module 3. Authorization of Telecommunication/ICT Services

3.2 Competition

Once the authorization process is underway the role of the regulator is to ensure non-discriminatory treatment of all

players in the liberalized market. The UN Task Force on Financing ICT has advocated equitable treatment of market players as an essential means towards liberalization by stating: "*The explosion of ICT sector investment in most developing countries correlates closely with an improved environment for private investment to take place and the transformation of formerly closed, monopoly ICT markets to allow competitive entry. Where Governments have actively pursued an open, equitable market environment, investors have generally welcomed the opportunity to compete.*" [1]

However, at the outset of the liberalization process, the market is unbalanced with the incumbent clearly the dominant, vertically integrated player. It is likely that the tariff structure of the incumbent is unbalanced, where prices charged do not reflect the underlying costs of service provision so that some cross-subsidies are in operation. Market distortions can wrongly discourage or encourage new entrants. For instance, on the one hand, cross-subsidies can artificially decrease the incumbent's costs and allow the incumbent to under cut the newcomer's prices, which leads to under-investment by new entrants. On the other hand, excessively priced international calls, for example, can lead to over-investment by newcomers.

There are numerous ways in which the incumbent can further distort competition (see Module 2 and Module 6) unless the regulatory authorities take action. These include:

- Failure to deal with the requests of competitors for network interconnection in a timely or serious manner (typical responses are: "it is not technically possible," "it will take a very long time," and "it will be very expensive");
- Charging its retail arm lower fees than those paid by competitors;
- Reducing retail tariffs to a level where new entrants cannot survive;
- Making the sale of one product (to customers or competitors) conditional upon the purchase of a second product;
- Offering discounts to customers who take a combination of products/services;
- Entering agreements with distributors that preclude them from offering the products/services of competitors; and
- Providing low-quality products/services to competitors.

These activities are known as price/margin squeeze, predatory pricing, tying, bundling and exclusive arrangements. Although some of these practices, particularly tying, bundling and exclusive deals, often produce pro-competitive and pro-consumer benefits, these activities may be proscribed in individual authorizations or may be prohibited under the application of *ex post* competition law. In some cases, the competition agency is responsible for the application of competition law. In other cases, the sector-specific regulator has the authority or assumes the powers of the competition agency.

Generally, the focus of ICT regulation is on "essential facilities." New entrants are certain to require some inputs from the incumbent. Some of these inputs cannot be replicated economically or technologically by new entrants and no substitute can be found for them. These are "essential facilities" for new entrants and the "last mile" and interconnection disputes flow from this characteristic. Many of the above activities are prohibited by law or addressed in detailed *ex ante* licenses. There is a large body of analyses, case law and remedies concerning anti-competitive behavior provided in the Toolkit that reflects various jurisdictions.

Regulators also need to promote the interests of consumers since the incumbent can set tariffs above costs where it holds a dominant position (*e.g.*, line rental, local calls, and to some extent national calls) since new entrants initially target the international segment. Baskets, sub-basket and associated price caps have been constructed and linked to rates of inflation [2] (*i.e.*, Retail Price Index(RPI)/Consumer Price Index (CPI) minus some "X factor") to take account of expected efficiency gains. The impact of these price caps is largely felt by new entrants who can rarely set prices above those of the incumbent. Increasingly sophisticated costing models, such as forward-looking or incremental, with significant information requirements have been developed to improve tariff-setting efficiency. Regulatory tariff setting is much less common in competitive mobile markets, especially where three or more operators have been authorized.

The growing availability of the Internet and broadband are changing the tariff landscape with customers frequently paying for access and not usage. For a flat fee, customers can obtain a broad range of services such as Caller ID, conference calling, and call forwarding, plus unlimited national calls and/or free calls to on-net customers, as well as reduced prices for international calls. These practices are both a challenge to the previous principles of tariff setting and to the business models of incumbents.

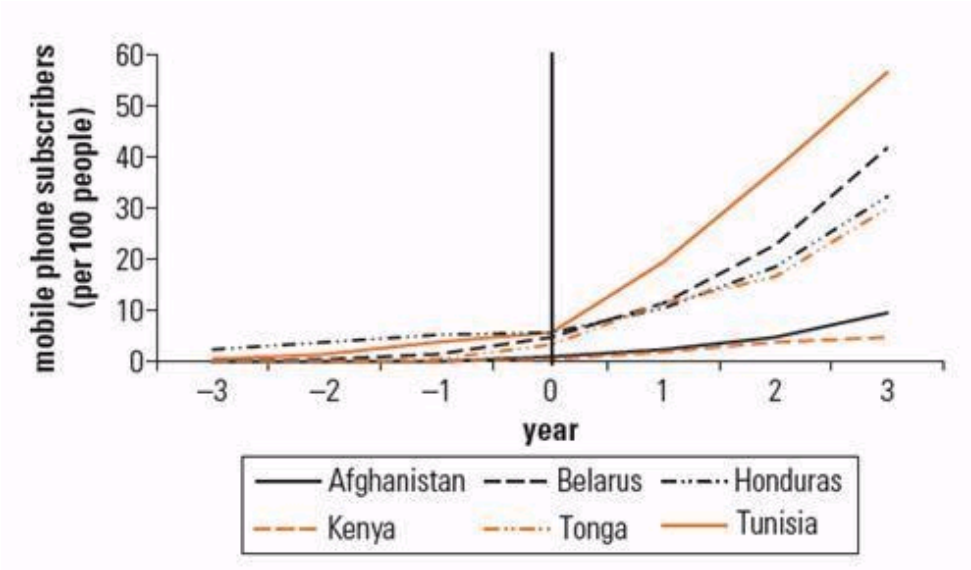
Poorer consumers, such as those in South and Southeast Asia, have taken advantage of competition in the broadband market through the rise of prepaid mobile broadband access.[3] Originally emerging in the budget voice telephony market, prepaid cards are now expanding to mobile broadband access and compete with the "always on" broadband access model. The prepaid mobile broadband market allows poorer consumers, whose incomes are often irregular, to purchase broadband access according to their needs or ability to afford broadband. A necessary

condition of this development is the removal or reduction of barriers to entry in the mobile broadband market and protection of competition.

Ultimately, competition leads to the erosion of the dominant positions of incumbents. In these circumstances emphasis shifts from *ex ante* sector specific to *ex post* competition law-based regulation. Simple market share thresholds (*e.g.*, 35 percent) in broadly defined markets have typically been used as a means of identifying a dominant position. However, competition policy has developed and become more sophisticated. In today's *ex post* regulation, the first step is the "definition of the relevant market."[4] Where the identified market is considered sufficiently competitive, sector-specific regulation has been lifted. For definitional purposes, markets can be analyzed according to product, geographic location, type of customer, retail, wholesale and time. Market definitions that are too narrow or too broad will fail to accurately identify dominant positions. Certain products in the market display clear signs of dominance, such as call termination on networks and thereby interconnection. For definitional purposes, markets must be analyzed from the point of view of buyers and sellers, particularly in regard to whether a product is a substitute for the one under analysis. Additionally, the presence or absence of barriers to entry (such as essential facilities) is central to defining markets. Once again, there is a substantial body of analyses, methodologies, and *ex post* competition case law reflecting the experience in different jurisdictions in the Toolkit.

The success of competition and private investment is demonstrated in mobile penetration rates in various countries around the world before and after the introduction of competition in the mobile market, as illustrated in the following Figure 1.[5]

Figure 1: Mobile Telephony Penetration Before and After the Introduction of Competition



Note: Year 0 in the figure indicates the year of entry of a second mobile operator.

Source: ITU, World Telecommunication/ICT Indicators Database

As the above figure shows, the number of mobile subscribers was relatively stagnant until the entrance of a second mobile operator, at which point the number of mobile phone subscribers typically skyrocketed. In Tunisia, for example, fewer than five percent of the population had mobile phones prior to the introduction of competition in 2001. By 2005, the mobile penetration rate jumped to more than 57 out of 100 people and reached a penetration rate of 84.6 per cent by end of 2008.[6]

ENDNOTES

[1] ITU, World Summit on Information Society, The Report of the Task Force on Financial Mechanisms for ICT for Development at http://www.itu.int/wsis/tffm/final-report.pdf.

[2] The X-factor in the price cap formula is an efficiency target chosen to reflect the productivity growth potential of the regulated firm over the (forwards-looking) term of the price cap. See Toolkit Module 2, Section 5.11.3.

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4 Interconnection

Networks interconnect to exchange traffic and supply inputs in situations where the operators both compete and cooperate. As explained above, such inputs are “essential facilities.” As the OECD observed: “*the regulation of the terms and conditions under which competing firms have access to essential inputs provided by rivals has become the single biggest issue facing regulators of public utility industries. This issue is both theoretically complex and inherently controversial. Since the development of competition and the success of liberalization often depend on the access terms and conditions chosen, there is also a strong public policy interest in getting these terms and conditions “right”. At the same time, new entrant firms and incumbents often have a substantial financial stake in the outcome and therefore a strong interest in negotiating aggressively.*”[1]

The legacy of the initial liberalization of markets and required interconnection lingers in current interconnection practices. Interconnection charges are often characterized by the same features as retail voice tariffs with a dependency on time of day, length of call, and distance covered. These characteristics are coming under increasing pressure from disruptive technologies. For example capacity-based charging[2] has been implemented by ISPs in some instances while most large Internet backbone providers use “sender keeps all” (or “bill and keep”) for interconnection with equivalent “peers.”

In order for a new entrant to compete with the incumbent on a wide range of services, it needs access to different, separately priced facilities on a network, often on a shared basis. To ensure access, many regulators have required incumbents to “unbundle” their facilities, particularly the local loop, which allows the competitor to lease the incumbent’s local line to the customer on a wholesale basis. Although unbundling can help ensure competition, in developing countries where fixed penetration is limited, such unbundling may discourage network roll out. The availability of wireless access and the authorization of multiple services via cable TV and other platforms are diminishing the “essential” nature of some facilities and thereby the need for *ex ante* regulation.

Many agree that interconnection charges should be based on the necessary cost incurred by the receiving party of the additional traffic it has to carry – that is, the requesting party pays the providing party the relevant costs caused by the request. However, there is much less agreement on the underlying theoretical models. Fundamental disputes surround the issues of sunk, variable, shared, common, replacement, historic, depreciation, incremental and forward-looking costs, and differing pricing models[3] that are found in the Toolkit. Benchmarks may be more appropriate in developing markets where the informational requirements of these various approaches are too onerous for operators and regulators.

Disputes over local loop unbundling have declined as mobile voice services and IP-based services have risen in importance. Two areas in which interconnection policies continue to develop and mature are issues relating to mobile termination rates (MTRs) and interconnection between traditional and IP-based services, particularly Voice over Internet Protocol (VoIP.)

Interconnection charges on calls from fixed to mobile operators continue as a legacy from introducing competition in the voice services market. The mobile sector was originally perceived as an “elite” rather than a “mass” market and, at the time, the technology was new and fairly costly. Furthermore, incumbents were frequently members of the first wave of authorized mobile service providers. In these circumstances, there was a tendency for the incumbent operator to set high fixed-to-mobile interconnection (or termination) charges as a means of transferring funds internally to its start-up subsidiary. When additional authorizations were issued, the new entrants willingly accepted these high charges and such payments became an important element of mobile business plans. There has been a tendency for regulators to focus on the charges paid by mobile operators to fixed operators for call termination rather than the reverse. This tendency has persisted even when the total number of mobile customers has surpassed the number on the fixed network. The decline in the interconnection charges of mobile operators has not kept pace with the dramatic fall in the capital expenditure of mobile operators to less than USD $100 per subscriber.

Now regulators are paying much closer attention to mobile interconnection and termination charges[4] rather than allowing operators to set fees themselves. This is especially the case when operators switch to “calling party pays” billing[5] and for international roaming charges as more customers complain[6]. Regulators sometimes pursue market-based solutions to bring down interconnection charges. They can promote competition by encouraging new (*e.g.*, “virtual”) mobile operators or by allowing customers greater opportunities to choose between mobile operators (by for instance number portability) and generally increasing transparency. Indirectly, more intense competition will reduce mobile termination charges. Regulators have continued to play a role in determining the interconnection charges of fixed operators.

There is a myriad of ways for a country to handle mobile termination charges, including:

- Full regulation of mobile termination rates (*e.g.*, Austria, Portugal and Cuba);
- No regulation of MTRs by allowing operators to negotiate freely (*e.g.*, Brazil);
- Only regulate mobile termination charges for fixed-to-mobile calls (e.g. Jamaica);
- Require mobile network operators to apply a single regulated termination charge regardless of where the call originates; and
- Apply asymmetric regulation where only the MTRs of mobile operators with SMP are regulated (*e.g.*, Colombia). [7]

With so many possibilities, the decision on which type of MTR regulations to implement should be based on a complete analysis of each country's particular needs. However, MTRs tend to be high where there is no regulation. For example, the MTRs in Brazil, a country without rate regulation, are among the highest in the world. Several factors should influence the decision, including the amount of price competition in the mobile market; potential costs and delays associated with reliance upon negotiation; the regulator's available resources; and consumer complaints regarding prices.

New interconnection regulations are also arising with the transition from analogue to digital, voice to data, narrowband to broadband, circuit-switched to packet-switched and the growing role in this context of wireless has radical consequences for existing interconnection regimes. In a converged environment, interconnection may frequently entail interconnection between different services and devices, as well as a wider range of platforms. A major challenge facing regulators is the management of tensions between the traditional, closed-network model in which the network operator owns and runs the public-switched telephone network (PSTN), and the new IP-based network model, which is open and decentralized. Since the IP-based model separates services from the platform, the network operator loses significant control over which applications and content users may run over the network. [8]

While VoIP originally involved two customers connected to the Internet (by different devices) making voice calls or other forms of communications over the Internet without connecting through the PSTN or incurring any additional charges over their monthly payments to their ISPs, VoIP has become interconnected.

"Interconnection" in these IP-based business models is fundamentally different from interconnection as it has been widely practiced. Instead, interconnection refers to peer-to-peer (P2P) network operator relationships, which are.much more harmonious than the traditional interconnection relationship, which has been characterized as confrontational (incumbent versus new entrant, big versus small), especially in the early phases. Peers are by definition of equivalent scale. Generally, P2P agreements are not subject to regulatory supervision.

A hierarchy of "peers" has developed with an ascending ladder of "aggregators" or transit providers. Within a peer group, traffic is exchanged on a sender-keeps-all basis and there is consequently no need for interconnection models. Peers exchange traffic but do not charge each other, because this is a largely symmetrical relationship. Traffic between different peer groups is exchanged on commercially negotiated rates for a given capacity and maximum peak load for "transit" services. Where there is sufficient choice and competition between rungs on the ladder or peer groups, market solutions will prevail for commercially negotiated rates. "Fair" cost-based charges emerge from a well-functioning market and in those instances where a dominant peer group emerges, any abuse of such a position would be the subject of *ex post* regulation via the application of competition law. For many operators in developing countries, the advantages of P2P may be slow to materialize where the choice of "transit" providers is restricted and international access capacity is limited. Further, while many developed economies have established cooperative or joint application of competition law (thereby extending jurisdiction beyond a national boundary), there is much less experience of such relations in developing countries. Consequently, action to improve regional connectivity may be necessary, accompanied by appropriate regional regulatory initiatives.

It is widely held that the costs of IP-based networks are substantially below those of public switched telephone networks (PSTN), so that any form of cost-based interconnection (or capacity charging) will be cheaper than those prevailing for traditional operators,[10] thereby implying a generalized downward pressure on fees. All these P2P "interconnection" charges are already factored into the monthly charges to final customers rather than individual tariffs billed to customers of the traditional model.

While "traditional" interconnection is on the wane, its legacy will linger. VoIP is permitted in a substantial and growing number of jurisdictions, such as the Philippines, South Africa, and Ecuador.[11] It is also possible to use VoIP services to call PSTN customers with a "breakout" from a local Internet point of presence to the final destination. In these circumstances a "traditional" domestic interconnection fee will be charged to the originating customer even if the call is international. It is also possible to reverse the breakout, with similar consequences, and to provide two-way breakouts. All of these possibilities are disruptive for PSTN business models. The leaders in VoIP services (Skype, Google Talk, Yahoo! IM with voice, VoIP Buster) are not traditional telecommunications operators and their core revenue sources are not necessarily from the provision of voice services.

Many developing country operators are already under pressure from operators in developed countries. The latter,

both privatized incumbents and new entrants, seek lower international termination charges, which challenge the finances of their developing country correspondents. VoIP and its impact on international termination fees further intensifies these downward pressures.[12]

ENDNOTES

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[2] See ITU case study on capacity based charges in Colombia http://www.itu.int/ITU-D/treg/Case_Studies/Convergence/Colombia.pdf.

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RELATED CONTENT

Module 2, Section 3, Regulating for Interconnection

5 Universal Access

Widespread access to and diffusion of ICTs are highly desirable for social and economic reasons. Ensuring the full participation of all in the Information Society is a major policy goal, the implementation of which brings all the benefits and transformational opportunities of ICTs. For example, countries participating in WSIS set the ambitious goal of connecting all villages of the world to ICTs by 2015, including establishing community access points, and connecting universities, schools, libraries, post offices, health centers, and local governments. The EU has adopted the term “e-inclusion” to refer to full access and participation[1] and is particularly conscious of the promises of new digital opportunities and the new risks of digital exclusion.

As the ITU observes, two different terms are used to describe levels of inclusion. Universal Service (US) means that every household in a country has the opportunity for telephone service. Universal Access (UA) means that everyone in a community can gain access to a publicly available telephone, although not necessarily in their homes. Normally, both include free access to emergency services, the availability of directory services and special provision for customers with disabilities. Since many countries have reached universal access for telephony and now strive to achieve universal service, they are now focusing on reaching universal access for broadband. Therefore, the generic term UAS (or UA/S) is becoming more common as policies target both UA and US.

The term “Universal” encompasses several elements including availability, affordability, and accessibility (see Module 4). The focus of UAS policies is delivering service to those segments of society that are least able to attract the commercial provision of service. Policies targeted at US address non-commercially viable households and those targeted at UA address non-commercially viable communities. High cost-of-service provision and/or low incomes are the primary reasons that such customers are unattractive to operators.

However, the provision of UAS should not be viewed as a burden since extending access brings about the economic benefits of “network externalities” (increasing the customer base brings benefits to all customers), “call externalities” (new customers may not make many calls but they generate revenues when they receive calls), and externalities derived from substituting electronic communications for other forms of participation or access to important public services. Generally, operators do not take these externalities into account when making purely commercial decisions. The possibility of materializing such externalities provides a rationale for policy interventions.

The WSIS target is one for universal access, which is appropriate for developing countries at this time. But as markets and technology unfold, the bar will continue to be set higher. This implies a periodic reconsideration of what types of service should be included in any definition of UAS (ranging from single line voice-grade, incrementally all the way to two-way broadband services) and at what cost to the consumer. Flowing from these issues are the mechanisms for both delivering and financing the desired level of service.

Global experience with extending access and UAS policies has expanded considerably since the publication of the *info*Dev Telecommunications Regulation Handbook. Separately or in combination, the following approaches have been implemented:

- Market based reforms
- Mandatory service obligations
- Leveraging new technologies, *e.g.*, mobile services
- Leveraging new business practices, *e.g.*, pre-paid cards
- Cross subsidies
- Access deficit charges
- Universal Funds
- Public-private partnerships

Of these, the most successful have been the market-based reforms associated with the liberalization of the mobile sector, supported by a stable regulatory environment and the subsequent exponential growth in customers in developing countries. These initiatives have allowed market forces to contribute fully and thereby close the “market gap.” Regulators have used a variety of methods to achieve UAS through market forces, including regulatory reforms that create incentives for the private sector to extend universal access, establishing interconnection frameworks, flexible spectrum rules and other technology-neutral policies to encourage the entry and use of new and innovative technologies and provide a wider range of participants to achieve UAS goals.[2] The remaining “access gap” can be categorized as:

- Communities that only require a targeted capital injection where future revenues will support operational

expenditure, often referred to as the “sustainability frontier” and

- Communities that require ongoing support for both capital and recurring expenditures.

The practice of ensuring universality by using cross subsidies between the different services of an operator (from international to local and/or access) to ensure affordability has been severely strained by the introduction of competition. Access deficit charges have also been found to be sub-optimal in competitive environments. In many jurisdictions, Universal Service Obligations (USO) are in place. The informational demands on regulators are considerable where a designated operator (frequently the incumbent) is reimbursed for the losses incurred or reported in the provision of UAS.

As the Toolkit illustrates, Universal Access/Service Funds (UAS Funds) have been established to provide financial incentives to operators to close the access gap. They require mechanisms to garner finance and disburse the incentives in a cost-effective manner to achieve the ends of the UAS policy objective. Frequently, the sector is the source of finance for the UAS Fund in the form of levies and in other cases the fund is financed from the general budget. While UAS Funds (also called Universal Service Funds or USFs) are an important tool, they should not be solely relied on to achieve universality. Other mechanisms to be considered and adopted include direct state aid and public financing such as loan guarantees and public-private partnerships, as well as liberalizing the licensing and spectrum frameworks.

Where UAS Funds are used, they have proved effective when disbursement is coupled with competitive bidding or auctions for these financial incentives, requiring operators to compete for the minimum subsidies needed to fulfill the UAS target.[3] Since subsidizing ICT projects carries certain risks such as market distortion, dependence on funding, fraud and abuse, favoritism and wasted resources, regulators have introduced “smart subsidies.” Smart subsidies provide a one-time award geared towards obtaining results in areas where investors have been reluctant to invest, but will ultimately become commercially viable. Thus, the subsidy acts as more of a kick start to investment rather than as a crutch. The Dominican Republic provides an example of where a smart subsidy, known as an output-based aid (OBA) subsidy, has been used. The regulator conducted transparent, minimum subsidy auctions in which the winners receive the subsidies in phases over the course of the project rather than all at once.[4] Thus, winners receive 20 percent upon signing the contract, 40 percent upon completion of the required installations and the remaining 40 percent in six month installments over a five-year period.

In some instances, subsidies have been provided directly to customers or to particular institutions, such as libraries, schools, and public tele-centers. Early, large-scale UAS projects were frequently undertaken on a top-down, supply-driven approach where a single provider, often the incumbent, was selected to provide a standard set of services, using a narrow set of technologies over a wide geographical area. The introduction of NGN-related technologies, such as Broadband Wireless Access (BWA) and Wi-Fi, has substantially reduced economies of scale in both the infrastructure and service segments. This has opened up the field to a wider range of small or local providers to expand universal access from a bottom-up, demand-driven approach.

The phenomenal spread of the Internet has had an impact on notions of universal service. In the 2002 Universal Service Directive, the EU included the concept of “Functional Internet Access”[5] in the definition of universal service and is currently constructing a “future proof” regulatory environment. For example, in September 2009, the EU announced that it will inject EUR 1.02 billion into the European Agricultural Fund for Rural Development (EAFRD), part of which will be used to support investment in high-speed broadband to help ensure 100 percent coverage to EU citizens by 2010.[6] As part of the EU’s stimulus plan to secure investments in broadband deployment, Member States must ensure that provision of state aid is 1) granted out of state resources; 2) confers an economic advantage to businesses; 3) selectively targeting recipients and is not distorting or threatening to distort competition; and 4) affects intra-Community trade.

In a converged economic space of electronic communications, new forces have been set in motion. VoIP business models are leading to the erosion of revenues from voice services for operators, while the intensification of competition is hastening the transition to NGNs. While NGNs provide the opportunity for a much wider range of revenue-generating services, the platforms will be deployed on a commercial basis. It is quite possible that this deployment will follow the geographic and income-related distribution of computers in businesses and households. This implies that those locations currently underserved or benefiting from a UAS Fund will not be among the first to be connected. Furthermore, given the shift in cost towards the user, when the cost of a computer is included, the concept of “affordability” must be re-examined. Clearly there will be an enhanced role for shared access and community-based initiatives.

There is growing interest in and experience of community-based projects to provide Internet services based on the “municipal open access model.” A study by *info*Dev found numerous examples of community-based projects, including the Myagdi, Kaski, and Parbat districts in north-west Nepal; the municipality of Pirai in the Rio de Janeiro state of Brazil; and the city governments of Philadelphia (USA) and Knysna (South Africa).[7]

The debate over the role of broadband in universal service is underway around the world, such as Chile[8] and India. In 2006, India was one of the first countries to include broadband in the UAS Fund, which allows fund to

support broadband connectivity and mobile services in rural and remote areas of the country. [9] Convergence, facilitated by NGNs, raises the potential externalities by increasing the potential benefits to households of services if they had access to them. Convergence may possibly increase the sector base on which levies can be made for a UAS Fund while also raising specific regulatory issues related to universal service regarding voice quality, emergency services, and services for the disabled.[10] Overall, policy makers should keep in mind that UAS requirements have expanded to include broadband due to the rise of NGNs and convergence. While market forces are dynamic, UAS policies should build on competition to encourage deployment to all. These issues are addressed in Module 4 of the Toolkit.

ENDNOTES

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RELATED CONTENT

Module 4. Universal Access and Service

6 Radio Spectrum

The importance of spectrum to the electronic communications sector is evidenced by the soaring number of mobile service subscribers, the huge numbers of viewers and listeners to television and radio and the relatively new and mushrooming phenomenon of Wi-Fi and WiMAX radio access – all of which place demands on the radio spectrum. The transition to digital broadcasting adds a new dimension to the radio spectrum agenda.

In the modern era, spectrum has been subject to detailed regulation for national security and emergency services purposes, as well as to manage spectrum as a scarce resource and minimize the risks of harmful interference between spectrum users. The notion of spectrum scarcity has increasingly led administrations to more efficiently manage spectrum through various mechanisms, such as spectrum trading, reallocation of spectrum to more valuable uses and in-band sharing. In-band sharing is a flexible spectrum management policy in which several licensees are permitted to offer different applications and/or technologies over the same spectrum bands, provided they do not cause harmful interference to any other lawful users. Since spectrum management involves cross-border agreements and harmonization, the spectrum agenda necessarily entails international coordination, where the ITU plays a particular role.

The central issues for spectrum management are allocation (where choices are made between competing uses) and price. Spectrum can be used for many applications where more than one application can work on any given frequency; where some applications can work on a range of different frequencies; and where different applications require varying amounts of spectrum.

Under traditional radio spectrum management, decisions have been made regarding allocations of radio spectrum among competing applications or services for the range of frequencies available. These decisions have often taken place in a two-staged manner. First, frequencies are allocated to particular applications (often according to international agreements), then within those applications certain operators are assigned particular frequencies (often on a first-come, first-served basis) and are charged fees. There is a relationship between fees that can be charged for spectrum usage and revenues that can be earned from services of operators. These choices and prices should provide the maximum net benefit. Issues arise where new technologies offer higher value opportunities for frequencies already allocated to operators or applications. Allocating resources among competing uses is traditionally the realm of economics and markets, but decisions have been made to a large extent administratively, in order to take account of public-interest policies.

Spectrum-related technology is moving much faster than spectrum-related regulation in the context of demand for spectrum growing at an accelerated rate. Once regarded as a particularly scarce resource (another rationale for detailed regulation) the switch from analogue to digital broadcasting will produce a “spectrum dividend.”[1] Equally, new compression techniques and the use of very short range spectrum are enhancing the availability of spectrum. It is clear that radio spectrum is becoming more valuable with the development of convergence and the expanding range of services that can be delivered via radio spectrum. Consequently there is a requirement to use radio spectrum efficiently.

Currently, there are certain inefficiencies in the radio spectrum arena. These are caused by the inertia and legacies of licensees and certain spectrum management practices that can limit spectrum availability and impede innovation. Very often the public sector is a major holder of radio spectrum. For instance, in the United Kingdom the public sector accounts for nearly half the spectrum below 15 GHz,with the UK Ministry of Defence the largest user. Often, public sector holders of radio spectrum do not use it in the most efficient ways, and in some cases “warehouse” the spectrum, which led to Ofcom issuing a decision in 2008 requiring the public sector to more efficiently use spectrum. [2] The decision also permits government agencies to sell their unused spectrum to the private sector.

Markets and price mechanisms are generally associated with efficient allocation of scarce resources and may be used to cover the administrative costs of spectrum management; maximizing the economic benefit of the spectrum resource for the public; and ensuring that those operators that benefit pay for the use of spectrum. Often in the second stage, frequencies are assigned to particular operators by market means, and auctions are very common in the issuance of mobile licenses. Some of these licenses have subsequently been traded in mergers and acquisitions. Increasingly, financial incentives are being introduced to encourage users to economize the spectrum they occupy. Measures are also being introduced to allow for the reuse of assigned spectrum that is not fully utilized.

As Module 5 of the Toolkit explains, four radio spectrum management models have been developed and implemented:

- The traditional “command-and-control” model, which is regarded by some as best suited to fulfilling public interest policies. The model can also provide for the harmonization of spectrum use leading to the development

of economies of scale and falling costs for equipment manufacturers and customers

- A “market-based property rights” model involving exclusive usage rights and spectrum trading and pricing. The market-based model should stimulate further technological change in spectrum-based applications and usage, which may not lead to the same degree of harmonization and falling costs of production of equipment.
- The “commons” or “unlicensed” model where, on a shared basis, spectrum is available to all users who comply with certain pre-determined technical limits (e.g., total transmission power/output limits) and equipment certification requirements of mitigation techniques to guard against interference. This “open” model is generally flexible regarding usage rights of “white spaces”, lowers access barriers to radio spectrum usage, and effectively decentralizes radio spectrum allocation to users. As a consequence, the commons approach allows quicker new market entry. In combination, decentralization, rapid market entry, and flexibility can encourage technological developments for spectrum-efficient applications like Wi-Fi. The drawback of the commons model is that it can stimulate overuse of spectrum rather than the efficient use of alternative resources.
- More recently, an “easement” model has been developed and implemented, which relies on intelligent or smart technologies. These technologies allow for spectrum sharing. They enable unlicensed users of devices to operate in the same frequencies on a secondary basis as licensed users who hold exclusive rights to use spectrum. The model draws on both the market-based and commons approaches. It is clear that the easement model can only function where the spectrum in question is not used intensively.

There is always a tension between harmonizing spectrum uses, thereby generating economies of scale and lower costs, and permitting wider uses of any particular band of frequencies and thereby stimulating innovation. The past has largely been characterized by harmonization, while the future is more likely to encourage innovation. Equally, there is a tension in the command-and-control model with the requirements for technological and service neutrality associated with the converged environment.

The ICT sector has witnessed the evolution of spectrum management policy from pure command and control to include increasing contributions from the other three models. It is clear that no single model can be applied in all circumstances. It is also clear that many operators would prefer greater flexibility in using the spectrum they already hold. As discussed in the Toolkit, the challenge for regulators is to achieve a balance between these models that best suits their circumstances. Wireless is clearly the most popular technology in developing countries, and therefore, spectrum management is very high on the regulatory agenda.

ENDNOTES

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7 New Technologies and Their Impact on Regulation

As emphasized throughout the Toolkit, new technologies have a major impact on ICT regulation. One word is missing from the new vocabulary described at the start of this Module – Globalization. ICTs have been a major driving force and enabler of globalization and its associated connectedness. Globalization brings with it a whole set of international and cross-border regulatory issues, and a requirement for multilateral regulatory forums. For example, IT-enabled services, international financial services, and e-commerce entail the transfer of data across borders, and these activities raise the issue *inter alia* of privacy. The sheer volume of data transfer is itself a challenge, but the OECD[1] notes two additional risks related to:

- Secondary uses of personal data; and
- Information security breaches.

It has always been difficult for individuals to monitor how organizations use their personal data in a secondary manner and the problem is made more difficult due to the ease and frequency with which organizations currently process data. The second risk is evidenced by the growing number of high profile data security breaches that are publicly reported. Privacy is not the only issue; according to OECD, "*A wide variety of scams operate in the online environment, ranging from fraudulent lottery schemes, travel and credit-related ploys, modem and web page hijacking, and identity theft (ID theft) to name but a few… the Internet has given criminals access to a worldwide base of consumer targets as well as more opportunities to elude enforcement as they need not be in the same country, or even in the same hemisphere, as their victims.*"[2] Ensuring e-security is a major task. However, "security" is applied both to the individual and the state, and requires a balance between the two sets of interests.

Lack of trust in the Internet, and therefore the need to address the above issues, is often cited as one of the most important obstacles to the use of the Internet and e-commerce. Internet governance is a major topic in its own right. In order to involve all stakeholders and ensure comprehensive cybersecurity protections, national governments are often in the best position to implement new security policies. These policies should touch on many different areas including highlighting the importance of ICTs to the nation; identifying and analyzing the risks from cyber crime and attacks; establishing objectives such as prevention, detection and prosecution of cyber crimes; and setting a plan to achieve these objectives that details the stakeholders' roles and responsibilities for data protection and cybersecurity.[3]

Regulation in an IP environment raises serious questions concerning the current regulatory environment. It impinges on all of the previously discussed topics: competition, spectrum management, interconnection, UAS, authorization, price regulation, and also numbering, together with all associated regulatory and legal practices and instruments. For example, spam has become a particularly unwelcome and costly consequence of the spread of the Internet where national and international agencies are taking actions to limit it. For emergency services, IP telephony poses a particular problem in many countries. In Europe, for instance, access to emergency service numbers is an obligation of Publicly Available Telephone Service (PATS). Both the U.K. and Irish regulators have conducted consultations on ensuring that VoIP users can contact police, fire and ambulance services. Challenges that VoIP users face in accessing emergency services include location correspondence since VoIP numbers are often non-geographic and quality of service since power failures often make VoIP phones useless.[4]

One of the major consequences of the evolving technology is that it at last makes a reality of the long-promised "convergence" (the EU issued its first Green Paper on convergence in 1997). Convergence is facilitated by the transition from analogue to digital, voice to data, narrowband to broadband, circuit switched to packet switched, one way to interactive, scarcity to abundance, and the accompanying digitalization of all content. Convergence allows both previously separate industries and entirely new sectors to compete in the same newly expanded market space. For example, numerous markets around the world are offering IPTV and mobile television. However, countries are taking different approaches towards classifying IPTV. Some countries regulate all IPTV-related services as broadcasting while other countries prefer to focus on competitive market entry and do not classify IPTV at all. Still other countries have adopted a middle ground in which some IPTV services are classified as broadcasting while other services, such as video-on-demand, are not regulated as a broadcasting service. See Module 7 for more detail on how IPTV is impacting regulation.

In this new converged market space, technology allows, and customers can expect, the seamless provision from multiple sources on a single device of all of electronic communications for one supplier competing with many other suppliers – a working definition of "convergence." This one-stop-shop could be the business of a single entity or of multiple entities working in collaboration. In the new market space, the core business of a traditional player may be peripheral to that of a new player and yet the traditional player may not be able to withstand the competition from

the new entrant. This transition has radical consequences for existing business models, platforms, content, and devices, together with the regulatory environments that support investment in and consumption of them.

A broadband platform can deliver telecommunications services, information services, broadcasting services and much more. Frequently, regulation has taken a “line of business and technology” approach and has often limited cross-market entry. Normally, there have been separate regulators for the different lines of business and often an additional regulatory body dealing with radio spectrum. Often the objectives of the government vary according to the “line of business,” notably between broadcasting and telecommunications. The regulation of broadcasting has focused on the social and cultural impact of the sector, while in telecommunications the concern has been the transition from monopoly to competition. Convergence calls this state of affairs into question since the content of these lines of business are indistinguishable digital messages. While the objectives of the government may not have changed with respect to a “line of business,” they will become more difficult to implement in the new market space.

Both broadcasting and telecommunications have been regulated with the goal of achieving a form of universal access and service. Broadcasting has also been charged with nation building, preserving language and culture, promoting values and standards, protecting minors, etc. The regulation of publishing has some of the characteristics of broadcasting, especially with regard to values, minors, slander, and defamation. The Internet is largely unregulated but there are some controls on content. As yet, there is little regulatory experience on “web casting” even though live audio-visual streaming of content can be a very close substitute for television broadcasting. Increasingly these platforms are providing overlapping or the same service, applications, and content.

A distinction has been made between “linear” and “non-linear” services. TV broadcasts are regarded as linear services where content is “pushed.” On-demand services are regarded as non-linear where content is “pulled.” The EU has defined non-linear services as any audiovisual media service where the user decides upon the moment in time when a specific program is transmitted.[6] Generally, non-linear services are regulated by e-commerce regulations rather than broadcasting legislation. Consequently, the two types of content are subject to different forms of regulation regarding obligations, the treatment of advertising, and what is termed “positive” content regulation, such as requirements to support independent content production.

The key questions in a converged environment capable of delivering both linear and non-linear service are how and by which institution should these platforms and the content they carry be regulated? Is there any case for continuing to regulate according to the technology of a platform where all platforms deliver the same services, applications, and content? Should platforms that are near-perfect substitutes for each other be regulated in the same way?

The questions are especially important because investment in platforms will only generate positive returns where customers are willing to pay for the service, applications and the content they provide – that is, content drives platform investment. Market distortions, impacting investment and consumption decisions, can result from the unequal regulatory treatment of different platforms delivering overlapping content or unequal regulatory treatment of different content where all platforms deliver the same services, applications, and content.

Clearly a level playing field would be most advantageous – that is, an integration of existing regulatory frameworks into a single framework that is coherent across the entire electronic communications market space. But in leveling the field, should the regulatory field be raised to the highest common factor (possibly broadcasting) or dropped to the lowest common denominator (possibly Internet)?

Convergence will present new challenges for competition authorities since it is expected to generate pressures for “consolidation.” We have already witnessed numerous mergers and acquisitions among players in the new market space. In some instances, acquirers have emerged from non-traditional sectors. There are forces in play that stimulate vertical consolidation. These forces flow from the enhanced economies of scope and scale between platforms and content made available by convergence. Where size is a key factor for business sustainability, there are also forces at work to bring about horizontal consolidation.

There has been a trend towards *ex post* regulation using competition law and away from sector-specific *ex ante* regulation as ICT markets have become more competitive. One of the pillars of ICT regulation has been “access” and interconnection that predominantly concerns access to customers. In a converged environment there are additional access issues because there are additional “gateways” both technical and economic. The gateway may be a set top box (conditional access) or a digital rights management (DRM) system. Service providers need access to content and content providers need access to customers, both of which may establish some form of economic gateway. In the new value chain, control over a gateway can ensure considerable returns to its owner. Competition policy must continue to address dominant positions that may emerge in the converged environment, hence the need for the application of competition policy.

Similarly, competition authorities in different jurisdictions have already struggled with and come to different conclusions regarding the treatment of exclusive rights – especially for significant national and now global media events – termed “general access to major events,” such as the Olympic Games. Regulating these events in a global converged market space requires international cooperation and innovative thinking. There are many examples where cross-media ownership is not permitted, where the “reach” of same-owner TV channels is limited, where there

are limitations on foreign ownership and the provision of bundled services is strictly regulated on competition grounds. Such practices risk becoming redundant or unenforceable in a converged Web 2.0 environment. The latter represents the “second generation” web-based services based on sharing and on-line collaboration, such as blogs and websites like YouTube.

The transition from monopoly to competition in telecommunications is well underway in the vast majority of countries and largely completed in many. The transition has proved beneficially transformational and has set in motion further dynamic changes that are delivering a vastly expanded set of global opportunities in electronic communications. These opportunities are again positively transformational and are encapsulated in the term “convergence.” But in order to participate in and maximize the benefits of convergence, a new regulatory paradigm has to be put into place. The new paradigm must address the legacy of the earlier transition period while supporting investments in the new period and facilitating new investments in the new market space.

The costs - social, economic, and political - of being left behind in these transformations are very considerable. The ICT Regulation Toolkit is designed to help developing countries implement effective regulatory frameworks that can harness the latest technological and market advances, enabling them to best use ICT as a development tool.

ENDNOTES

[1] OECD, Cross- Border Privacy Law Enforcement (2007) at http://www.oecd.org/document/25/0,2340,en_2649_37441_37571993_1_1_1_37441,00.html. For a definition of security terms see *ITU-T Approved Security Definitions* at http://www.itu.int/dms_pub/itu-t/oth/0A/0D/T0A0D00000A0002MSWE.doc.

[2] OECD, Policy Brief, Protecting Consumers from Cyberfraud (2006) at http://www.oecd.org/dataoecd/4/9/37577658.pdf.

[3] GSR 2009 Background Paper, Eric Lie, Rory Macmillan and Richard Keck, Draft Background Paper on Cybersecurity: The Role and Responsibilities of an Effective Regulator at http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR09/doc/GSR-background-paper-on-cybersecurity-2009.pdf.

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[5] Telecommunications Management Group, IPTV: The Killer Broadband Application (2007) at http://reports.tmgtelecom.com/iptv/TMG%20IPTV%20datasheet.pdf.

[6] European Commission, Proposal for a Directive on the Coordination of Certain Provisions Laid Down by Law, Regulation or Administrative Action in Member States Concerning the Pursuit of Television Broadcasting Activities (2005) at http://eur-lex.europa.eu/LexUriServ/site/en/com/2005/com2005_0646en01.pdf.