Module 1. Regulating the Telecommunications Sector: Overview

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Module 1. Regulating the Telecommunications Sector: Overview

The ICT Regulation Toolkit, produced by infoDev and the International Telecommunication Union (ITU), is a much expanded, practical web-based update of infoDev's popular and influential Telecommunications Regulation Handbook of 2000. The Toolkit is divided into several 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 ICT developments will promote greater access to ICTs, especially in developing countries. At the same time, they 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 design effective and enabling regulatory frameworks to harness the latest technological and market advances, while facing the challenges of a changing sector. The Toolkit is designed to better enable developing countries to use ICTs as a development tool. The World Summit on the Information Society (WSIS) recognized the key role 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 drawn from academia, industry, the ITU, the legal profession and the World Bank Group. 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 having a dramatic effect on 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 five sections.

1.1 New Vocabulary, New Economy, New Regulation

Our vocabulary is evolving. Existing words assume new meanings – burn, rip, text, game, cookie - or appear in new combinations – cyber crime, file sharing, instant message, search engine, navigation bar. Some vocabulary is entirely new – blog, podcast, Wikipedia. The range of acronyms continues to expand – MP3, P2P, SMS, BPO, DRM, NGN, VoIP, VoBB, WiMAX. This evolving vocabulary can even evoke the experience of an era – "dotcom bubble." The common factor here is ICTs and this reflects the growing and highly significant contribution of ICTs and the Internet in particular to a new landscape of economic and social activities and relations. The new landscape is populated by new ways of performing existing activities as well as entirely new activities – in terms of the evolving vocabulary - the "Information Society" and the “New Economy.”

Electronic communications infrastructure and services (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 regulation of ICTs has itself continued to evolve. The liberalization of ICT markets has stimulated cumulative interacting innovations in products, services, and technologies, and 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, to 2002. This framework is being adopted by increasing numbers of countries as they accede to the EU or become candidate members.

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 EU. 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 implemented ICT strategies.[1]

ENDNOTES


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, and 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 US 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. In the context of WSIS, Kofi Annan observed:
Information and communications technologies have considerable potential to promote development and economic growth. They can foster innovation and improve productivity. They can reduce transaction costs and make available, in mere seconds, the rich store of global knowledge. In the hands of developing countries, and especially small- and medium-sized enterprises, the use of ICTs can bring impressive gains in employment, gender equality and standards of living."

On 4 April 2005, Ethiopian Prime Minister Meles Zenawi stated: “Now we believe we are too poor not to save everything we can and invest as much as possible in ICT. We recognize that while ICT may be a luxury for the rich, for us the poor countries, it is a vital and essential tool for fighting poverty, for beating poverty that kills and ensuring our survival.”

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 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.

There are some stunning successes. In 2002, the total number of mobile subscribers in the world surpassed that of fixed customers. The ITU listed 25 countries in 2005 where mobile penetration rates exceeded 100 percent of the population. Asia is the biggest mobile market with 40 percent of all subscribers in the world. The number of mobile subscribers in China far exceeds the combined number of Japan and the United States. (In fact, there are some 84 million more mobile subscribers in China than in the United States and Japan combined.) Even though Africa has only 4 percent of mobile subscribers, this translates into 80 million customers (compared to less than 30 million for fixed lines), growing at around 60 percent annually between 1999 and 2004. These successes indicate that a framework has been in place that supports investment and widespread diffusion.

Mobile phone handsets are now digital cameras, Internet-enabled video, 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. As digital cameras, they facilitate instant news gathering and industrial espionage. Their Internet-enabled video and music capability brings them into the realm of the media, copyright, and Internet governance. As a component of the banking system, the mobile network can provide service where the financial network is weak, but there is also the risk of banking fraud and misdemeanors. This widely used electronic consumer device now straddles several regulatory jurisdictions and brings new challenges to the regulatory framework to sustain investment and promote widespread diffusion, while protecting the legitimate interests of all the players.

ICTs have had a significant impact on business operations where a large number of new, non-OECD countries have successfully entered the market. This is particularly the case for software and Information Technology Enabled Services (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. Bandwidth has two major attributes: it can carry huge quantities of data, and it carries huge volumes at very high speeds. Postal and courier services can also deliver large quantities of data (a truckload of CDs) but they fail the speed test. To transfer the digital information contained in a DVD copy of the film "The Matrix" from New York to California would take 13 days using a 56Kbps dial-up modem; 10 hours by FedEx; and one minute using broadband (1000 Mbps optical fiber).

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 that were considered non-tradable have become tradable, e.g., back-office functions such as the management of employee benefits or dental records. There has been a massive increase in “out-sourcing” and/or “business process off-shoring” (BPO). The total addressable market for off-shoring is estimated at USD $300 billion of which USD $100 billion will be off-shored by 2010. This is another ICT success story. India, the dominant player in this market, experienced growth in BPO exports of 44.5 percent in 2005 and an increase in employment in the sector from 42,000 in 2002 to an estimated 470,000 in 2006. The state of Andhra Pradesh increased its exports of ITES from USD $37 million in 2001 to USD $714 million in 2005. Countries like the Philippines, Brazil, Romania, and Ireland have been particularly successful in attracting investment and creating employment in these occupations. But these successes reflect the underlying supporting regulatory framework. In the case of India, the 1999 telecommunications reforms established the foundations for these new activities.

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1.3 Disruptive Technologies

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. Here in economic terms is an example of a “Wave of Creative Destruction,” where from the perspective of the consumer, **disruptive technologies** can bring wider choices and lower prices.

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). Second, the organizations introducing the new technologies are not members of the traditional ICT/telecommunications community and may not play by the same rules – they are innovators. The new entrants are armed 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 that are 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) provides an example. It disrupts the pre-existing business plans of traditional service providers and is being introduced by organizations outside the traditional community. According to The Economist, "It is now no longer a question of whether VoIP will wipe out traditional telephony, but a question of how quickly it will do so. People in the industry are already talking about the day, perhaps only five years away, when telephony will be a free service offered as part of a bundle of services as an incentive to buy other things such as broadband access or pay-TV services. VoIP, in short, is completely reshaping the telecoms landscape."[1] Even search engine companies are unexpectedly entering more traditional markets like e-mail and voice services.

**Next-Generation Networks** (NGNs)[2] capable of transporting all forms of information and services in packets often built around Internet Protocol (IP) are already being deployed. There are three broad NGN platforms: Digital Interactive TV, Online and Mobile Wireless (using various technologies such as DTH, Cable, DSL, 3G, DVB-H, IPTV); each of these platforms are capable of providing six content categories (TV programs, music, film, radio, games, publishing), as well as the full range of Internet services and traditional services.[3]

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, NGNs could be very disruptive. Chief executive officers in many developed economies may face the stark choice between cannibalizing their own businesses or having another company doing it. The threat of NGNs may also cause some strong incumbents to adopt delaying tactics where the extent to which they can do so depends to a large extent on the effectiveness of implementing pro-competitive regulatory frameworks. Disruptive elements also exist on the demand side where local champions (or local action groups) frustrated by existing suppliers are constructing new municipal networks, sometimes using the “open access” model and the “bottom up” development of applications. Such “open access” models are also gaining currency in international networks.[4] These are the technological advances that gave rise to the ICT Regulation Toolkit.

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 but new technologies expand choice immensely. 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 (documentaries, entertainment, news, music, blogs) in the hands of many – 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. Recently, the “Long Tail”[5] of digital content has attracted the attention of many observers. This refers to the huge quantities of content available from digital delivery platforms in comparison to the very limited offerings of traditional platforms, such as analogue broadcasting, music and book stores, and cinemas. With broadband, this “long tail” of niche media content has found a highly receptive audience, witnessed for example, by the popularity of the video-sharing site “YouTube.” The coming abundance of choice of 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.

ENDNOTES


RELATED CONTENT

Module 7, New Technologies and Impacts on Regulation
1.4 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, Post and Telecommunications were structurally separated and frequently became corporations. Often, the telecommunications operator was 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. The risks of misguided decisions by a single operator, with possibly very damaging outcomes, were mitigated.

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. In some countries, regulation in some markets has changed from sector-specific status as ex post regulation has replaced ex ante. Increasing numbers of countries have followed this path of change so that now the old MPTT model is a rarity.

1.5 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. But there is no simple sequencing for the drafting and adoption of the framework since several issues have to be addressed simultaneously. Interconnection, universal access, 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 the light of market and technological developments.

The absence of a simple sequencing also means there is no obvious sequence for the order of topics addressed in this module or in the Toolkit as whole. The sequence chosen here is to start with issues related to the regulatory agency, the characteristics that enhance its legitimacy, the functions performed by the regulator and others, together with 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.

RELATED CONTENT

Module 6, Legal and Institutional Framework

2.1 Rationale for an Effective and Independent Regulator

Effective regulators are normally associated with being to some degree independent. 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 behaviour. 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 where the old structures may be unwilling to cooperate and where prospective cooperation is between unequal cooperators/partners;
- 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 (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 stated: “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] The Task Force further observed: “The introduction and strengthening of independent, neutral sector regulation has helped to reinforce investor confidence and market performance, while enhancing consumer benefits.”

The success of competition and private investment is demonstrated in mobile markets in Africa and is illustrated in the following Figure 1.[2]

Figure 1: Mobile Teledensity of 42 African Countries
By the end of 2006, the total number of mobile subscribers in 48 Sub-Saharan African countries was just under 125 million, up from almost 88 million at the end of 2005. Of these, 123.5 million customers resided in jurisdictions where competition prevailed in the provision of mobile services, up from 86.9 million at the end of 2005.

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Module 6, Section 5, “Elements for an Effective Regulator”

2.2 What is “Independence” and How is it Fostered?

Clearly, 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 of the regulator from political influences, especially on a day-to-day or decision-by-decision basis. The body must be an impartial, transparent, objective, non-political 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.

2.3 Accountability, Transparency, and Predictability

In addition to independence, an effective regulator should demonstrate additional characteristics, including: accountability, transparency, and predictability. All of these are 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 they are in place.

The independence of the regulator needs to be balanced with accountability. The duties assigned to the regulator provide significant power to redistribute income among different constituents in the economy. 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 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 and 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 nonpolitical entity (though some “threshold” should be established to deter frivolous challenges that simply delay the implementation of decisions);
■ mandating annual reports by the regulator 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; and
■ 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 or discriminatory. When regulatory decisions, including the principles and evidence that guided them, are clearly presented on the public record, the reasons for them will be apparent. By these means the regulator can demonstrate that decisions are reasonable. Discriminatory or corrupt decisions will become evident and more difficult to substantiate when transparent processes are in place.

The market, particularly investors, requires that the regulatory process is predictable. 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 (in common law jurisdictions) stare decisis. Respect for precedent means that regulators do not reverse policy decisions unless there is evidence that those decisions have led to significant problems. The principles of stare decisis (which also apply across all legal traditions) 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).
- 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. 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 “posted” “long tail” content exceeds that of traditional broadcasters in some countries. In August 2006, YouTube had an audience of over 70 million. The explosion in content provision is a huge physical 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.

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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, a telecommunications platform has been regulated in a different manner than a broadcasting platform. 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?

To date, there is relatively little experience (with some notable exceptions) of addressing these questions and quite possibly there are more multi-utility regulators (which include telecommunications) than “converged” regulators. In Malaysia, the issue was addressed at an early date. The Communications and Multimedia Act 1998 established the Malaysian Communications and Multimedia Commission (MCMC) as the sole regulator of telecommunications, broadcasting, and computing industries. However, while the EU is implementing a “future-proof” single regulatory framework for electronic communications, only four member states out of 25 (at 31 December 2006) have what could be regarded as “converged” regulatory bodies.[1] These are Finland, Italy, Slovenia, and the United Kingdom.

The OECD distinguishes between regulatory bodies dealing with:

- telecommunications;
- broadcasting carriage;
- broadcasting spectrum allocation; and
- content.

Among OECD members, only Australia and Iceland have single bodies dealing with all four forms of regulation.[2] For each of the EU countries listed above, at least one of the four regulatory functions lies outside the “converged” regulator.
In a converged environment 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


RELATED CONTENT

Module 6, Section 4, "Impact of Convergence"
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 licences 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 and in the case of concession agreements, also those of the government. The authorization process is the means of introducing and intensifying 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” market entry.[1]

When competition was first introduced, the original licences 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. Here 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, in many jurisdictions the legacy of the original licensing practices lingers on.

Many of the original heavy-duty licences 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, and consequently the detailed license was used as the primary regulatory instrument. Since that time, regulators have implemented and updated a substantial body of regulations, so it is no longer necessary to issue particular, detailed, and specific authorizations, but merely to refer to the regulations in place where necessary.

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. Authorizations will increasingly become service-neutral or multi-service and technologically neutral. Unified licences are starting to appear in some jurisdictions, such as Kenya and India, which allow the licensee to use any platform to deliver any service. Clearly, there will be restrictions on the number of licences issued where resources like the radio spectrum are limited. Consequently, “individual” licences are likely to remain but these should not preclude various arrangements that would facilitate, for example, fixed mobile integration. Existing restrictions on, or unequal treatment of, authorized operators may impede convergence. For example, where Cable TV operators are allowed to enter the voice and data markets, but telecommunications operators are excluded from the video market, these aspects of the existing authorizations will need to be re-examined, taking account of competition policy issues.

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.

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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. At the outset the market is unbalanced with the incumbent clearly the dominant vertically integrated player. It is likely that the tariff structure of the incumbent is un-balanced, where prices charged do not reflect the underlying costs of service provision so that
some cross-subsidies are in operation. These cross-subsidies distort the market and provide incorrect incentives to new entrants. For instance, excessively priced international calls 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 dealings. While such activities may be proscribed in individual authorizations, they are also 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 “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 - for example, in 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 - (Retail Price Index (RPI)/Consumer Price Index (CPI) - minus some “X factor”[1] 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 (forward-looking, 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 and even some credit for international calls. These practices are both a challenge to the previous principles of tariff setting and to the business models of incumbents.

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., 25 percent) often in broad markets have been used as means of identifying a dominant position, but competition policy has developed and become more sophisticated. In ex post regulation, the first step is the “definition of the relevant market.”[2] 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 need to 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.

ENDNOTES

[1] 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.

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” and as the OECD observes: “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 the required interconnection lingers on 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.”

The legacy is also evident in the level of interconnection charges, particularly for calls from fixed to mobile operators. The mobile sector was originally perceived as an “elite” rather than a “mass” market. 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[3] rather than allowing operators to set fees themselves. This is especially the case when operators switch to “calling party pays” billing[4] and for international roaming charges as more customers complain[5]. 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.

In order for a competitor to offer a range of services, it needs access to different facilities (priced separately) in a network, often on a shared basis. In some jurisdictions, regulators have gone further and have obliged incumbents to “unbundle” the facilities like the local loop, meaning that a competitor can rent the local line of the customer of an incumbent on an exclusive basis. 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.

Broadly, there has been general agreement across all players 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[6] that are found in the Toolkit. The informational requirements of these various approaches are in many instances too onerous for operators and regulators in developing markets where benchmarks may be more appropriate.

There is already a considerable tension between a) business practices such as un-metered local calling, “always on, all you can eat,” and the wide range of tariff “packages” on offer (for example, unlimited national calling or 1,000 minutes per month for a flat fee) and b) the interconnection practices in place that generally reflect traditional retail voice tariffs. These tensions may cause a rupture in the near future, in the context of convergence, and as circuit switched-based interconnection models become redundant as NGNs proliferate[7].

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, devices, and a wider range of platforms. Two customers connected to the Internet (by different devices) can make voice calls or other forms of communications over the Internet without incurring any additional charges over their monthly payments to their ISPs. The same holds for Voice over Broadband (VoBB), which also offers the possibility of conference calling and video conferencing.

In these IP-based business models, “interconnection” refers to peer-to-peer (P2P) network operator relationships, which are fundamentally
different from interconnection as it has been widely practiced. While the traditional interconnection relationship has been characterized as confrontational (incumbent versus new entrant, big versus small), especially in the early phases, the peer relationship is much more harmonious. 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,[8] 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.[9] 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.[10]

ENDNOTES


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.

The term “Universal” encompasses several elements including availability, affordability, and accessibility (see Module 4). The focus of US/UA 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 UA/S 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 UA/S (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 UA/S policies has expanded considerably since the publication of the infoDev 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

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.” The remaining “access gap” can be categorized as:

- communities that only require a targeted capital injection where future revenues will support operational expenditure – sometimes 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 US/A.

As the Toolkit illustrates, Universal Access/Service Funds (UA/S 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 UA/S policy objective. Frequently, the sector is the source of finance for the UA/S Fund in the form of levies and in other cases the fund is financed from the general budget. The EU, under strict conditions, provides subsidies[2] of up to 50 percent to ICT local users in circumstances where broadband is not economically viable. UA/S Funds have proved effective when disbursement is coupled with competitive bidding or auctions for these financial incentives, where operators compete for the minimum subsidies required to fulfill the
In some instances, subsidies have been provided directly to customers or to particular institutions, such as libraries, schools, and public telecenters. Early, large-scale UA/S 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. The EU has included the concept of “Functional Internet Access”[4] in the definition of universal service and is currently constructing a “future proof” regulatory environment. In a converged economic space of electronic communications, new forces are being 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 US/A 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 infoDev found numerous examples of community-based projects, including[5] 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).

The debate over the role of broadband in universal service is underway in developing countries, such as Chile[6] and India.[7] Convergence, facilitated by NGNs, raises the potential externalities (referred to as “Social Capital”[8]) 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 UA/S Fund while also raising specific regulatory issues related to universal service regarding voice quality, emergency services, and services for the disabled.[9] These issues are addressed in Module 4 of the Toolkit.

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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. 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 because it is vital to national security and emergency services, and there is a risk of interference in communications where spectrum is used flowing from the so-called “Tragedy of the Commons.” 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[2] 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,[3] 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.

Markets and price mechanisms are generally associated with efficient allocation of scarce resources. 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, 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.

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7 New Technologies and Their Impact on Regulation

As stressed 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."

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.

Regulation in an IP environment also raises serious questions concerning the current regulatory environment. It impinges on all of the previously discussed topics: competition, spectrum management, interconnection, UA/S, authorization, price regulation, and also numbering, together with all associated regulatory and legal practices and instruments. IP telephony poses a particular problem for emergency services in the context of UA/S policy. 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.[3]

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. There are already numerous examples of markets offering IPTV and Mobile television.

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. This is illustrated below:

Figure 1: Convergence and the New Market Space

<table>
<thead>
<tr>
<th>Company</th>
<th>Old Market Core Business</th>
<th>New Market Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Print</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Audio-visual</td>
<td></td>
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<tr>
<td>C</td>
<td>Voice</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>e-commerce</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Search engine</td>
<td>On-line multimedia services</td>
</tr>
</tbody>
</table>
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 and 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.[4] 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 raise 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] http://www.oecd.org/document/25/0,2340,en_2649_37441_37571993_1_1_1_37441,00.html