

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

1.1.1 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 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. For example, Rwanda Information Technology Authority, National Information and Communications Infrastructure Plans, see . Also see Info-communications Development Authority of Singapore, Infrastructure Programs at.

1.1.2 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.*”^{*} 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.* 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.*"*

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.* 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.*

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 billion, translating into a growth in mobile penetration from less than 28 percent to 67 percent.**

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.* 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.*

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).*

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.* 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.* 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.* 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”).* GSR 2009 Discussion Paper, Rory Macmillan, Connectivity, Openness and Vulnerability: Challenges Facing Regulators at

Reference Documents

- [GSR 2009: Connectivity, Openness and Vulnerability: Challenges Facing Regulators](#)
- [IC4D 2009: How Do Manual and E-Government Services Compare? Experiences from India](#)

1.1.3 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.*”*

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.* 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.* 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.* World Bank, Tim Kelly, Victor Mulas, Siddhartha Raja, Christine Zhen-Wei Qiang and Mark Williams, What Role Should Governments Play in Broadband Development? at .

1.1.4 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.* 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.* 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”^{*} 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.* 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.* The growth of innovative technologies, NGNs and convergence promises to become a disruptive force for the way individuals interact with one another in society.* Dev, Broadband as a Platform for Economic, Social and Cultural Development: Lessons from Asia at .

Practice Notes

- [Public \(Municipal\) Initiatives](#)
- [The municipal wireless broadband networks in Knysna and Tshwane in South Africa](#)

Reference Documents

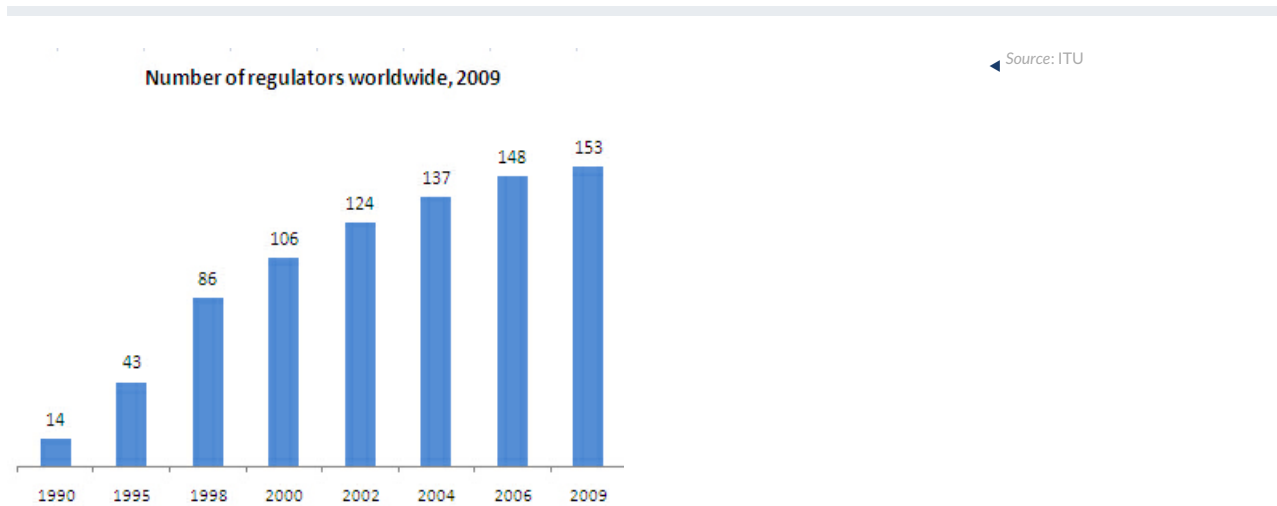
- [Next Generation Networks and Universal Access: The Challenges Ahead](#)
- [Open Access Models](#)
- [Open Access Report](#)

1.1.5 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.* 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**



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.** See Korea Communications Commission Annual Report 2008 at .

1.1.6 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.

[Next: 1.2 The Regulator →](#)

The ICT Regulation Toolkit is a joint production of infoDev and the International Telecommunications Union (ITU).



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